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This is the Published version of the following publication

Magableh, Khaled Naser and Kannan, Selvi (2023) Early recognition of entrepreneurial traits and intentions: a comparative study on university students in Australia and Japan. *Entrepreneurship Education*, 6. pp. 99-124. ISSN 2520-8144

The publisher's official version can be found at
<https://link.springer.com/article/10.1007/s41959-023-00097-z>
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Early recognition of entrepreneurial traits and intentions: a comparative study on university students in Australia and Japan

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Received: 5 May 2023 / Revised: 2 June 2023 / Accepted: 28 June 2023 /

Published online: 14 July 2023

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Abstract

The aim of this study is to evaluate the impact of entrepreneurial traits on entrepreneurial intentions, while exploring the mediating role of entrepreneurial alertness. An online structured questionnaire (facilitated by Qualtrics tool) via the Facebook platform was used to collect data from university students in Australia and Japan. We applied bootstrapping and algorithms performed on Smart-PLS software to test the study's developed hypotheses. The findings suggest risk-taking propensity affects Australian and Japanese students' entrepreneurial alertness the greatest. However, Japanese students' need for achievement has a considerable influence on entrepreneurial alertness and an indirect effect on entrepreneurial intentions. Japanese students' self-efficacy has little influence on entrepreneurial awareness or intentions, but Australian students do. Overall, Japanese student personality factors affect more to entrepreneurial alertness and entrepreneurial intentions. The research findings are original and unique and are based on established models and theories from the literature on entrepreneurship. The results are based on a sample of Australian and Japanese institutions owing to the Australia–Japan friendship, common strategy, and economic interests. Respondents are from six Australian and Japanese institutions. Educational institutions, academics, and policymakers may leverage the study results for entrepreneurial success. Future research should reflect this study's limitations. The researcher did not study the direct impact of personality factors on entrepreneurial inclinations. Future studies should explore the influence of personality factors on entrepreneurial inclinations. Future research may conduct a similar study in other countries.

Keywords Traits · Entrepreneurship · Entrepreneurial intentions · Japan · Australia · Higher education

Introduction

Over the last few decades, researchers have extensively focused on and explored the concept of entrepreneurship as entrepreneurs play a major role in the economic and social development of a country and its economy. Specifically, entrepreneurs present new ideas, and seize available opportunities, which in turn results in reduced unemployment (Dutta & Meierrieks, 2021). Unlike developing countries, developed countries are continuously performing well as the rate of new ventures in these countries is comparatively much higher. Bruton et al. (2021) argue that in recent times, especially in developed countries, the younger generations prefer to have their own business instead of getting paid employment. A recent study conducted by HRD confirms that more individuals are exploring ventures than a job and nearly 40% of employers are struggling to find good talent (Tilo, 2022). On one hand this creative economy is encouraging, and it plays a significant role in the economic development of a country and on the other it does pose issues. The shift could be explained by the various studies that found entrepreneurial activities are the result of entrepreneurial intentions (EI), which means such individuals tend to lean toward entrepreneurship as their career (Biswas & Verma, 2021). These individuals have certain personality traits (PT), like the need for achievement and self-efficacy, which make them different from others (Ahmed et al., 2022). Much of the previous research revolves around Big Five personality traits in this regard. However, little importance is given to specific personality traits like risk-taking propensity and the need for achievement (Awwad & Al-Aseer, 2021).

Vodă and Florea (2019) noted that personality traits are the driving force behind developing intentions regarding entrepreneurship. Based on these personality traits, individuals are able to notice opportunities without deliberate search, which is referred to as entrepreneurial alertness (EA) (Biswas & Verma, 2021). Gill et al. (2021) and Hu et al. (2018) found that EA has an ignition role in framing entrepreneurial intentions, especially among new entrepreneurs. This is to say that some individuals identify the opportunities while others do not. Entrepreneurially active individuals are quick to identify the opportunities as well as their associated challenges, even when there is no clue of a problem (Awwad & Al-Aseer, 2021) and the association of the knowing to action is what is classed as entrepreneurial alertness which then translates to entrepreneurial intentions, which in turn leads to entrepreneurial behavior (Biswas & Verma, 2021; Gill et al., 2021; Urban, 2020). A behavioral cycle of an entrepreneurial trait person. Therefore, entrepreneurial intentions have significant importance in literature, especially with respect to university students. In this regard, educational institutions have a major role in developing the personality traits of students, which in turn leads to entrepreneurial intentions.

Although much importance has been given to PT and EI, limited evidence is available with respect to the usage of EA as a mediator between PT and EI. Also, previous scholars have evaluated the impact of PT on EI in the context of developing countries as these countries are suffering from the economic crisis,

while entrepreneurship is one of the important tools to quickly increase economic growth (Jena, 2020, Munir et al., 2019, Vodă & Florea, 2019). Therefore, governments, policymakers and researchers have been focusing on developing countries. However, there is a need to study multiple countries together in order to identify how the personality traits' effects on entrepreneurial intentions change between different countries. Scholars have individually evaluated the relationship in various countries; however, this study aimed to compare the results of two different countries in order to better understand the reasons behind differences and similarities. According to recent reports, Australia and Japan are among the top developed countries feasible for startups owing to their high per capita GDP, high human development index, industrialization and infrastructure, and high standard of living (Segal, 2022, US News, 2022). Also, they are closest regarding their friendship, common strategy, and economic interests (DFAT, 2020). Therefore, it is more appropriate to conduct a current study in these countries and analyze the differences as well as similarities. Also, this study has also studied the important role of entrepreneurial alertness between personality traits and entrepreneurial intentions.

This paper starts with a literature review of entrepreneurial intentions, entrepreneurial alertness, self-efficacy, need for achievement, risk-taking propensity and innovativeness. We then explain our research method applied in this study, including research design, sampling techniques, data collection, measurements, and data analysis, along with explaining the sample characteristics. Following this, we showcase the results along with a discussion on the results. This study will make a significant contribution to the gap in these entrepreneurial characteristics and also insight into the comparative analysis between Australia and Japan. We will also conclude with any research limitations and future research directions.

Literature review—theoretical framework and hypotheses development

Entrepreneurial intentions (EI)

Entrepreneurship is continuously gaining strength in developed countries due to sufficient resources, while developing countries are getting support for their economy through entrepreneurship as it directly contribute to their economic and industrial development. Esfandiar et al. (2019) noted that developing countries are specifically focusing on entrepreneurship as it results in the creation of employment, adding value to products and services, expanding the markets, enhancing social welfare, and benefiting the economy. In order to continuously increase entrepreneurship, educational institutions and professional organizations need to understand how individuals move toward entrepreneurship. Specifically, the initial stage of intentions and inclinations toward entrepreneurship is backed by factors which need to be identified. Several research studies have found that entrepreneurship results from the EI of individuals (Bogatyreva et al., 2019; Teixeira et al., 2018). EI refers to the

conscious state of mind and inclination of individuals toward entrepreneurial behavior (Nguyen et al., 2019, Shah et al., 2020).

These intentions are predicted by the strong influence of personality traits. Qazi et al. (2020) found that personality traits like innovativeness and risk-taking propensity have a strong influence on building and strengthening the intentions of individuals toward entrepreneurship. Fuller et al. (2018) particularly focused on self-efficacy, one of the important personality traits, to predict EI. Similarly, Elnadi and Gheith (2021) also noted self-efficacy as a strong predictor of EI. In comparison, some other scholars believe that the need for achievement and locus of control can lead to EI (Ida Ketut, 2019). Overall, several scholars have explored the influence of personality traits over EI. These personality traits work as ignition and enhance the inclination of individuals toward entrepreneurship. Among several identified personality traits, the current study has focused on four major and most noted personality traits, including self-efficacy, need for achievement, risk-taking propensity, and innovativeness, to evaluate their relationship with entrepreneurial intentions.

Entrepreneurial alertness (EA)

Entrepreneurial alertness is defined differently by multiple scholars; however, the common meanings have still prevailed. Lanivich et al. (2022) linked it with the sixth sense of individuals, which helps them identify the opportunities that other individuals miss. Chavoushi et al. (2021) found that EA is utilized to collect, transform and choose particular information from the surrounding, which can be used to identify business opportunities, while Sharma (2018) stated that EA guides students clearly toward entrepreneurship as their career; hence, this in turn increases their intentions toward entrepreneurship. Therefore, EA is the awareness of individuals about changes, chances and opportunities arising around. Many scholars have found that an entrepreneurial mindset and inclination toward entrepreneurship are developed when individuals are aware of available opportunities along with the associated costs (Gill et al., 2021; Jiatong et al., 2021). Hu et al. (2018) found that alertness is the key factor to lead toward entrepreneurial intentions.

Although scholars have identified EA as the predictor of EI, there is a lack of evidence with respect to the evaluation of this relationship. And also in the context of countries where culture and other elements may play a role. Hence in this study, we have compared Australia and Japan to compare the results. Among other studies, Samo and Hashim (2016) highlighted a strong impact of EA on EI and noted that educational institutions play a major role in providing entrepreneurial education as well as highlighting the students' personality traits feasible to form entrepreneurial intentions. Not only for new ventures, but entrepreneurial alertness also benefits the existing organizations to identify the opportunities in the market, which, if favorable, results in increasing organizations' intentions (Gill et al., 2021). In this case, the theory of planned behavior also helps to find the relationship between entrepreneurial alertness and entrepreneurial intentions (Samo & Hashim, 2016; Van Gelderen et al., 2008). Similarly, many other studies have found that entrepreneurial alertness is a significant predictor of

entrepreneurial intentions (Li et al., 2020). Based on this evidence, the following two separate hypotheses are developed to examine their relationship in Australia and Japan.

H1a Entrepreneurial alertness has a significant positive impact on the entrepreneurial intentions of university students in Australia.

H1b Entrepreneurial alertness has a significant positive impact on the entrepreneurial intentions of university students in Japan.

Self-efficacy (SE)

It is widely accepted that individuals must have confidence in their abilities to achieve a goal (Stankov & Crawford, 1997; Woodman et al., 2010). However, this confidence is developed and based on an individual's belief. Self-efficacy (SE) refers to the belief of an individual over his ability to attain a goal (Bandura, 1977). The major role behind one's ability to achieve a goal is self-perception. If self-perception is positive and strong, there are high chances of high performance (Gill et al., 2021). In other words, for those individuals who believe that their performance will result in goal attainment, their level of motivation will be increased (Chang et al., 2014). Bandura (1977) stated that motivation to perform well and achieve goals is based on beliefs. Therefore, an individual's behavior and performance are not fully controlled by his capability and competence but are also mostly influenced by self-belief and confidence (Komarraju & Dial, 2014).

Those individuals whose beliefs in their abilities are strong tend to be motivated; hence, their alertness regarding the changes in their surroundings becomes more responsive (Li et al., 2020). The alertness and awareness help them identify entrepreneurial opportunities. Bandura (1977) asserted that self-efficacy helps individuals to be prepared for uncertain events and face difficulties and gives abilities to identify appropriate solutions to the prevailed difficulties. Therefore, individuals with a high level of self-efficacy are able to identify entrepreneurial opportunities more accurately as compared to others (Urban, 2019, 2020). Also, empirically some scholars have found a positive link between self-efficacy and entrepreneurial alertness. Biswas and Verma (2021) conducted research on Indian university students and found that their self-efficacy has a major role in influencing their entrepreneurial alertness. Similarly, Tang et al. (2021) found that self-efficacy is a strong predictor of entrepreneurial alertness. Based on this discussion, following hypotheses are developed.

H2a Self-Efficacy has a significant positive impact on entrepreneurial alertness of university students in Australia.

H2b Self-Efficacy has a significant positive impact on entrepreneurial alertness of university students in Japan.

Need for achievement (NFA)

In simple terms, the need for achievement is the desire of an individual for something difficult (Ida Ketut, 2019; Lowell, 1952). This personality trait is majorly influenced by intrinsic motivation as well as external pressure of others' expectations (extrinsic motivation). This motivation performs as a driving force for an individual to attain a goal (Sitanggang et al., 2020). Need for achievement (NFA) is influenced by the difficulty of the goal which an individual is intends to achieve. If an individual has a high level of NFA, he or she may choose difficult and challenging objectives or goals to achieve. On the other hand, those persons who have a lower level of NFA will choose easy and simple goals in order to avoid any form of failure (Carraher et al., 2010). Schultheiss et al. (2014) have found that a high level of NFA drives individuals to choose challenging tasks and to feel more independence.

As high NFA is connected to challenging and difficult tasks, it is also significant to note that individuals with high NFA take more risks as compared to others; therefore, their tendency toward entrepreneurship is comparatively more (Ryan et al., 2011). Conversely, individuals with lower NFA tend to be risk averse; therefore, they do not move toward risk-related tasks and generating new ideas. Owing to a less risk-taking attitude, individuals with lower NFA have lower entrepreneurial alertness (Biswas & Verma, 2021). Widjaya et al. (2021) also found a positive impact of the need for achievement on entrepreneurial alertness; therefore, based on the above discussion, the following hypotheses are developed.

H3a Need for achievement has a significant positive impact on the entrepreneurial alertness of university students in Australia.

H3b Need for achievement has a significant positive impact on the entrepreneurial alertness of university students in Japan.

Risk taking propensity (RTP)

Risk taking propensity (RTP) is the inclination of an individual to take a risk. RTP, as an important personality trait, plays an important role for entrepreneurs, who often face risks while pursuing a new opportunity (Antoncic et al., 2018). Importantly, entrepreneurs not only take financial risk but also assumes the risk of their family life, reputation as well as professional life ahead (Herdjiono et al., 2017). Danso et al. (2016) conducted a study in a Sub-Saharan country and found that RTP is one of the crucial elements when making decisions at the organizational level. The tendency of risk taking has a direct influence on the performance of an organization. Therefore, in order to mitigate the effects of risk, the authors utilized the moderating role of the manager's network ties. Many other scholars have also found that RTP is crucial, especially for entrepreneurs. However, some other scholars have also differentiated between entrepreneurs and managers based on their risk-taking propensity (Biswas & Verma, 2021).

Another important factor is the rewards attached to risk taking propensity. Entrepreneurs take high risks when high rewards are attached. On the other hand, individuals having less tendency to take risks prefer rewards without high risk (Antoncic et al., 2018, Chen et al., 2012, Wang & Poutziouris, 2010). In addition, those who have a high level of RTP are more responsive toward awareness and alertness. Although multiple researchers have explored the concept of RTP as well as EA, limited evidence is available regarding examining the impact of RTP on EA. Only a few scholars have evaluated the correlation between these two variables, not the impact of RTP on EA. Cui et al. (2016) studied the impact of alertness to business ideas on entrepreneurial capabilities while using RTP as a moderator. The authors found a positive correlation between RTP and alertness. Similarly, Biswas and Verma (2021) found a positive association between RTP and EA. Based on this information, the following hypotheses are developed.

H4a Risk taking propensity has a significant positive impact on entrepreneurial alertness of university students in Australia.

H4b Risk taking propensity has a significant positive impact on entrepreneurial alertness of university students in Japan.

Innovativeness (INN)

Gozukara and Colakoglu (2016) asserted that innovativeness (INN) is the ability, skill, and state of mind to think creatively and pursue available opportunities. Innovativeness as one of the important personality traits is necessary among entrepreneurs as it makes them different from others owing to their ability to identify and chase the opportunities which others may miss (Awwad & Al-Aseer, 2021). Thomas Hurt and Ward Teigen (1977) noted that individuals with a high level of innovativeness often quickly identify opportunities at the early stage, perform tasks in an innovative way, and provide innovative solutions to the consumers. As innovativeness is majorly a state of mind; therefore, individuals having high innovativeness tend to be more alert in order to actively identify the available opportunities (Jiao et al., 2014). Again, there is limited evidence with respect to the impact of innovativeness on EA. Gozukara and Colakoglu (2016) conducted a study in the context of Turkish university students and examined the impact of innovativeness on entrepreneurial intentions both directly as well as in the mediation role of entrepreneurial alertness. The authors found a positive impact of innovativeness on EA. Similarly, Çolakoğlu and Gözükar (2016) found that innovativeness is the strong predictor of EA among university students. Sharma (2018) conducted a systematic review and found that innovativeness leads to EA. In addition, Awwad and Al-Aseer (2021) examined the impact of innovativeness on entrepreneurial intentions in the mediating effects of entrepreneurial alertness and found a positive impact of innovativeness on entrepreneurial alertness. Based on this information, the following hypotheses are developed.

H5a Innovativeness has a significant positive impact on the entrepreneurial alertness of university students in Australia.

H5b Innovativeness has a significant positive impact on the entrepreneurial alertness of students in Japan.

Mediation effect of entrepreneurial alertness

Many scholars have used the current study variables; however, there is a lack of sufficient evidence with respect to studying the impact of SE, NFA, RTP, and INN on entrepreneurial intentions in the mediation role of entrepreneurial alertness. However, Baron and Kenny (1986) proposed a method to prove mediation between variables in a way that if independent variables have a significant link with both mediators and dependent variables, while mediators have a significant impact on dependent variables, there are chances that mediation relation will also be proved. With respect to the current study, multiple scholars have found the impact of self-efficacy on both entrepreneurial alertness and entrepreneurial intentions. Elnadi and Gheith (2021) found that SE has a significant positive impact on EI. At the same time, Urban (2020) found that self-efficacy has a positive and significant effect on both entrepreneurial alertness and entrepreneurial intentions. Moreover, Urban (2020) and Hu and Ye (2017) found that self-efficacy has a positive and significant impact on entrepreneurial intentions while also founding a positive correlation between SE and EA. Based on the above evidence and the method of Baron and Kenny (1986), the following hypotheses are developed.

H6a Entrepreneurial alertness plays a significant mediation role between self-efficacy and entrepreneurial intentions of university students in Australia.

H6b Entrepreneurial alertness plays a significant mediation role between self-efficacy and entrepreneurial intentions of university students in Japan.

Those individuals who have a high need for achievement tend to choose the difficult tasks as well as setting high standards to achieve. These individuals take comparatively more risks either due to accepting challenging goals or pursuing high rewards (Chen et al., 2012). In order to avoid failure or the consequences of high risk, these individuals remain more active, responsive, and alert to identify the available opportunities (Ida Ketut, 2019). Therefore, the need for achievement has a positive impact on entrepreneurial alertness, which in turn leads to entrepreneurial intentions (Widjaya et al., 2021). Biswas and Verma (2021) found a significant positive impact of NFA on EA, while Uysal et al. (2022) found a significant positive impact of NFA on EI. Based on the above evidence, the following hypotheses are developed.

H7a Entrepreneurial alertness plays a significant mediation role between the need for achievement and entrepreneurial intentions of university students in Australia.

H7b Entrepreneurial alertness plays a significant mediation role between the need for achievement and entrepreneurial intentions of university students in Japan.

Entrepreneurs are distinguished from managers for two major reasons, including innovativeness and risk-taking behavior (Antoncic et al., 2018). Entrepreneurial activities involve high risk as entrepreneurs tend to develop innovative products, provide innovative and easy solutions, and adopt different processes to complete operations; therefore, innovativeness often involves risk, which increases the awareness and alertness of entrepreneurs (Don Scott-Kemmis, 2020; Herdjiono et al., 2017). Therefore, Vu and Nwachukwu (2021) found a positive impact of risk taking propensity on entrepreneurial alertness. In contrast, Gurel et al. (2021) found a positive association between risk-taking propensity and entrepreneurial intentions. Therefore, based on the above discussion, the following hypotheses are developed.

H8a Entrepreneurial alertness plays a significant mediation role between risk-taking propensity and entrepreneurial intentions of university students in Australia.

H8b Entrepreneurial alertness plays a significant mediation role between risk-taking propensity and entrepreneurial intentions of university students in Japan.

Entrepreneurs attract the market with their innovative ideas, services, products, or processes. Their creative and innovative mindset helps them evaluate their surroundings in a new way (US News, 2022). Gozukara and Colakoglu (2016) asserted that entrepreneurs' awareness and alertness increase owing to their innovativeness as they identify those opportunities which other individuals miss; therefore, innovativeness and entrepreneurial alertness have a positive association (Jiao et al., 2014). Law and Breznik (2017) found that both engineers' and non-engineers' innovativeness has a significant effect on entrepreneurial intentions, while the impact of entrepreneurial alertness on entrepreneurial intentions is also proved (Biswas & Verma, 2021; Urban, 2020); therefore, based on the above evidence, following hypotheses are developed.

H9a Entrepreneurial alertness plays a significant mediation role between innovativeness and entrepreneurial intentions of university students in Australia.

H9b Entrepreneurial alertness plays a significant mediation role between innovativeness and entrepreneurial intentions of university students in Japan.

Conceptual model

Based on the literature and hypotheses, a conceptual model is developed, presented in Fig. 1, that highlights four important personality traits identified as independent variables, while entrepreneurial intentions are the dependent variable.

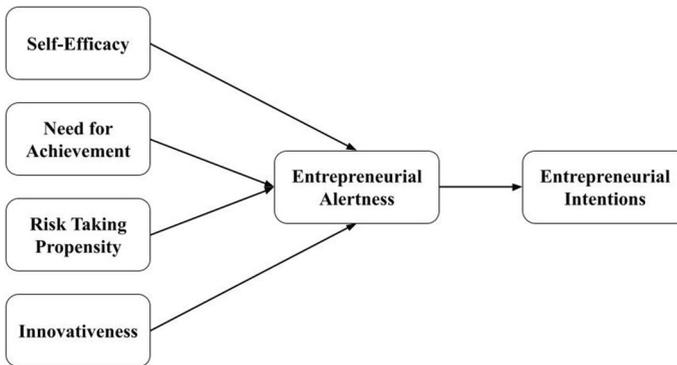


Fig. 1 Proposed model | *Source:* Authors

Also, entrepreneurial alertness, which is missed in the previous research as a mediator between personality traits and entrepreneurial intentions, is included (Biswas & Verma, 2021; Karabulut, 2016). Unlike previous studies which mostly revolve around big five personality traits (Awwad & Al-Aseer, 2021), this study used some specific personality traits such as self-efficacy, need for achievement, risk-taking propensity, and innovativeness to examine their impact on entrepreneurial alertness and entrepreneurial intentions. On the basis of developed hypotheses, the relationships are presented in a figurative form in Fig. 1.

Methodology

Sampling design and data collection

The population of this study includes all university students in Australia and Japan. The exact size of the population is unknown; therefore, non-probability sampling techniques are appropriate. In this study, a convenience sampling technique is selected. For data collection, a web-based structured questionnaire (facilitated by Qualtrics) was used. Qualtrics is an effective online survey software used for data collection, analysis, and reporting, making it a popular choice for researchers and organizations (Carpenter et al., 2019; Molnar, 2019). Data were collected online by accessing students from various universities in Australia and Japan through different Facebook groups and pages owing to COVID-19 restrictions. These students were selected between an age range of 15–60 years. Students were ensured that their data were kept confidential in line with ethical standards. Also, no personally identifiable information was collected in order to avoid cultural restrictions and comply with the general ethical standards. For sample size, the researcher used G*Power software. This software is used for power analysis that allows researchers to calculate sample size needed for hypothesis testing based on various input parameters and assumptions. It is used for sample size calculation as it helps to ensure that the study has sufficient statistical power to detect meaningful effects and avoid type two error

(Kang, 2021). In this software, by using multiple linear regression from F -test, 15% effect size, 5% probability of error, 95% power, and 5 predictors, G*Power software provided us 138 as a minimum required sample size. Although 138 responses are sufficient to present the result, closer the sample size to the population more accurately represents the targeted population. Therefore, this study has selected a comparatively higher sample size. The data collection process was stopped after getting responses above 300 in the case of Australian and Japanese universities each. However, after removing the inappropriately filled responses (with missing values and outliers), a sample of 292 for each country was finalized. In order to validate the method and to maintain equality, an equal size sample was selected for each country.

Data analysis

Based on two parts of the questionnaire, the demographic characteristics were analyzed through frequency distribution on SPSS software, while the rest of the analysis was performed on SmartPLS. For reliability, both Cronbach's alpha and composite reliability (CR) were performed, while convergent validity was analyzed through average variance extracted (AVE). The discriminant validity was evaluated with the help of Fornell and Larcker (1981) criterion. Specifically, algorithm and bootstrapping were performed for hypotheses testing. Algorithm is "essentially a sequence of regressions in terms of weight vectors," and it is used to get reliability, validity, and outer loading. While "Bootstrapping is a nonparametric procedure that allows testing the statistical significance of various PLS-SEM results such path coefficients, and mediation effects (Henseler et al., 2009). In the context of SmartPLS software, bootstrapping is used to estimate the significance of the path coefficients in a structural equation model. SmartPLS employs a nonparametric bootstrapping algorithm, which does not assume any specific distribution of the data. The algorithm generates a large number of resamples from the original data set, calculates the path coefficients for each resample, and estimates their standard errors and p -values based on the distribution of the resampled coefficients. This approach provides a robust and reliable way to test the significance of the relationships between the latent variables in the model (Sarstedt & Cheah, 2019).

Measurements

The paragraph describes the measurement of variables used in the current study by adapting scales from previous studies, which is an important step in data analysis techniques as it ensures the validity and reliability of the data collected through established and validated scales. In order to measure the current study variables, scales were adapted from previous studies. The scale for self-efficacy was adapted from Shook and Bratianu (2010), while for the need for achievement, the scale was adapted from Cassidy and Lynn (1989). Similarly, a scale was adapted for risk-taking propensity, developed by Verheul et al. (2006), while a scale developed by Hurt et al. (1977) was adapted to measure innovativeness. Two scales were adapted for entrepreneurial alertness and entrepreneurial intentions, which were developed

by Kaish and Gilad (1991), and Liñán and Chen (2009), respectively. These variables were measured on a 5 points Likert scale, starting from 1 = strongly disagree to 5 = strongly agree.

Results and discussion

This results section summarizes and presents the findings of the study to put them in context with the research question and we present the data in a logical sequence from the hypotheses designed.

Demographic profile

University students from both Australia and Japan were approached, and invited to participate in a voluntary study via Facebook. There were two parts to the questionnaire, including demographic information and questions about the main variables of the study. The data collected showed in relation to demographic profile, Table 1 shows that 55.1% of males and 44.9% of females from Australian universities, while 61.6% of males and 38.4% of females from Japanese universities participated in this study. In Australian universities, most of the students (40.4%) who participated belonged to the 25–35 years of age range, while in Japanese universities, most of the students belonged to the age range of 35–45 years. The major reason behind this difference can be the age distribution in Japan, where the young population is comparatively less (Statista, 2023).

Table 1 Demographic profile

| | Australia | | Japan | |
|----------------------|-----------|---------|-----------|---------|
| | Frequency | Percent | Frequency | Percent |
| <i>Gender</i> | | | | |
| Male | 161 | 55.1 | 180 | 61.6 |
| Female | 131 | 44.9 | 112 | 38.4 |
| Total | 292 | 100.0 | 292 | 100.0 |
| <i>Age</i> | | | | |
| 15–25 years | 49 | 16.8 | 29 | 9.9 |
| 25–35 years | 118 | 40.4 | 83 | 28.4 |
| 35–45 years | 82 | 28.1 | 130 | 44.5 |
| Above 45 years | 43 | 14.7 | 50 | 17.1 |
| Total | 292 | 100.0 | 292 | 100.0 |
| <i>Qualification</i> | | | | |
| Undergraduate | 167 | 57.2 | 91 | 31.2 |
| Postgraduate | 88 | 30.1 | 118 | 40.4 |
| PhD | 37 | 12.7 | 83 | 28.4 |
| Total | 292 | 100.0 | 292 | 100.0 |

Also, Table 1 shows that 57.2% of undergraduate, and 40.4% of postgraduate students from Australian and Japanese universities, respectively, participated in this study. Respondents were also asked about their university names; however, owing to large number of universities, their names are intentionally not highlighted here.

Construct reliability and validity

The construct reliability and validity, along with factor loadings and multicollinearity, are presented in Table 2. Fitzner (2007) noted that the internal consistency of scales is presented through measuring reliability, which is often measured through two methods, including Cronbach's alpha and CR. Under both methods, the minimum threshold value is 0.7. Table 2 shows that all the values of Cronbach's alpha and CR are greater than 0.7 in the case of both countries; therefore, reliability is sufficient. Convergent validity shows up to what extent the constructs, as well as the measures under the same variable, are related to each other (Carlson & Herdman, 2012; Russell, 1978). With respect to convergent validity, the minimum threshold value for AVE is 0.5, and Table 2 shows that all the values of AVE are greater than 0.5; therefore, convergent validity is present in the scales in both countries. In order to measure multicollinearity, variance inflation factor (VIF) values are utilized, which should be less than 5 (Craney & Surlles, 2002; Miles, 2005).

Similarly, Table 2 also shows high factor loadings, which are normally acceptable at 0.5 and above (Shevlin & Miles, 1998; Thorndike, 1987). In short, construct reliability and validity are proved on scales in both countries. Table 3 shows the discriminant validity, which shows up to what extent the constructs which should not be correlated are, in fact, unrelated (Ab Hamid et al., 2017). On the basis of Fornell and Larcker (1981) criterion, the square root of AVE should be greater than the correlation between variables. In Table 3, the highlighted diagonal values are the square root of AVE, which are greater than the correlation among variables; therefore, discriminant validity is acceptable.

Hypotheses testing

With the help of bootstrapping in SmartPLS, both direct and indirect effects of personality traits on employee outcomes are measured. Structural equation modeling (SEM) technique does not assume that data is normally distributed; therefore, parametric significance tests (like regression) cannot be applied; hence, nonparametric bootstrapping helps find significance of the path coefficients. Figures 2 and 3 show the measurement models separately for Australia and Japan, respectively. These figures represent the factor loadings, individual effects, and combined effects as well. In both models, all the factor loadings are greater than 0.7, which provides sufficient contribution to the measurement of variables. Under the Australian measurement model, all four personality traits have a combined 79.8% effect on entrepreneurial alertness combined indirect effect of 56.4% on entrepreneurial intentions. In the case of the Japanese measurement model, the personality traits have a comparatively

Table 2 Construct reliability and validity

| Variable names | Items | Australian universities | | | | | Japanese universities | | | | |
|----------------------------|-------|-------------------------|-------|---------------------|-------|-------|-----------------------|-------|---------------------|-------|-------|
| | | Factor loadings | VIF | Cronbach's α | CR | AVE | Factor loadings | VIF | Cronbach's α | CR | AVE |
| Self-efficacy | SE1 | 0.780 | 1.735 | 0.844 | 0.888 | 0.615 | 0.803 | 2.212 | 0.905 | 0.929 | 0.725 |
| | SE2 | 0.808 | 2.072 | | | | 0.896 | 3.451 | | | |
| | SE3 | 0.747 | 1.861 | | | | 0.868 | 3.178 | | | |
| | SE4 | 0.711 | 1.574 | | | | 0.869 | 3.279 | | | |
| | SE5 | 0.867 | 2.231 | | | | 0.819 | 4.349 | | | |
| Need for achievement | NFA1 | 0.800 | 2.179 | 0.905 | 0.930 | 0.726 | 0.787 | 1.768 | 0.849 | 0.892 | 0.623 |
| | NFA2 | 0.895 | 3.421 | | | | 0.806 | 2.068 | | | |
| | NFA3 | 0.866 | 3.131 | | | | 0.752 | 1.881 | | | |
| | NFA4 | 0.872 | 4.278 | | | | 0.724 | 1.641 | | | |
| | NFA5 | 0.822 | 4.323 | | | | 0.871 | 2.315 | | | |
| Risk taking propensity | RTP1 | 0.890 | 2.757 | 0.892 | 0.925 | 0.756 | 0.895 | 2.897 | 0.898 | 0.929 | 0.767 |
| | RTP2 | 0.917 | 3.458 | | | | 0.928 | 3.928 | | | |
| | RTP3 | 0.804 | 1.838 | | | | 0.808 | 1.898 | | | |
| | RTP4 | 0.863 | 2.566 | | | | 0.869 | 2.675 | | | |
| Innovativeness | INN1 | 0.882 | 2.231 | 0.844 | 0.906 | 0.762 | 0.895 | 2.443 | 0.858 | 0.913 | 0.779 |
| | INN2 | 0.853 | 1.906 | | | | 0.860 | 1.969 | | | |
| | INN3 | 0.883 | 1.998 | | | | 0.892 | 2.199 | | | |
| Entrepreneurial alertness | EA1 | 0.866 | 2.090 | 0.868 | 0.919 | 0.791 | 0.870 | 2.152 | 0.874 | 0.922 | 0.799 |
| | EA2 | 0.910 | 2.566 | | | | 0.914 | 2.681 | | | |
| | EA3 | 0.891 | 2.283 | | | | 0.896 | 2.378 | | | |
| Entrepreneurial intentions | EI1 | 0.800 | 1.840 | 0.861 | 0.905 | 0.705 | 0.808 | 1.909 | 0.872 | 0.912 | 0.723 |
| | EI2 | 0.885 | 3.830 | | | | 0.895 | 3.880 | | | |
| | EI3 | 0.842 | 3.194 | | | | 0.861 | 3.267 | | | |
| | EI4 | 0.829 | 1.724 | | | | 0.834 | 1.785 | | | |

Table 3 Discriminant validity

| Variables | | 1 | 2 | 3 | 4 | 5 | 6 |
|-------------------------|----------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Australian universities | Entrepreneurial alertness | 0.889 | | | | | |
| | Entrepreneurial intentions | 0.751 | 0.840 | | | | |
| | Innovativeness | 0.796 | 0.744 | 0.873 | | | |
| | Need for achievement | 0.720 | 0.627 | 0.672 | 0.852 | | |
| | Risk taking propensity | 0.826 | 0.672 | 0.684 | 0.696 | 0.870 | |
| | Self-efficacy | 0.656 | 0.632 | 0.649 | 0.605 | 0.554 | 0.784 |
| Japanese universities | Entrepreneurial alertness | 0.894 | | | | | |
| | Entrepreneurial intentions | 0.764 | 0.850 | | | | |
| | Innovativeness | 0.807 | 0.746 | 0.882 | | | |
| | Need for achievement | 0.664 | 0.645 | 0.662 | 0.790 | | |
| | Risk taking propensity | 0.845 | 0.696 | 0.693 | 0.585 | 0.876 | |
| | Self-efficacy | 0.726 | 0.646 | 0.688 | 0.621 | 0.721 | 0.852 |

Bold indicates the correlation is significant at a 0.01 level

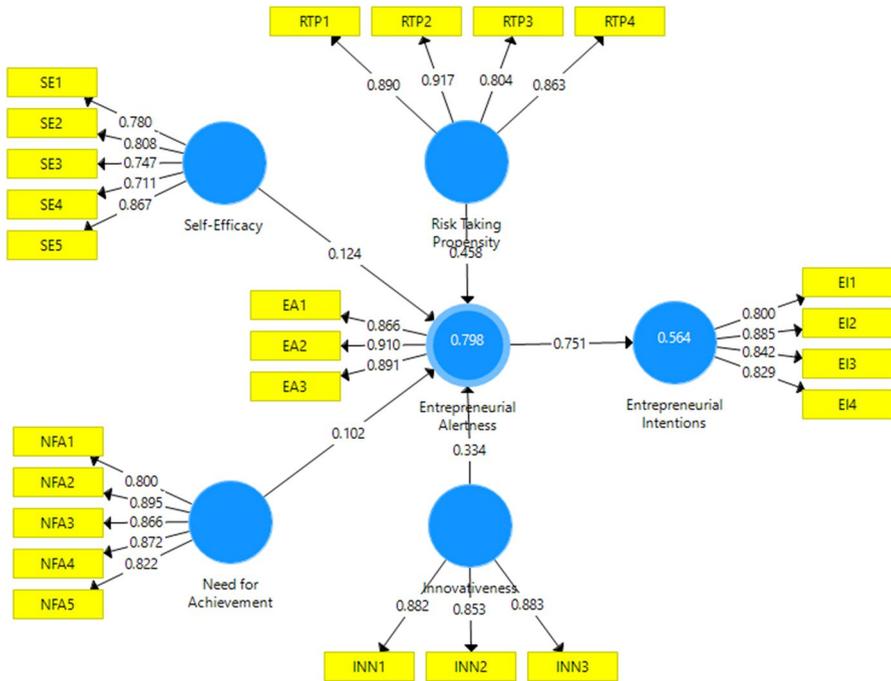


Fig. 2 Measurement model (Australia) | Source: Authors

more combined effect of 81.7% on entrepreneurial alertness and an indirect effect of 58.4% on entrepreneurial intentions.

It means comparatively, personality traits are more effective in influencing the entrepreneurial alertness and resultantly to intentions of Japanese university

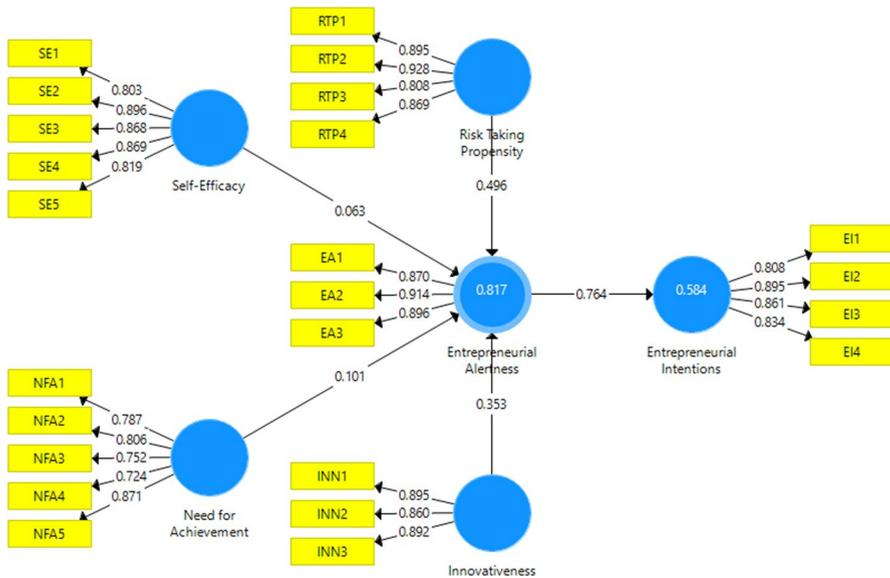


Fig. 3 Measurement model (Japan) | *Source:* Authors

students. The individual effect of each personality trait on the entrepreneurial alertness of students is presented in Table 4. With respect to Australian university students, entrepreneurial alertness has a 75.4% positive and significant effect on entrepreneurial intentions. This strong effect shows that entrepreneurial alertness strongly predicts the entrepreneurial intentions of Australian university students. This relationship is significant at $p < 0.01$; therefore, the first hypothesis (H1a) is accepted. Similarly, in the case of Japanese universities, entrepreneurial alertness has a 76.4% impact on entrepreneurial intentions. This effect is significant at $p < 0.01$; therefore, hypothesis (H1b) is also accepted. Similar effects and relationships are found by previous scholars. Samo and Hashim (2016) conducted a study in Pakistan and found that entrepreneurial alertness has a strong positive impact on entrepreneurial intentions. Similarly, Gill et al. (2021) also noted that entrepreneurial alertness has a strong influence on entrepreneurial intentions.

Table 4 also shows that self-efficacy has a 12.4% positive influence on the entrepreneurial alertness of Australian university students. This effect is significant at $p = 0.002$; therefore, H2a is accepted. While, in the case of Japanese university students, self-efficacy has no significant impact on entrepreneurial alertness as significance value $p = 0.333 < 0.05$; therefore, H2b is rejected. Here one thing is important, previous scholars have noted that the Japanese mostly prefer to work in a team rather than individually; therefore, self-efficacy has not much significance for them (Heller, 2022; Imai & Kawagoe, 2000). On the other hand, self-efficacy is important for Australian university students to enhance their entrepreneurial alertness, which in turn leads to entrepreneurial intentions.

According to Table 4, the need for achievement has no significant impact on entrepreneurial alertness as $p = 0.110 < 0.05$; therefore, hypothesis (H3a) is rejected.

Table 4 Path coefficients

| Variable names | | Original sample | Sample mean | SD | t | P | Status |
|-------------------------|--|-----------------|-------------|-------|--------|-------|----------|
| Australian universities | Entrepreneurial alertness → entrepreneurial intentions | 0.751 | 0.754 | 0.028 | 27.281 | 0.000 | Accepted |
| | Self-efficacy → entrepreneurial alertness | 0.124 | 0.126 | 0.040 | 3.093 | 0.002 | Accepted |
| | Need for achievement → entrepreneurial alertness | 0.102 | 0.106 | 0.064 | 1.600 | 0.110 | Rejected |
| | Risk taking propensity → entrepreneurial alertness | 0.458 | 0.453 | 0.071 | 6.483 | 0.000 | Accepted |
| Japanese universities | Innovativeness → entrepreneurial alertness | 0.334 | 0.334 | 0.057 | 5.837 | 0.000 | Accepted |
| | Entrepreneurial alertness → entrepreneurial intentions | 0.764 | 0.768 | 0.026 | 29.667 | 0.000 | Accepted |
| | Self-efficacy → entrepreneurial alertness | 0.063 | 0.069 | 0.065 | 0.969 | 0.333 | Rejected |
| | Need for achievement → entrepreneurial alertness | 0.101 | 0.105 | 0.039 | 2.565 | 0.011 | Accepted |
| | Risk taking propensity → entrepreneurial alertness | 0.496 | 0.489 | 0.068 | 7.269 | 0.000 | Accepted |
| | Innovativeness → entrepreneurial alertness | 0.353 | 0.353 | 0.051 | 6.896 | 0.000 | Accepted |

This relationship is not similar to previous studies, as Biswas and Verma (2021) found a significant impact of the need for achievement on entrepreneurial alertness. On the other hand, in the case of Japanese university students, the need for achievement is important; therefore, Table 4 shows that the need for achievement has a 10.1% positive impact on entrepreneurial alertness at $p=0.011 > 0.05$; therefore, H3b is accepted. The major reasons behind the difference between the personality traits of students of both countries include political, economic, and cultural differences.

In Australia, people adopt entrepreneurship to secure their careers, not for just achievement (Don Scott-Kemmis, 2020; Jackson, 2014). On the other hand, Japanese students adopt it as an achievement. Furthermore, the risk-taking propensity of Australian university students has a 45.8% positive impact on entrepreneurial alertness at $p < 0.01$; therefore, H4a is accepted. With a little difference, the risk-taking propensity of Japanese university students has a 49.6% positive impact on entrepreneurial alertness at $p < 0.01$; therefore, H4b is accepted.

Here, the difference between both countries shows that risk-taking propensity is comparatively more important for Japanese university students for their entrepreneurial alertness and to form entrepreneurial intentions as compared to Australian students. However, in both countries, the risk-taking propensity is the most important and influential personality trait that has a strong impact on entrepreneurial alertness.

Finally, the innovativeness of Australian university students has a 33.4% positive impact on entrepreneurial alertness at $p < 0.01$; therefore, H5a is accepted. With a bit higher intensity, the innovativeness of Japanese students has a 35.3% positive impact on their entrepreneurial alertness at $p < 0.01$; therefore, H5b is accepted. Again, the difference in effect between both countries shows that the innovativeness of Japanese students has a comparatively stronger effect on entrepreneurial alertness as compared to that of Australian students. Gozukara and Colakoglu (2016) also found a strong impact of innovativeness on entrepreneurial alertness, which leads to entrepreneurial intentions. Authors further suggested that higher education institutions should be more focused on developing innovativeness among students in order to put a valuable contribution to the development of a country. Similarly, Jiao et al. (2014) found a positive relationship between innovativeness and entrepreneurial alertness, while knowledge about entrepreneurship also has significance in increasing innovativeness. Overall, results present a stronger influence of personality traits of Japanese students on their entrepreneurial alertness.

Mediation effect

The indirect effects of personality traits on entrepreneurial intentions are presented in Table 5. These mediation effects are necessary to confirm whether entrepreneurial alertness plays a mediation role between personality traits and entrepreneurial intentions. The table shows that the self-efficacy of Australian students has a 9.3% indirect positive effect on entrepreneurial intentions in the mediation role of entrepreneurial alertness at $p < 0.01$; therefore, H6a is accepted. However, as it was

Table 5 Indirect effects

| Variable names | Original sample | Sample mean | SD | t | p | Status |
|---|-----------------|-------------|-------|-------|-------|----------|
| Australian universities | | | | | | |
| Self-efficacy → entrepreneurial alertness → entrepreneurial intentions | 0.093 | 0.095 | 0.030 | 3.059 | 0.002 | Accepted |
| Need for achievement → entrepreneurial alertness → entrepreneurial intentions | 0.077 | 0.080 | 0.048 | 1.609 | 0.108 | Rejected |
| Risk taking propensity → entrepreneurial alertness → entrepreneurial intentions | 0.344 | 0.341 | 0.055 | 6.241 | 0.000 | Accepted |
| Innovativeness → entrepreneurial alertness → entrepreneurial intentions | 0.250 | 0.252 | 0.045 | 5.529 | 0.000 | Accepted |
| Japanese universities | | | | | | |
| Self-efficacy → entrepreneurial alertness → entrepreneurial intentions | 0.048 | 0.053 | 0.050 | 0.964 | 0.335 | Rejected |
| Need for achievement → entrepreneurial alertness → entrepreneurial intentions | 0.077 | 0.081 | 0.030 | 2.537 | 0.011 | Accepted |
| Risk taking propensity → entrepreneurial alertness → Entrepreneurial intentions | 0.379 | 0.375 | 0.054 | 7.045 | 0.000 | Accepted |
| Innovativeness → entrepreneurial alertness → entrepreneurial intentions | 0.269 | 0.271 | 0.040 | 6.748 | 0.000 | Accepted |

Authors drew arrows (→) in the table to represent which variables are independent and which ones are dependent, similarly, here arrows are included to show the hypothesis in the short form

mentioned above, self-efficacy has less significance for Japanese students; therefore, the indirect effect of self-efficacy on entrepreneurial intentions is not significant as $p=0.335 > 0.05$; therefore, H6b is rejected.

Also, Table 5 shows that the need for achievement of Australian students has no significant indirect effect on entrepreneurial intentions as $p=0.108 > 0.05$; therefore, H7a is rejected. However, the need for achievement of Japanese students has a 7.7% indirect positive effect on entrepreneurial intentions in the mediation effect of entrepreneurial alertness at $p=0.011 < 0.05$; therefore, H7b is accepted. Furthermore, the risk-taking propensity of Australian as well as Japanese students has a 34.4% and 37.9% indirect positive impact on entrepreneurial intentions, respectively. These effects are significant at $p < 0.01$; therefore, H8a and H8b are accepted. Finally, the innovativeness of Australian and Japanese students has a 25% and 26.9% indirect positive impact on entrepreneurial intentions, respectively. These effects are significant at $p < 0.01$; therefore, H9a and H9b are accepted.

Overall, the personality traits of Japanese students have a stronger impact on their entrepreneurial alertness, which results in a higher level of entrepreneurial intentions. More specifically, Australian students' need for achievement has no significant impact on their entrepreneurial alertness owing to their preferences for entrepreneurship as their career. On the other hand, the self-efficacy of Japanese students has no significant impact on entrepreneurial alertness as they prefer to work in teams; hence, they feel less need for self-efficacy.

Conclusion and implications

Australia and Japan are among the top-ranked countries regarding entrepreneurial growth and start-ups. Despite extensive research on personality traits and entrepreneurial intentions, there is no sufficient evidence regarding Australia and Japan because previous scholars have majorly focused on analyzing the relationship between personality traits and entrepreneurial intentions in developing countries individually. Also, the significant role of entrepreneurial alertness is not well explored in the current study model. To examine how university students' personality traits affect their entrepreneurial alertness and intentions, the researcher collected data from various universities in Australia and Japan. This study used a simple random sampling technique to select samples. Data were collected through an online survey by accessing students through their Facebook groups and pages of respective universities. 292 sample for each country was finalized, and data were analyzed on SPSS and SmartPLS software. Specifically, the demographic characteristics of respondents were analyzed through frequency distribution. In SmartPLS, algorithm and bootstrapping were performed to get results. Both Cronbach's alpha and composite reliability were used to examine the reliability of scales, while convergent validity was evaluated through AVE. The discriminant validity was analyzed by using the criteria of (Fornell & Larcker, 1981). Also, multicollinearity was evaluated through VIF.

Results of this study revealed that risk-taking propensity is the most important personality trait among four in both countries. Importantly, the need for achievement

has no significant impact on entrepreneurial alertness and has an indirect effect on entrepreneurial intentions among Australian students as they pursue entrepreneurship as a career rather than as an achievement. On the other hand, the need for achievement has a significant impact on entrepreneurial alertness and an indirect effect on entrepreneurial intentions among Japanese students. Self-efficacy has no significant impact on entrepreneurial alertness and indirect effect on entrepreneurial intentions among Japanese students as they prefer to work in teams; therefore, self-efficacy is less important for them. Conversely, self-efficacy is an important personality trait among Australian students; therefore, it has a significant impact on entrepreneurial alertness and an indirect effect on entrepreneurial intentions. Risk-taking propensity and innovativeness have a significant positive impact on entrepreneurial alertness and an indirect effect on entrepreneurial intentions in both countries. Overall, it is important to note that these personality traits are more influential among Japanese students. Current study results are mostly similar to previous studies; however, few differences are found, which may appear owing to financial and cultural differences.

This study has both theoretical and practical implications which are explained below. Many scholars have studied the impact of personality traits on entrepreneurial intentions; however, there is a lack of evidence with respect to the usage of entrepreneurial alertness as a mediator. Also, there is a lack of evidence regarding the comparison of two developed and top-ranked countries with respect to their entrepreneurship. The current study has theoretical and contextual contributions with respect to the above-mentioned gaps. With respect to practical implications, educational institutions must focus on the personality traits of students, especially self-efficacy, need for achievement, risk-taking propensity, and innovativeness. In both countries, the risk-taking propensity is the major concern among four personality traits; therefore, academicians must encourage these students in order to enhance their entrepreneurial intentions.

Australian students have less concern about the need for achievement, which is important among Japanese students. On the other hand, self-efficacy is less important among Japanese students, while it has significance among Australian students; therefore, these differences should also be considered in order to get most of it. Educational institutions have a major role in developing their entrepreneurial intentions with the help of developing above mentioned personality traits, which may not only be beneficial for these students but also for the economy of their respective countries. Specifically, Japanese students' personality traits are more influential than their entrepreneurial alertness; therefore, policymakers and academicians must consider their importance.

This study has some limitations, which are important to be considered in future studies. Firstly, the researcher has not studied the direct effects of personality traits on entrepreneurial intentions; however, indirect effects were considered owing to study length and time limitations. Therefore, future researchers should also include the direct effects of personality traits on entrepreneurial intentions. Secondly, this study is based on limited data that were collected from various universities from each in Australia and Japan. Therefore, the findings of this study may not be generalized. Future researchers can increase the scope of the current study, including

more universities from both countries. Thirdly, the current study has included only four personality traits. Future researchers can include locus of control, proactiveness, perseverance, and entrepreneurial attitude, along with four personality traits of the current study model. Also, entrepreneurial education should be used as a moderator between personality traits and entrepreneurial alertness.

Funding Open Access funding enabled and organized by CAUL and its Member Institutions.

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Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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