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The instrumentality of teaching pedagogies in maturing entrepreneurial intentions among women entrepreneurs in Saudi Arabia

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Abstract: The global diffusion of entrepreneurship education necessitates a better understanding of what is being taught, why, how, and to whom it is taught. Despite enormous empirical evidence on the role of entrepreneurship teaching pedagogies in maturing students' entrepreneurial skills and behaviours, it is important to examine how particular teaching pedagogies may help in developing and exploiting university students' entrepreneurial potentials in Saudi Arabia, where the government is investing tremendous resources to promote entrepreneurial activities, yet entrepreneurship education is the weakest entrepreneurial ecosystem factor. Based on a PLS-based SEM model involving 825 female students from Saudi universities, a positive association between different entrepreneurship teaching pedagogies has been found in maturing entrepreneurial attitudes, entrepreneurial self-efficacy, as well as enhancing perceived behavioural control. The study found a significantly positive role of these three determinants of entrepreneurial intentions among female students in Saudi universities.

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Keywords: entrepreneurship teaching pedagogies; venture creation; entrepreneurial intentions; Vision 2030; Saudi Arabia; partial least squares; PLS; structure equation modelling; SEM.

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1 Introduction

Entrepreneurship education is an emerging field as numerous studies have been conducted during recent decades to examine the role of entrepreneurship education in promoting skills, attitudes, and behaviours among students, the potential entrepreneurs. The debate on if entrepreneurs are born or made has also advanced to the premise that entrepreneurship can be taught (Kuratko, 2003), that in turn, has increased demand for the entrepreneurship education (Florin et al., 2007). Entrepreneurship education is increasingly becoming an important topic of discussions/debates in schools and universities (Van Ewijk et al., 2020). Over the last couple of decades, the number of entrepreneurship departments, endowed chairs in entrepreneurship, as well as the specialised undergraduate and postgraduate programs in entrepreneurship have increased remarkably (Duval-Couetil, 2013; Gilje and Erstad, 2017; Katz, 2003; Kuratko, 2005; Sa and Kretz, 2014; Solomon, 2007; Van Ewijk et al., 2020). Entrepreneurship is also being taught in engineering (Da Silva et al., 2015) and other schools imparting non-business education. Besides, there is also tremendous increase in research articles, journals, conferences, books, and other scholarly works related to entrepreneurship, especially in recent times. Much of the prevalent research in entrepreneurship education discipline has focused upon the instrumentality of entrepreneurship education programs in developing entrepreneurial intensions among students (e.g., Phan, 2014; Harmeling and Sarasvathy, 2013; Pardede and Lyons, 2012; Stone et al., 2005) so as to induce these potential entrepreneurs to initiate successful ventures (Florin et al., 2007). A notable focal point of many of these studies has remained the instrumentality of various teaching pedagogies in the development and promotion of entrepreneurship (more specifically, entrepreneurial attitudes, intentions and/or actions). Many special issues of entrepreneurship journals have shed light on the importance of entrepreneurship teaching pedagogies to better understand *what* and *whom* to teach, as well as to why and how it could lead to the culmination of entrepreneurial attitudes and behaviours among students.

Nabi et al. (2017), after a systematic review of entrepreneurship education literature, assert that research encompassing outcomes of the entrepreneurship teaching pedagogies is severely under-described. Despite plenty of research being undertaken on entrepreneurship education, limited research has examined the effectiveness of different entrepreneurship pedagogies (particularly venture creation programs) in promoting students' startup initiatives in the universities (Lackéus and Middleton, 2015; Rasmussen and Sørheim, 2006). Considering the importance of venture creation as an important pedagogy, this study bridges this gap by highlighting the use of venture creation pedagogy to an extent deemed to be significant enough to transform universities into the entrepreneurial institutions. The study makes an appeal to the theory of planned behaviour (TPB) proposed by Ajzen (1991), to theorise that strong entrepreneurial intentions can be built by culminating positive attitudes towards entrepreneurial behaviour, enhancing entrepreneurial self-efficacy (ESE), and perceived behavioural control (PBC) through adopting appropriate and highly instrumental entrepreneurship teaching pedagogies (Ahmed et al., 2020; Gird and Bagraim, 2008). Effective entrepreneurship teaching pedagogies increase the desirability, efficacy, and intentions to choose entrepreneurship as career among young and promising graduates. The relevant context to study these interactions among these subject constructs has been Saudi Arabia.

Saudi Arabia is a progressive country; the government is implementing dynamic and transformational policies to promote entrepreneurship in the Kingdom through its overarching Vision 2030. The Global Entrepreneurship Monitor (GEM) report for the year 2019–2020 for Saudi Arabia provides a comprehensive outlook on the entrepreneurial ecosystem in the Kingdom. The GEM 2019–2020 report has benchmarked very promising improvements in the entrepreneurial ecosystem in KSA against the most prominent countries across North America, Middle East, Australia, Europe, and North Africa (MENA) regions (GEM, 2020). A detailed analysis of GEM report profoundly reflects that the country has scored relatively higher (compared to the than GEM average) performance on important entrepreneurial ecosystem determinants such as; government policies, taxes and bureaucracy, government programs to support entrepreneurship, internal market dynamics, and entry regulations. However, entrepreneurship education and training has been revealed as the weakest element of the Kingdom's entrepreneurial ecosystem (GEM, 2020), that magnifies the perceived importance of improving entrepreneurship education at all levels, especially the higher education to actualise its vision of transforming it youth into productive and successful (potential) entrepreneurs. Nevertheless, majority of Saudi universities are teaching entrepreneurship as a regular subject using traditional teaching pedagogy; there is paucity of practice and action-based pedagogies that leads to an emergence of relatively lower numbers of startups from universities. Alsharief and El-Gohary (2016) maintain that Saudi university students are destitute from understanding true meanings of entrepreneurship; there is lack of training regarding enterprise and new product development. Alsharief and El-Gohary (2016) also pinpoint to a scarcity of research on entrepreneurship education especially while considering the context of Saudi Arabia. It is highly pertinent to note that a significant chunk of Saudi population comprises young people who are enthusiastic to learn and exploit their entrepreneurial potentials, this particularly holds true for young Saudi women who have, in recent times, been given profound support, confidence and entrepreneurial opportunities by the government to make them a vibrant and productive part of the society. Given its novelty, scarcity, and significance, we have chosen the same cohort (Saudi female students) as the relevant context for this study.

The study bridges an important research gap in contemporary literature by focusing upon the impact of entrepreneurship teaching pedagogies on the culminations of entrepreneurialism. While considering the pervasive entrepreneurship teaching pedagogies being adopted by the faculty members in Saudi universities, the study seeks to determine the effectiveness of these pedagogies in developing entrepreneurial attitudes, PBC, ESE, and the entrepreneurial intentions. More specifically, the study examines the significance of adopting the venture-creation based teaching pedagogy as the means to promote student-based startups, particularly from female students, in Saudi Universities.

2 Literature review

Several definitions of the entrepreneurial intentions are available in the entrepreneurship literature. For example, *entrepreneurial intentions* construct is referred as 'search for information that can be used to help fulfil the goal of venture creation' (Choo and Wong, 2006). Pihie et al. (2009) reveal entrepreneurial intentions as to be a state of mind that

affects entrepreneurial behaviour. Tkachev and Kolvereid (1999) define it as 'one's willingness in undertaking entrepreneurial activity, or in other words, becoming self-employed'. Thompson (2009) corresponds entrepreneurial intentions to a conviction to initiate a new business in the times to come. It is evidenced from these available definitions that entrepreneurial intentions refer to be a starting post in the entrepreneurial process which eventually cause the desirable acts, i.e., initiating and/or expanding business ventures.

Similarly, to males, females also yearn to be engaged in entrepreneurial activities. The parenting literature on entrepreneurship reflects that the size of 'pink' businesses has increased round the globe during the last decade (Acker, 1990; Delmar and Davidsson, 2000). Interest in women entrepreneurship increases around the globe while Saudi Arabia is no exception. In Saudi Arabia, numerous initiatives have been taken as government level for the promotion of female participation in labour market, particularly, in the entrepreneurial domains. However, research on female entrepreneurship in Saudi Arabia yet to be explored, particularly when it comes down to exploring the role of entrepreneurship education in shaping entrepreneurial intentions among the young females. By explicitly focusing on this cohort, this study one of the studies to explore this deficiency in contemporary research. While making an appeal to the all-encompassing TPB, the study endeavours to investigate the instrumentality of teaching pedagogies (particularly venture-based pedagogies) in culminating stronger entrepreneurial intentions among the female students (the potential women entrepreneurs) in Saudi universities.

2.1 Theory of planned behaviour

Ever since put forwarded by its proponent Ajzen (1991), TPB has remained the capstone reference framework for the studies endeavouring to explain the antecedents and consequences of intentions as precursor to human behaviour. It has been derived from Fishbein and Ajzen's (1975) theory of reasoned action (TRA), which postulates that much of the human action is under volitional control and, therefore, can be mirrored through intentions. According to TPB, behavioural intentions are emerging from an interplay of certain behavioural contingencies such as attitude toward the actions, self-efficacy, subjective norms, and PBC (Ajzen, 2002). TBP has been validated by number of scholars across different domains of human behaviour to predict actions towards certain behaviours (Krueger et al., 2000). Extending it to an entrepreneurialism context, the antecedents of entrepreneurial intentions would include attitude towards entrepreneurial attitudes, self-efficacy, and behavioural control perceived by the entrepreneurs (more precisely, perceived desirability towards entrepreneurship action). While making an appeal to the central tenets of TPB, this study seeks to explain the instrumentality of various teaching pedagogies in promoting entrepreneurial intentions, through affecting entrepreneurial attitudes, self-efficacy, and behavioural control perceived by female students being taught, coached and/or developed as potential women entrepreneurs at the Saudi Universities. However, before we proceed any further towards the hypotheses development, we would briefly discuss the three antecedents of entrepreneurial intentions, as often altercated by TPB.

2.1.1 Entrepreneurial self-efficacy

ESE corresponds to someone's stronger perceptions about his/her capability to achieve desirable outcomes of entrepreneurial activities (Chen et al., 1998). ESE is one of the key constructs that has been used extensively in entrepreneurship research over the decades (Miao et al., 2017). According to Newman et al. (2018), it is an important antecedent to developing positive intentions to undertake entrepreneurial ventures. Similar assertions have been made by researchers such as Newman et al. (2018) and Scholz et al. (2002). In our research, we have taken it as an important precondition in inducing entrepreneurial intensions and have investigated the instrumentality of various teaching pedagogies in affecting the same in context of potential women entrepreneurs under development at Saudi universities.

2.1.2 Perceived behavioural control

PBC refers to the perceived ease/difficulty of performing certain behaviours (Ajzen, 1987). Higher levels of perceived control are generally associated with stronger intentions to undertake the relevant behaviours. In alternative words, when perceiving an adequate extent of control over the behaviour, individuals are get strongly predisposed to actualise their intentions when any opportunity for the same arises (Fishbein et al., 2002). PBC becomes especially more crucial when there might be a paucity of complete volitional control over the subjective behaviours. However, it is pertinent to note that the perception of control related to the behaviour, not the outcomes (Ajzen, 2002). In simple words, a perception of it being one's piece of cake would generally affect his/her intentions to walk that path.

2.1.3 Attitude towards entrepreneurial action

Robbins and Judge (2015) define attitude as object-specific predispositions to behaviour that tend to persist over time. Attitudes have been revealed as an important precursor to developing stronger intent to behave (Luthans, 2010). Extending it to an entrepreneurial context would posit that potential (women) entrepreneurs need to feel positive about being entrepreneurs before any positive intentions to undertake any such ventures could peak up. The classical attitude-intention-actions continuum however in contingent upon certain other desirable cognitive, affective, and conative elements of human behaviour that in itself are highly contextualised.

2.2 Hypotheses of study

2.2.1 Entrepreneurship teaching pedagogies and entrepreneurial behaviours

Entrepreneurship literature is quite rich in describing the appropriateness of various (entrepreneurship) teaching pedagogies in affecting entrepreneurial behaviours. Various studies have highlighted the role of numerous pedagogies in improving entrepreneurial outcomes. Balan and Mefcalfe (2012) describe case studies, poster report as the most engaging entrepreneurship teaching pedagogies followed by a team-based learning method. Linton and Klinton (2019) advocate the pertinence of design-based entrepreneurship teaching pedagogy to understand entrepreneurial process and develop entrepreneurial mindset. Similarly, Berglund et al. (2020) maintain that the pedagogical

process of invention, co-creation, stimulating curiosity, thought-provoking questions, etc. promote entrepreneurial actions among students. Greene (2020) describes four methods of teaching entrepreneurship:

1 starting businesses

2 serious games and simulations

3 design-based learning

4 reflective practice.

Although entrepreneurship scholars advocate different entrepreneurship teaching pedagogies that offer distinctive merits and challenges.

Our study uses four teaching pedagogies to examine how they differ in promoting entrepreneurial attitudes and intensions among female students in Saudi Arabia. These pedagogies include use of videos and films, venture creation, design-based learning, and traditional pedagogies to teach entrepreneurship. Plenty of scholars advocate venture creation pedagogy, which exposes students to the practical problems being faced by the entrepreneurs and seek to develop problem solving skills in potential entrepreneurs, not many institutions, especially in the (academically) developing world, use this pedagogy due to lack of motivation and training of educators and due to paucity of resources faced by the educational institutions. In this research, we advance a unique theoretical model that examines the applicability of various entrepreneurship teaching pedagogies (including venture-creation pedagogy) in the development/enhancement of ESE, attitudes, and intentions among female students (the potential female entrepreneurs) in the context of Saudi Arabia – a country undergoing social transformation with the changing role of women being the key highlight of this social change. The following paragraphs would present our conceptualisation of the impact of all these teaching pedagogies on certain entrepreneurial outcomes.

2.2.2 Videos, and films-based entrepreneurship teaching pedagogy and entrepreneurial behaviours

This entrepreneurship teaching pedagogy primarily involves the use of videos and filming, presentations, group discussions and workshops. This entrepreneurship teaching pedagogy is practiced widely by the faculty members to provide knowledge, abilities, and skills about entrepreneurship to students and particularly motivating them to adopt entrepreneurship as their career choice. The famous TEDx lecture is an example of using videos and films to teach entrepreneurship. The use of digital media, social media and such contents are fascinating for the young people in today's digital age for adoption of entrepreneurial behaviours (Du Gay and Pryke, 2002; Pierre-Michel, 1999). Faculty members use videos and films from the famous entrepreneurship motivational speakers and entrepreneurial role models to encourage students to acquire knowledge and adopt entrepreneurial behaviours. Since students spend most of their times on internet, they can also search such videos and films at their convenience, share with their class fellows in social media groups and learn from such contents. The role of teacher is keeping the students on the track to achieve the course objective and generate positive group discussions and organise workshops to practical learning's. Based on this discussion we maintain that the use of videos and films pedagogy promotes positive entrepreneurial

attitudes, self-efficacy, and perceived control towards entrepreneurship behaviours, we therefore propose the following hypotheses:

H1a Videos and films-based entrepreneurship teaching pedagogy is significantly related to development of positive attitude towards entrepreneurship among potential women entrepreneurs.

H1b Videos and films-based entrepreneurship teaching pedagogy is positively related to development of ESE among potential women entrepreneurs.

H1c Videos and films-based entrepreneurship teaching pedagogy is significantly related to promotion of PBC among potential women entrepreneurs.

2.2.3 Venture creation entrepreneurship teaching pedagogy and entrepreneurial behaviours

Venture creation entrepreneurship teaching pedagogy is generally regarded as the most important pedagogy in developing potential entrepreneurs across the globe. Plenty of studies advocate the use of real venture creation pedagogy; however, this method is very challenging as compared to traditional pedagogy as it requires engagement in activities that are outside the classroom learning environment (Nabi et al., 2017). Venture creation pedagogy has inherited tensions that range from problems related to creation and management of real venture, managing associated risks, documentations, to educational assessment and accomplishment of learning objectives (Lackeus and Milddleton, 2015). Plenty of studies suggest use of venture creation pedagogy, for instance, Ho et al. (2018) and Järvi (2015) suggest the use of action-based (venture creation) pedagogy to develop entrepreneurial knowledge and skills, however there is relatively less attention paid to address the challenges associated with using venture creation pedagogy. Although the venture creation pedagogy is not relatively strongly integrated in the curriculum in Saudi Arabia, however based on the reflection from majority of studies available in the literature we propose that the use of venture creation pedagogy promotes positive entrepreneurial attitudes, self-efficacy, and perceived control towards entrepreneurship behaviours among potential women entrepreneurs.

H2a Venture creation entrepreneurship teaching pedagogy is positively related to the development of positive attitude towards entrepreneurship among potential women entrepreneurs.

H2b Venture creation entrepreneurship teaching pedagogy is positively related to the maturing of ESE among potential women entrepreneurs.

H2c Venture creation entrepreneurship teaching pedagogy is significantly related to promotion of PBC among potential women entrepreneurs.

2.2.4 Design-thinking based learning entrepreneurship teaching pedagogy and entrepreneurial behaviours

Design-based entrepreneurship teaching pedagogy refers to a context where the course requires students to participate in design-based learning, i.e., identification and exploitation of opportunities through writing case studies and/or business plans. This pedagogy is focused on using a design thinking to learn entrepreneurial process, skills

and mindset required to manage an enterprise (Linton and Klinton, 2019). A significant number of faculty members at different universities in Saudi Arabia are using design-based learning approach in imparting entrepreneurial knowledge, abilities, and skills among students. Design thinking pedagogy is considered useful and practiced widely as it seeks to encourage creativity among students (Koh et al., 2015; Nielsen and Stovang, 2015). Linton and Klinton (2019) propound that design-based learning is an important tool to teach entrepreneurship. Consistent with these studies, we also postulate the design-based pedagogy to be effective means in enhancing students entrepreneurial potential of students – more specifically, their knowledge, skills that promotes positive entrepreneurial attitudes, self-efficacy, and perceived control towards entrepreneurship behaviours among potential women entrepreneurs.

Therefore, we propose the below hypotheses:

H3a Design-thinking based learning entrepreneurship teaching pedagogy is significantly related to development of positive attitude towards entrepreneurship among potential women entrepreneurs.

H3b Design-thinking based learning entrepreneurship teaching pedagogy is significantly related to the maturing of ESE among potential women entrepreneurs.

H3c Design-thinking based learning entrepreneurship teaching pedagogy is significantly related to promotion of PBC among potential women entrepreneurs.

2.2.5 Traditional entrepreneurship teaching pedagogy and entrepreneurial behaviours

The traditional or conventional entrepreneurship teaching pedagogy that generally focuses on teaching entrepreneurship knowledge with no explicit focus on entrepreneurial context outside the university and no focus on creation of learning through venture creation is the most used pedagogy across the globe. Lectures are delivered based on theory and the students play role of merely the active listeners. It may also include in-class discussions and teaching of textbook-based case studies. Evaluations are generally based on individual assignments, structured exams, solving case studies, and group-based business plan writing projects. Sometimes, instructors also invite leading entrepreneurs as guest speakers to educate students about the practical aspects of entrepreneurship as well as to motivate them for such initiatives (Solomon et al., 2002; Van Ewijk et al., 2020). Although traditional entrepreneurship teaching pedagogy offers well-planned lectures in stable classroom setting, it limits creative thinking and action-based (or experiential) learning experiences that are crucial to the development of potential entrepreneurs (Do Paço et al., 2011). Mukesh et al. (2020) explainsthe inability of traditional entrepreneurship teaching pedagogy producing actionable entrepreneurial outcomes (Higgins and Elliott, 2011). Although traditional entrepreneurship teaching pedagogy is not that strongly associated with development of positive entrepreneurial outcomes, it is still largely used by teachers in (academically) less developed institutions mainly due to the lack of teacher's training to use action-oriented pedagogies and universities vision to pay special focus on teaching entrepreneurship. Consequently, we see relatively fewer student ventures created during their studies at such institutions compared to those of the (academically) advanced countries. Nevertheless, since plenty of universities use traditional entrepreneurship teaching pedagogy, we also propose that

traditional pedagogy is significantly related to development of positive entrepreneurial attitudes, self-efficacy, and perceived control towards entrepreneurship behaviours among potential women entrepreneurs.

H4a Traditional entrepreneurship teaching pedagogy is positively related to development of positive attitude towards entrepreneurship among potential women entrepreneurs.

H4b Traditional entrepreneurship teaching pedagogy is positively related to the maturing of ESE among potential women entrepreneurs.

H4c Traditional entrepreneurship teaching pedagogy is positively related to promotion of PBC among potential women entrepreneurs.

2.2.6 Entrepreneurial attitudes, ESE, PBC and entrepreneurial intentions

In consonance with the central tenants of TPB in explaining various antecedents of human behaviour, we have sought to explain the instrumentality of attitudes, and PBC together with self-efficacy in explaining the entrepreneurial action/behaviour. TBP has been validated by number of scholars across different domains of human behaviour to predict actions towards certain behaviours (Krueger et al., 2000). The study also made an appeal to TPB to predict entrepreneurial intentions based on entrepreneurial attitudes, ESE, and PBC developed among students through entrepreneurship teaching pedagogies. Linan (2004) also holds that entrepreneurial intentions grasp the influence of entrepreneurial attitudes, ESE, and perceived desirability of the entrepreneurial action. According to Laviolette et al. (2012), ESE derived from entrepreneurial role models is a strong predictor of entrepreneurial intentions. Hence, we propose the following set of hypotheses:

H5 Higher levels of a positive predisposition towards entrepreneurship leads to higher levels of entrepreneurial intentions among potential women entrepreneurs.

H6 There is a significant association between ESE and entrepreneurial intentions among potential women entrepreneurs.

H7 PBC is significantly and positively related to entrepreneurial intentions among potential women entrepreneurs.

2.2.7 Mediating role of entrepreneurial attitudes, ESE, and PBC

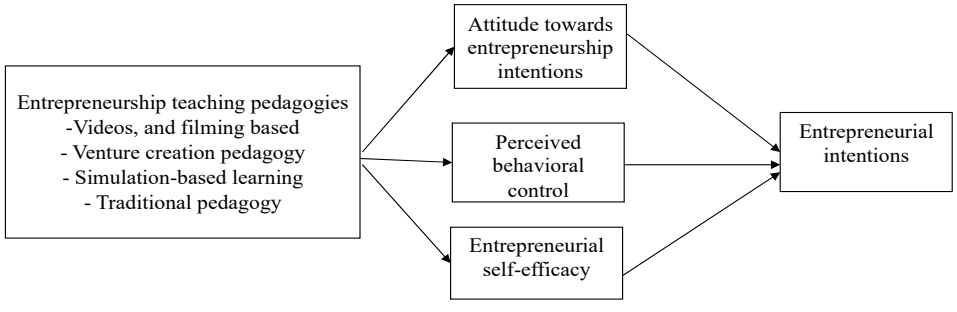
To arrive at a more desirable process explanation of the phenomena of interest, the study does not examine the direct linkages between entrepreneurship teaching pedagogies and entrepreneurial intentions. We postulate significant mediating roles of entrepreneurial attitudes, ESE, and PBC in promoting entrepreneurial intentions through entrepreneurship education. This is in line with studies by Bagozzi et al. (1989), Fishbein and Ajzen (2011), Krueger et al. (2000), and particularly with Ahmed et al. (2020) who suggests the role of exogenous factor (entrepreneurship education) for the promotion of attitudes towards being an entrepreneur, and PBC for being an entrepreneur in enhancing entrepreneurial attitudes and behaviours. Based on this literature, we also postulate that to enhance the entrepreneurial intentions among young university (female) students, we need to develop positive entrepreneurial attitudes, ESE, and PBC through effective

entrepreneurship teaching pedagogies, particularly, the venture-creation based pedagogies.

3 The conceptual model

Figure 1 presents the conceptual model of this study. The exogenous constructs in this model include diverse entrepreneurship teaching pedagogies comprising; use of videos and film-based pedagogy, venture creation pedagogy, design-thinking-based learning pedagogy, and traditional pedagogy, the mediating constructs are *entrepreneurial attitudes*, *ESE, and PBC*, whereas outcome (endogenous) construct is the entrepreneurial intention. Making an appeal to the central tenants of the TPB, this study posits that the *entrepreneurial attitudes*, *ESE, and PBC* can be enhanced by using appropriate and effective entrepreneurship teaching pedagogies, that in turn could culminate stronger entrepreneurial intentions among the subjects, which in this context are the female students (the potential entrepreneurs) being taught at Saudi universities.

Figure 1 The conceptual model



4 Research methodology

4.1 Sample and data

The data has been collected from various universities from different cities of Saudi Arabia. It has been a part of larger research project which is sponsored by Ministry of Education under Research and Development Office (RDO) in Saudi Arabia. This project included multiple research themes including "examining the role entrepreneurial ecosystem in shaping entrepreneurial behaviours among female Saudi university students, the role of universities and entrepreneurship education in developing entrepreneurial knowledge, skills, and attitudes among female university students". The current study was investigated under one the subthemes of the larger project that examined the role of entrepreneurship teaching pedagogies in the development of entrepreneurial competencies among female university students. A team of ten female research assistants was hired and trained for data collection. A self-administered structured survey questionnaire was prepared while both in-person and online data collection technique using Google forms were used. In case of data collection in-person, the female university

students were approached by the research assistant team in their classrooms with prior consent of university administration. Since, this study focuses only on female entrepreneurship; therefore, data was collected only from female university students. The whole data collection process was performed through the research assistant team. As the data was collected throughout the country, thus the data sample was diverse with diverse socio-economic backgrounds. The questionnaire was initially formulated in English and later translated into Arabic to ensure valid and reliable responses from students. All the required processes of back-translation equivalence were exercised during the development of the questionnaire (Mullen, 1995). The pilot testing of survey questionnaire was performed with some respondents, who later were not included in the final sample. Finally, after several modifications, it was confirmed that all items were easily readable. The final version of the Arabic questionnaire can be obtained from the authors upon request. Total of 825 female students from various universities across the country, voluntary participated in the data collection.

4.2 Measures

A five-point Likert scale comprising of six items has been adapted from Linan and Chen (2009) to measure entrepreneurial intentions construct. The scale has been widely used in previous studies (e.g., Ali et al., 2019; González-Serrano et al., 2018; Lorz, 2011). The instruments to measure attitude towards entrepreneurship, ESE, and PBC have also been borrowed from well published studies with reliable and valid measurement scales. Similarly, the instruments to measure videos and film-based entrepreneurship teaching pedagogy is measured on single-items scale item, 'the entrepreneurship course involves use of videos and filming, presentations, group discussions and workshops', similarly, venture creation teaching pedagogy is measured through item 'the entrepreneurship course requires students to use project-based learning, i.e., start and manage a business during the course to learn practical skills and knowledge', design-based learning pedagogy is measured using item 'the entrepreneurship course requires students to participate in design-based learning, i.e., identification and exploitation of opportunities through writing case studies and/or business plans', and traditional entrepreneurship teaching pedagogy is measured through an item 'The entrepreneurship course uses traditional method using lecture slides and explanation of theories only'. The respondents were asked to show their agreeableness/disagreeableness towards the extent entrepreneurship course are being taught using these teaching pedagogies on five-point Likert scale.

4.3 Modelling

Partial least squares (PLS) based path modelling has been used to calibrate the auxiliary and structure models (Hair et al., 2021; Sarstedt et al., 2016). The use of PLS-SEM in entrepreneurship research is broadly considered as an appropriate analytical toolbox (Manley et al., 2020) and widely used in similar studies (Ali, 2021; Ali et al., 2019, 2022; Algarni et al., 2022; Badghish et al., 2022; Wang et al., 2021). Following the guidelines in Manley et al. (2020), we employed PLS-SEM as an analytical toolbox via SmartPLS 3.2.7 software (Ringle et al., 2015) to analyse the measurement and structure model.

5 Results

5.1 Measurement model

Following the guidelines in Manley et al. (2020), the measurement model was analysed as follows. The item loading values of ≥ 0.500 or ≥ 0.708 and two-tailed test – *t*-value ≥ 1.96 were used as generally accepted rule for accepting item loadings. Table 1 show that item loadings were significant with values of ≥ 0.500 or ≥ 0.708 while four item PBC4–PBC7 of PBC had indices less than 0.500 and were deleted from further analysis, thus establishing reliability of items. Secondly, the assessment of composite reliability of all variables was confirmed by the assessing values of Cronbach's alpha, Dijkstra-Henseler's rho (ρA) and composite reliability. Values corresponding to each variable reliability were ≥ 0.700, the minimum acceptable threshold, (see Table 1) establishing adequate levels of composite reliability for all constructs. Third, the values of average variance extracted (AVE) for all eight constructs were also > 0.500, the minimum acceptable threshold (see Table 1), establishing the convergent validity of all variables (as per Fornell and Larcker, 1981). Finally, the discriminant validity was ascertained following Fornell-Larcker criterion and the heterotrait-monotrait (HTMT) values. F-L criterion was satisfied since the square roots of AVE (see diagonal values in Table 2) were greater than each correlation value between all variables on the corresponding rows and columns. In Table 2, above the diagonal, the HTMT values could also been seen as to be below the threshold of 0.85 or 0.90 (Henseler et al., 2015), establishing sufficient discriminant validity for all variables.

5.2 Structural model

Following Hair et al. (2021), all structural estimates were found to be significantly acceptable. First, multicollinearity among the endogenous constructs of the structural model were examined, to avert the biasness in path coefficient estimation. Results show the non-existence of collinearity, since for all endogeneous constructs, variance inflation factor (VIF) values were < 3.000 (Hair et al., 2021) – see Table 2. The four independent variables constructs that are, use of videos and movies, venture creation pedagogy, design-based based learning, and traditional pedagogy explained 7% of attitude towards entrepreneurship, 12.5% of ESE, and 13.4% of PBC. The R^2 coefficient values of all dependent variable constructs are contained in Table 4. Moreover, the assessment of structural model includes the predictive relevance Q^2, measured through the blindfolding technique using an omission distance of 7 for each dependent variable construct (Hair et al., 2021). The results (see Table 4) adequately supported the predictive relevance of proposed structural model.

The bootstrapping procedure was performed to gauge significance and the relevance of hypothetical relationships in the structural model. The results from bootstrapping (825 responses, 5,000 samples with no sign change option) yielded the results of hypotheses as shown in Table 4. The bootstrapping results provided evidence that video and films-based pedagogy was positively related to attitude towards entrepreneurship (H1a; $\beta = 0.127$; $p < 0.01$), ESE (H1b; $\beta = 0.183$; $p < 0.001$), and PBC (H1c; $\beta = 0.144$; $p < 0.001$). Therefore, H1a, H1b, and H1c were accepted. The empirical results provided evidence that venture creation-based pedagogy was not positively related to attitude

towards entrepreneurship (H2a; $\beta = 0.055$; $p > 0.05$) and ESE (H2b; $\beta = 0.031$; $p > 0.05$) but was positively related to PBC (H1c; $\beta = 0.134$; $p < 0.001$). Therefore, H2a and H2b were not accepted but H2c was accepted. The empirical results provided evidence that Design-based based learning pedagogy was positively related to attitude towards entrepreneurship (H3a; $\beta = 0.076$; $p < 0.05$), ESE (H3b; $\beta = 0.145$; $p < 0.001$), and PBC (H3c; $\beta = 0.118$; $p < 0.01$). Therefore, H3a, H3b, and H3c were accepted. The empirical results provided evidence that traditional pedagogy was positively related to attitude towards entrepreneurship (H4a; $\beta = 0.142$; $p < 0.001$), ESE (H4b; $\beta = 0.169$; $p < 0.001$), and PBC (H4c; $\beta = 0.145$; $p < 0.001$). Therefore, H4a, H4b, and H4c were accepted. The empirical results provided evidence that attitude towards entrepreneurship was positively related to entrepreneurial intentions (H5; $\beta = 0.415$; $p < 0.001$), indicating that H5 was accepted. The results of statistical analysis provided empirical evidence that ESE was positively associated with entrepreneurial intentions (H6; $\beta = 0.065$; $p < 0.05$), indicating that H6 was accepted. Finally, the empirical results provided evidence that PBC was positively related to entrepreneurial intentions (H7; $\beta = 0.360$; $p < 0.001$), indicating that H7 was accepted. Additionally, value of the standardised root means square residual (SRMR) is 0.066, profoundly meeting the threshold (i.e., < 0.080), with zero-value indicating a perfect fit. The value of SRMR also confirms the overall goodness-of-fit, following Hair et al. (2021).

Table 1 Measurement model assessment

Construct	*Code*	*FL*[a]	*S.E*	*t-value*	α	*ρA*	*C.R*	*AVE*
Attitude towards entrepreneurship					0.806	0.823	0.873	0.634
	ATE1	0.675	0.029	23.616				
	ATE2	0.836	0.015	55.981				
	ATE3	0.831	0.018	47.197				
	ATE4	0.832	0.015	54.518				
Entrepreneurial self-efficacy					0.783	0.808	0.851	0.537
	ESE1	0.750	0.021	35.519				
	ESE2	0.784	0.020	39.944				
	ESE3	0.678	0.036	19.038				
	ESE4	0.826	0.013	62.248				
	ESE5	0.604	0.035	17.318				
Perceived behavioural control					0.864	0.87	0.894	0.513
	PBC1	0.668	0.029	23.221				
	PBC2	0.710	0.023	30.706				
	PBC3	0.680	0.027	25.609				
	PBC8	0.679	0.027	25.343				
	PBC9	0.748	0.020	37.656				
	PBC10	0.739	0.020	36.870				
	PBC11	0.785	0.016	48.257				
	PBC12	0.711	0.024	29.752				

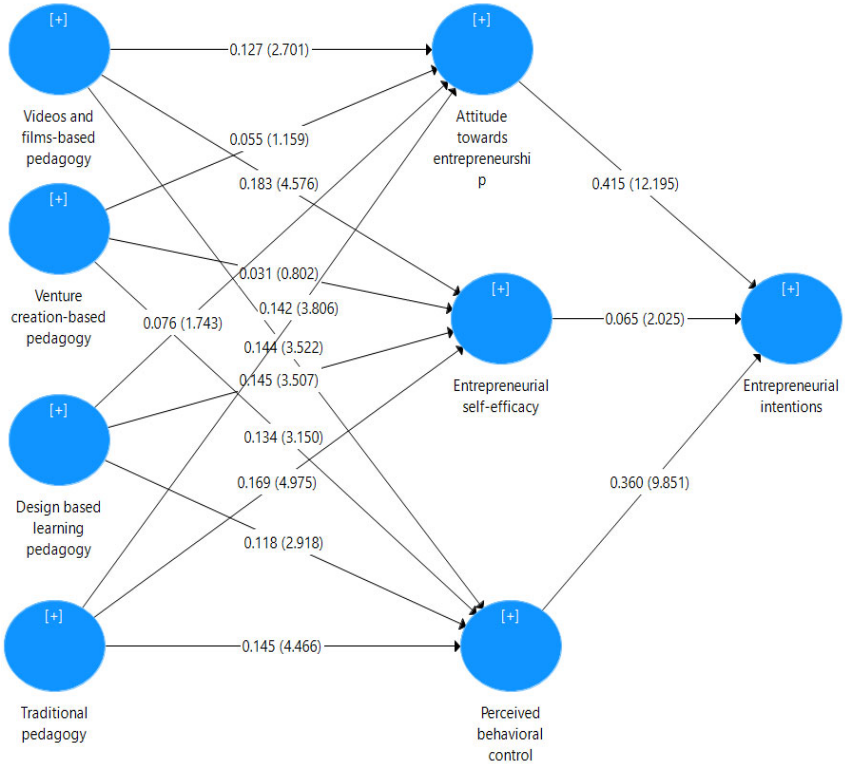
Note: [a]All factor loadings (FL) are significant at 1%, α; Cronbach's alpha, C.R; Composite reliability, ρA; Dijstra-Henseler's rho, AVE; Average variance extracted.

Table 1 Measurement model assessment (continued)

Construct	*Code*	*FL*[a]	*S.E*	*t-value*	*α*	*ρA*	*C.R*	*AVE*
Entrepreneurial intentions					0.886	0.888	0.913	0.637
	EI1	0.750	0.021	36.086				
	EI2	0.800	0.016	49.599				
	EI3	0.813	0.017	48.542				
	EI4	0.837	0.014	60.230				
	EI5	0.753	0.021	35.516				
	EI6	0.833	0.015	54.715				
Entrepreneurship teaching pedagogies								
Videos and films-based pedagogy		1.000	0.000	0.000	1.000	1.000	1.000	1.000
Venture creation-based pedagogy		1.000	0.000	0.000	1.000	1.000	1.000	1.000
Designed based learning pedagogy		1.000	0.000	0.000	1.000	1.000	1.000	1.000
Traditional pedagogy		1.000	0.000	0.000	1.000	1.000	1.000	1.000

Note: [a]All factor loadings (FL) are significant at 1%, α; Cronbach's alpha, C.R; Composite reliability, ρA; Dijstra-Henseler's rho, AVE; Average variance extracted.

Figure 2 The structural equation model (see online version for colours)



Notes: All arrows indicate hypothesised positive relationship. In the parenthesis, t-values are reported. $|t| \geq 1.65$ at $p = 0.05$ level, $|t| \geq 2.33$ at $p = 0.01$ level, $|t| \geq 3.09$ at $p = 0.001$ level.

Table 2 Mean, standard deviations, correlations, and discriminant validity results

		Mean	*SD*	*VIF*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	Attitude towards entrepreneurship	3.993	0.778	1.317	*0.796*	0.419	0.564	0.705	0.219	0.198	0.197	0.177
2	Entrepreneurial self-efficacy	3.772	0.742	1.450	0.352	*0.733*	0.646	0.478	0.293	0.244	0.288	0.219
3	Perceived behavioural control	3.836	0.733	1.647	0.478	0.548	*0.716*	0.664	0.296	0.316	0.291	0.186
4	Entrepreneurial intentions	3.828	0.865	1.417	0.610	0.408	0.594	*0.798*	0.216	0.232	0.234	0.157
5	Videos and films-based pedagogy	3.558	1.105	1.687	0.193	0.268	0.269	0.204	*1.000*	0.509	0.441	0.031
6	Venture creation based pedagogy	3.514	1.079	1.543	0.177	0.224	0.289	0.218	0.509	*1.000*	0.565	0.104
7	Designed-based learning pedagogy	3.570	1.048	1.013	0.174	0.257	0.269	0.219	0.441	0.565	*1.000*	0.081
8	Traditional pedagogy	3.445	1.129	1.012	0.158	0.19	0.173	0.148	0.031	0.104	0.081	*1.000*

Notes: SD; Standard deviation. Below the diagonal are the correlations values between the constructs. Above the diagonal are HTMT values. Diagonal and italicised values are the square roots of the AVE.

Table 3 Net effect results

Structural path	*Path coefficient*	*Significant difference ($p < 0.05$)?*	*95% BCa confidence interval*	*Conclusion*
Videos and films-based pedagogy → Attitude towards entrepreneurship	0.127**	Yes	[0.051, 0.206]	Supported
Videos and films-based pedagogy → Entrepreneurial self-efficacy	0.183***	Yes	[0.119, 0.251]	Supported
Videos and films-based pedagogy → Perceived behavioural control	0.144***	Yes	[0.077, 0.212]	Supported
Venture creation-based pedagogy → Attitude towards entrepreneurship	0.055^{ns}	No	[–0.027, 0.128]	Not supported
Venture creation-based pedagogy → Entrepreneurial self-efficacy	0.031^{ns}	No	[–0.036, 0.096]	Not supported
Venture creation-based pedagogy → Perceived behavioural control	0.134***	Yes	[0.064, 0.202]	Supported
Design-based learning pedagogy → Attitude towards entrepreneurship	0.076*	Yes	[0.005, 0.145]	Supported
Design-based learning pedagogy → Entrepreneurial self-efficacy	0.145***	Yes	[0.074, 0.211]	Supported
Design based learning pedagogy → Perceived behavioural control	0.118**	Yes	[0.052, 0.185]	Supported
Traditional pedagogy → Attitude towards entrepreneurship	0.142***	Yes	[0.081, 0.204]	Supported
Traditional pedagogy → Entrepreneurial self-efficacy	0.169***	Yes	[0.112, 0.223]	Supported
Traditional pedagogy → Perceived behavioural control	0.145***	Yes	[0.091, 0.196]	Supported
Attitude towards entrepreneurship → Entrepreneurial intentions	0.415***	Yes	[0.358, 0.467]	Supported
Entrepreneurial self-efficacy → Entrepreneurial intentions	0.065*	Yes	[0.013, 0.118]	Supported
Perceived behavioural control → Entrepreneurial intentions	0.360***	Yes	[0.300, 0.419]	Supported
SRMR composite model = 0.066				
$R^2_{\text{(Attitude towards entrepreneurship)}} = 0.070$			$Q^2_{\text{(Attitude towards entrepreneurship)}} = 0.042$	
$R^2_{\text{(Entrepreneurial self-efficacy)}} = 0.125$			$Q^2_{\text{(Entrepreneurial self-efficacy)}} = 0.064$	
$R^2_{\text{(Perceived behavioural control)}} = 0.134$			$Q^2_{\text{(Perceived behavioural control)}} = 0.068$	
$R^2_{\text{(Entrepreneurial intentions)}} = 0.494$			$Q^2_{\text{(Entrepreneurial intentions)}} = 0.309$	

Notes: ^{ns}Not significant, *$|t| \geq 1.65$ at $p = 0.05$ level, **$|t| \geq 2.33$ at $p = 0.01$ level, ***$|t| \geq 3.09$ at $p = 0.001$ level. 0R^2; determination coefficients, Q^2; predictive relevance of endogenous (omission distance = 7). Threshold for R^2; value ≥ 0.25 (weak); ≥ 0.50 (moderate); ≥ 0.75 (substantial). Threshold for Q^2 value > 0 indicate predictive relevance.

Table 4 Mediation analysis results

		Indirect effects on entrepreneurial intentions		
	Direct effect on entrepreneurial intentions	*Through attitude towards entrepreneurship*	*Through entrepreneurial self-efficacy*	*Through perceived behavioural control*
Videos and films-based pedagogy	–0.008^{ns}	0.053**	0.012*	0.052***
Venture creation-based pedagogy	0.015^{ns}	0.023^{ns}	0.002^{ns}	0.048**
Design based learning pedagogy	0.031^{ns}	0.031*	0.009*	0.043**
Traditional pedagogy	0.007^{ns}	0.059**	0.011*	0.052***

Note: ^{ns}Not significant, *$|t| \geq 1.65$ at $p = 0.05$ level, **$|t| \geq 2.33$ at $p = 0.01$ level, ***$|t| \geq 3.09$ at $p = 0.001$ level.

6 Mediation analysis

6.1 Robustness of the model

To test for the rigor of the proposed structural model (Figure 2), an alternative model was examined by adding the direct links from the entrepreneurship teaching pedagogies to entrepreneurial intentions and to examine if attitude towards entrepreneurship, ESE, and PBC serve as mediators. The mediation analysis was carried out by following the procedure recommended in Carrión et al. (2017) and Hair et al. (2021). Results of mediation analysis show that none of entrepreneurship teaching pedagogies significantly affected entrepreneurial intentions. The result suggested that the influences of entrepreneurship teaching pedagogies on entrepreneurial intentions were fully mediated through PBC while the results of mediating effect of attitude towards entrepreneurship and ESE were partially supported.

7 Discussion and conclusions

7.1 Discussion

TPB has been considered a leading framework in explaining antecedents of human action in variety of contexts in various disciplines, including business research. While making an appeal to the central tenants of the TPB, this study has sought to explain the impacts of teaching pedagogies in promoting entrepreneurial action. Indeed, the effective of teaching pedagogies is an essential component of any curriculum that seeks to enhance entrepreneurial motivation, intentions, actions and/or potential of the future entrepreneurs participating in any such development programs at various levels of training, education, and development.

TPB maintains that actions are preceded by stronger intentions that depend upon a positive attitude towards such actions, normative acceptance of such actions, a perceived higher control, i.e., a belief that the individual is efficacious enough to undertake this action successfully. All these three preconditions would result in the built up of strong intentions that would eventually results in favourable action. In context of entrepreneurship, all these factors also count a lot and teaching pedagogies can play a critical role in promoting them. An individual's desire to become an entrepreneur, a higher acceptance of entrepreneurs in the social structure of a society, and their confidence on their ability to undertake any such ventures successfully are pivotal to build stronger entrepreneurial intentions among potential entrepreneurs. We sought to study the associations among the subject constructs in the much research-deficient contexts of potential women enterprises in the evolving Saudi society.

Women entrepreneurship has been one of the hall marks of the overarching Vision 2030 being pursued strongly by the present regime in Saudi Arabia. Not only is the government becoming more supportive to it, but the society is also getting more egalitarian and pluralistic towards women. These developments are increasing the desirability of the ecosystem in which women entrepreneurship can thrive. An effective teaching pedagogy can profoundly augment these pre-conditions and could lead to the development of positive attitudes, their perceptions of increased normative acceptance and a confidence in themselves that they can also leave strong imprints, all of which could prove to be quite instrumental in promoting women entrepreneurship.

The findings also support the notion that effectiveness of the teaching pedagogies plays a significant role in prompting entrepreneurial intentions in Saudi female student as well. Out of the various pedagogies, the instrumentality of the venture-creation based pedagogies has been our special interest during this research as the same is perceived to be highly efficacious in the culmination of entrepreneurial action. Unfortunately, this pedagogy is not that strongly integrated while coaching female students because of the perceived difficulties that female students and teachers alike would experience while actualising this pedagogy in its true spirit and to harness its fullest potential. Though the society is gradually opening and government is also taking a lot of initiatives to culminate a desirable ecosystem where women entrepreneurship can flourish, but the discrepancy between the desired and the actual state is still sider enough to warrant an enthusiastic use of any such hands-on learning opportunities. Consequently, we could not find a significant positive impact of these apparently most efficacious means/instruments of learning on the mediating constructs, except the PBC. Hence, we concluded that the use of venture-creation based pedagogy though is instrumental in enhancing perceived control in female students if they undertake any such initiatives after they graduate, it though is not a significant mediating condition as far as developing desirable attitude and/or enhancing the self-efficacy is concerned. However, our observations and the non-structured discourse reflected a strong desire and receptivity of this pedagogy alike in the female students and the teachers.

7.2 Conclusions

Some of the findings of this study are contrary to the existing literature on entrepreneurship pedagogy research. For instance, the study found no significant association between venture creation pedagogy and entrepreneurial attitudes and ESE.

The reason behind these insignificant results could be lack of using venture creation entrepreneurship teaching pedagogy by majority of Saudi universities. Similarly, majority of faculty members in Saudi universities are teaching entrepreneurship like regular theory-based courses using traditional pedagogies, we therefore see very few student ventures emerging from universities. There are only very few higher education institutions, and universities like Prince Muhammad bin Salman College for Entrepreneurship (MBSE) that is providing entrepreneurship training in a highly specialised environment in collaboration with Babson College USA – a premier entrepreneurship education institution. Similarly, Centre for Entrepreneurship at the King Fahad University of Petroleum and Mineral Sciences (KFUPM) is also doing tremendous job in promotion of student startups in the Kingdom among few other institutions. An in-depth comparative analysis of entrepreneurial attitudes and behaviours among different universities using venture creation versus traditional pedagogies can yields interesting results about entrepreneurial outcomes of different teaching pedagogies used in such institutions.

The insights gathered from this study support the central tenets of TPB by confirming that entrepreneurial attitudes, ESE and PBC could be enhanced by adopting effective entrepreneurship teaching pedagogy that may induce stronger entrepreneurial intentions among young female university students, the potential women entrepreneurs.

7.3 Practical implications

Results profoundly support GEM Saudi Arabia report by stressing the importance of improving entrepreneurship education to reap the benefits of improving entrepreneurial ecosystem in the Kingdom. This study particularly proposes use of venture creation entrepreneurship teaching pedagogy by Saudi universities to train students in a practice-based learning environment so that they may accelerate their entrepreneurial ventures after graduation and play important role in job-creation and socio-economic development of Saudi Arabia. The findings are useful for policy makers interested to promote entrepreneurial activities among Saudi youth. After detailed literature analysis, formal and informal data collection from multiple types of respondents this study strongly proposes use of venture creation teaching pedagogies by faculty members to train potential entrepreneurs through action-based experiential pedagogy (venture creation) to increase students' startups from Saudi universities. The management of universities should have the vision to develop entrepreneurial universities who not only produce high quality professionals but also future entrepreneurs in all university-wide disciplines. The management of schools should practice special care in hiring faculty to teach entrepreneurship, the entrepreneurship teachers should be well-trained to use venture creation pedagogy to train students in practical environment to increase students' startups from the universities. The Ministry of Education in Saudi Arabia should also assess the performance on the bases of number of entrepreneurial venture startups registered and scaled up from each university to boost entrepreneurial activities in the Kingdom as intended in the Saudi Government's Vision 2030.

7.4 Limitations and future research directions

Since the findings has been drawn using data gathered from females students from Saudi universities, therefore, these could be subject certain Saudi context, hence the

generalisability of the findings could be limited to Saudi Arabia. The study used cross-sectional data only – despite that the longitudinal data could have generated better results. Additionally, cross-sectional comparisons of respondents on the basis their gender, and socio-economic background can also provide valuable information that could profoundly help policy makers in crafting efficacious plans to promote entrepreneurialism among women. The recommendation for future research also includes use of randomised control trial (RCT) for entrepreneurship teaching pedagogies and use of longitudinal data before and after running RCT to examine the impact of various teaching pedagogies particularly venture creation entrepreneurship teaching pedagogy to find conclusive evidence on the effectiveness of venture creation entrepreneurship teaching pedagogy to be used for developing future entrepreneurs. More the selection of faculty members, their experience of teaching entrepreneurship, field of specialisation, entrepreneurial background, and similar factors can also yield interesting results for improving entrepreneurship teaching effectiveness. Finally, the role of university support and support from the schools should also be examined to improve university students' entrepreneurial outcomes.

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