

The Effects of Founders' Characteristics on Student Spin-Offs Intention: A Gender Analysis

Abdul Rahman Zahari*

College of Business Management and Accounting, Universiti Tenaga Nasional, Malaysia
Email: Rahman@uniten.edu.my

Puteri Fadzline Muhamad Tamyaz

Faculty of Industrial Management, Universiti Malaysia Pahang, Malaysia

Noor Azlinna Azizan

College of Business Administration, Prince Sultan University, Saudi Arabia

** Corresponding Author*

Abstract

Purpose: This paper aims to drawing on the Theory of Planned Behavior (TPB), explore the effects of founders' characteristics on student spin-offs intention (SI) and examines the question of whether the effects are vary by gender.

Design/methodology/approach: Data were collected from a sample of 369 students at eleven public universities in Malaysia. Partial least square-structural equation modelling, bootstrap procedure and multi-group analysis were used to analyze the data.

Findings: The results show that three personality of student of founders' student spin-offs positively influence SI. No gender differences were recorded in the relationship between need for achievement, innovativeness, propensity for risk taking, locus of control, and self-efficacy on SI.

Research limitations/implications: Future studies should go beyond examining the mere fact of knowing founders' characteristics effects on SI and to study the differences with other demographic profiles by using omnibus test of group differences particularly for more than two groups.

Practical implications: The results of this study have clear implications for both universities and policymakers.

Originality/value: The study discusses some important element in pre-founding stage of student spin-offs process development context by providing new insights from developing country like Malaysia.

Keywords: Gender, Founders' Characteristics, University Roles, Entrepreneurial Environments, Perception of Barriers, Student Spin-Offs Intention

Introduction

In the last few years, the interest in the facilitation of student spin-offs (SSO) has increased in many advanced economies (Leire et al., 2016; Manbachi et al., 2018). SSO firms are generally founded by students attending programs in any faculty at a university (Bailetti 2011). The firms seem to be essential in order to enhance economic conditions, to create new job positions and

self-employment, and to give value to societies (Molino et al., 2018). Apart from that, the gap between male and female students in entrepreneurial intentions has long been acknowledged, and it is attracting increasing academic attention (Hughes et al., 2012; Karimi et al., 2014; Santos et al., 2016; Shinnar et al., 2018). Gender is always considered as a central dimension of socio-cultural environment and could be a possible enabler of student spin-offs intention (SI) or entrepreneurship (Karimi et al., 2014). It is widely accepted that men have stronger entrepreneurial intentions than women and empirical evidence also indicates similar findings among university students (Chaudhary, 2017; Molino et al., 2018; Shinnar et al., 2018).

Research also have suggested that founders' characteristics such as need for achievement, innovativeness, propensity for risk taking, locus of control, and self-efficacy were related to SSO intentions. For example, Yukongdi and Lofa (2017) have identified significant differences between genders of university students with need for achievement and propensity for risk taking. Moreover, Law and Breznik (2016) have proved a significant difference between male and female students with innovativeness. On top of that, previous works of Molino et al., (2018) highlighted the significant differences between genders of university students with locus of control and self-efficacy. In entrepreneurship filed, individual qualities are considered as a major element to new venture creation and become a central examination among researchers (Shaver and Scott, 1991; Littunen, 2000). With limited studies that examines the differences across genders from non-advanced economies particularly on SSO context (Boh et al., 2015; Hayter et al., 2016), therefore this study has motivated to close the mentioned gap. A better understanding of how founders' characteristics shape SSO intentions can serve to explain the gender gap in SSO context and possibly identify strategies to close the gaps.

The current study considers SI as a pre-founding phase in the SSO process development, in order to investigate its determinants by considering five founders' characteristics namely need for achievement, innovativeness, propensity for risk taking, locus of control, and self-efficacy among male and female SSO founders. The remainder of the paper is structured as follows: a review of the relevant literature and then details of the research method applied, later the current study explains the findings, followed by discussion and conclusion in the last section.

Literature Review

Entrepreneurship has been identified as essential to economic development and growth in developing countries, unexpectedly little penetration has been paid during the past decade of research to factors which influence the intention of individual to start new businesses and particularly the SI of those still within the education system (Karimi et al., 2010; 2014). It is obviously crucial that those factors which influence the SIs and behaviour of university students be adequately understood to develop and implement effective strategies to stimulate these. Thus, the identification of a suitable theoretical framework and adequate understanding of the determinants of SIs and behavior can help universities and policymakers to foster SSO starting at universities. SI represents the first phase or pre-founding stage in creating a new venture. Secondly, it must involve founding stage (skills to manage a new venture) and thirdly it requires post-founding (measuring the performance of a new venture) (Gubeli and Doloruex, 2005).

The SI phase is one of the most significant areas of interest concerning the entrepreneurial research (Thompson, 2009; Battistelli and Odoardi, 2016; Molino et al., 2018). Several past

works have focused their study to differentiate the role of gender with SI. For instances, Sanchez and Licciardello (2012), Sabiu, Abdullah and Amin (2017) and Molino et al., (2018) have shown significance difference between male and female students with SI. Some past studies (e.g. Chaudhary, 2017; Murugesan and Jayavelu, 2017; Ojewumi et al., 2018) identified no significance difference between groups of genders with SI. Even though the past studies posit mixed results, some previous works carried out in Malaysia found that female students are more interested in entrepreneurial careers than male students (Nasip et al., 2017; Al Mamun et al., 2017; Zahari et al., 2018).

McClelland (1961) introduces the need for achievement concept with insightful empirical evidence on the existence of a connection between the need for achievement and business development. University students who have a high need to achieve will show more entrepreneurial behaviour and this could lead them to become entrepreneurs (Karabulut 2016; Yukongdi and Lofa 2017). On another note, past studies from Ryan, Tipu and Zeffane (2011) and Saleh (2014) revealed that female students had a greater need for achievement to become an entrepreneur compared to male students. Those studies were conducted in United Arab Emirates and Lebanese universities respectively. In contrast, past studies (Handaru, Wasposito and Carolina, 2013; Yukongdi and Lofa; 2017 and Bagnotti and Roux, 2018) highlighted that the male students have a higher need for achievement than female. In addition, Tunkarimu and Hassan (2017) empirically found no significant different between genders and need for achievement among university students in Malaysia.

Ghazali, Ibrahim and Zainol (2013) defined innovativeness as crafting new products or higher quality products, generating new methods of production, attainment of a new market, creating a new source of supply or building new organizations or structures in business. It is suggested as a behaviour that characterizes entrepreneurial intention (Karanja, Ithinji and Nyaboga 2016; Koe 2016). Furthermore, work produced in Iran by Saleh (2014) demonstrated a significant difference in innovativeness according to gender. Another example can be found in a study by Law and Breznik (2016) where they had highlighted the positive gender effects on innovativeness in Hong Kong universities. A parallel result also can be traced by past study of Tunkarimu and Hassan (2017). In their study, male students have posit a significant different between female in term of innovativeness.

Gurol and Atsan, (2006) defined risk taking as the propensity of an individual to reveal risk taking or risk avoidance when confronted with risk situations. Previous studies (Pinho and de Sa, 2014; Karanja et al., 2016; Al Mamun et al., 2017) indicated that students who can manage risks are linked with high entrepreneurial intentions. Apart from that, a past study from Yukongdi and Lopa, 2017 have identified significant differences between gender and propensity for risk taking. Tunkarimu and Hassan (2017) reported that male students have greater propensity for risk taking than female students. However, Sanchez and Licciardello (2012) claimed no significant different between genders and propensity of risk taking.

Altinay et al., (2012) consider the locus of control as an individual's perception of his or her ability to influence events in life. More importantly, locus of control expectation is usually associated with entrepreneurial characteristics (Littunen, 2000; Karanja et al., 2016; Karabulut,

2016). Findings from past studies revealed that there is no significant difference in relation to locus of control with groups of genders (Sanchez and Licciardello, 2012; Saleh, 2014; Murugesan and Jayavelu, 2017). In addition, studies from Molino et al., (2018) and Bignotti and Roux (2018) have revealed that there is significant different between the effect of locus of control with group of genders. Wood and Bandura (1989) mentioned that self-efficacy is an individual's perception regarding his or her ability to successfully complete a given task and can be a prediction of entrepreneurial intention (Barani et al., 2010; Pinho and de Sa, 2014; Manik and Sidharta, 2016; and Solesvik (2017). With regards to gender, a few studies by the likes of Solesvik (2017) and Nowinski et al., (2017) have revealed significant differences between genders. Both studies reported that female students generally have lower self-efficacy compared to male students. Therefore, the following hypotheses are proposed:

H1: There is a significant difference between the effect of need for achievement on SI in male and female students.

H2: There is a significant difference between the effect of innovativeness on SI in male and female students.

H3: There is a significant difference between the effect of propensity for risk taking on SI in male and female students.

H4: There is a significant difference between the effect of locus of control on SI in male and female students.

H5: There is a significant difference between the effect of self-efficacy on SI in male and female students.

Conceptual Framework

In social cognition models, the Theory of Planned Behavior (TPB) is the most widely used among social science researchers which originally proposed by Ajzen (1988, 1991). This theory more focuses to individual intention which was defined as a person's readiness to perform a given behavior (Ajzen, 1991). The theory has three main elements that results of intention and was very popular in entrepreneurship research (Nasip et al., 2017; Al Mamun et al., 2017). In the last 20 years, many models and theories have been developed to explain entrepreneurial intention. For instance, the Luthje and Franke's model (Luthje and Franke, 2003) has combined personal characteristics and contextual factors to enlighten entrepreneurial intention. Bird (1988) claimed that the intentional entrepreneurial process begins in response to a combination of those factors. The conceptual framework used for the current study is shown in Figure 1.

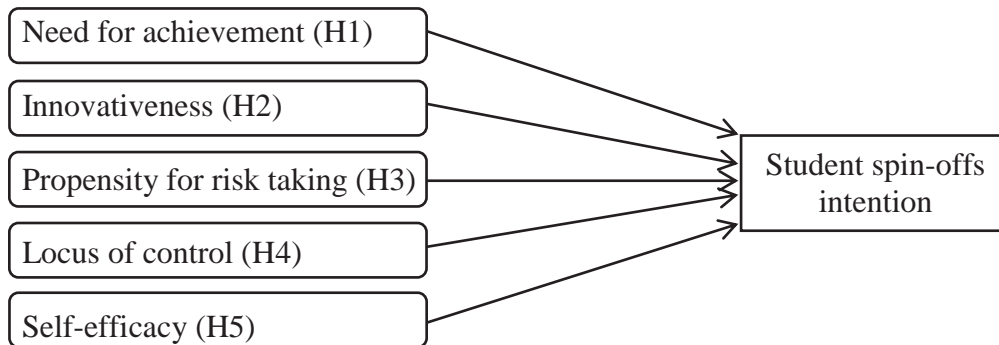


Figure 1: Theoretical Framework

Method

The unit of analysis in this study is the founders of SSO from Malaysian public higher educational institutions (HEIs). A total of 750 founders of SSO were approached through online (email) using a stratified sampling method. Of these, 21 emails were failed to be delivered due to incorrect email addresses. The data collection was carried out over a period of four weeks (June 2017) by using a stratified sampling technique. This study was able to gather only 369 completed questionnaires (50.6 percent of responses rate) and used for further analysis. The questionnaire was divided into two parts: (1) Part One comprises of independent and dependent constructs, and (2) Part Two is referring to the characteristic of respondents. In general, a total of twenty six items were used to measure the exogenous and endogenous factors. Table 2 explains the detail items used in this study. All items for exogenous and endogenous factors were adapted from Dinis et al., (2013), Pihie and Bagheri (2013), Davidsson (1995) and Linan and Chen (2009). The first part of survey question has used a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

In addition, there were nine questions used to explain the characteristic of respondents. A few steps were used to increase the face validity of the designed questionnaires using experts' opinion, pre-tested procedures and pilot study. Based on the feedback obtained from those procedures, the questionnaire was subsequently upgraded. The data was analyzed using the partial least square-structural equation modelling (PLS-SEM). There are four types of analysis namely descriptive analysis, test of measurement model, test of structural model, and multi-group analysis (MGA) were carried out for this study

Findings

Findings of the current study are reported in the form of descriptive analysis, analysis of measurement model, and assessment of the structural model and multi group analysis. Table 1 summarizes the profile of respondents in the two groups: male founders of SSO and female founders of SSO. The characteristics of respondents are categorized in eight groups.

Table 1: Profile of Respondents

Characteristics		Male		Female	
		Number	(%)	Number	(%)
Age	20 years old and below	8	5.3	16	7.3
	21 to 25 years old	133	88.1	187	85.8
	26 to 30 years old	9	6.0	12	5.5
	31 years old and above	1	.7	3	1.4
Ethnicity	Malay	127	84.1	189	86.7
	Indian	10	6.6	8	3.7
	Chinese	8	5.3	16	7.3
	Others	6	4.0	5	2.3
Religion	Islam	133	88.1	194	89.0
	Buddhism	6	4.0	13	6.0
	Christianity	5	3.3	5	2.3
	Hinduism	7	4.6	6	2.8
Place of Origin	Rural area	75	49.7	99	45.4
	Urban area	76	50.3	118	54.1
	Others			1	.5
Level of education	Postgraduate	16	10.6	35	16.1
	Undergraduate	134	88.7	181	83.0
	Others	1	.7	2	.9
Year of study	Year 1	9	6.0	18	8.3
	Year 2	44	29.1	73	33.5
	Year 3	48	31.8	68	31.2
	Year 4	50	33.1	59	27.1
Types of university	Research university	37	24.5	62	28.4
	Focused university	99	65.6	135	61.9
	Comprehensive university	15	9.9	21	9.6
Types of business	Product oriented	58	38.4	111	50.9
	Service oriented	93	61.6	107	49.1

As indicated in Table 2, the mean values for self-efficacy and SSO intentions were higher for male founders of SSO than female. Similarly, the mean scores for other individual items are also dominated by male founders SSO.

Table 2: Descriptive Analysis

Constructs/Associated Items	Male (N=151)		Female (N=218)	
	MV	SD	MV	SD
Need for achievement (NA)				
Competition makes me work harder.	4.28	.704	4.31	.661
I do not like a well-paid job if I cannot have a sense of achievement from it.	3.87	.877	4.01	.856
I always try to accomplish something above the average.	4.33	.700	4.23	.720
I always try to improve all the time.	4.38	.681	4.29	.661

Innovativeness (IN)				
I always change the way things are done.	4.14	.864	3.95	.860
I am able to perceive opportunities for business.	3.91	.879	3.73	.871
I believe there are always new and better ways of doing things.	4.48	.701	4.53	.601
I find it easy to come up with new ideas.	3.77	.860	3.67	.814
Propensity of risk taking (RT)				
I am willing to take high risks for high returns.	3.90	.893	3.78	.894
I do not mind working under conditions of uncertainty.	3.72	1.047	3.69	1.004
I do not fear investing my money in a business venture.	3.91	.919	3.68	.948
I do not fear moving into a new undertaking.	4.19	.781	4.05	.790
Locus of control (LC)				
I believe failure is a product of fate rather than personal effort.	4.22	.692	4.16	.668
I am willing to accept both positive and negative consequences of my decisions.	4.30	.773	4.28	.649
It is me who influence the outcome of events in my life.	4.19	.859	4.23	.687
I prefer to make things happen rather than waiting for things to happen.	4.30	.870	4.17	.754
Self-efficacy (SE)				
I can successfully complete the necessary marketing tasks related to owning a business.	3.74	.907	3.67	.821
I can successfully complete the necessary accounting tasks related to owning a business.	3.49	.979	3.39	.930
I can successfully complete the necessary operational tasks related to owning a business.	3.89	.837	3.72	.807
I can successfully complete the necessary organizational tasks related to owning a business.	3.85	.820	3.80	.783
SSO intention (SI)				
I am ready to do anything to be an entrepreneur.	4.13	.838	3.94	.908
My professional goal is to become an entrepreneur.	4.09	1.002	4.00	.972
I will make every effort to start and run my own business.	4.27	.848	4.11	.852
I am determined to create a business in the future.	4.28	.844	4.30	.879
I have seriously thought about starting a business.	4.28	.881	4.22	.914
I have a firm intention to start a business some day.	4.33	.846	4.26	.945

Note: MV = Mean value; SD = Standard deviation

This study conducted a confirmatory factor analysis using PLS-SEM to check the properties of the latent constructs in the proposed research model. To assess the measurement model, three types of analyses were executed. With regards to factor loading, the current study has adopted the guidelines recommended by Duarte and Raposo (2010) and Hair et al., (2017), where indicators with loadings equal to or greater than .50 were considered to be accepted. Table 3 shows that the loading values for male and female were above than .50 and therefore no single item is deleted. Moreover, the reliability of the constructs which was measured by using composite reliability indicates the values of above than .70. Thus, the constructs for groups of

genders were considered reliable (Hair et al., 2017). In addition, the results of convergent validity which was accessed through average variance extracted displays the values of above than .50 (Fornell and Larcker, 1981). Hence, these indicators satisfied the requirement for the convergent validity of their respective constructs.

Table 3: Assessment Results of the Measurement Model

Constructs/ Associated Items	Loading		CR		AVE		R ²	
	Male	Female	Male	Female	Male	Female	Male	Female
Need for achievement			.862	.856	.610	.605	.532	.497
NA1	.811	.827						
NA2	.737	.534						
NA3	.792	.870						
NA4	.782	.833						
Innovativeness			.856	.812	.598	.521		
IN1	.788	.650						
IN2	.795	.800						
IN3	.773	.655						
IN4	.737	.770						
Locus of control			.856	.828	.601	.549		
LC1	.642	.631						
LC2	.834	.820						
LC3	.822	.720						
LC4	.787	.779						
Propensity for risk taking			.864	.862	.614	.609		
RT1	.785	.819						
RT2	.749	.720						
RT3	.812	.807						
RT4	.788	.772						
Self-efficacy			.894	.897	.680	.686		
SE1	.858	.839						
SE2	.712	.764						
SE3	.860	.880						
SE4	.858	.827						
SSO intention			.954	.963	.775	.811		
SI1	.803	.877						
SI2	.865	.892						
SI3	.887	.891						
SI4	.905	.915						
SI5	.931	.913						
SI6	.886	.916						

Note: CR= Composite reliability; AVE = Average variance extracted.

To establish discriminant validity, the current study used the Heterotrait-Monotrait Ratio (HTMT) ratio of correlations approach as suggested by Henseler, Ringle and Sarstedt (2015). HTMT is selected because the previous methods have shortcomings. The criterion or statistical test of HTMT should not be greater than the HTMT.85 value of .85 (Kline, 2011), or the HTMT.90 value of .90 (Gold, Malhotra and Segars, 2001). As shown in Table 4, all values for both male and female have passed both HTMT.85 and HTMT.90 measures (Kline, 2011). Thus, the discriminant validity has been established for the research constructs.

Table 4: Discriminant Validity (HTMT_{.85} criterion)

Constructs	IN (M)	LC (M)	NA (M)	RT (M)	SE (M)	SI (M)	IN (F)	LC (F)	NA (F)	RT (F)	SE (F)	SI (F)
IN												
LC	.573						.753					
NA	.714	.714					.851	.854				
RT	.661	.550	.601				.804	.719	.755			
SE	.617	.430	.538	.582			.756	.604	.683	.731		
SI	.617	.465	.587	.578	.533		.749	.630	.724	.723	.678	

Note: IN = Innovativeness; LC = Locus of control; NA = Need for achievement; SE = Self-efficacy; SI = SSO intentions; RT = Propensity for risk taking; M= Male; F=Female.

Table 5 displays the results of the structural model assessment (Hair et al., 2017) and, in a multi-method approach, the MGA outcomes from Henseler's bootstrap-based MGA (Henseler, Ringle and Sinkovics, 2009). This technique is used to assess differences between the path coefficients of two groups are the most conservative technique for PLS-SEM (Sarstedt, Henseler and Ringle, 2011). Henseler's MGA directly compares group-specific bootstrap estimates from each bootstrap sample. According to this method, a p value of differences between path coefficients lower than .05 or higher than .95 indicates at the 5 percent level significant differences between specific path coefficients across two groups (Henseler et al., 2009; Sarstedt et al., 2011).

Table 5 illustrates the results of hypothesis testing using 5000 bootstrap re-samples. The findings posit that NA, IN and RT shown positive and significant effects on SI in both male and female founders of SSO. In addition, the results disclose that SE has a significant and positive effect on the SI of female founders of SSO, while the effect of SE on SI is negative in male founders of SSO. Moreover, the findings reveal that LC has no significant and negative effect on SI of two groups of gender. The R² value was reported at .532 (male) and .497 (female), and considered moderate (Chin, 1998). The research model of this study explains the 53.2 percent and 49.7 percent variation in the SI construct was accounted for by constructs. The results of a multi-method MGA, using Henseler's MGA expose no significant differences between male and female founders of SSO in Malaysian public higher educational institutions with respect to the effect of NA, IN, RT, LC and SE on SI (H1, H2, H3, H4, and H5). Thus, the results show that all hypotheses were not supported.

Table 5: Results of Hypothesis Testing

Hypothesis	Relationships	PCM	PCF	PCD	P-values	Supported
H1	NA -> SI	.237**	.159*	.079	.555	No
H2	IN -> SI	.205**	.226***	.021	.855	No
H3	LC -> SI	.090	.026	.064	.561	No
H4	RT -> SI	.154*	.231**	.078	.554	No
H5	SE -> SI	.126	.203**	.077	.559	No

Note: * $p < .1$; ** $p < .05$; *** $p < .01$; PCM = Path coefficient male; PCF = Path coefficient female; PCD = Path coefficient differences

Discussion and Conclusion

The aims of the current study is to investigate the determinants of founders' characteristics namely need for achievement, innovativeness, propensity for risk taking, locus of control, and self-efficacy on SI in male and female SSO founders. Findings indicate that all characteristics on SI in male and female SSO founders have no significance different. Thus H1, H2, H3, H4 and H5 were not supported. As depicted in Table 5, there is no significant difference between the effect of need for achievement on SSO intentions in male and female students. The results are consistent with past studies of Dzomonda, Fatoki and Oni (2015) and Tunkarimu and Hassan (2017). Table 5 also revealed that there is no significant difference between the effect of innovativeness on SSO intentions in male and female students. The findings are similar with previous studies of Cheung and Lau (2010), Ferreira et al., (2012), Ramoni (2016), Camacho-Minano and Campo (2017) and Al-Mamun et al., (2017).

Moreover, results shown in Table 5 posit that there is no significant difference between the effect of propensity for risk taking on SSO intentions in male and female SSO founders. The findings are in line with past studies (Sanchez and Licciardello, 2012; Dzomonda et al., 2015; Ramoni, 2016). In addition, the current study has recorded no significant difference between the effect of locus of control on SSO intentions in male and female students. The similar results could be found in the past works of (Sanchez and Licciardello, 2012; Murugesan and Jayavelu, 2017). On another note, the current study also unable to show a significant difference between the effect of self-efficacy on SSO intentions in male and female students. Therefore, the results are consistent with previous studies (Dzomonda et al., 2015; Law and Breznik, 2016).

The findings confirmed that there are no significance differences between need for achievement, innovativeness, propensity for risk taking, locus of control, and self-efficacy on SI in male and female SSO founders in Malaysian HEIs. Due to this, the universities and policymakers could easily penetrate both genders among university students to become student entrepreneurs. In addition, those parties could also focus on other determinants of SI to facilitate SSO starting at Malaysian HEIs which can help to create self-employment community among university students. The current study was executed in Malaysian HEIs, therefore the future study should extend to Malaysian private HEIs for the purpose of the generalizability of the findings. Moreover, the study concentrated to study the effects of founders' characteristics on SI in genders. Hence, future studies can introduce other determinants of SI and conduct the comparative study with no limit to groups of genders.

References

- Ajzen, I. (1988). *Attitudes, personality, and behavior*. Chicago: Dorsey Press.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Process*, 50, 179-211.
- Al Mamun, A., Che Nawi, N., Mohiuddin, M., Shamsudin, S.F.F. and Fazal, S.A. (2017). Entrepreneurial intention and startup preparation: A study among business students in Malaysia, *Journal of Education for Business*, 92(6), 296-314.
- Altinay, L., Madanoglu, M., Daniele, R. and Lashley, C. (2012). The influence of family tradition and psychological traits on entrepreneurial intention, *International Journal of Hospitality Management*, 31(2), 489-499.
- Bailetti, T. (2011). Fostering student entrepreneurship and university spinoff companies, *Technology Innovation Management Review*, 7-12.
- Barani, S., Zarafshani, K., Del-Angizan, S. and Lorgani, S.M. (2010). The impact of entrepreneurship education on entrepreneurial behavior of students Payam-Noor University of Kermanshah: Structural equation modeling approach, *Quarterly Journal of Research and Planning in Higher Education*, 57, 85-105.
- Battistelli, A. and Odoardi, C. (2016). The psychology of entrepreneurship. In *Psychology of work* (Eds.) Argentero, P. and Cortese, C.G. Milan: Raffaello Cortina Editore, 373-398.
- Bignotti, A. and Roux, I.L. (2018). Discovering the entrepreneurial endowment of the youth, *African Journal of Economic and Management Studies*, 9(1), 14-33.
- Bird, B. (1988). Implementing entrepreneurial ideas: The case of intention, *The Academy of Management Review*, 13(3), 442-453.
- Boh W.F., De-Haan, U. and Strom, R. (2015). University technology transfer through entrepreneurship: Faculty and students in spinoffs, *The Journal of Technology Transfer*, 1-9
- Camacho-Minano, M.D.M and Campo, C.D. (2017). The role of creativity in entrepreneurship: An empirical study on business undergraduates, *Education and Training*, 59(7/8), 672-688.
- Chaudhary, R. (2017). Demographic factors, personality and entrepreneurial inclination: A study among Indian university students, *Education and Training*, 59(2), 171-187.
- Cheung, P.C. and Lau, S. (2010). Gender differences in the creativity of Hong Kong school children: Comparison by using the new electronic Wallach-Kogan creativity tests, *Creativity Research Journal*, 22(2), 194-199.
- Chin, W. W. (1998). The partial least squares approach to structural equation modeling. In *Modern methods for business research* (Ed.) Marcoulides, G.A. Mahwah, New Jersey: Lawrence Erlbaum Associates, 295-336.
- Davidsson, P. (1995). Determinants of entrepreneurial intentions. Working paper presented at the annual meeting of the Rent IX Workshop, Piacenza, Italy.
- Dinis, A., do Paço, A., Ferreira, J., Raposo, M. and Ricardo, R.G. (2013). Psychological characteristics and entrepreneurial intentions among secondary students, *Education and Training*, 55(8/9), 763-780.
- Duarte, P. and Raposo, M. (2010). A PLS model to study brand preference: An application to the mobile phone market. In *Handbook of partial least squares* (Eds.) Esposito Vinzi, V., Chin, W.W., Henseler, J. and Wang, H. New York: Springer Berlin Heidelberg, 449-485.

- Dzomonda O., Fatoki, O. and Oni, O. (2015). The effect of psychological and contextual factors on the entrepreneurial intention of university students in South Africa, *Corporate Ownership of Control*, 13(1), 1297-1303.
- Ferreira, J.J., Mario L., Raposo, R. G. R., Dinis, A. and do Paço, A. (2012). A model of entrepreneurial intention: An application of the psychological and behavioral approaches, *Journal of Small Business and Enterprise Development*, 19(3), 424-440.
- Fornell, C. and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error, *Journal of Marketing Research*, 18(1), 39-50.
- Ghazali, Z., Ibrahim, N. A. and Zainol, F. A. (2013). Factors affecting entrepreneurial intention among UniSZA students, *Asian Social Science*, 9(1), 85-93.
- Gold, A.H., Malhotra, A. and Segars, A.H. (2001). Knowledge management: An organizational capabilities perspective, *Journal of Management Information Systems*, 18(1), 185-214.
- Gubeli, M.H. and Doloreux, D. (2005). An empirical study of university spin-off development, *European Journal of Innovation Management*, 8(3), 269-282.
- Gurul, Y. and Atsan, N. (2006). Entrepreneurial characteristics amongst university students: Some insights for entrepreneurship education and training in Turkey, *Education and Training*, 48(1), 25-38.
- Hair, J. F., Hult, G. T. M., Ringle, C. M. and Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)*. 2nd ed. Thousand Oaks, CA: Sage.
- Handaru, A.W., Waspado, A. and Carolina, C. (2013). Motivational factors, entrepreneurship, gender, and parental background: Evidence from the tailor's guild at Sunan Giri traditional market, Jakarta, Indonesia, *China-USA Business Review*, 12(6), 627-635.
- Hayter, C.S., Lubynsky, R. and Maroulis, S. J. (2016). Who is the academic entrepreneur? The role of graduate students in the development of university spinoffs, *Journal of Technology Transfer*, 41(4), 1-18.
- Henseler, J., Ringle, C. M. and Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modelling, *Journal of the Academy of Marketing Science*, 43(1), 115-135.
- Henseler, J., Ringle, C. M. and Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. In *Advances in international marketing* (Eds.) R. R. Sinkovics, R.R. and Ghauri, P.N. England: Emerald: Bingley, 20, 277-320.
- Hughes, K. D., Jennings, J. E., Brush, C.G., Carter, S. and Welter, F. (2012). Extending women's entrepreneurship research in new directions, *Entrepreneurship Theory and Practice* 36(3), 429-442.
- Karabulut, A.T. (2016). Personality traits on entrepreneurial intention, *Social and Behavioral Sciences*, 229, 12-21.
- Karanja, T.W., Ithinji, G.K. and Nyaboga, A. (2016). The contribution of personality trait in entrepreneurial intentions among university students in Kenya, *International Journal of Economics, Commerce and Management*, IV(7), 64-82.
- Karimi, S., Harm, J.A., Biemans, T. L., Chizari, M. and Mulder, M. (2014). Effects of role models and gender on students' entrepreneurial intentions, *European Journal of Training and Development*, 38(1), 694-727.

- Karimi, S., Chizari, M., Biemans, H.J.A. and Mulder, M. (2010). Entrepreneurship education in Iranian higher education: The current state and challenges, *European Journal of Scientific Research*, 48(1), 35-50.
- Kline, R. B. (2011). *Principles and practice of structural equation modeling*. New York: Guilford Press.
- Koe, W.L. (2016). The relationship between individual entrepreneurial orientation and entrepreneurial intention, *Journal of Global Entrepreneurship Research*, 6(13), 1-11.
- Law, K.M.Y. and Breznik, K. (2016). Impacts of innovativeness and attitude on entrepreneurial intention: Among engineering and non-engineering students, *International Journal of Technology and Design Education*, 1-8.
- Leire, M., Rosa, C., Juan, I.I. and Nekane, E. (2016). Factors fostering students' spin-off firm formation: An empirical comparative study of universities from North and South Europe, *Journal of Management Development*, 35(6), 814-846.
- Linan, F. and Chen, Y. (2009). Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions, *Entrepreneurship: Theory and Practice*, 33(3), 593-617.
- Littunen, H. (2000). Entrepreneurship and characteristics of the entrepreneurial personality, *International Journal of Entrepreneurial Behavior & Research*, 6(6), 295-309.
- Luthje, C. and Franke, N. (2003). The 'making' of an entrepreneur: Testing a model of entrepreneurial intent among engineering students at MIT, *R&D Management*, 33(2), 135-148.
- Manbachi, A., Kreamer-Tonin, K., Walch, P., Gamo, N.J., Khoshakhlagh, P., Zhang, Y.S., Montague, C., Acharya, S., Logsdon, E.A., Allen, R.H., Durr, N.J., Luciano, M.G., Theodore, N., Brem, H. and Yazdi, Y. (2018). Starting a medical technology venture as a young academic innovator or student entrepreneur, *Annals of Biomedical Engineering*, 46(1), 1-13.
- Manik, E. and Sidharta, I. (2016). Entrepreneurial intention on studentpreneurs to become entrepreneur, *International Review of Management and Marketing*, 6(3), 625-630.
- McClelland, D.C. (1961). *The achieving society*. Princeton, NJ: Van Nostrand.
- Molino, M., Dolce, V., Cortese, C.G. and Ghislieri, C. (2018). Personality and social support as determinants of entrepreneurial intention. Gender differences in Italy, *PLoS ONE*, 13(6), e0199924. <https://doi.org/10.1371/journal.pone.0199924>
- Murugesan, R. and Jayavelu, R. (2017). The influence of big five personality traits and self-efficacy on entrepreneurial intention: The role of gender, *Journal of Entrepreneurship and Innovation in Emerging Economies*, 3(1), 41-61.
- Nasip, S., Amirul, S.R., Sondoh Jr, S.L. and Tanakinjal, G.H. (2017). Psychological characteristics and entrepreneurial intention: A study among university students in North Borneo, Malaysia, *Education and Training*, 59(7/8), 825-840.
- Nowinski, W., Haddoud, M.Y., Lancaric, D., Egerova, D. and Czegledi, C. (2017). The impact of entrepreneurship education, entrepreneurial self-efficacy and gender on entrepreneurial intentions of university students in the Visegrad countries. *Studies in Higher Education*. doi10.1080/03075079.2017.1365359
- Ojewumi, A.K., Oyeleke, J.T., Agberotimi, F. and Adedayo, O. (2018). Obafemi Awolowo university undergraduate students: The influence of gender and self-efficacy on entrepreneurial intentions, *Africology: The Journal of Pan African Studies*, 11(2), 168-185.

- Pihie, Z.A.L. and Bagheri, A. (2013). Self-efficacy and entrepreneurial intention: The mediation effect of self-regulation. *Vacations and Learning*, doi10.1007/s12186-013-9101-9
- Pinho, J.C. and de Sa, E.S. (2014). Personal characteristics, business relationships and entrepreneurial performance, *Journal of Small Business and Enterprise Development*, 21(2), 284-300.
- Ramoni, S.A. (2016). Determinants of entrepreneurial intention among Nigerian university graduates, *World Journal of Social Sciences*, 6(1), 45-59.
- Ryan, J.C., Tipu, S.A. and Zeffane, R.M. (2011). Need for achievement and entrepreneurial potential: A study of young adults in the UAE, *Education, Business and Society: Contemporary Middle Eastern Issues*, 4(3), 153-166.
- Sabiu, I.J., Abdullah, A.A. and Amin, A. (2017). Impact of motivation and personality characteristics on Bumiputeras' entrepreneurial persistence in Malaysia, *Journal of Development Entrepreneurship*, 22(2), DOI: 10.1142/S1084946717500091
- Saleh, H.A. (2014). The perceptions of the Lebanese of choosing their career in entrepreneurship, *Jordan Journal of Business Administration*, 10(2), 333-364.
- Sanchez, J.C and Licciardello, O. (2012). Gender differences and attitudes in entrepreneurial intentions: The role of career choice, *Journal of Women's Entrepreneurship and Education*, 1(2), 7-27.
- Santos, F.J., Roomi, M.A. and Linan, F. (2016). About gender differences and the social environment in the development of entrepreneurial intentions, *Journal of Small Business Management*, 54(1), 49-66.
- Sarstedt, M., Henseler, J. and Ringle, C. (2011). Multigroup analysis in partial least squares (PLS) path modeling: Alternative methods and empirical results, *Advances in International Marketing*, 22, 195-218.
- Shaver, K.G. and Scott, L.R. (1991). Person, process, choice: The psychology of new venture creation, *Entrepreneurship: Theory and Practice*, 16, 23-45.
- Shinnar, R.S., Hsu, D.K., Powell, B.C. and Zhou, H. (2018). Entrepreneurial intentions and start-ups: Are women or men more likely to enact their intentions? *International Small Business Journal*, 36(1), 60-80.
- Solesvik, M.Z. (2017). A cross-national study of personal initiative as a mediator between self-efficacy and entrepreneurial intentions, *Journal of East-West Business*, 23(3), 215-237.
- Thompson, E.R. (2009) Entrepreneurial intent: Construct clarification and development of an internationally reliable metric, *Entrepreneurship Theory Practice*, 33(3), 669-694.
- Tunkarimu, T.I. and Hassan, Z. (2017). Entrepreneurial characteristics among local & foreign students studying in Malaysia: The role of gender, *International Journal of Education, Learning and Training*, 2(1), 12-27.
- Wood, R. and Bandura, A. (1989). Social cognitive theory of organizational management, *Academy of Management Review*, 14(3), 361-384.
- Yukongdi, V. and Lopa, N.Z. (2017). Entrepreneurial intention: A study of individual, situational and gender differences, *Journal of Small Business and Enterprise Development*, 24(2), 333-352.
- Zahari, A.R., Muhamad Tamyez, P.F., Azizan, N.A. and Hashim, F. (2018). Student spin-off intentions in Malaysian higher educational institutions: Founders' characteristics and university roles, *Journal of Entrepreneurship Education*, 21(Special Issues), 1-15.