

Academics Entrepreneurial Orientation and Research Commercialization: Role of Technology Transfer Office

WIRYA NAJM RASHID, KAMARIAH ISMAIL
Department of Management, Faculty of Management
Universiti Teknologi Malaysia
Johor Bahru, 81310, Johor
MALAYSIA
wiryarashid@gmail.com, m-maria@utm.my

Abstract: - Universities are unique in sense that they hold the key to inventions and innovations in the form of highly capable human resource. This human resource if provided with suitable environment and support exhibits entrepreneurial behavior. The present study is an attempt to investigate the moderating role of technology transfer office on the relationship between academic's entrepreneurial orientation and commercialization of academic research. The study is conducted in Malaysian five research universities focusing on two faculties of science and technology and engineering. Sample for the study comprised of academic researchers engaged in R&D activities and belonging to the two faculties. The results indicate that TTO significantly influences the relationship. The results of the study are significant for the university management and researchers. The study recommends future course of action for researchers interested in pursuing the subject area.

Key-Words: - Entrepreneurial orientation, commercialization, research universities, technology transfer office, academic researcher, Malaysia.

1 Introduction

Universities are the traditional custodians of learning, knowledge and technology. They are unique as they hold the key to innovations and inventions. The key is the faculty and researchers that are continuously involved in R&D activities. Thus, faculty is the source of all R&D activities that happens within university. The faculty needs to have entrepreneurial orientation if they want to be involved in entrepreneurial activities. These entrepreneurial activities are helped by the support structures in the form of technology transfer offices established in universities around the world to enhance commercialization of academic research.

Researchers are of the view that increasing entrepreneurial activities in the universities have left universities with no choice but to re-invent their operational activities and engage themselves in entrepreneurial activities to remain competitive globally [18]. Though entrepreneurial activities are associated with the profit making but universities engagement in entrepreneurial activities is merely to stay economically healthy. Hence, innovation and commercialization has become an essential agenda for universities to survive in the competitive environment [16].

It has been highlighted that points out that the traditional academic viewpoint dictates universities to have sole focus of teaching, learning and research and not involve in commercial activities [10]. This traditional academic thinking has been the result of continuous government funding [8],[25]. In the public protected environment there was no pressing need for universities to change their previous academic philosophies; hence there was reluctance on their part to enter into the marketplace [32],[7],[17]. However, due to increased competition in the higher education system worldwide, where public and private sector universities strive for funding from both public and private sectors, as well as the government emphasis on universities to engage into research and development for knowledge and technology development has compelled these universities to venture into entrepreneurial activities [13],[31],[38],[5].

Rauch et al. [44] highlights that even though the field of entrepreneurship is relatively new to the university environment; commercialization of academic research depends on the university support to encourage academic staff to commercialize their research [10]. Two things are important if universities want to engage in commercialization

activities: university support structure such as technology transfer office and entrepreneurial orientation of the academic staff and researchers. O'Shea et al. [41] have highlighted that the entrepreneurial disposition and individual's abilities are important in shaping the individual's behavior regarding commercialization. Similarly, Jain et al. [29] have also highlighted the missing link that is the university scientist whose disposition towards entrepreneurial activity is the key to emergence of knowledge intensive fields.

The increased entrepreneurial activities engaged by the universities across the globe has mainly been attributed to the establishment of special support structures in the form of Technology Transfer Offices (TTO) and incubator centres [39],[6],[26]. Technology Transfer Offices have become critical in transferring research results to private companies in the form of licensed technologies [26],[11] through its capable and expert staffing and reward systems [6],[24],[52],[21]. The TTO have become the gatekeepers and boundary spanners in the technology transfer and commercialization activities undertaken by the research universities [55],[6],[50].

The present study is an attempt to investigate the entrepreneurial orientation of the academic researchers towards commercialization with the moderating role of technology transfer office. The context is the Malaysian research universities engaged in R&D activities for commercialization purposes. The sample has been taken from two faculties of five Malaysian research universities. These faculties are engineering and science and technology. These two faculties have been targeted because of their role in R&D activities and subsequently commercialization.

Malaysia is a developing country ranked in the upper middle income group and is looking to join the high income bracket by 2020. The country is striving hard to attain this goal by enacting policies and measures that help in the overall economic development of the country. In this scenario, the role of higher education institutions has been highly emphasized. It has been highlighted that Malaysia is still behind in terms of its research capabilities [4] and in fact has entered the commercialization game very recently, which is reflected through a small percentage of R&D output in the form of commercialized product [28],[2].

2 Literature Review

Litan and Mitchel [36] point out that the degree of an entrepreneurial orientation in public institutions like universities has not been investigated.

Entrepreneurial orientation in universities may be reflected in the way entrepreneurship is viewed within the university, the manner in which risk-taking is considered in performance reviews, or the means by which success is measured [49], [45]. Kenney and Patton [31] suggest that today's universities need to develop entrepreneurial skills and traits. Hence, there is a need for perception of the importance of the market in forming a new philosophy for the future of higher education with respects to traditional academic principles [35],[31].

O'Shea et al. [42] highlights that the size and nature of financial resources allocated to universities influence academic entrepreneurship. This means that the greater industrial funding will attract more academicians to commercialize their innovations. Shane [48] is of the view that the nature of funding attracts opportunities for technology commercialization and the propensity of the academics to engage in technology transfer that may vary across fields. O'Shea et al. (2008) have highlighted that the entrepreneurial disposition and individual's abilities are important in shaping the individual's behavior regarding commercialization. Similarly, Roberts [46] found that academic entrepreneurs having extroverted personalities were more likely to engage in commercialization activity. He further concludes that personal characteristics like need for achievement, the desire for independence and an internal locus of control compel academics to become entrepreneurs.

Technology transfer is the process whereby inventions or IP from academic research is licensed or conveyed through use rights to industry. Universities, primarily through their knowledge production function, play an important role in the national innovation system [26]. The various stages involved include securing IP rights, prototype product and production process development, and compliance with regulatory standards and marketing activities. In Malaysia, with the government support universities have established TTOs to enhance the commercialization of academic research and to bring the new technologies to the market with emphasis on strong industry-university linkage [43], [26].

In order to improve university-industrial ties, universities operate technology transfer office as a vehicle to support the commercialization activity [23]. According to [53] technology transfer office plays an important role with respect to engendering academic entrepreneurship. This is achieved by engineering synergistic networks between academics and industry, advisors and managers who provide human and financial resources that are

necessary for spin-off formation, and by providing expertise, as many technology transfer office personnel have expertise in evaluating markets, writing business plans, raising capital, assembling teams and obtaining space and equipment.

There are many definitions of commercialization, but in simple words commercialization means; presenting or introducing a new product to market [52],[34],[26],[27]. According to Kenney and Patton [31] commercialization is a process through which developing and selling costs of a new product will be declined because, the extent to which the product is totally matched with its customer needs and wants, the selling of that product easily be carried out. Commercialization has also been termed as set of actions which convey knowledge to a product [30],[51],[22]. Similarly, Siegel, et al [50] is of the opinion that commercialization is the process of turning a creation or invention into a commercially viable service, product or process.

Bathelt et al. [1] recognized that the increased pressure for public research universities to be more accountable as well as to produce commercialized technology has compelled several public universities to pay more attention to the need to be dynamic and operate entrepreneurially. Similarly, Fini et al. [19] also mentions that within modern universities, attention to commercialization of university research has increased mainly due to recognition of the creation and implementation of new technology that drives economic development.

3 Methodology

The present study seeks to investigate the moderating effect of technology transfer office on the relationship between entrepreneurial orientation and academic commercialization. For the purpose the study uses survey method. The study focuses on the academic faculty members of science and technology and engineering faculties of five Malaysian research universities. The unit of analysis is individual researcher involved in R&D activities. The sample size of the study was 249 respondents selected through random sampling technique. The lists of all the faculty members of science and technology and engineering faculties of the five research universities were obtained from two sources: the first source was website and the second source was administrative offices of the targeted faculties. Using random table, respondents were selected.

The survey instrument for the study was designed to capture the perceptions of the respondents regarding entrepreneurial orientation,

academic commercialization and technology transfer office. The dependent variable of the study academic commercialization was measured using eleven items, adapted from the study of [54],[33],[40]. Independent variable of entrepreneurial orientation was measured using 23 items adapted from [37]; while technology transfer office as a moderating variable was measured using ten items adapted from the studies of [9],[14]. The items used 5-point Likert scale to show the level of agreement of the respondents. As the instrument was developed for technology transfer office and commercialization, it was subjected to factor analysis for validation purposes. The factor analysis results indicated that the instrument was valid and all the items were retained. Data collected was analyzed through Pearson correlation and regression analysis. Before applying regression, assumptions of regression were satisfied.

4 Results and Discussion

The present study investigated the relationship between entrepreneurial orientation and commercialization with the moderating role of technology transfer office. To establish the relationship between the variables, Pearson correlation was calculated. The results of correlation are shown in Table 1.

Table 1 Correlation matrix

	EO	TTO	Comm.
EO	1		
TTO	.143*	1	
Comm.	.481**	.216**	1

**Correlation significant at 0.01 level

*Correlation significant at 0.05 level

The correlation analysis shows that there exists significant positive relationship between EO and TTO ($r = 0.143$, $p < 0.05$) and EO and Comm. ($r = 0.481$, $p < 0.01$). The results indicate that the relationship between EO and TTO is of weak nature, while the relationship between EO and Comm. is strong in nature. This further illustrates that the presence of EO would help enhance commercialization. Similarly, the results indicate that there exist a positive significant relationship between TTO and commercialization ($r = 0.216$, $p < 0.01$). This shows that presence of TTO in a university would also help in enhancing commercialization process.

To check the moderating influence of TTO on the relationship between EO and commercialization, hierarchical regression was applied. Before regression was applied, assumptions of regression were satisfied. The results are presented in Table 2.

Table 2 Regression Analysis

Model	R	R ²	Adj .R ²	β	t	Sig.
EO	.481 ^a	.232	.229	.773	8.632	.000
TTO	.216	.047	.043	.225	3.478	.001
EO* TTO	.420	.177	.173	.094	7.277	.000
F 74.513, p < 0.01 a dependent variable: Commercialization						

In the first step of the moderation model, relationship of entrepreneurial orientation and commercialization has been evaluated. The result shows that EO has significant positive relationship with commercialization. The EO has a more positive influence on commercialization of research activities. In second step, relationship of technology transfer office and commercialization has been evaluated. The value of F statistics is 12.095 ($p < 0.01$). The value of beta coefficient is .225. This beta coefficient is significant here as revealed by t-statistics ($p < 0.01$). The third model indicates the interaction term of EO and TTO. The result indicates that model is significant here as indicated by F-Statistics (52.951, $p < 0.01$). The result further indicates that when TTO plays a moderating role, it brings a variation of 17.7% in the dependent variable. The value of beta coefficient is significant here. The t-statistics is 7.277 ($p < 0.01$). Significance of beta coefficient of the interaction term confirms that TTO plays a moderating role between the relationship of entrepreneurial orientation and Commercialization. The results do indicate that the influence of the product of EO*TTO is less as compared to when EO alone acts. This shows that EO acts independently of other variables. However, the results are significant for the interaction term of EO*TTO.

The results of the present study indicate that respondents view entrepreneurial orientation as the most significant of the factors in commercialization of academic research, which is influential in commercialization of academic research. Previous researches also point out that higher level of EO within the organization leads to increased performance, new market entry and new product

innovation and development [44],[47],[36]. In academic context, EO relates to the greater capacity of identifying opportunities and reacting to internal and external demands of competition [15],[20].

Previous researchers highlight that technology transfer offices are the entrepreneurial centers of the universities helping students and faculty members develop their skills by imparting trainings like technology commercialization, mentoring programs, incubator centers, entrepreneurship education, business plan competitions etc. [6],[21]. Similarly, researchers maintain that TTOs are the driving forces behind commercialization of university research by providing much needed resources in the form of expertise, financial and trainings [12],[53],[50],[43]. In addition, greater the level of entrepreneurial orientation in an organization, greater will be the success of that organization [3].

5 Conclusion

The study investigated the EO-Commercialization relationship with TTO as a moderator. The results provide empirical evidence that TTO when acts as a moderator influence the relationship between academics entrepreneurial orientation and their commercialization of research. The results of the study are significant for both policy makers of the higher education institutions and the TTO as well. A strong entrepreneurial climate with the university along with support of technology offices would not only motivate academic researchers to engage in entrepreneurial activities but would also help in enhancing the overall commercialization of R&D activities. The study is significant in the context of Malaysian research universities, as they are struggling to enhance their overall commercialization efforts. Malaysian universities especially research universities need to develop entrepreneurial culture and motivate their researchers to engage in entrepreneurial activities such as commercialization. This can be done by developing and providing enough resources to technology transfer offices so that they can help and motivate the researchers to be entrepreneurial in nature. The study is not without limitations. First the study only focused on two faculties and the sample was limited to academic researchers who were engaged in R&D activities in these two faculties. Inclusion of more faculties and researchers may affect the results of the study. Researchers whether from engineering and science and technology faculty or any other faculty for that matter engage in entrepreneurial activities such as consultancy work etc. Therefore, a sample including researchers from

other faculties is needed to have an in depth knowledge and information regarding true commercialization output. Furthermore, the study focused only on entrepreneurial orientation of the academic researchers. Entrepreneurial orientation is affected by numerous factors such as leadership style, organizational culture, human resource practices etc. It would be interesting to see the influence of such factors on commercialization activity. Last but not least, the study looked at five Malaysian research universities; it is recommended that a comparative study should be undertaken between public and private Malaysian universities to ascertain the level of commercialization in Malaysia.

References:

- [1] Bathelt, H., Kogler, D. F. and Munro, A. K. A knowledge-based typology of university spin-offs in the context of regional economic development. *Technovation*, Vol. 30, No.9/10, 2010, pp. 519–532.
- [2] Ajagbe, A. M., Ismail, K., Aslan, A. S. and Rashid, W. N. Technology Based Firms Financing: An Operational Model for Malaysia” *South East Asia Journal of Contemporary Business, Economics and Law*, Vol. 1, 2012, pp. 108-114.
- [3] Aziz, R. A., Tajudin, A., Mahmood, R., and Abdullah, M. H. The Relationship between Entrepreneurial Orientation and Business Performance of SMEs in Malaysia. *International Journal of Management Excellence*, Vol. 2, No. 3, 2014, pp. 221-226.
- [4] Aziz, K., Harris, H. and Norhashim, H. University Research, Development & Commercialisation Management: A Malaysian Best Practice Case Study. *World Review of Business Research*, Vol. 1, No. 2, 2011, pp. 179 – 192.
- [5] Bianchi, M., Cavaliere, A., Chiaroni, D., Frattini, F. and Chiesa, V. Organisational modes for Open Innovation in the bio-pharmaceutical industry: an exploratory analysis. *Technovation*, Vol. 31, No. 1, 2011, pp. 22–33.
- [6] Boh, W. F., De-Haan, U., and Strom, R. *University technology transfer through entrepreneurship: faculty and students in spinoffs*. Ewing Marion Kauffman Foundation, 2012.
- [7] Browne, J. *Securing a sustainable future for higher education. An independent review of higher education funding and student finance*. 2010.
- [8] Buenstorf, G. and Geissler, M. Not invented here: technology licensing, knowledge transfer and innovation based on public research, *Journal of Evolutionary Economics*, Vol. 22, 2012, pp. 481–511.
- [9] Carlsson, B., and Fridh, A. C. Technology transfer in United States universities. *Journal of Evolutionary Economics*, 12(1-2), 2002, pp. 199-232.
- [10] Chan, Y. K., Moon-ho, R. H., Oleksandr, S., Chernyshenko, O. B., Marilyn, A. U., David, G., Sam, Y. L. and Wei Ming, J. P. Entrepreneurship, professionalism, leadership: A framework and measure for understanding boundaryless careers. *Journal of Vocational Behavior*, Vol. 81, 2012, pp. 73–88.
- [11] Collier, A. and Gray, B. *The commercialization of university innovations – A qualitative analysis of the New Zealand situation*, Research Report, 2010, www.otago.ac.nz
- [12] Colyvas, J., Crow, M., Gelijns, A., Mazzoleni, R., Nelson, R. R., Rosenberg, N., and Sampat, B. N. How do university inventions get into practice? *Management Science*, Vol. 48, No. 1, 2002, pp. 61-72.
- [13] Dahl, M. S., & Sorenson, O. Home sweet home: Entrepreneurs' location choices and the performance of their ventures, *Management Science*, Vol. 58, No. 6, 2012, pp. 1059-1071.
- [14] D'Amico, A., Abbate, T., and Coppolino, R. The contribution of university to territorial development: the role of Technology Transfer Office. Atti del XXIV Convegno annuale di Sinergie. 2012.
- [15] DuBrin, A. J. *Leadership: Research findings, practice, and skills*, South-Western Pub, 2012.
- [16] Duening, T. N. and Sherrill, W. *Entrepreneurism: exploring entrepreneurship from a business process perspective*, Phoenix, AZ: Arizona State University, Atomic dog publishing, 2005.
- [17] Ejeremo, O., Kander, A. and Svensson Henning, M. The R&D-growth paradox arises in fast-growing sectors, *Research Policy*, Vol. 40, 2011, pp. 664–672.
- [18] Elenurm, T. and Alas, R. Features of successful entrepreneurs in Estonia and changing organizational development challenges, *Baltic Journal of Management*, Vol. 4, No. 3, 2009, pp. 318-30.
- [19] Fini, R., Lacetera, N. and Shane, S. Inside or outside the IP system? Business creation in

- academia, *Research Policy*, Vol. 39, 2010, pp. 1060–1069.
- [20] George, T., Karippa C., Fatemeh, N., Markde, R. and Harry, B. Serving the poor: Multisided mobile service plat forms, openness, competition, collaboration and the struggle for leadership. *Telecommunications Policy*, Vol. 37, 2013, pp. 24–34.
- [21] Grimaldi, R., Kenney, M., Siegel, D. S., and Wright, M., 30 years after Bayh–Dole: Reassessing academic entrepreneurship, *Research Policy*, Vol. 40, No. 8, 2011, pp. 1045-1057.
- [22] Geuna, A. and Rossi, F. Changes to university IPR regulations in Europe and the impact on academic patenting, *Research Policy*, Vol. 30, 2011, pp. 1068–1076.
- [23] Hague, D. and K. Oakley, *Spin-offs and start-ups in UK universities*, Committee of Vice-Chancellors and Principals (CVCP) Report, 2000.
- [24] Hughes, A., Kitson, M., Abreu. M., Grinevich, V., Bullock, A. and Milner, I. *Cambridge Centre for Business Research Survey of Knowledge Exchange Activity by United Kingdom Academics 2005–2009*, UK Data Archive Study No. 6462, 2010.
- [25] Ismail, K. and Ajagbe, A. M. The Roles of Government in the Commercialization of Technology Based Firms, *Middle East Journal of Scientific Research*, Vol. 16, No. 2, 2013, pp. 229-236.
- [26] Ismail, K., Aslan, A., Soong, W. and Ajagbe, A. Decision making process in the commercialization of University patent in Malaysia, *African Journal of Business Management*, Vol. 6, No. 2, 2012, pp. 681-689.
- [27] Ismail, K., Mason, C., Cooper, S., Omar, W., Zaidi, W., and Majid, I. Who are the Actors involved and How the Decision Making Process for the Exploitation of University Patents have been made?. *International Journal of Business and Information*, Vol. 3, No. 2, 2008, pp. 165-192.
- [28] Ismail, K., Wan Zaidi, W. and Izaidin, A. The commercialisation process of patents by universities, *African Journal of Business Management*, Vol. 5, No. 17, 2011, pp. 7198-7208.
- [29] Jain, S., George, G., and Maltarich, M. Academics or entrepreneurs? Investigating role identity modification of university scientists involved in commercialization activity, *Research Policy*, Vol. 38, No. 6, 2009, pp. 922-935.
- [30] Juanola-Feliu, E., Colomer-Farrarons, J., Miribel-Catal, P., Samitier, J. and Valls-Pasola, J. Market challenges facing academic research in commercializing nano enabled implantable devices for in-vivo biomedical analysis, *Technovation*, Vol. 32, 2012, pp. 193–204.
- [31] Kenney, M. and Patton, D., Does inventor ownership encourage university research-derived entrepreneurship? A six university comparison, *Research Policy*, Vol. 40, 2011, pp. 1100– 1112.
- [32] Kuratko, D. F. Entrepreneurial Leadership in the 21st Century: guest editor’s perspective, *Journal of Leadership and Organizational Studies*, Vol. 13, No. 4, 2007, pp. 1-11.
- [33] Landry, R., Amara, N., & Rherrad, I. Why are some university researchers more likely to create spin-offs than others? Evidence from Canadian universities. *Research Policy*, Vol. 35, No. 10, 2006, pp. 1599-1615.
- [34] Lissoni, F., Llerena, P., McKelvey, M. and Sanditov, B. Academic patenting in Europe: new evidence from the KEINS database. *Research Evaluation*, Vol. 17, 2008, pp. 87–102.
- [35] Litan, R. E., Mitchell, L. and Reedy, E. J. The university as innovator: bumps in the road. *Issues in Science and Technology*, Vol. 23, No. 4, 2007, pp. 57–66.
- [36] Litan, B. and Mitchell, L. A faster path from lab to market, *Harvard Business Review* (January–February), 2010, pp. 52–53.
- [37] Lumpkin, G.T. and Dess, G.G. Clarifying the entrepreneurial orientation construct and linking it to performance, *Academy of management Review*, Vol. 21, No. 1, 1996, pp. 135-172
- [38] Merrill, S. A. and Mazza, A. M. *Managing University Intellectual Property in the Public Interest*, National Research Council, Washington, DC, 2010.
- [39] Meyers, A. D. and Pruthi, S. Academic entrepreneurship, entrepreneurial universities and biotechnology, *Journal of Commercial Biotechnology*, Vol. 17, No. 4, 2011, pp. 349-357.
- [40] Nikulainen, T., & Palmberg, C. Transferring science-based technologies to industry—Does nanotechnology make a difference?. *Technovation*, Vol. 30, No. 1, 2010, pp. 3-11.
- [41] O’Shea, R. P., Chugh, H. and Allen, T. J. Determinants and consequences of university spin-off activity: a conceptual framework,

- Journal of Technology Transfer*, Vol. 33, 2008, pp. 653–666.
- [42] O'Shea, R. P., Allen, T. J., Chevalier, A., and Roche, F. Entrepreneurial orientation, technology transfer and spinoff performance of US universities, *Research Policy*, vol. 34, No. 7, 2005, pp. 994-1009.
- [43] Othman, A., Haiyat, U., and Kohar, A. University-Industry Technology Commercialization in Malaysia: Opportunities and Challenges. *World Applied Sciences Journal (Innovation Challenges in Multidisciplinary Research & Practice)*, Vol. 30, 2014, pp. 167-184.
- [44] Raunch, A., Wiklund, J., Lumpkin, G. T. and Frese, M. Entrepreneurial Orientation and Business Performance: An Assessment of Past Research and Suggestions for the Future, *Entrepreneurship Theory and Practice*, Vol. 33, No. 3, 2009, pp. 761-787.
- [45] Renko, M., El Tarabishy, A., Carsrud, A. and Brannback, M. Understanding and measuring entrepreneurial leadership, *Journal of Small Business Management*, 2014.
- [46] Roberts, E. *Entrepreneurs in High Technology, Lessons from MIT and Beyond*, Oxford: Oxford University Press, 1991.
- [47] Rutherford, M. W. and Holt, D. T. (2007). Corporate entrepreneurship. *Journal of Organizational Change Management*, Vol. 20, No. 3, 2007, pp. 429-446.
- [48] Shane, S. *Academic entrepreneurship: university spin-offs and wealth creation*. Northampton, MA: Edward Elgar. 2004.
- [49] Short, J. C., Broberg, J. C., Cogliser, C. C. and Brigham, K. H. Construct validation using computer-aided text analysis (CATA): An illustration using entrepreneurial orientation, *Organizational Research Methods*, Vol. 13, No. 2, 2010, pp. 320-347.
- [50] Siegel, D. S., Veugelers, R., and Wright, M. Technology transfer offices and commercialization of university intellectual property: performance and policy implications, *Oxford Review of Economic Policy*, Vol. 23, No. 4, 2007, pp. 640-660.
- [51] Takahashi, M. and Carraz, R. Academic patenting in Japan: illustration from a leading Japanese university. In Wong, P.K. (Ed.), *Academic Entrepreneurship in Asia*, Edward Elgar Publishing, 2011, pp. 86–107.
- [52] Von Proff, S., Buenstorf, G. and Hummel, M. University patenting in Germany before and after 2002: what role did the professors' privilege play? *Industry and Innovation*, Vol. 19, 2012, pp. 24–44.
- [53] Wright, M. B., Clarysse, P. M. and Lockett, A. *Academic Entrepreneurship in Europe*, Edward Elgar, 2007.
- [54] Yaacob, N. A., Rasli, A. M., Senin, A. A., & Othman, S. N. Perceptions of commercialization activities of research results among academic researchers in Malaysia. *American Journal of Economics and Business Administration*, Vol. 3, No. 1, 2011.
- [55] Yusof, M., Entrepreneurial leadership and academic entrepreneurship in Malaysian public research universities, *Asia Pacific Journal of Innovation and Entrepreneurship*, Vol. 3, No. 3, 2009, pp. 63-84.