

The Enablers of Student Spin-Offs Intention: A Study in Malaysian Higher Educational Institutions

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Abstract

Purpose: This study aims to investigate the enablers (founders' characteristics, university roles and entrepreneurial environments) of student spin-offs intention.

Design/methodology/approach: The data were collected using cluster sampling method. Respondents in eleven Malaysian public universities were approached using an online survey questionnaire. Of these, 369 completed questionnaires were obtained for further analysis. Data was analysed using Partial Least Square-Structural Equation Modelling.

Findings: The results show that four of founders' characteristics such as need for achievement, innovativeness, propensity of risk taking and self-efficacy have positively influence student spin-offs intention. In addition, three constructs like locus of control, university roles and entrepreneurial environments clearly unable to associate with student spin-offs intention.

Research limitations/implications: Future studies should include other enablers of student spin-offs intention. Furthermore, longitudinal and qualitative study should also be deployed in the future studies.

Practical implications: The results of this study may help universities and policymakers to identify the enablers of student spin-offs in which could be used to generate more student spin-offs firms in the future.

Originality/value: This study deliberates the enablers of student spin-offs intention, where this issue is relatively new in Malaysia. Also, it may help to achieve the intentions of government to create a job creator community among university students.

Keywords: Founders' Characteristics, University Roles, Entrepreneurial Environments, Student Spin-Offs Intention

Introduction

According to Department of Statistics Malaysia (2017), there were 508,800 unemployed people in October 2017, with the majority of them being undergraduates. The gaps between supply and demand in labor market is not only contributed to the problem of graduate

unemployment but also had damaged the effectiveness of public and private investment in higher educational institutions (Boateng and Ofori, 2002). Numerous solutions are being offered by the government to solve these issues and one of them is the promotion of entrepreneurship development among graduates (Central Bank of Malaysia, 2014). To support the development of student entrepreneurs, universities in Malaysia are actively taking part in facilitating entrepreneurship activities through the establishment of entrepreneurship professorships, departments and centers for entrepreneurship (Yusoff, Zainol and Ibrahim, 2015). On top of that, the Malaysian Ministry of Higher Education launched the Malaysia Education Blueprint (MEB): Higher Education 2015-2025 (2015) which centered on 10 shifts. The Shift-1 of MEB indicated that the Malaysian higher educational institutions (HEIs) should produce holistic, entrepreneurial, and balanced graduates in the future. Even though a wide variety of initiatives were established by policymakers and universities, the percentage of graduates becoming entrepreneurs is still very low. For examples, only 2347 of graduates became entrepreneurs in the year 2014, 2833 students in 2015 and being less than 7 % in 2016 (Ministry of Higher Education, 2017).

In recent years, the study of student spin-offs (SSO) among university students in developed countries has been the subject of increasing interest among scholars (Leire et al., 2016). Generally, SSO firms are founded by students attending programs in any faculty at a university (Bailetti, 2011). In addition, they are operating independently from the university whereby they have their own legal, technical, and commercial structures. More importantly, SSO will help to create self-employment for university students and contribute to greater local gross economic impact (Astebro and Bazzazian, 2011). In addition, USOs in Italy, Norway and the United Kingdom were also help to create more jobs (Fini et al., 2017).

In many occasions, opening up a new venture is always associated with an individual decision, which is why the individual's qualities as an entrepreneur are central in the examination of entrepreneurship field (Littunen, 2000). Past studies (Chatterjee and Das, 2015; Nasip et al., 2017) identified the personality traits or founders' characteristics have proven as the enablers to start a business among university students. Aside from founders' characteristics, other factors like university roles and entrepreneurial environments have also linked to entrepreneurial intentions among graduates (Khuong and An, 2016; Nowinski et al., 2017; Al Mamun et al., 2017). With limited studies on SSO in developing countries, this paper aims to examine the enablers of SSO intentions in Malaysian public HEIs by answering the following question: Do the enablers (founders' characteristics, university roles and entrepreneurial environments) contribute to SSO intentions. The results may help the policymakers and universities to generate job creators among university students.

Literature Review

Enablers of Student Spin-Offs

Individual with high entrepreneurial intentions is more likely to create a business compared to one with a lower entrepreneurial intention (Zeffane, 2012). Many past studies have focused on personal characteristics like independence, previous work experience, self-efficacy, locus of control, risk taking, the achievement of higher education and skills as predictors of entrepreneurial activity and championing of new ventures (Walter and Heinrichs, 2015). Moreover, recent studies by Nasip et al., (2017) and Al Mamun et al., (2017) explained that the emergence of student entrepreneur is mostly influenced by founders' characteristics namely a

need for achievement, innovativeness, propensity for risk taking, locus of control and self-efficacy. McClelland (1961) introduces the need for achievement concept with insightful empirical evidence (obtained through several methods) on the existence of a connection between the need for achievement and (business) development. Davidsson (1989) also believe there is a strong link between the need for achievement and entrepreneurial behavior, and consider that this need to achieve represents a crucial factor in entrepreneurial intentions. Other studies have indicated that 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).

The next key personality of founders' characteristics is innovativeness. Innovativeness is related to recognizing and acting on business activities in new and unique ways (Robinson et al., 1991) and heavily linked to an essential entrepreneurial characteristic (Schumpeter, 1934). Ghazali, Ibrahim and Zainol (2013) further 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. Previous studies (Karanja, Ithinji and Nyaboga, 2016; Koe, 2016) also revealed that entrepreneurial intention is associated with innovative students. Another key characteristic of an entrepreneur is a risk taking propensity. Risk taking propensity has been conceptualized by Sexton and Bowman (1985) as one's orientation toward taking chances in a decision making situation. Previous studies (Karanja et al., 2016; Al Mamun et al., 2017) have indicated that students who can manage risks are linked with high entrepreneurial intentions. Altinay et al., (2012) consider the locus of control as an individual's perception of his or her ability to influence events in life. Specifically, an internal control expectation is usually associated with entrepreneurial characteristics and success (Littunen, 2000). Past studies of Karanja et al., (2016) and Karabulut (2016) highlighted that students who have a high internal locus of control are more likely to become entrepreneurs than those with an external locus of control.

As explained by Wood and Bandura (1989), self-efficacy is an individual's perception regarding his or her ability to successfully complete a given task. The self-perceived competence of the founders of entrepreneurial firms is positively related to the entrepreneurial intention and performance (Hmieleski and Baron, 2008). According to Saleh (2014), students with a strong belief in personal capability or self-efficacy will have higher entrepreneurial intentions than those with low personal capability. This finding is supported in studies conducted by Manik and Sidharta (2016) and Solesvik (2017).

Undoubtedly, the role of universities in relation to entrepreneurship education is to promote and shape an entrepreneurial culture among students (Yusoff et al., 2015; Nowinski et al., 2017). More importantly, entrepreneurship education in universities is a significant contributor to spin-off creation in the longer term (Bigliardi et al., 2013). Besides entrepreneurship education, an entrepreneurially supportive environment, the roles of entrepreneurial centers and technology transfer office have encouraged entrepreneurial activities among university students (Keat, Selvarajah and Meyer, 2011). Entrepreneurial centers, the technology transfer office, or even universities in general, should build strong networks with industries, government agencies and financial institutions to drive SSO intentions (Saleh, 2014; Ankrah and Al-Tabbaa, 2015). Moreover, SSOs intentions can also be promoted through the

establishment of business incubators and university incentive policies or a rewards system (Piterou and Birch, 2014; Guerrero, Urbano and Gajon, 2017).

Entrepreneurial environments can be associated with a combination of factors that perform a role in the expansion or nurturing of entrepreneurship and entrepreneurial activities (Ahmad and Xavier, 2012). Past studies have revealed that the government can boost entrepreneurship through assistance programs such as tax breaks and other incentives, by keeping rules and regulations to a minimum as well as providing a favorable entrepreneurial environment and intention (Keat and Ahmad, 2012; Bigliardi et al., 2013). A study, carried out in Thailand and Hong Kong, of university students' perceptions of becoming entrepreneurs indicated that there are four categories of government assistance: financial support, a friendly business environment, technical support, creation of new markets and education and training programs (Moy et al., 2001). The findings were further supported by (Ibrahim and Mas'ud, 2016; Al Mamun et al., 2017). The information led to the following hypotheses:

- H1: The need for achievement positively influences SSO intentions.
- H2: Innovativeness positively influences SSO intentions.
- H3: A propensity for risk taking positively influences SSO intentions.
- H4: Locus of control positively influences SSO intentions.
- H5: Self-efficacy positively influences SSO intentions.
- H6: University roles positively influence SSO intentions.
- H7: Entrepreneurial environments positively influence SSO intentions.

Conceptual Framework

Student Spin-Offs Intention

Entrepreneurship is the process of a new venture creation and therefore SSOs intention is relatively important in this process because it shows the correlation between ideas and action (Bird, 1988). As a background to the theory, this study refers to most highly complementary model of individual behavior namely the Theory of Planned Behavior (Ajzen, 1991) to explain the entrepreneurial intentions. Ajzen's model explains and predicts how culture and social environments affect human behavior. Ajzen (2005) further added the factor of individual background such as age, gender, tribes, economic-social status, personal characteristics, personal traits, and knowledge into the Theory of Planned Behavior. This theory has obtained support from many past researchers (e.g. Manik and Sidharta, 2016; Nasip et al., 2017; Yukongdi and Lofa, 2017). The conceptual framework (see Figure 1) sets out the relationship between enablers and SSO intentions constructs. Specifically, there are seven hypotheses that have been developed in the current study.

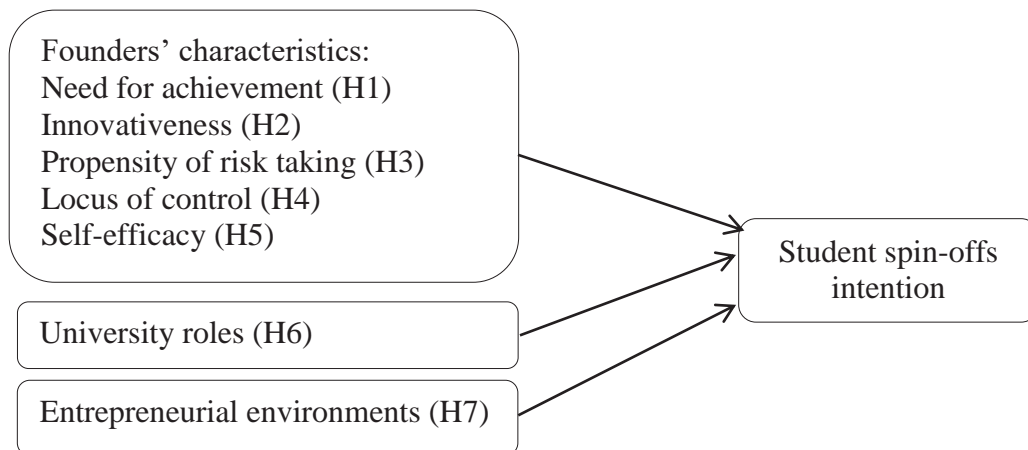


Figure 1: Relationship between enablers and student spin-offs intention

Method

750 potential respondents were approached online (email) to participate in the study during the data collection period (June 2017). Of the 750 email addresses, 21 emails failed to be delivered to the recipients (respondents) due to incorrect email addresses. Finally, a total of 369 completed questionnaires were gathered for this study and resulted to 50.6 % of response rate. In addition, this study applied a cluster sampling technique to capture the respondents. The data set of population (SSO founders) is gathered from entrepreneurship centers in Malaysian public HEIs. The SSO founders have been selected as the respondents in this study because they have established the SSO firms in the university. Therefore, their experiences could be used to verify the factors that influence SSO intentions as suggested in the entrepreneurship literatures.

With regards to respondents' profile, more than half of the respondents were female (59.1 %) and 40.9 % were male. The majority of the respondents (86.7 %) were aged between 21 and 25, followed by 20 years of age and below, at 6.5 %. With regards to ethnicity, almost all of respondents (85.6 %) were Malay, 6.5 % (Chinese) and 4.9 % (Indian). As for place of origin, 52.5 % respondents were from urban areas. Only 13.8 % of the respondents were postgraduate students and 85.4 % were undergraduate students. The majority of respondents were in year 2, 3 and 4 of their studies at 31.7 %, 31.4 % and 29.6 % respectively. Also, 63.4 % of participants were from focused university, followed by researched university (26.8 %) and comprehensive university at 9.8 %. Finally, the nature of the businesses operated by respondents were mostly service oriented at 54.2 % as compared to being product oriented which was recorded at 45.8 %.

The questionnaire has been designed with two sections. The first section consists of items relating to the constructs while the second part consists of nine demographic questions. A total of 45 item questions were used to explain exogenous and endogenous constructs by using a five-point scale ranging from one (strongly disagree) to five (strongly agree). Founders' characteristics construct consists of five personalities and have contributed to 20 items scale. The items were adapted from Dinis et al., (2013), Pihie and Bagheri (2013) and Davidsson (1995). Further, the university roles construct was measured with the seven-item scale that are developed by Turker and Selcuk (2009), Keat et al., (2011), Hofer et al., (2010) and Goldstein et al., (2013). Moreover, four-item scale was used to measure entrepreneurial environments which is developed

from the past works of Turker and Selcuk (2009). Finally, the exogenous construct was measured with six-item scale that is developed by Linan and Chen (2009). All constructs were measured using reflective indicators which show effects on variables (Jarvis et al., 2003).

The partial least squares method does not require a multivariate normal data distribution, therefore, this study tested multivariate normality using the IBM SPSS Statistics for Windows, Version 24. The results of multivariate skewness, kurtosis coefficients and Kolmogorov-Smirnov were less than two, seven and .050 respectively, confirming non-normality (West et al., 1995). In this study, the measurement of the research constructs relied solely on the judgment of single individuals (founders of SSOs) which could result in common method bias. Due to this, Harman's single-factor test (recommended by Podsakoff et al., 2003) was used to check a common method bias. The percentage variance of a single factor was at 28.8 %, less than the threshold value. Also, a correlation analysis used to examine common method bias. A correlation among the constructs of more than .90 is considered an indicator of common method bias (Bagozzi, Yi and Phillips, 1991). Hence, there is no common method bias that will affect the data or the results.

Findings

This study conducted a confirmatory factor analysis (partial least squares-structural equation modelling: Smart PLS 3.0) to check the properties of the latent constructs in the proposed research model. The first step in a PLS-SEM is to examine a measurement model. In order to establish the significance and the relative importance of the factor loading, this study has adopted the guidelines recommended by Duarte and Raposo (2010) and Hair et al., (2017), in which indicators with loadings equal to or greater than .50 will be accepted. No single item is deleted because the loadings values are above acceptable benchmark of .50 (see Table 1). Moreover, the reliability/internal consistency of the constructs were determined by using the composite reliability (CR). The CR values were above .70, thus, the constructs were considered reliable (Hair et al., 2017). Next, convergent validity is accessed through average variance extracted (AVE). The values of AVE for all constructs were above the accepted value of .50 (Fornell and Larcker, 1981), indicates satisfied requirement for the convergent validity.

Table 1: Results of Measurement Model

Construct	Indicator	Loading	CR	AVE
Need for achievement	NA1	.821	.858	.604
	NA2	.620		
	NA3	.838		
	NA4	.811		
Innovativeness	IN1	.717	.832	.554
	IN2	.800		
	IN3	.701		
	IN4	.755		
Propensity of risk taking	RT1	.808	.863	.613
	RT2	.728		
	RT3	.812		
	RT4	.780		

Locus of control	LC1	.639	.843	.575
	LC2	.829		
	LC3	.770		
	LC4	.781		
Self-efficacy	SE1	.847	.896	.684
	SE2	.745		
	SE3	.871		
	SE4	.840		
University roles	UR1	.832	.912	.601
	UR2	.854		
	UR3	.848		
	UR4	.839		
	UR5	.667		
	UR6	.708		
	UR7	.645		
Entrepreneurial environments	EE1	.713	.833	.557
	EE2	.822		
	EE3	.637		
	EE4	.799		
SSO intentions	SI1	.850	.959	.796
	SI2	.881		
	SI3	.890		
	SI4	.908		
	SI5	.919		
	SI6	.904		

Note: CR = Composite reliability, AVE = Average variance extracted

This study used the Heterotrait-Monotrait Ratio (HTMT) ratio of correlations approach to determine the discriminant validity of the constructs as suggested by Henseler, Ringle and Sarstedt (2015) because the previous methods have shortcomings. The current study applied a technique called the criterion or statistical test, where the HTMT value should not be greater than the HTMT.85 value of 0.85 (Kline, 2011). As shown in Table 2, all values have passed HTMT.85 (Kline, 2011). Thus, the discriminant validity has been established for the research constructs.

Table 2: HTMT Criterion

	EE	IN	LC	NA	RT	SE	SI	UR
Entrepreneurial environments (EE)								
Innovativeness (IN)	.380*							
Locus of control (LC)	.491	.672						
Propensity of risk taking (RT)	.486	.738	.640	.683				
Self-efficacy (SE)	.461	.692	.525	.617	.664			

SSO intentions (SI)	.388	.688	.551	.661	.656	.613	
University roles (UR)	.620	.361	.306	.398	.270	.523	.333

Note: * The criterion for HTMT ratio is below 0.85.

The second step in PLS-SEM analysis is to establish a structural model in which the path coefficient between two latent variables is assessed. To obtain the results, a bootstrapping procedure with 5000 re-sampling was applied (Hair et al. 2017). There are four paths which were not statistically significant; the paths included LC→SI, UR→SI and EE→SI, whereas the paths of NA→SI, IN→SI, RT→SI and SE→SI were significant (see Table 3). The coefficients of LC→SI, UR→SI and EE→SI were very small and considered not significant. Therefore Hypothesis H4, H6 and H7 were not supported. The path coefficients of NA→SI, IN→SI, RT→SI and SE→SI were good and considered significant. Thus, Hypothesis H1, H2, H3 and H5 were supported.

Table 3: Path Coefficient and Hypothesis Testing

Hypothesis	Relationship	Beta	t-value	Supported	R ²	f ²	Q ²	q ²
H1	NA→SI	.191*	3.034	Yes	.503	.034	.368	.021
H2	IN→SI	.214**	3.839	Yes		.048		.027
H3	RT→SI	.212**	3.312	Yes		.046		.027
H4	LC→SI	.046	.802	No		.002		.000
H5	SE→SI	.172*	2.702	Yes		.030		.016
H6	UR→SI	.050	.933	No		.004		.002
H7	EE→SI	.032	.641	No		.002		.000

Note: *p<0.05; **p<0.01; NA = Need for achievement; IN = Innovativeness; RT = Propensity of risk taking; LC = Locus of control; SE = Self-efficacy; UR = University roles; EE = Entrepreneurial environments; SI = SSO intentions.

The R² value was reported at .503 and considered moderate (Chin, 1998). The research model of this study explains the 50.3 % variation in the SSO intentions construct was accounted for by its founders' characteristics, university roles, entrepreneurial environments and perception of barriers constructs. To quantify the significant effects, this study assessed the effect sizes (f²). The results of f² for all constructs were considered as very weak and small effect sizes (Cohen, 1988). Furthermore, the Q² value for SSO intentions was .368, indicating high predictive relevance (Chin, 2010). The relative impact of predictive relevance can be determined by comparing to q² effect size. Table 3 shows that all constructs except for locus of control, university roles and entrepreneurial environments contributed only small effects on SSO intentions (Cohen, 1988).

Discussion and Conclusions

The purpose of this study was to examine the role of enablers such as founders' characteristics, university roles and entrepreneurial environments on SSO intentions. First, the findings proved that the founders' characteristics such as need for achievement (H1), innovativeness (H2), propensity of risk taking (H3) and self-efficacy (H5) were found to be positive and significantly associated with SSO intentions. These findings are consistent with previous research (e.g. Koe, 2016; Manik and Sidharta, 2016; Solesvik, 2017; Al Mamun et al., 2017; Nasip et al., 2017; Yukongdi and Lofa, 2017). By contrast to earlier findings in literature,

this study was unable to make a connection between locus of control (H4) and SSO intentions. A possible explanation for this might be that the founders of SSOs have less belief in their own capabilities to successfully engage in the creation of new ventures (Fietze and Boyd, 2017). However, the findings are in agreement with several studies such as Uddin and Bose (2012) and Nasip et al., (2017) who found out that there was no significant relationship between locus of control and entrepreneurial intention among students in Bangladesh, Portugal and Malaysia respectively.

Second, this study has been unable to demonstrate that university roles (H6) are significant for SSO intentions among SSO founders in Malaysian public HEIs. These findings aligned with previous works (e.g. Keat and Nasiru, 2015; Mustafa et al., 2016; Nowinski et al., 2017; Guerrero et al., 2017). Third, analysis confirmed a negative link between entrepreneurial environments (H7) and SSO intentions. The similar findings to this study can be found in the studies by Turker and Selcuk (2009), Hadian et al., (2015), Khuong and An (2016) and Trivedi (2017). This study aligned and supported by the Theory of Planned Behavior because only two proposed relationship are supported. Meanwhile, findings of this study give insight understanding regarding the application of Theory of Planned Behavior to understand the under-study constructs. This study elaborated the crucial role of enablers of SSO intentions.

To conclude, the findings confirmed that SSO founders' characteristics did impact SSO intentions. In contrast, university roles and entrepreneurial environments have been unable to associate with SSO intention among SSO founders in Malaysian public HEIs. Overall, the findings highlighted the importance of university students having the characteristics (need for achievement, innovativeness, propensity of risk taking and self-efficacy) if they wish to become student entrepreneurs. This study will facilitate the universities and policymakers to improve their roles in helping the university to achieve Shift-1 of MEB and generating job creators among graduates.

This study is not without its limitations. Firstly, the study was conducted in public HEIs in Malaysia and may limit the generalizability of the findings. Thus, future studies can replicate the present study in different settings would further support the research model. Secondly, the data was gathered using a cross-sectional design and confined to a single point of time. A supporting future studies using longitudinal and qualitative study may utilize some of the issues raised here. Finally, this study was able to make propositions regarding SSO founders' characteristics, university roles and entrepreneurial environments on SSO intentions but not concentrated to the other factors that associated to SSO intentions. Future studies should integrate other factors like social contexts as part of the enabler of SSO intentions.

References

- Ahmad, S. Z. and Xavier, S.R. (2012). Entrepreneurial environments and growth: Evidence from Malaysia GEM data, *Journal of Chinese Entrepreneurship*, 4(1), 50-69.
- Ajzen, I. (1991). The theory of planned behavior, *Organizational Behavior and Human Decision Process*, 50, 179-211.
- Ajzen, I. (2005). *Attitudes, personality and behavior*. 2nd edition. UK: Open University Press-McGraw Hill Education.
- 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.
- Ankrah, S. and Al-Tabbaa, O. (2015). Universities-industry collaboration: A systematic review, *Scandinavian Journal of Management*. doi:org/10.1016/j.scaman.2015.02.003
- Astebro, T. and Bazzazian, N. (2011). Universities, entrepreneurship and local economic development, in *Handbook of Research on Entrepreneurship and Regional Development*. Cheltenham: Edward Elgar.
- Bailetti, T. (2011). Fostering student entrepreneurship and university spinoff companies, *Technology Innovation Management Review*, 7-12.
- Bigliardi, B., Galati, F. and Verbano, C. (2013). Evaluating performance of university spin-off companies: Lessons from Italy, *Journal of Technology Management and Innovation*, 8 (2), 178-188.
- Bird, B. (1988). Implementing entrepreneurial ideas: The case for intention, *Academy of Management Review*, 13(3), 442-453.
- Boateng, K. and Ofori, S.E. (2002). An analytical study of the labour market for tertiary graduates in Ghana, (<https://www.modernghana.com/news/401569/1/solving-graduate-unemployment-in-ghana-1.html>). Accessed on June 2, 2016.
- Chatterjee, N. and Das, N. (2015). Key psychological factors as predictors of entrepreneurial success: A conceptual framework, *Academy of Entrepreneurship Journal*, 21(1), 102-114.
- Central Bank of Malaysia (2014). The 2014 budget speech, (<http://www.bnm.gov.my/index.>). Accessed on May 21, 2016.
- Chin, W.W. (2010). How to write up and report PLS analyses, in *Handbook of partial least squares: Concepts, methods and applications*. Ed. V., Esposito Vinci, W.W., Chin, J., Henseler, and H., Wang. Heidelberg: Springer, 655-690.
- Chin, W. W. (1998). The partial least squares approach to structural equation modeling, in *Modern Methods for Business Research*. Ed. G.A., Marcoulides. Mahwah, New Jersey: Lawrence Erlbaum Associates, 295-336.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. New York: Routledge Academic.
- Davidsson, P. (1989). *Continued entrepreneurship and small firm business*. Stockholm: Stockholm School of Economics.
- Davidsson, P. (1995). Determinants of entrepreneurial intentions, working paper presented at the annual meeting of the Rent IX Workshop, Piacenza, Italy.
- Department of Statistics Malaysia (2017). Key statistics of labor force in Malaysia, October 2017, (<https://www.dosm.gov.my/v1/index.>) Accessed on Nov. 30, 2017.
- 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*. Ed. V., Esposito Vinzi, W.W., Chin, J., Henseler, and H., Wang. New York: Springer Berlin Heidelberg, 449-485.

- Fietze, S. and Boyd, B. (2017). Entrepreneurial intention of Danish students: A correspondence analysis, *International Journal of Entrepreneurial Behavior and Research*, 23(4), 656-672.
- Fini, R., Fu, K., Mathisen, M.T., Rasmussen, E. and Wright, M. (2017). Institutional determinants of university spin-off quantity and quality: A longitudinal, multilevel, cross country study, *Small Business Economics*, 48(2), 361-391.
- 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.
- Goldstein, H., Peer, V. and Sedlacek, S. (2013). Vienna as a region of knowledge: Increasing the generation of university spin-offs, *Vienna Chamber of Commerce (WKW)*, 44.
- Guerrero, M., Urbano, D. and Gajon, E. (2017). Higher education entrepreneurial ecosystems: Exploring the role of business incubators in an emerging economy, *International Review of Entrepreneurship*, 15(2), 175-202.
- 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 edition. Thousand Oaks, CA: Sage.
- Henseler, J., C. M., Ringle, C. M. and Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling, *Journal of the Academy of Marketing Sciences*, 43(1), 115-135.
- Hmieleski, K.M. and Baron, R.A. (2008). When does entrepreneurial self-efficacy enhance versus reduce firm performance?, *Strategic Entrepreneurship Journal*, 2(1), 57-72.
- Hofer, A.R., Potter, J., Fayolle, A., Gulbrandsen, M., Hannon, P., Harding, R., Dahlstrand, A.L. and Phan, P.H. (2010). From strategy to practice in university entrepreneurship support: Strengthening entrepreneurship and local economic development in Eastern Germany: Youth, entrepreneurship and innovation, working paper presented at OECD Local Economic and Employment Development (LEED). OECD Publishing. doi:org/10.1787/5km7rq1xvnxp-en
- Iakovleva T.A., Kolvereid, L., Gorgievski, M.J. and Sorhaug, O. (2014). Comparison of perceived barriers to entrepreneurship in Eastern and Western European countries, *International Journal of Entrepreneurship and Innovation Management*, 18(2/3), 115-133.
- Ibrahim, N.A. and Mas'ud, A. (2016). Moderating role of entrepreneurial orientation on the relationship between entrepreneurial skills, environmental factors and entrepreneurial intention: A PLS approach, *Management Science Letters*, 6(3), 225-236.
- Jarvis, C. B., MacKenzie, S. B. and Podsakoff, P. M. (2003). A critical review of construct indicators and measurement model misspecification in marketing and consumer research, *Journal of Consumer Research*, 30(2), 199-218.
- 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.

- Keat, O. Y., Selvarajah, C. and Meyer, D. (2011). Inclination towards entrepreneurship among university students: An empirical study of Malaysian university students, *International Journal of Business and Social Sciences*, 2(4), 206-220.
- Keat, O. Y., and S., Ahmad (2012). A study among university students in business start-ups in Malaysia: Motivations and obstacles to become entrepreneurs, *International Journal of Business and Social Science*, 3(19), 181-192.
- Keat, O. Y. and Nasiru, A. (2015). Perceived effective entrepreneurship education and entrepreneurial intention: The role of the perception of university support and perceived creativity disposition, *Journal of Education and Vocational Research*, 6(2), 70-79.
- Khuong, M. N. and An, H.U. (2016). The factors affecting entrepreneurial intention of the students of Vietnam National University - A mediation analysis of perception toward entrepreneurship, *Journal of Economics, Business and Management*, 4(2), 101-111.
- 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.
- 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 and Research*, 6(6), 295-309.
- 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.
- Ministry of Higher Education (2017). Graduate tracer study 2017, (<http://graduan.mohe.gov.my/skpgreport/Dashboard/TrendSektorPekerjaan.aspx>). Accessed on Feb. 24, 2017.
- Ministry of Higher Education (2015). Malaysia Education Blueprint 2015-2025: Higher Education, (<https://www.mohe.gov.my/en/download/public/penerbitan/pppm-2015-2025-pt/5-malaysia-education-blueprint-2015-2025-higher-education>). Accessed on July 21, 2016.
- Moy, J., Luk, V., Sheehan, B. and Sammapan, N. (2001). A comparative study on the perceptions of university business students in Hong Kong and Thailand: Why do they become entrepreneurs?, BRC working papers. (<http://net2.hkbu.edu.hk/~ied/publications/wp/WP200102.pdf>). Accessed on July 25, 2016.
- Mustafa, M.J., Hernandez, E., Mahon, C. and Chee, L.K. (2016). Entrepreneurial intentions of university students in an emerging economy: The influence of university support and proactive personality on students' entrepreneurial intention, *Journal of Entrepreneurship in Emerging Economies*, 8(2), 162-179.
- 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
- 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
- Piterou, A. and Birch, C. (2014). The role of higher education institutions in supporting innovation in SMEs: University-based incubators and student internships as knowledge transfer tools, *The Journal of Innovation Impact*, 7(1), 72-79.
- Podsakoff, P. M., MacKenzie, S.B., Lee, J.-Y. and Podsakoff, N.P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies, *Journal of Applied Psychology*, 88(5), 879-903.
- Robinson, P.B., Stimpson, D.V., Huefner, J.C. and Hunt, H.K. (1991). An attitude approach to the prediction of entrepreneurship, *Entrepreneurship: Theory and Practice* (5), 13-31.
- Saleh, H.A. (2014). The perceptions of the Lebanese of choosing their career in entrepreneurship, *Jordan Journal of Business Administration*, 10 (2), 333-364.
- Schumpeter, J. (1934). *The theory of economic development*. Cambridge, MA: Harvard University Press.
- Sexton, D.L. and Bowman, N. (1985). The entrepreneur: A capable executive and more, *Journal of Business Venturing*, 1(1), 129-140.
- 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.
- Trivedi, R.H. (2017). Entrepreneurial-intention constraint model: A comparative analysis among post-graduate management students in India, Singapore and Malaysia, *International Entrepreneurship and Management Journal*, 1-23.
- Turker, D. and Selcuk, S.S. (2009). Which factors affect entrepreneurial intention of university students?, *Journal of European Industrial Training*, 33(2), 142-159.
- Uddin, M. R. and Bose, T.K. (2012). Determinants of entrepreneurial intention of business students in Bangladesh, *International Journal of Business and Management*, 7(24), 128-137.
- Walter, S.G. and Heinrichs, S. (2015). Who becomes an entrepreneur? A 30-years-review of individual-level research, *Journal of Small Business and Enterprise Development*, 22(2), 225-248.
- West, S.G., Finch, J.F. and Curran, P.J. (1995). Structural equation models with non-normal variables: Problems and remedies, in *Structural equation modeling: Concepts, issues and applications*. Ed. R.H., Hoyle. Newbery Park, CA: Sage, 56-75.
- 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.
- Yusoff, M.N.H., Zainol, F.A. and Ibrahim, M.D. (2015). Entrepreneurship education in Malaysia's institutions of higher learning-A review of the current practices, *International Education Studies*, 8(1), 17-28.

Zeffane, R. (2012). Gender and youth entrepreneurial potential: Evidence from the United Arab Emirates, *International Journal of Business and Management*, 8(1), 60-72.