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THE PSYCHOMETRIC CHARACTERISTICS OF THE OMANI ENTREPRENEURIAL SELF-EFFICACY SCALE

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ABSTRACT

The purpose of this study was to assess the Psychometric Characteristics of Entrepreneurial Self-Efficacy Scale in Omani college students. Entrepreneurial Self-Efficacy Scale (ESES) of 23 items developed by (De Noble, Jung & Ehrlich, 1999) was administered to a sample of 339 college students at Sultan Qaboos University, female constituted 55% of the sample. De Nobel et al., (1999) indicated that the scale was composed of six dimensions. Confirmatory Factor Analysis was conducted by testing a hexagonal factor model. The analysis showed that two of the six factors were not accepted and the fit between data and the proposed model was low. The CFA and the model fits data extracted acceptable fit indices; that is χ^2*=212.681, df=92, p<0.01, the comparative fit index (CFI)=0.908, Tucker-Lewis index (TLI)=0.957, and the Root Mean Square Error of Approximation (RMSEA)=0.080.These indices were accepted and indicted that the four dimensions give a reasonably valid assessment of entrepreneurial self-efficacy, that is loadings of items ranged from 0.44 to 0.88 and were significant. Cronbach's alpha of this scale was found to be 0.930. All told, these values indicated that the scale has an internal consistency of items.*

Keywords: Confirmatory Factor Analysis, Entrepreneurial Self-efficacy, Omani College Students.

INTRODUCTION

On a theoretical level, it is seemingly evident that proving cultural, ethnic, racial, gender and college differences in entrepreneurial self-efficacy (ESE) is still controversial or inconclusive. This controversy may be demonstrated through intensive research efforts to measure the dimensionality of this construct, that is, numerous research studies demonstrated variances in all dimensions of entrepreneurial self-efficacy (Dempsey, 2014; Dempsey & Jennings, 2014; Schjoedt, & Craig, 2017). Some of these studies revealed high scores in some dimensions in diverse populations in terms of cultural factors, but other ones showed lowering in other dimensions (Chen et al., 1998; Spagnoli et al., 2017; Barakat et al., 2014; Urban, 2006; Basol & Karatuna, 2017). The most important challenge of the ESE is to find global psychometric characteristics of the scale. Although the original version of the ESE scale has six

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dimensions, some previous studies may confirm other dimensions (Abrams, 2017; McGee et al., 2009; De Noble et al., 1999).

A plethora of the ESE research has used either a one-item measure or an aggregated multiple-item measure to assess the ESE construct. Both one-item measures and aggregated multiple-item measures do not capture the multidimensionality and task specificity of the ESE construct (McGee et al., 2009).

Some challenges may hinder further development and measurement of the ESE. These challenges or difficulties were summarized by (McGee et al., 2009) as follows: disagreement exists as to whether the ESE construct is more appropriate than general self-efficacy (GSE), as well as there is inconsistency in the manner in which researchers attempt to capture the dimensionality of the ESE construct. Besides, studies conducted on this construct mainly relied on data collected from university students and practicing entrepreneurs.

Chen et al., (1998) developed an ESE scale by referencing 36 entrepreneurial roles and tasks which, in turn, were reduced to a 26-item measurement instrument. Factor analysis identified 22 items that loaded on five distinct dimensions:

1. Marketing,
2. Innovation,
3. Management,
4. Risk-taking, and
5. Financial control.

Such techniques produced viable task-specific the ESE measurement instruments that allowed researchers to distinguish entrepreneurs from non-entrepreneurs.

The most important challenge of the ESE is to find global psychometric characteristics of the scale. Although the original version of the ESE scale had six dimensions (hexagonal dimensions), some previous studies confirmed the uni-dimensionality of it, whereas other empirical studies confirmed multidimensionality. Factor analyses used to estimate the construct validity of the ESE scale revealed cultural differences in diverse populations worldwide (Arenius & Minniti, 2005; Baum & Locke, 2004; Baum et al., 2001; Kristiansen & Indarti, 2004).

Researchers in career development have not fully examined cultural factors with specific racial/ethnic populations or subpopulations; neither have they examined the complex ways in which these factors interface with one another. As a result, the field has a very limited understanding of how the career development process may be affected by one's cultural background (Fouad & Kantamneni, 2013).

Lent & Brown (1996) note that "*It is particularly important to consider how gender and ethnicity influence the contexts in which percepts about personal efficacy are acquired*". Sources of self-efficacy are thought to come from one's family of origin as well as variables including gender, ethnicity, socioeconomic status, and available educational opportunities. Research suggests that low self-efficacy expectations result in the avoidance of studying certain academic subjects and related careers (Betz, 2004).

Task performance effects did not generalize to career self-efficacy and career interest measures, but consistent gender differences in self-efficacy emerged as a result of both math and verbal task performance (Hackett et al., 1990). There have been few investigations on unique cultural influences in the development of academic and career self-efficacy, and cultural

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dynamics have not yet been spotlighted in the context of other variables within social cognitive career theory (Hackett & Byars, 1996).

From Bandura's self-efficacy theory, parallel measures of interests and self-efficacy (or confidence) are used to improve the prediction of vocational choice behavior (Betz & Borgen, 2000). Human capabilities vary in their psychobiologic origins and in the experiential conditions needed to enhance and sustain them. Diversity in social practices produces substantial individual differences in the capabilities that are cultivated and those that remain underdeveloped (Bandura, 1989).

Social cognitive career theory (SCCT) is a relatively new theory that is aimed at explaining three interrelated aspects of career development:

1. How basic academic and career interests develop,
2. How educational and career choices are made, and
3. How academic and career success is obtained.

SCCT developed by Lent et al., (1994) is based on Albert Bandura's general social cognitive theory (Lent et al., 1999).

Bandura's self-efficacy theory is grounded on Social Cognitive Theory (2001). The self-efficacy theory provides explicit guidelines on how to develop and enhance human efficacy. According to this theory, people make significant contributions to their psychosocial functioning through mechanisms of personal agency. Among the mechanisms of agency, self-efficacy stands as the most central and pervasive agent (Bandura, 2009). Bandura defined self-efficacy as perception and belief in one's abilities. He ascertained that one's perception of abilities and human agency shapes one's endeavors to achieve. Self-efficacy contains many dimensions and is dependent on the person's cognitions (Bandura, 1982).

Perceived self-efficacy refers to beliefs in one's capabilities to organize and execute the courses of action required to manage prospective situations. Efficacy beliefs influence how people think, feel, motivate themselves, and behave. A central question in any theory of cognitive regulation of motivation, affect, and action concerns the issue of causality. Efficacy beliefs regulate human functioning through four major processes. These include cognitive, motivational, affective, and selection processes. These different processes operate in harmony, rather than in isolation (Bandura, 2009; Bandura, 2006).

Self-efficacy theory posits that efficacy judgments play a causal role in the development of vocational interests (Bandura, 1986). Occupational self-efficacy and interest have consistently been found to be moderately related. Strong career efficacy beliefs should give rise to enhanced occupational interests (Lent et al., 1994). Self-efficacy is strongly predictive of a wide range of career-related behaviors from early high school through college and beyond (Hackett & Lent, 1992; Lent & Hackett, 1987).

Perceived efficacy plays a key role in human functioning because it affects behavior not only directly. Behavior, cognition and other personal factors, and environmental influences all operate as interacting determinants that influence each other bi-directionally (Bandura, 1989). Additionally, perceived efficacy may also affect other determinants such as goals and aspirations, outcome expectations, affective proclivities, and perception of impediments and opportunities in the social environment (Bandura, 1997).

Efficacy beliefs influence whether people think erratically or strategically, optimistically or pessimistically. They also influence the courses of action people choose to pursue, the challenges and goals they set for themselves and their commitment to them, how much effort

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they put forth in given endeavors, the outcomes they expect their efforts to produce, how long they persevere in the face of obstacles, their resilience to adversity, the quality of their emotional life and how much stress and depression they experience in coping with taxing environmental demands, and the life choices they make and the accomplishments they realize (Bandura, 2006).

The self-efficacy perspective is highly appropriate for the study of entrepreneurship. Researchers in this context explained the reasonable relationship of self-efficacy and entrepreneurship as follows: self-efficacy theory helps address the problem of lack of specificity in previous entrepreneurial personality research due to a task-specific construct rather than a global disposition one, as well as entrepreneurial self-efficacy -as a belief of one's vocational capabilities- is relatively more general than task self-efficacy. This allows entrepreneurs to derive, modify, and enhance their self-efficacy in their continuous interaction with their environment. Additionally, self-efficacy can be used to predict and study entrepreneurs' behavior choice, persistence, and effectiveness (Chen et al., 1998; Boyd & Vozikis, 1994).

Entrepreneurial Self- Efficacy refers to how much one believes he or she is capable of successfully performing the roles and tasks of an entrepreneur (Boyd & Vozikis, 1994). De Noble et al., (1999) defined Entrepreneurial Self-Efficacy as "*a construct that measures a person's belief in their own abilities to perform on the various skill requirements necessary to pursue a new venture opportunity."*

There are six dimensions in the concept of Entrepreneurial Self-Efficacy developed by De Noble et al., (1999), (Table 1) including developing new product and market opportunities; building an innovative environment; initiating investor relationships; defining core purpose; coping with unexpected challenges; developing critical human resources.

Table 1
HEXAGONAL ENTREPRENEURIAL SELF-EFFICACY DIMENSIONS DEVELOPED BY De Noble et al., (1999)

	Dimension
1	Developing a new product and market opportunities involve a person's belief to be able to create new products and to find opportunity, to have a solid foundation to launch a venture.
2	Building an innovative environment involves a person's belief to be able to encourage others or his/her team to try a new idea or to take innovative action.
3	Initiating investor relationships involves a person's belief to be able to find sources of funding for their venture.
4	Defining core purpose involves a person's belief to be able to be clear with his/her vision and to maintain the vision, and clarify it to his/her team and investors.
5	Coping with unexpected challenges involves a person's belief to be able to tolerate and deal with ambiguity and uncertainty in the start-up entrepreneur.
6	Developing critical human resources involves a person's belief to be able to recruit and retain important and talented individuals to be members of the venture.

Some research studies (Abrams, 2017; McGee et al., 2009; De Noble et al., 1999) Demonstrated a hexagonal model of ESE developed by De Noble et al. (1999). Abrams (2017) supported a six-factor structure accounting for 61.9% of the total variance in ESE of (De Noble et al., 1999) using Exploratory analysis conducted among 115 randomly selected undergraduate students and confirmatory factor analysis performed on the remaining 157 students.

However, other research showed other factors of ESE. In a comparative exploratory factor analysis of several groups of undergraduate and graduate students, the results supported a five-subscale, 23-item instrument. Principal component factor analysis with varimax rotation

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extracted five factors of ESE accounting for 56.6% of the variance. Twenty-two out of 26 items were loaded on the five factors (marketing, innovation, management, risk-taking, and financial control), all at or above the level of 0.40 (Chen et al., 1998). This result was demonstrated by other research employing Confirmatory Factor Analysis (Model of the ESE Factors) using structural equation modeling, that is this analysis specifically identified six ESE dimensions:

1. Searching,
2. Planning,
3. Marshaling,
4. Implementing-people, and
5. Implementing-financial
6. Attitude toward venturing (CFI=0.96, TLI=0.95, RMSEA=0.06) (McGee et al., 2009).

Barbosa et al., (2007) showed that factor analysis conducted using the Principal Axis Factoring method with oblique rotation (oblimin) extracted four factors of Entrepreneurial Self-Efficacy as follows: Opportunity-Identification Self- Efficacy, Relationship Self-Efficacy, Managerial Self-Efficacy, and Tolerance Self-Efficacy.

These results were proved by the study conducted by Spagnoli et al., (2017) who examined the reliability and validity of the ESE Scale proposed by McGee et al., (2009) both in Italy and Portugal. Construct, convergent, and discriminant validity of the ESE Scale were assessed through confirmatory factorial analysis and multi-groups confirmatory factorial analysis using structural equation modeling. Findings supported multidimensionality and the use of the ESE Scale in Italy and Portugal for research and practical purposes.

Barakat et al., (2014) developed a measure of ESE comprising 7 sub-dimensions of ESE using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). These 7 sub-dimensions of ESE capturing an entrepreneur's self-efficacy are innovation, financial valuation, teamwork, product development, start-up processes, leadership, and creativity. Liu, Lin, Zhao, and Zhao (2019) investigated entrepreneurial self-efficacy in a sample of 327 Chinese college students. Confirmatory factor analysis showed that the four-factor model of entrepreneurial self-efficacy scale is the most ideal for the fitting with actual data (χ^2/df=2.75; CFI=0.935; GFI=0.898; TLI=0.922; IFI=0.936; RMSEA=0.073). Urban (2006) examined the reliability and validity of ESE in the sample of different major ethnic groups of entrepreneurs in South Africa. Factor analysis of this scale showed three factors: marketing, innovation, and financial control.

Although numerous studies demonstrated multidimensionality of ESE, other studies weren't in line with them, Schjoedt & Craig (2017) revealed a uni-dimensional three-item self-efficacy scale by conducting factor analysis using samples of nascent entrepreneurs and a control group. This result is consistent with Basol & Karatuna (2017) who investigated the entrepreneurial self-efficacy perceptions among university students across two countries: Poland and Turkey. Data were obtained through 365 Polish and 278 Turkish students completed ESES. Results indicated that Polish and Turkish students did not significantly differ concerning the overall measure of entrepreneurial self-efficacy. Confirmatory factor analysis compared the ESES in two countries about the model fit statistics. The analysis did not confirm the validity of a six-factor ESE model and suggested a two-factor model fit the data best.

A principal components factor analysis with varimax rotation revealed that all ten items of ESE loaded onto one factor, supporting arguments in favor of a uni- rather than a multi-

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dimensional measure of overall ESE administered to a sample of 82 males and 140 females enrolled at a major Canadian university (Dempsey, 2014).

Statement of the Problem

Entrepreneurial self-efficacy is theoretically based on the self-efficacy theory and Social Cognitive Learning Theory (SCLT) of Bandura. The importance of self-efficacy as a cognitive construct is that it can be applied to personality dimensions, psychological traits, and concepts, aspects of counseling and career development, and other educational and academic facets. One of the vocational and career development dimensions that deserve an in-depth investigation is an entrepreneurship. The SCLT helped employ and imply self-efficacy in an individual's perceptions that he/she can plan and design ventures and firms. These self-perceptions can be termed as entrepreneurial self-efficacy.

The problem of this study was to assess entrepreneurial self-efficacy to reach a highly valid and reliable form of ESE scale whose dimensions were six in the original one developed by De Noble et al., (1999); because previous studies showed evident differences in factoring the scale between uni-dimensionality and multidimensionality, even though some of these studies supported the hexagonal model of De Noble et al., (1999). The current study attempted to assess the construct validity of the ESE scale by conducting a confirmatory factor analysis and create a new model of it with one factor or multiple ones in college students. This population is best targeted to be studied in terms of entrepreneurial self-efficacy; because this construct can be developmentally crystallized in this category which overlooks the near future of the labor market. Consequently, this study attempted to verify the psychometric characteristics of the Omani Entrepreneurial Self-Efficacy Scale.

Significance

Since confirmatory factor analyses mentioned in previous studies revealed a poor fit to the hypothesized models of the ESE, the psychometric measures of this scale should be assessed with caution. The importance of this study comes from assessing entrepreneurial self-efficacy (ESE) among college students at Sultan Qaboos University. The college education stage is considered crucial in helping students make significant decisions about their future educational and career paths. This study is also significant as it attempts to find the psychometric characteristics of the ESE scale in the Omani context.

This study may provide a scientific (theoretical and practical) framework on this construct; because it is associated with other personality, and psychological traits and concepts, as well as this construct, may be correlated with other entrepreneurial components, such as; entrepreneurial intentions, proactive personality, entrepreneurial success, and planning for the entrepreneurial life. Finding a psychometric foundation of the ESE scale in the Omani context can save efforts to conduct much research to assess fitting of the scale in different settings, instead, these studies should be directed to study the relationship of entrepreneurial self-efficacy with other entrepreneurial constructs.

METHODOLOGY

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Participants

A convenience sample of 339 college students at Sultan Qaboos University was used, (males, n=151), and (females=188); that is the ESE Scale was distributed to a lot of college classes, then the participants who responded to this scale were 339.They represented different majors of colleges at Sultan Qaboos University. Table 2 illustrates the demographic characteristics of the sample.

Table 2
SAMPLE OF STUDY
DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE

		Male	Female	Total
Major	Islamic	10	19	29
	Arabic	24	24	48
	Math &Science	89	98	187
	Engineering	10	8	18
	Physical Education	12	11	23
	Art Education	6	13	19
	Early Childhood	-	15	15
	Total	151	188	339

Measure

Entrepreneurial Self-Efficacy Scale (ESE Scale)

The (ESE Scale) developed by De Noble et al., (1999) consisted of 23 items assessing ESE in terms of the following six dimensions: developing new product and market opportunities, building an innovative environment, initiating investor relationships, defining core purpose, coping with unexpected challenges, developing critical human resources.

Face validity was assessed by submitting the scale to a panel of experts whose PhD is counseling and psychological measurement. Construct validity was also assessed by conducting Confirmatory Factor Analysis (CFA) whose detailed findings are illustrated in the section of findings. The items the ESE Scale are rated on a 5-point Likert-type scale:

1. Not applicable,
2. Rarely applicable,
3. Sometimes applicable,
4. Often applicable, and
5. Completely applicable.

The maximum score of all scale items is (115), and the minimum score is 23, and the average score is 69 which means that the higher the score the higher the entrepreneurial self-efficacy. Internal consistency was calculated by Cronbach Alpha and found 0.93.

RESULTS

To verify the psychometric characteristics of the Omani Entrepreneurial Self-Efficacy Scale. Confirmatory Factor Analysis (CFA) was conducted. The CFA extracted four factors/dimensions whose item loadings ranged from (0.44) to (0.88); that is the item loadings

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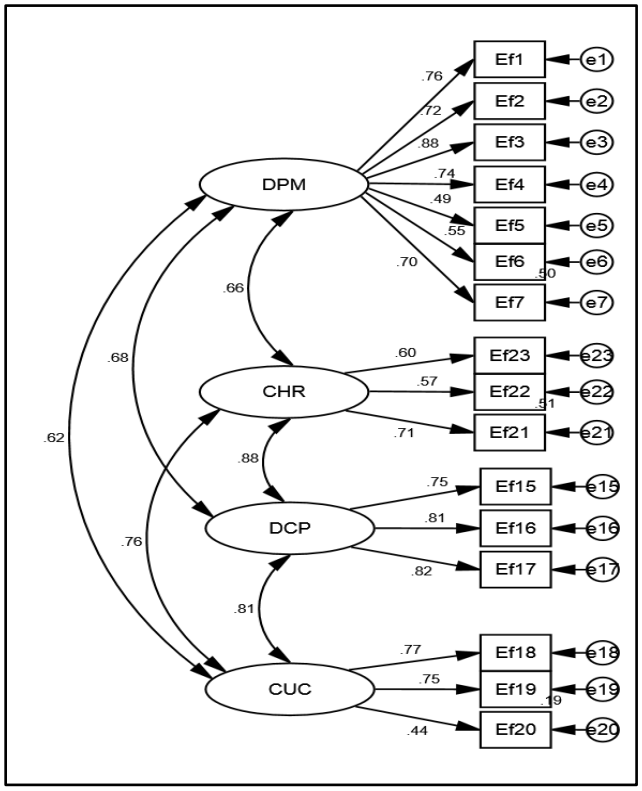
were significant, p=0.00001 as shown in figure 1. These factors are: Developing new product and market opportunities, developing critical human resources, Defining core purpose, coping with unexpected challenges. However, two factors were deleted because of low item loadings, these factors are: Building an innovative environment and Initiating investor relationships. The CFA and the model fits data extracted acceptable fit indices; that is χ^2=212.681, df=92, p<0.01, the comparative fit index (CFI)=0.908, Tucker-Lewis index (TLI)=0.957, and the Root Mean Square Error of Approximation (RMSEA)=0.080. Correlational coefficients between factors ranged between (0.62) to (0.88), and these factors were significant, p=0.0001. Sampling adequacy and sphericity test was assessed by Kaiser-Meyer-Olkin (KMO) Measure, and Bartlett's Test of sphericity as shown in Table 3.

Table 3
KMO AND BARTLETT'S TEST

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		851.0
Bartlett's Test of Sphericity	Approx. Chi- Square	2776.393
	df	253
	Sig.	0.0001*
*Significant<0.05**		

Table 3 shows degree of Kaiser-Meyer-Olkin (KMO) was 0.851 which indicates that sampling is highly adequate. Approximate Chi-square of Bartlett's test of sphericity (253) =2776.393, p=0.0001 which leads to accepting the null hypothesis that indicates that there were no significant differences among the sample participants whose homogeneity is greatly high.



DPM: Developing new product and market opportunities, CHR: Developing critical human resources, DCP: Defining core purpose, CUC: Cope with unexpected challenges.

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FIGURE 1
FINDINGS OF CONFIRMATORY FACTOR ANALYSIS AND THE MODEL FIT ON THE ESE SCALE

DISCUSSION

Confirmatory Factor Analysis extracted four dimensions of the (ESE Scale) of De Noble et al., (1999) which included six dimensions. These differences in the current study and other previous studies in exploratory and confirmatory factor analysis extractions may be due to some factors: the cultural, ethnic, and educational background of the target samples in these studies. The nature of participants utilized in entrepreneurial self-efficacy studies may result in differences in factor analysis; that is these participants may differ in the extent to which they understand and respond to the items of the (ESE). Some of them may respond to the items accurately, but others may respond to them randomly and inaccurately. This will engender an increase of error in analysis, correlations between items, and loadings. Additionally, there may be some cultural factors related to understand and recognize the words of items by the target participants. The way of understanding may intervene with the accuracy and soundness of assessment, and then this will lead to gaps in factor analysis results. Moreover, the concept of entrepreneurial self-efficacy may not be understandable by all target participants; because of different cognitive levels of them; that is entrepreneurship is not recognized and understood by students of high schools; because they don't have sufficient information about it, although they may receive some knowledge by the mass media, as well as this concept may be more abstract for them. The concept of entrepreneurship may be understandable in postgraduate students rather than undergraduate ones. Consequently, cross-cultural differences in the (ESE Scale) were found in previous studies. Gender differences may be found in this scale; because males and females may differently perceive the content of it; that is females in various educational levels (school and college levels) may not be interested in administrative and economic concepts as in males. Career differences between male and female students were methodologically proved, and theories of career development explained these differences as a result of various factors, such as socialization, parenting, and education. It is reasonable to deal with scientific concepts and constructs in diverse fields differently because of cultural factors. Accordingly, cross-cultural differences in these concepts may be logical. The findings of the current study go along with the findings of Barbosa eta l., (2007) that showed that factor analysis conducted using the Principal Axis Factoring method with oblique rotation (Oblimin) extracted four factors of Entrepreneurial Self-Efficacy, as well as the findings, are also in line with findings of Liu et al., (2019) who showed using confirmatory factor analysis that the four-factor model of entrepreneurial self-efficacy scale was extracted.

Consequently, considerable differences in the ESE scale may be due to cultural determinants. In other words, these factors are relevant to the understanding of entrepreneurial concepts and constructs; that is inadequacy, lack and low interest of information related to entrepreneurship throughout the diverse cultures and other multicultural groups may play an important role in the recognition and comprehension of the topics of entrepreneurial education, therefore, there were no crucial findings that give an accurate analysis of the dimensions of entrepreneurial self-efficacy concept in multicultural populations; because the culture of entrepreneurship hasn't been crystallized or disseminated yet throughout different areas of this world.

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CONCLUSIONS AND IMPLICATIONS

The findings of the current study reached four factors or dimensions of the (ESE) scale. However, the inclusion of method effects is needed to achieve a good model fit. Model effects of Confirmatory Factor Analysis or the SEM are associated with item composition, understanding, and responding. These findings support those of relevant previous studies conducted on verifying the construct validity of the (ESE) scale. Nevertheless, other previous studies supported the six dimensions of the original version of the (ESE) of De Noble et al., (1999). The results of the CFA in the current study indicated there were significant correlations between the extracted factors. It is concluded that these significant correlations indicate the items of the (ESE) whose loadings are significantly accepted may be unidimensional. The difference in factor extractions of this scale may be due to numerous causes: the nature of factor analysis rotation may result in variances in uni-dimensionality and multidimensionality. The subjective response to the items of the (ESE) may lead to variant extractions. Uni-dimensionality of the (ESE) scale may be accepted for some populations because of interrelated items within one unit, while the multidimensionality of it may be understandable and well-recognized for other populations because of low loadings. Accordingly, it is reasonable to find variance in extractions and loadings of the (ESE) as a result of many factors mentioned earlier. A lot of cross-cultural studies are needed to be conducted to find a uni-dimensional or multidimensional scale for assessing entrepreneurial self-efficacy. It is unnecessary to consider the original version of the (ESE) of De Noble et al., (1999), however, other scales may be constructed or developed to assess this concept by eliminating or excluding the factors which are responsible for the error of variance. The findings of the current study can be beneficial for concerned individuals of scholars and practitioners who are keen on entrepreneurship. They may need the required tools for conducting cross-cultural research to study the psychological features of entrepreneurship such as self-efficacy and proactivity. The findings of this study are also advantageous to students and faculty members in higher education institutions. College students can assess their entrepreneurial abilities based on the tool used in this study, whereas faculty members can use this tool and administer it to different samples.

LIMITATIONS

This research encountered some challenges related to the sampling. It was hoped that the sample would be more comprehensive and representative in a way that allows to generalizing the findings to other populations, although the adequacy and homogeneity of the sample used in this study were high. However, the limitations might be created under circumstances that the researchers can't control or deal with them. Moreover, if the sample is comprehensive and representative, and the participants can't understand the concepts on entrepreneurship and relevant dimensions or they don't have any information on these concepts, their cognitive conceptions are distorted, then their responses will be inaccurate, so it is difficult to generalize their analyzed responses or findings related to information analysis that can be obtained from the ESE scale.

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