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The Gamble: A Behavioral Agency Model Application of Academic Entrepreneur Risk Taking

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Abstract: Risk taking is an important factor in entrepreneurship. Entrepreneurship is the key driver to the innovation economy engine. The purpose of this studies is to explore how are risk taking of university academics differ among Malaysian research universities. This is the first study to use Behavioral Agency Model (BAM) to explain how decision making is made by academics to pursue risk in becoming a technology start-up CEO. Four case studies are conducted on research universities in Malaysia. Findings showed that risk bearing of academics could be reduced if the university provided sabbatical leave, a business KPI and entrepreneurship training. The study also proposed a framework to reduce risks for the lecturers to venture into entrepreneurship in order to commercialize university researches.

Key words: Innovation, agency theory, entrepreneurship, entrepreneurial orientation, venture

INTRODUCTION

During the late 19th century, research was not considered as a part of education until the first academic revolution (Veysey, 1965; Jencks and Reisman, 1968). In the second academic revolution, the university was then transformed into an economic development enterprise, besides teaching and research. The Massachusetts Institute of Technology (MIT) was the first to experience this transformation. It was a "land grant" university, when it was created in 1862. The second evidence is found in Stanford a 100 years ago, when the liberal arts university culture adapted an entrepreneurial academic model. All around the globe, this phenomenon is proceeding. Etzkowitz (2003) proposed that to fulfill the increasing global requirements for increased productivity, to create jobs through start-ups born from product idea pools, the traditional university system then have to be molded into a model of entrepreneurial university.

Hailing to commercialization and technology transfer, the funds declining problems by government are very much solved and universities emerged as great assistancefor society. To bridge the gap between invention and commercialization of high-technology products, Malaysian government has established Commercialization of Research and Development Fund (CRDF) worth RM100 mln. which provides funding for commercialization activities of locally developed technologies/research and development (R&Ds) undertaken by eligible Malaysian-owned companies.

Despite all these, out of the total 802 number of Intellectual Properties (IP) in Malaysian universities, only 116 of them are commercialized with low rate of commercialization of 14% (Azrin). This figure shows that Malaysian universities are very upright in research, but deprived on entrepreneurship. To bring these inventions from lab to market, academic themselves can make the initiative to take risk to be the CEO of their new technology venture.

What is problematic is not all scientists have the guts to be an entrepreneur. One of agency problem is of risk sharing that arises when the university as the principal and the academics as the agent have different attitudes toward risk (Eisenhardt, 1989). A research in a UK university (Ismail *et al*., 2010) reveals that academics risk preferences vary widely among each other. This situation could also be managed by using output controls tied to rewards to scientists for commercialization. Because the unit of analysis is the contract governing the relationship between the principal and the agent, the purposes of the theory is on searching the most efficient contract managing the agent-principal relationship. Another way of saying is we can use agency theory to explain the risk attitude of university academics towards becoming entrepreneur.

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Fig. 1: Research commercialization process (Kim *et al*., 2009; Azmi, 2014)

This study contributes by attempting to fill this gap between university research commercialization literature and agency theory literature. We then attempt to come out with a risk taking model to assist academics to become entrepreneurs. In doing so we hope we could answer the question why do some university lecturers dare to take risks to become entrepreneur? Why do some of them do not?

Literature review

Commercialization process in universities: A university research will start with the funding for research purpose, as shown in Fig. 1. This first step will produce an output of research disclosures, leading to the output of patents (among other intellectual properties) filed and issued and eventually will lead to the formation of start-ups or the execution of licenses.

Academic risk taking: Ismail *et al*. (2010) mentioned that researchers also must be willing to be involved in product development, networking and other process, for a patent to be exploited through spin- off formation. The finding of literatures (Thursby *et al*., 2001; Jensen *et al*., 2003) revealed that most of the University technologies needed researchers/involvement to bring them into the market and the technologies were at early stage at the time the university licensed them. Ismail *et al*. (2010) found out that all researchers in this group have the motivation and desire to see the inventions utilised and developed. The chances that the patents will be exploited will be lower if there is low commitment of the researchers to networking and product development.

That being said, academics can opt to champion their own commercialization venture. But the choice of starting a career as an entrepreneur involves considerable risk and a costly downside (Pernia *et al*., 2013). A study by Morales-Gualdron *et al*. (2009) on entrepreneurial motivation in academia revealed that high levels of bureaucracy and low risk orientation in the incubator organization push researchers to establish companies but still the study did not address risk taking of academia. For the past decade, we have seen resource based view theory has been dominating the academic literatures. Landry *et al*. (2006) tried to explain the creation of university spin-offs from financial assets, intellectual property assets, knowledge assets, social capital assets and organizational assets. Pernia *et al*. (2013) also uses similar framework explaining the creation of spin-offs from resources of TTOs and resources of universities. A huge gap in their studies is they barely touch the aspect of risk taking in academics. A good study on academics risk taking was done by Li (2012) However his samples are managers not academics-therefore the risk taking aspects of academics remains an unexplored territory.

Behavioral agency model: "Agency theory (is characterized) by its emphasis on the risk attitudes of principals and agents" (Barney and Hesterly, 1999). To be precise, principals (university) are assumed risk neutral in their preferences for individual venture actions, because they can (or supposed to) diversify their investments across a variety of ventures. On the contrary, because agent (lecturer) income and employment are inextricably bonded to one organization (university), agents are presumed to show risk aversion in actions regarding the company because they want to reduce risk to personal wealth (Wiseman and Gomez-Mejia, 1998; Williamson, 1963). Nonetheless, agent risk aversion spawns opportunity costs for risk-neutral principals (universities) who wish that agents maximize start-up returns (Wiseman and Gomez-Mejia, 1998; Coffee, 1988). This "risk differential" (Baysinger and Hoskisson, 1990; Coffee, 1988) between principals and agents spawns a "moral hazard" issue in the agent-principal relationship.

The aim of corporate governance is to create supervisory and incentive alignment systems that modify the risk preference of agents to align them with the principal's interests (Wiseman and Gomez-Mejia, 1998; Tosi and Gomez-Mejia, 1989). Although, the major part risk plays in the mathematics of agency theory, Wiseman and Gomez-Mejia (1998) contented that agency theory's conception of risk has been very limited and simple. This narrow perspective of risk has blocked a holistic understanding of lecturer's decision making under conditions of different risk bearing and risk preferences between agents and principals. It is the purpose of our research to enhance agency theory's treatment of risk by addressing these constraints.

Risk bearing: Risk bearing plays a huge role in agency models of agent behaviour (Wiseman and Gomez-Mejia, 1998; Beatty and Zajac, 1994). To be precise, normative

agency researchers have argued that risk bearing amplifies risk aversion by aggravating the overinvestment issue faced by managers (Wiseman and Gomez-Mejia, 1998; Amihud *et al*., 1983). Risk bearing normally happens by design, through governance systems constructed to displace risk, (i.e., risk sharing) from the principal to the agent (therefore, putting more of the agent's income at risk) or is deep-rooted in the role of the agent owing to the employment risk that cannot be diversified away. Progressing from this thesis, we use "risk bearing" to represent perceived risk to lecturer wealth that can result from employment risk or other threats to lecturer wealth. "Risk taking" however, represents the lecturer's choice of career risk from being the venture CEO.

Strategic decisions by academics to become CEOs of their technology companies can be considered a mixed gamble for them, given that the vast majority of these strategic choices create the possibility of gains and losses for their career track value and also impact the personal wealth of the academics through their risk of losing academic promotion. That is, because the career promotions is tied to impact factor article-writing plus teaching, strategic decisions by the academic to lead his start-up could positively or negatively affect the value their current academic performance. We argue that the academic prescience with regard to potential gains and losses to being a CEO is likely to weigh upon him or her when making strategic decisions under risk, given the potential for changes (positive or negative) in the firm's performance and thus the value of his or her current academic career track, as a result of the success or failure of his or her strategic decisions. Thus, the decision to pursue prospective wealth or preserve current wealth (the gamble) manifests when the academic makes such strategic decisions to be a CEO.

Reducing risk bearing

Autonomy for academic leave: In Finland the science system has central as well as decentral characteristics. The tertier educations in Finland are run by the state and their missions and funding amounts are given by the ministry in discussion with the universities. Still the law gives tolerance for universities to decide on detailed organisation, administration and appointment of professors. Scientists are public servants with rather strict limitations on choices for secondary occupation and leave regulations. To apply for leave, permission from the university is needed. Following the act on the right to carry on business it is intolerable for the line between official service and private business becomes vague. Nonetheless, this law is told to make only little effect in practice.

It remains to be empirically analysed to what extent different framework conditions, e.g., evaluation criteria or leave regulation, influence research and teaching practices. Thus, in Malaysian context we would like to forward the following proposition.

Proposition 1 (P1): Risk taking of lecturer to be a CEO must happen if the university provide business sabbatical leave.

Autonomy from university publications: Certain risks exist with lecturer's mobility and extended industry links that we should be aware of, i.e., they could delay publication of research results and create conflicts within the university (Harman, 1999; Bond and Paterson, 2005). As suggested by previous studies, publications in refereed journals are more important than commercialization activities (Lambert, 2003; Strandburg, 2005). Other than the direct monetary incentives, inventors also said that commercialization activities do not count towards promotion (Ismail *et al*., 2010).

A contrasting results from 492 UK researchers shows that publications are not found to have a significant impact on patenting. The result could be different if we study Malaysian setting. Therefore we propose:

Proposition 2 (P2): Risk taking of lecturer to be a CEO must happen if lecturers have autonomy from university publications.

Entrepreneurship training: Governments are increasing their interest on efficient human capital development by the means of entrepreneurship education and training, as this trend is expanding swiftly around the globe (Martin *et al*., 2013). Findings revealed that main formal institutional factors that affect academic entrepreneurship in Iran includes entrepreneurship and business training programs (Farsi *et al*., 2014).

Farsi *et al*. (2014) used original data of the biggest randomized control experiment administering entrepreneurship training in the United States. They found support showing that people who are more risk taking gain more from entrepreneurship training compared to risk-averse people. This study shows that there is a strong correlation between entrepreneurship training and entrepreneurial risk taking. Therefore we would like to suggest that:

Proposition 3 (P3): Risk taking of lecturer to be a CEO must happen if the university provide entrepreneurship training.

MATERIALS AND METHODS

The approach in this study is multiple case studies (Yin, 2013). Four inventors were chosen. The first two

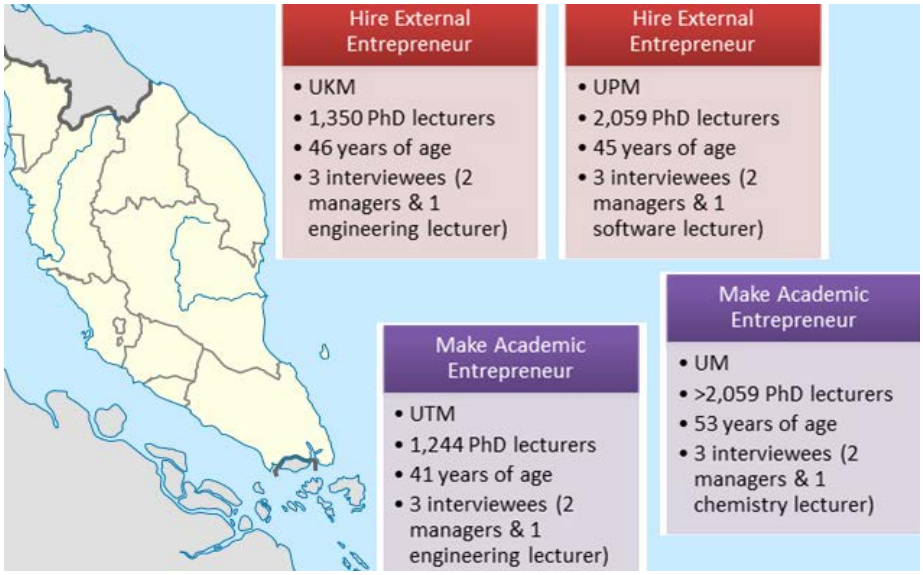

Fig. 2: Background of universities and inventors

Table 1: Findings

Variables	Sabbatical leave	Business KPI	Academic entrepreneurship training	Risk taking to be CEO
UTM Inventor	√	√	√	√
UM Inventor	√	√	√	√
UPM Inventor	×	×	×	×
UKM Inventor	×	×	×	×

cases represent lecturers who dares to take risk to be the CEO of the university spin-off company, from Universiti Teknologi Malaysia (UTM) and Universiti Malaya (UM). The second two cases represents lecturers who are risk averse from Universiti Putra Malaysia (UPM) and Universiti Kebangsaan Malaysia (UKM).

The logic (Yin, 2013) of using multiple-case studies is each case should be carefully selected so that it either predicts similar outcomes (a litervzal replication) or predicts contrasting outcomes but for expectable reasons (a theoretical replication). The ability to carry out 4 case studies is analogous to the ability to conduct 4 experiments on related topics; 2 cases (inventors) would be literal replications, whereas another 2 cases (inventors) have been contructed to go after two contrasting patterns of theoretical replications. If all the cases turn out as expected, these 4 cases, in the aggregate, would have provided compelling support for the initial set of propositions. This logic is similar to the way scientists deal with conflicting experimental findings (Fig. 2 and Table 1).

RESULTS AND DISCUSSION

P1 pattern matching: In UTM some academics carried out research commercialization and lost some of academics Key-Performance Index (KPI) weightage. Now the university amended their IP policy and give academics 2 years sabbatical leave for their spin-off companies. This is a new policy because they have learnt from previous cases. Academics must concentrate 100% to their business. According to an interview with a TTO officer, university academics cannot be 50-50 in business. In those 2 years academics can concentrate without KPI in academics.

The sabbatical leave program will not conflict the Malaysian Research Assessment-II (MYRA-II). MYRA-II requires income generated from commercialization. If academics concentrate on spin-offs full-time maybe the income will be generated quicker from doing part-time. They will full-force doing marketing. After 2 years and if their business succeed, if they want to continue their business they have to pay the university. It is because the university paid them full salary in 2 years.

In UM we interviewed a lecturer who discovered a method to make bioethanol. He got a grant then he establishes a start-up. It is supposed to be a vehicle to commercialize this product. He became the CEO of the company. Then, we interviewed the UM Human Resource management. They verified that they provided this sabbatical leave scheme. We created the business Sabbatical scheme. Although, our experience is not very nice, we never closed the scheme. There is still a space. UM human resource UKM has no academic leave for lecturers to open a spin-off. All technology start-up companies in UKM are under one umbrella company called UKM Technology. UKM technology appointed

external entrepreneurs to be the CEO of these start-ups. An officer in UKM Technology claiming they can offer academic leave with a condition that the academics should get their own funding. But until now there is still no case like this. The officer said UKM as a university do not have a policy for these lecturers to take a sabbatical leave and joined UKM technology to be a CEO in a start-up. And UKM Technology do not want to pay their salary. If that case ever happen, it will increase UKM Technology operating costs. We cross-checked his statement with a UKM lecturer. She has an engineering invention and she confirmed that UKM has no sabbatical leave policy. We also interviewed UPM and they also do not have business sabbatical leave scheme. "If the lecturer become the CEO of technology start-up company, who will pay for them? UPM Deputy Vice Chancellor 01".

We found literal replication of Proposition 1 on UTM inventor and UM inventor (Table 1). UPM and UKM did not have business sabbatical leave and their inventors did not take the risk to become a technology start-up CEO, therefore we found theoretical replication. So, proposition 1 is accepted.

P2 pattern matching: UTM allow their researcher, champion of his group to be seconded to his spin-off company in 2015. UTM changed their KPI from teaching KPI into business KPI. The KPI will be evaluated by UTM Holding CEO, not their deans or heads of department. The annual performance will be evaluated by the CEO. UTM can no longer burden them with publications because they want to concentrate on their business. It is a very good idea. UTM have studied why academics did not want to form spin-off. They were afraid they will lose their salary. And the sabbatical leave would be for maximum 3 years because most of business plan that they saw will only get ROI in 2-3 years. The policy was made up to 3 years to give options whether they want to go back being an academic staff or they want to continue with business.

In UM they established business sabbatical leave scheme in 2012. They have set up the standards that the lecturer had to fulfill. The evaluator is the usual, his Head of Department (HOD) and up until the university top management, the Deputy vice chancellor (Academic). The university top management will evaluate the lecturer. For a scientist from biomedical to become a CEO in his company, he will go for this business sabbatical leave. UKM told a different story. Only recently the academics were offered 3 new career tracks. They only started to implement them on 1st September 2015. If the academic generate income, the academic has to record all these in the online system.

Table 2: UKM only recent business KPI (LPU, 2015)

	Assistant professor (Grade 54)			
Criteria	Science and technology cluster	Social science and humanity cluster	Clinical/ preclinical	Data sources
CK1A	Income generating to university total of RM1 million cumulatively			(Chancellery Trust, UKM Holding, TTO)

K4: Income generating service for UKM

To be promoted an academic will get scores for his KPI. To be promoted to associate professor, if he got RM1 million cumulative, he is already considered great. For Professorship, he must get RM10 million. Unfortunately this policy came a bit too late. We then cross-interview a UKM lecturer who was appointing an external CEO to carry out the commercialization of her engineering invention. She said she already asked for the policy from the deputy vice chancellor 2 years before. Then, she claimed the university management was having a headache.

UKM instead asked another lecturer to take the leave. She is an associate professor. Why should she take a leave? There are not enough incentives for her. She is on the way up. If she went for the leave, she could not do publications and fulfil her KPI. Based on these evidences we cannot conclude that UKM applied this policy before the lecturer appointed the external CEO. Therefore we had to put the mark 'x' on the Business KPI in Table 2. We found theoretical replication that UKM lecturer did not take the risk to become a CEO but in the absence of a Business KPI policy in place.

The same story goes in UPM. They do not have Business KPI policy in place. We interviewed the UPM Deputy Vice Chancellor. He stated that UPM cannot link commercialization and academic. If they tried to train lecturers to be entrepreneur, from 1000 lecturers the ones with great products are professors. Assumed that the university trained 80 of them to be entrepreneurs. Each of them receives salary of RM50 thousand. What will happen? They will have brain-drain and the lecturers will quit their jobs to become entrepreneurs. "And remember, commercialization is non academic matters. We must have clear division in terms of commercialization issue and academic issue. If you mix it, what will happen? UPM Deputy Vice Chancellor".

We found literal replication of Proposition 2 on UTM inventor and UM inventor (Table 1). UPM and UKM did not have business sabbatical KPI and their inventors did not take the risk to become a technology start-up CEO, therefore we found theoretical replication. So Proposition 2 is accepted.

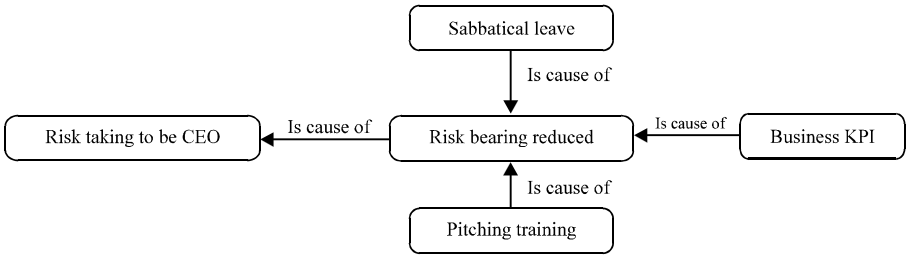

Fig. 3: Academic entrepreneur behavioral agency model

P3 pattern matching: In UTM except SYMBIOSIS start-up, all start-ups are structured by the academics. The TTO only helped academics until they formed spin-off companies. After that to guide them to manage the company is the role of the University Holding Company. The University Holding Company will train them how to be the board of director, CEO and managing finance. Sometimes scientists do not know these kinds of things. These trainings could be given by the Technology Entrepreneurship Centre (UTM-TEC).

In UM the TTO is called Commercialization and Innovation Centre (UMCIC). UMCIC gave not just marketing workshop. They gave matchmaking sessions with industries. And they took the lecturer on several workshops on how to make himself more competitive, how to sell the product, how to sizzle the product and how to improve the lecturer's personality. They paid a lot of money for all that.

UPM did not give entrepreneurship training to lecturers. They have another entrepreneurship program called InnoHub. Under InnoHub, they do not encourage academics to be the CEO. They will take fresh graduates to be the CEO and to grow. They are project managers. InnoHub brought investors to UPM for the start-ups to pitch and present.

For UKM they are a research university. About 99% of lecturers will focus more on R&D rather than commercialization. That was why the university established a company called UKM Technology. Lecturers have invention. They just teach their technology to UKM Technology so UKM technology could take over their job in sales and pitching. During the early establishment of UKM Technology, the external entrepreneurs hired by them will do maximum 3 interviews with lecturers and in the end the external entrepreneurs could pitch for funding on behalf of the lecturers. In this way the lecturers could focus on R&D. "For the existing lecturers they transferred their technological knowledge to us. The VC himself encouraged lecturers not to be involved in pitching.- UKM external entrepreneur".

UPM and UKM did not train their lecturers on entrepreneurship skills (Table 1). And results showed all two inventors are risk aversed to be CEO. This result is expected so we found theoretical replication on proposition 3. We found literal replication of P3 on UTM and UM. Therefore, P3 is accepted (Fig. 3).

CONCLUSION

Theoretical contribution: This is the first study that applies behavioural agency model into academic entrepreneurship theory and practice, after almost two decade (Wiseman and Gomez-Mejia, 1998). We added the literature on university research commercialization (Lambert, 2003; Strandburg, 2005) by showing that by giving autonomy to Malaysian university lecturers to have a sabbatical leave could reduce their risk bearings and help them champion their innovations the market place.

Findings on Malaysian academics showed university publications really do if not least affected the risk taking of academic entrepreneurs. This finding is confirmed previous findings (Ismail *et al*., 2010; Harman, 1999; Bond and Paterson, 2005; Lambert, 2003; Strandburg, 2005). We disconfirmed findings that stated publications did not hinder research commercialization (Landry *et al*., 2006; Baysinger and Hoskisson, 1990) and our findings demonstrate publications do influence academic entrepreneur risk bearing.

The last contribution is we demonstrated that business risk could be reduced by supplementing academics with entrepreneurship training. Confirming findings by previous researchers (Martin *et al*., 2013; Farsi *et al*., 2014; Fairlie and Holleran, 2012), in Malaysia entrepreneurship training will be positively associated with entrepreneurship outcomes. Training reduced risk bearing of academics, opening a door to lead them to become the CEOs of their start-up ventures. All these findings lead up to our proposed model. Using behaviour agency model as theoretical underpinning, we would like

to propose a behaviour agency model of academics to assist them in the risk taking to become an innovation-based start-up CEO.

Policy contribution: Findings revealed that academics could be turned into entrepreneurs and CEO. All they need was their risk bearings to be lowered. UTM and UM are already leading the way. The structures and policies must be in place to help these academics to lower their risk bearings. Autonomy for sabbatical leave, a business KPI and entrepreneurship training are needed to help them to become entrepreneurs. Our study does not claim their ventures would be successful. We are just providing an option that academic entrepreneurship is just another mechanism to commercialize university inventions in the marketplace.

LIMITATIONS

The ability of these case study findings to provide strong support for direction of causality is limited. Evidence for causality must address three criteria. First, the results must demonstrate temporal precedence, i.e., must show that the proposed causal variable precedes the proposed outcome. Second, the results must demonstrate the expected patterns of relationships. Third, the data must account for internal validity by accounting for other possible explanations of the results. Without strong internal validity, there may be a distortion of the determination of causal effects because omitted variables are not accounted for. These case studies do demonstrate relationships that align with expected patterns. However, these case studies provide a snapshot at a single time of the relationships between actors and decisions to take risks and so do not demonstrate temporal precedence. In addition, it is not certain that all potential variables contributing to causal relationships are addressed. Future quantitative study could help to prove the generalizability of hypotheses created from this study.

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REFERENCES

Amihud, Y., S.B. Kamin and J. Ronen, 1983. Managerialism, iownerism and risk. J. Banking Finance, 7: 189-189.

Azmi, I.M., 2014. Intellectual property policy and academic patenting in Malaysia: Challenges and prospects. Pertanika J. Social Sci. Humanities, 22: 1-20.

Barney, J.B. and W. Hesterly, 1999. Organizational Economics: Understanding the Relationship Between Organizations and Economic Analysis. In: Studying Organization: Theory and Method. Clegg, S.R., C. Hardy, W.R. Nord (Eds.). SAGE Publication, London, England, pp: 109-141.

Baysinger, B. and R. Hoskisson, 1990. The composition of boards of directors and strategic control: Effects on corporate strategy. Acad. Manage. Rev., 15: 72-87.

Beatty, R.P. and E.J. Zajac, 1994. Managerial incentives, monitoring and risk bearing: A study of executive compensation, ownership and board structure in initial public offerings. Administrative Sci. Q., 39: 313-335.

Bond, R. and L. Paterson, 2005. Coming down from the ivory tower? Academics civic and economic engagement with the community. Oxford Rev. Educ., 31: 331-351.

Coffee, J.C. Jr, 1988. Shareholders Versus Managers: The Strain in the Corporate Web. In: Knights, Raiders and Targets: The Impact of the Hostile Takeover, Coffee, J.C. Jr., L. Lowenstein and S. Rose-Ackerman (Eds.). Oxford University Press, New York, USA., pp: 77-134.

Eisenhardt, K.M., 1989. Agency theory: An assessment and review. Acad. Manage. Rev., 14: 57-74.

Etzkowitz, H., 2003. Research groups as quasi-firms: The invention of the entrepreneurial university. Res. Policy, 32: 109-121.

Fairlie, R.W. and W. Holleran, 2012. Entrepreneurship training, risk aversion and other personality traits: Evidence from a random experiment. J. Econ. Psychol., 33: 366-378.

Farsi, J.Y., M. Modarresi, M. Motavaseli and A. Salamzadeh, 2014. Institutional factors affecting academic entrepreneurship: The case of University of Tehran. Econ. Anal., 47: 139-159.

Harman, G., 1999. Australian science and technology academics and university-industry research links. Higher Educ., 38: 83-103.

Ismail, K., C. Mason and S. Cooper, 2010. University spin-off formations: How decision making process has been made?. Intl. J. Bus. Soc. Sci., 1: 103-123.

Jencks, C. and D. Reisman, 1968. The Academic Revolution. Doubleday, New York, USA.

Jensen, R.A., J.G. Thursby and M.C. Thursby, 2003. Disclosure and licensing of University inventions: The best we can do with the St we get to work with. Intl. J. Ind. Organiz., 21: 1271-1300.

Kim, J., T.U. Daim and T.R. Anderson, 2009. University technology transfer: A conceptual model of impacting factors and phased process. Proceedings of the Portland International Conference on Management of Engineering and Technology PICMET 2009, August 2-6, 2009, IEEE, Portland, Oregon, ISBN:978-1-890843-20-5, pp: 2798-2811.

Lambert, R., 2003. Lambert Review of Business-University Collaboration. HM Treasury Statistical Publication, London, England.

Landry, R., N. Amara and I. Rherrad, 2006. Why are some university researchers more likely to create spin-offs than others? Evidence from Canadian universities. Res. Policy,35: 1599-1615.

Li, C.Y., 2012. The influence of entrepreneurial orientation on technology commercialization: The moderating roles of technological turbulence and integration. Afr. J. Bus. Manage., 6: 370-387.

Martin, B.C., J.J. McNally and M.J. Kay, 2013. Examining the formation of human capital in entrepreneurship: A meta-analysis of entrepreneurship education outcomes. J. Bus. Venturing, 28: 211-224.

Morales-Gualdron, S.T., A. Gutierrez-Gracia and S.R. Dobon, 2009. The entrepreneurial motivation in academia: A multidimensional construct. Intl. Entrepreneurship Manage. J., 5: 301-317.

Pernia, J.L.G., G. Kuechle and P.I. Legazkue, 2013. An assessment of the determinants of university technology transfer. Econ. Dev. Q., 27: 6-17.

Strandburg, K.J., 2005. Curiosity-Driven Research and University Technology Transfer. In: University Entrepreneurship and Technology Transfer, Libecap, G.D. (Ed.). Emerald Group Publishing Limited, Bingley, UK.,ISBN:978-0-76231-230-6, pp: 93-122.

Thursby, J.G., R. Jensen and M.C. Thursby, 2001. Objectives, characteristics and outcomes of university licensing: A survey of major US universities. J. Technol. Transfer, 26: 59-72.

Tosi, H.L. and L.R. Gomez-Mejia, 1989. The decoupling of CEO pay and performance: An agency theory perspective. Adminis. Sci. Quart., 34: 169-189.

Veysey, L., 1965. The Emergence of the American University. University of Chicago Press, Chicago, Illinois, Pages: 505.

Williamson, O.E., 1963. Managerial discretion and business behavior. Am. Econ. Rev., 53: 1032-1057.

Wiseman, R.M. and L.R. Gomez-Mejia, 1998. A behavioral agency model of managerial risk taking. Acad. Manage. Rev., 23: 133-153.

Yin, R.K., 2013. Case Study Research: Design and Methods. Sage Publications, Thousand Oaks, California.