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Entrepreneurial Leadership and Academic Entrepreneurship in Malaysian Public Research Universities

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Abstract

Entrepreneurial leadership, capable of overcoming various hierarchical and internal constraints, as well as conflicts, has assumed great significance in the wake of institutions of higher learning trying to promote academic entrepreneurship. There is still a paucity of empirical research on academic entrepreneurship especially in the context of a developing economy like Malaysia and its higher education system. This paper analyzes and presents academic entrepreneurship as a leadership process of creating economic value through acts of organizational creation, renewal or innovation within or outside the university that results in research and technology commercialization. It contributes to the literature by examining the theoretical connection and relationship between leadership behavior and the level of academic entrepreneurship in Malaysian public research universities. Findings and results from this study will enable public research universities to evaluate the level of entrepreneurial leadership, their leadership strategies and capabilities in developing an entrepreneurial mindset which pervades the entire university organization, the status of their entrepreneurial systems within and outside the universities, identify enablers and barriers for academic entrepreneurship within their academic organizations, and, enhance decision making especially in fostering academic entrepreneurship.

Key words : *Entrepreneurial Leadership, Leadership Strategies, Academic Entrepreneurship, Entrepreneurial Mindset*

Introduction

At the heart of this research lies the phenomenon of academic entrepreneurship. It has become a very interesting, complex and important phenomenon because it is situated at the core of changes in the landscape and context of higher education transformation in Malaysia. In essence, it is changing how universities are being viewed. No longer are universities viewed only as the liberator and protector of all knowledge and science, of fact and principle, of inquiry and discovery, of experiment and speculation. No longer does it only play the role of producer of

human capital and industry-ready workers. In this century, universities pursue academic entrepreneurship to strategically place and position themselves as important engines of sustainable technological development and economic growth.

Academic entrepreneurship is the leadership process of creating economic value through acts of organizational creation, renewal, or innovation that occurs within or outside the university that results in research commercialization and technology transfer. It may occur at the level of individuals or groups of individuals, acting independently or as part of a university system, who create new organizations, or instigate renewal or innovation within the university or outside the university in science and technology parks, university-owned corporate firms, spin-offs or research centers. It is also the cumulative results and integration of these individuals' scientific activity, academic activity and commercialization activity in discovering, exploring, pursuing and capitalizing on the creation, innovation and renewal opportunities in the intrapreneurial process. These individuals are referred to as academic entrepreneurs or intrapreneurs.

This study addresses academic entrepreneurship in four public universities which have been designated as research universities by the Malaysian government in 2006 under the Ninth Malaysian Plan 2006 – 2010 (EPU, 2006). More specifically, this study examines the relationship between entrepreneurial leadership behavior and the level of academic entrepreneurship in Malaysian public research universities. Findings and results from this study are expected to enable public research universities to evaluate the level of entrepreneurial leadership, their leadership strategies and capabilities in developing an entrepreneurial mindset which pervades the entire university organization, the status of their entrepreneurial systems within and outside the universities, identify enablers and barriers for academic entrepreneurship within their academic organizations, and, enhance decision making especially in fostering academic entrepreneurship.

Literature Review

The academic entrepreneurship literature is fragmented due to the different approaches utilized by scholars in researching the phenomenon. Past studies have approached the inquiry from various angles including commercialization of knowledge (Lowe, 1993; Argyres and Liebeskind, 1998; Agrawal and Henderson, 2002), patent-related issues (Mowery *et. al.,* 2001; Saragossi and van Pottelsberghe de la Potterie, 2003), licensing of technology and inventions (Conceicao *et. al.,* 1998; Thursby and Thursby, 2004), entrepreneurship education (Gibb and Hannon, 2006), new venture creation (Chrisman *et. al.,* 1995; Steffensen *et. al.,* 2000; Nicolaou and Birley, 2003), academia-industry collaboration (Etzkowitz, 1998; Mansfield, 1998), proposition surrounding the triple-helix model (Etzkowitz *et. al.,* 2000; Etzkowitz, 2003) and issues related to national policies and socio-economic development (Etzkowitz and Klofsten, 2005; Gibb and Hannon, 2006).

Based on content analysis and review of 173 published papers, Rothaermel *et. al.* (2007) identified that there are four major research streams emerging in this area of study. These research streams are: (1) entrepreneurial research university, (2) productivity of technology transfer offices, (3) new firm creation, and (4) environmental context including networks of innovation. In investigating the phenomenon in the UK, Brennan *et. al.* (2005) conceptualized the field of academic entrepreneurship as a confluence of three overlapped streams of research on technology-based firms, the commercialization of academic discipline knowledge and the role of universities in society.

Several empirical studies which have developed or used an entrepreneurship, academic entrepreneurship or entrepreneurial university framework in examining entrepreneurial activities in a university setting include research by Louis *et. al.* (1989), Keast (1995), Chrisman *et. al.* (1995), Clark (1998), Klofsten and Jones-Evan (2000), Louis *et. al.* (2001), Jacob *et. al.* (2003), Laukkanen (2003), Zhao (2004), Bernasconi (2005), Brennan *et. al.* (2005), O'Shea *et. al.* (2005), Powers and McDougall (2005), and, Brennan and McGowan (2006).

Keast (1995) studied a single university and interviewed the vice president and director of research. He found that entrepreneurship activities or initiatives were becoming increasingly important to administrators in

the university. Chrisman *et. al.* (1995) also studied a single university and documented the entrepreneurial activities of the university faculties as well as the impact the university had on regional economic and technological development and the impact its budgetary problems might have on such activities. Data was collected through a multi-stage procedure which includes the use of questionnaires to all faculties, interviews with selected faculty members, interviews with entrepreneurs and managers, and secondary data.

It is possible that Louis *et. al.* (1989) were among the first to pioneer the use of the academic entrepreneurship label. The research was on the academic entrepreneurial behaviors of life scientists in universities in the USA and later was extended to clinical and non-clinical life sciences faculty in universities (Louis *et. al.,* 2001). Even though they referred to Etzkowitz's (1983) work on entrepreneurial university, theirs was among the earliest empirical study on entrepreneurship within a university setting. Consequently, other researchers such as Klofsten and Jones-Evans (2000) and Laukkanen (2003) had referred to Louis *et. al.'s* (1989) study. For instance, Laukkanen (2003) adopted Louis *et. al.'s* forms of academic entrepreneurship in his empirical research which identified the drivers, modes of transformation and the internal frictions created in the development of an entrepreneurial university.

The study undertaken by Klofsten and Jones-Evans (2000) focused on identifying entrepreneurship activities which had developed in five Irish universities and four Swedish universities. The study discussed and contrasted the extent to which academic entrepreneurship (i.e. all commercialization activities outside of the normal university duties of basic research and teaching) had developed. Data was collected via a structured questionnaire and statistically analyzed. The results demonstrated that there was considerable entrepreneurial experience among academics in both countries, and that this translated into a high degree of involvement in "soft" activities such as consultancy and contract research, but not into organizational creation via technology spin-offs.

A different approach was utilized by Brennan *et. al.* (2005) and Brennan and McGowan (2006) in their exploratory study of academic entrepreneurship within a university setting. The overall aim was to understand the enablers and barriers to academic entrepreneurship. The corporate entrepreneurship perspective was synthesized with several other theories to construct a framework of academic processes and five ontological dimensions/knowledge types. In both studies, they used a single case study method and a purposeful sampling approach. While in-depth interviews were used for both, a questionnaire was developed in the former to assess preferences in academic entrepreneurs.

There were also studies that focused on factors that stimulate the creation of spin-off firms from universities. O'Shea *et. al.* (2004) and O'Shea *et. al.* (2005) argued that existing literature on university spin-off activity can be divided into six distinct research streams or domains. Two studies (O'Shea *et. al.,* 2005; Powers and McDougall, 2005) used the resource-based view of the firm to investigate the impact of internal determinants i.e. resources, on university spin-off activity. O'Shea *et. al.* (2005) collected secondary data and through econometric estimators found history dependence for successful technology transfer to occur other than faculty quality, size, orientation of science and engineering funding, and, commercial capability. On the other hand, Powers and McDougall (2005) ran negative binomial regression analysis on secondary data of 120 universities and found a set of financial, human capital and organizational resources to be significant predictors of university's commercialization activities.

Using semi-structured interviews, direct observation and documentary reviews of five European universities, Clark (1998) identified issues associated with the entrepreneurial transformation of these universities and found five core elements of entrepreneurial universities. Bernasconi (2005) used Clark's entrepreneurial universities framework and studied a university undergoing transformation and privatization. Using secondary data, he concluded that under the pressure of privatization, the university orientated itself to the market as a means of survival and growth, and used a triple-helix strategy for that purpose. Jacob *et. al.* (2003) also applied Clark's framework to a single

technology university and based on interviews with key personnel involved in the university's internal transformation process, identified several important elements required for innovation. At the macro level, vision and implementation were crucial while at the micro level, flexibility and diversity were critical.

The review of extant literature reveals that there seems to be three differing views on academic entrepreneurship: first, the view that academic entrepreneurship is in conflict with the traditional view of the university, thus, it normally and conveniently occurs outside the university and beyond the traditional role of the academia due to the conflict and tension created thereby (Louis *et. al.,* 1989; Klofsten and Jones-Evans, 2000; Laukkanen, 2003); secondly, the view that academic entrepreneurship is merely the creation of new business ventures by any of the university agent, which therefore positions academic entrepreneurship as a mechanism of technology transfer (Chrisman *et. al.,* 1995; O'Shea *et. al.,* 2004; O'Shea *et. al.,* 2005; Powers and McDougall, 2005; Kirby, 2006); and thirdly, an integrative view based on corporate entrepreneurship perspective where academic entrepreneurship encompasses organizational creation, innovation and renewal inside and outside the university (Brennan *et. al.,* 2005; Brennan and McGowan, 2006).

In explaining academic entrepreneurship, this study adopts and uses the corporate entrepreneurship perspective as the background theory since the view has received the most attention as a concept in explaining entrepreneurship within an existing organization (Zahra, Jennings and Kuratko, 1999; Sharma and Chrisman, 1999; Christensen, 2004; Antoncic and Hisrich, 2004; Schildt *et. al.,* 2006), as is evident from special issues of journals, for example, *Strategic Management Journal in 1990 (Corporate Entrepreneurship), Strategic Management Journal in 2001 (Entrepreneurial Strategies for Wealth Creation), and Entrepreneurship, Theory & Practice in 1999 (Corporate Entrepreneurship in a Global Economy).*

Dimensions of Academic Entrepreneurship

Academic entrepreneurship encompasses internal or external corporate venturing, innovation and strategic renewal performed inside or outside the university. Academic entrepreneurship may occur at the level of individuals or groups of individuals, acting independently or as part of a university system, who create new organizations, or instigate renewal or innovation within the university or outside the university via science and technology parks, university-owned corporate firms or research centres (Chrisman *et. al.,* 1995; Röpke, 1998; Sharma and Chrisman, 1999; Brennan and McGowan, 2006).

In this study, innovation in the academic setting refers to the university's commitment to pursue research and development in creating and introducing scientific breakthrough, new inventions and products; introducing new ways of doing things in terms of production processes and organizational systems within the university; and, transferring and commercializing new knowledge and technology for economic and social development (Covin and Slevin, 1991; Lumpkin and Dess, 1996; Zahra, 1996; Clark, 1998; Röpke, 1998; Morris and Kuratko, 2002; Jacob *et. al.,* 2003; Brennan *et. al.*, 2005).

This study defines organizational creation or corporate venturing in the university context as the birth of new businesses from within the university by expanding operations in existing or new markets through university startup companies, spin-offs or spin-outs and strategic alliances, joint ventures or collaboration with the industry (Zahra, 1996; Sharma and Chrisman, 1999, Antoncic and Hisrich, 2004; Klofsten and Jones-Evans, 2000, Birley, 2002; Etzkowitz, 2003; O'Shea *et. al.,* 2004; O'Shea *et. al.,* 2005; Powers and McDougall, 2005; Brennan and McGowan, 2006).

Academic entrepreneurship involves the pervasive activity associated with the transformation or renewal of the existing university organization. Changes in the pattern of resource deployment – new combinations of resources in Schumpeter's (1934) terms – transform the organization into something significantly different from what it was before, something 'new'. This transformation of the firm from the old to the new reflects entrepreneurial behaviour. This study defines strategic renewal as the transformation of the existing academic organizations through the renewal or reshaping of the

ideas in which they are built on (Etzkowitz *et. al.,* 2000; Sporn, 2001; Hitt *et. al.,* 2001; Birley; 2002; Dess *et. al.,* 2003; Brennan and McGowan, 2006).

Entrepreneurial Leadership in a University Setting

Leadership has been a subject of interest for centuries, long before and much earlier than entrepreneurship. Hence, the contemporary study of leadership is rich on theories, models and research approaches. For example, Clawson (2006) categorized twenty six leadership models into six research approaches namely trait approach, behavior approach, power and influence, situational approach, charismatic approach and transformational approach. Within the context of management and corporate entrepreneurship studies, leadership research had centered on personality traits in the 1960s and behavioral leadership and leadership styles in the 1970s (Fernald *et. al.,* 2005, Thornberry, 2006).

Research on leadership style then evolved into the concept of situational leadership theory which advised managers to adapt their leadership styles in accordance to situation and context. This behavior and style flexibility is referred to as transactional leadership because of the emphasis on daily interpersonal interactions and transactions between leaders and their subordinates. However, if the leader is asked to bring about significant organizational change, then, the type of leadership needed is referred to as transformational leadership. Transformational leadership may be more effective at creating and sharing knowledge at the individual and group levels while transactional leadership is more effective at exploiting knowledge at the organizational level (Bryant, 2003; Judge and Piccolo, 2004; Clawson, 2006; Thornberry, 2006).

Entrepreneurial leadership is more like transformational leadership rather than transactional leadership, yet it differs in some fundamental ways. The fundamental difference between entrepreneurial leadership and transformational leadership is focus. Entrepreneurial leadership is inherently opportunity-focused. Hence, entrepreneurial leaders spend much less time to change people's minds to move into a new direction not like transformational leaders. Instead, entrepreneurial leaders seek out and recruit like-minded individuals who share their understanding and passion for the opportunity and are interested in taking quick, decisive action. Entrepreneurial leadership can be described as visionary leadership with inherent focus on opportunities, building/creating, creative destruction/ rearrangement, dynamic stake, staged investment, medium term and has an exit strategy (Fernald *et. al.,* 2005; Thornberry, 2006).

The entrepreneurial leader has an entrepreneurial mindset involving qualities such as internal locus of control, tolerance for ambiguity, willingness to hire people smarter than oneself, a consistent drive to create, build or change things, passion for an opportunity, a sense of urgency, perseverance, resilience, optimism and sense of humor about oneself. Entrepreneurial leaders can play either an active role as lead entrepreneurs themselves or act as the catalysts that stimulate the entrepreneurial actions and energies of others (Thornberry, 2006). Entrepreneurial leaders embody three characteristics of leadership which are vision, dedication and drive, and commitment to excellence (Dess *et. al.,* 2008).

This study argues that leaders in the university need to behave entrepreneurially in order to stimulate academic entrepreneurship. Yusof and Jain (2007) in reviewing six conceptual models or overviews associated with entrepreneurial universities (Clark, 1998; Etzkowitz *et. al.,* 2000; Sporn, 2001; Etzkowitz, 2004; Kirby, 2006; Rothaermel *et. al.,* 2007) found that leadership directly or indirectly is a key element in influencing university-level entrepreneurship. The behavior of leaders plays a fundamental role in facilitating, nurturing and supporting entrepreneurial activities within the university.

Despite the subject of leadership being a major and critical issue in studies pertaining to the entrepreneurial university as stipulated in various models of entrepreneurial university, the focus of leadership in those studies and models is on institutional leadership rather than leadership at various organizational levels in the university. On the contrary, this study focuses on entrepreneurial leadership as an organizational factor and process that can occur at various levels in

the university organization including at the individual level and capacity. The review of the empirical research literature on academic entrepreneurship has revealed a gap in the understanding of entrepreneurial leadership in the context of research universities and its relationship with academic entrepreneurship.

H1: The entrepreneurial behavior of leaders in the university significantly influences the level of academic entrepreneurship in the university.

A study on 112 entrepreneurial teams in Taiwan's high-tech ventures found that lead entrepreneurs who are risk-takers, proactive and innovative can stimulate the creativity of their team members (Chen, 2007). In addition, another study which used thematic analysis examined articles published in the Creativity and Innovation Management Journal from 1991 to 2000 to identify the association of leadership as a process contributing to creativity and innovation. The study revealed nine overlapping themes within each of which leadership plays a part in the production of creative insights or innovative productivity. Interestingly, it also revealed that many authors placed leadership as an implicit factor within their models of change (Rickards and Moger, 2006).

H1a: The entrepreneurial behavior of leaders in the university significantly influences organizational innovation in the university.

One of the critical elements found by Clark (1998) in successful entrepreneurial academic institutions strong top-down leadership and policies that support and encourage the process of academic entrepreneurship and which merge entrepreneurial orientation objectives with the traditional academic values of the university (O'Shea *et. al.,* 2004). Further, Bercovitz and Feldman (2004) found a significant leadership effect whereby individual faculty members are more likely to engage in technology transfer activities when the department head is also actively involved in these activities.

H1b: The entrepreneurial behavior of leaders in the university significantly influences organizational creation in the university.

Guth and Ginsberg (1990) postulated that entrepreneurial behavior in organizations is critically dependent on the characteristics, values/beliefs, and visions of their strategic leaders. For example, in a study on a large utility organization, it was found that managers who consistently practiced entrepreneurial leadership behaviors had significantly higher results in terms of employee satisfaction, customer satisfaction and financial district margin contributions than their peers who did not practice these behaviors. This study is important because it demonstrated the impact of the managers' entrepreneurial leadership training in enabling and facilitating a more creative climate for their subordinates (Pearce *et. al.,* 1997; Thornberry, 2006).

H1c: The entrepreneurial behavior of leaders in the university significantly influences organizational renewal in the university.

The Research Study

To test these hypotheses, a cross-sectional survey based methodology was used in this research to obtain data from the respondents namely academicians from four public research universities in Malaysia. The targeted population frame for this research comprised of academic staff categorized as professors, associate professors and lecturers in the selected four public research universities. The Directory of Academic Profiles established by the Ministry of Higher Education was used as the source for the sampling frame. The sample size was derived through proportionate stratified random sampling method.

Data collection for this study began in July 2008. The data for this study was collected through a self-administered questionnaire by the researchers. The questionnaire was divided into two sections, section A and B. Section A comprised questions eliciting demographic characteristics. Section B comprised of 9 questions designed to gather the information from the respondents on their perception about the entrepreneurial leadership behavior exhibited by academic leaders at various levels of the university and 18 questions (6 questions for each dimension) about the overall level of academic entrepreneurship exhibited in their universities. A five point Likert scale was used in

this section and the respondents were required to state the extent to which they agreed or disagreed with the statements in the questionnaire. Up to the end of August 2008, 77 questionnaires were successfully collected and were found to be complete and usable for data analysis.

There are various leadership theories and instruments that measure leadership behavior. Since the focus of this study is to investigate the level of entrepreneurial behavior in academic leaders and its association to academic entrepreneurship, Thornberry's (2006) instrument on General Entrepreneurial Leadership behavior is adopted and the categorization of academic entrepreneurship was based on the adoption and modification of Zahra's (1996) measure for corporate entrepreneurship. A Cronbach coefficient alpha test was conducted on the 27 items in Section B to determine internal consistency of the scales used. The values of Cronbach Alpha coefficient are depicted below in Table 1. All the variables and sub-components of the scale demonstrated sufficient alphas (0.7 or above).

Table 1: Reliability Statistics

Variables	Cronbach Alpha
Entrepreneurial Leadership Behavior	0.869
Organizational Innovation	0.935
Organizational Creation	0.925
Organizational Renewal	0.905
Academic Entrepreneurship	0.963

Data Analysis and Results

Demographic Characteristics of the Sample

Based on the demographic characteristics provided in Table 2 below, we found that the majority of the respondents were male (53.2%) and were 40 and above years of age (74%). In terms of race, majority were Malay (79.2%) which is a common scenario in local public universities. 81.8% of the respondents were permanent employees of the universities while the remaining worked on contract (13%) or temporary (5.2%) term. With regards to academic qualification, 63.6% of the respondents had PhDs, 29.9% had Masters and 6.5% had professional qualifications. 13% of the respondents were professors, 37.6% were associate professors, 35.1% were senior lecturers and the rest were lecturers (14.3%).

Table 2: Frequency Distributions of Sample (n = 77)

Demographic	Frequency	Percentage
Gender		
Male	41	53.2
Female	36	46.8
Age		
44 or below	41	53.2
45 or above	36	46.8
Race		
Malay	61	79.2
Chinese	7	9.1
Indian	2	2.6
Other	7	9.1
Working Status		
Permanent	63	81.8
Contract	10	13
Other	4	5.2
Highest Academic Qualification		
PhD	49	63.6
Master	23	29.9
Other	5	6.5
Academic Designation		
Professor & Associate Professor	39	50.6
Senior Lecturer & Lecturer	38	49.4

T-test for Gender, Race and Academic Designation

T-test was conducted to determine if there exist any significant differences between male and female academicians with regards to their perception towards entrepreneurial behavior of leaders in the selected universities. Levene's tests showed p-value of greater than 0.05 and hence homogeneity of variances exists (one of the assumptions for independent group t-test). The t-value and corresponding p-value were found to be not significant at the 5% level of significance. Thus, we conclude that there exist no significant difference between the means of male and female with regards to their perception towards leadership behavior. The results are depicted in Table 3.

T-Test was conducted to determine if there exist any significant differences between age groups (44 or below, and, 45 or above) and their perception towards entrepreneurial leadership. Levene's tests showed p-value of greater than 0.05 and hence homogeneity of variances exists (one of the assumptions for independent group t-test). The t-value and corresponding p-value were found to be significant at the 10% level of significance. Thus, we conclude that there exists significant difference between the respondents' age and their perception towards leadership behavior. The results are depicted in Table 3.

T-Test was also conducted to determine if there exist any significant differences between the professorial group and non-professorial group with regards to their perception towards leadership behavior. Levene's tests showed p-value of greater than 0.05 and hence homogeneity of variances exists (one of the assumptions for independent group t-test). The t-value and corresponding p-value were found to be not significant at the 5% level of significance. Thus, we conclude that there exists no significant difference between those in the professorial group and those in non-professorial group with regards to their perception towards leadership behavior. The results are depicted in Table 3.

Correlation Analysis

Using a series of correlation analyses, support was produced for each research hypothesis (see Table 4).

H1: The entrepreneurial behavior of leaders in the university significantly influences the level of academic entrepreneurship in the university.

The Pearson correlation analysis results in an R-value of 0.548 with a p-value of 0.0001. Based on these results, H1 is supported. Therefore, entrepreneurial behavior of leaders in these universities has a significant influence with the level of academic entrepreneurship. Nevertheless, the strength of this relationship is 0.3 as measured by R-squared, hence indicating that entrepreneurial leadership exerts a moderate influence on the level of academic entrepreneurship.

H1a: The entrepreneurial behavior of leaders in the university significantly influences organizational innovation in the university.

The Pearson correlation analysis results in an R-value of 0.524 with a p-value of 0.0001. Based on these results, H1a is supported. Therefore, entrepreneurial behavior of leaders in these universities has a significant influence with the level of organizational innovation. Nevertheless, the strength of this relationship is 0.275 as measured by R-squared, hence indicating that entrepreneurial leadership exerts a moderate influence on organizational innovation.

H1b: The entrepreneurial behavior of leaders in the university significantly influences organizational creation in the university.

The Pearson correlation analysis results in an R-value of 0.521 with a p-value of 0.0001. Based on these results, H1b is supported. Therefore, entrepreneurial behavior of leaders in these universities has a significant influence with the level of organizational creation. Nevertheless, the strength of this relationship is 0.272 as measured by R-squared, hence indicating that entrepreneurial leadership exerts a moderate influence on organizational creation.

H1c: The entrepreneurial behavior of leaders in the university significantly influences organizational renewal in the university.

The Pearson correlation analysis results in an R-value of 0.465 with a p-value of 0.0001. Based on these results,

Table 3: T-test for gender, age and academic designation

Variable	Levene's test for equality of variance		t-test for equality of means		
	F	Sig	t	df	Sig (2 tail)
Gender	2.714	0.104	-0.339	75	0.736
Age	0.341	0.561	1.749	75	0.084*
Academic Designation	1.005	0.319	-1.605	75	0.113

*Significant at 10% Sig. level

H1c is supported. Therefore, entrepreneurial behavior of leaders in these universities has a significant and positive influence with the level of organizational renewal. Nevertheless, the strength of this relationship is 0.216 as measured by R-squared, hence indicating that entrepreneurial leadership exerts a moderate influence on organizational renewal.

Multivariate Analysis of Variance (MANOVA)

To examine the relationship of leadership behavior with multiple dependent variables, MANOVA test was conducted. Results of the test are shown in Table 5. The findings demonstrate that entrepreneurial behavior of leaders significantly influences all three dependent variables of organizational innovation, organizational creation and organizational renewal. However, the most significant relationship is between leadership behavior and organizational innovation and the strength of the relationship is 0.411 as measured by the adjusted r-squared, indicating that entrepreneurial leadership exerts a moderate to strong influence on organizational innovation as compared to the other dependent variables.

Table 4: Means, Standard Deviations and Correlation Coefficients

	Variables	Mean	SD	1	2	3	4	5
1	Leadership Behavior	25.94	6.41	1				
2	Academic Entrepreneurship	59.93	14.55	0.548**	1			
3	Organizational Innovation	20.2	5.69	0.524**	0.947**	1		
4	Organizational Creation	19.22	5.33	0.521**	0.932**	0.851**	1	
5	Organizational Renewal	20.52	4.76	0.465**	0.881**	0.749**	0.713**	1

** Correlation is significant at the 0.01 sig. level (one tailed)

Table 5: MANOVA for Leadership Behavior, Organizational Innovation, Organizational Creation and Organizational Renewal

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Innovation	1487.648 (a)	25	59.506	3.125	.000
	Creation	1260.828 (b)	25	50.433	2.871	.001
	Renewal	844.683 (c)	25	33.787	1.962	.021
Intercept	Innovation	19922.806	1	19922.806	1046.279	.000
	Creation	18370.869	1	18370.869	1045.844	.000
	Renewal	21620.773	1	21620.773	1255.386	.000
Leadership Behavior	Innovation	1487.648	25	59.506	3.125	.000
	Creation	1260.828	25	50.433	2.871	.001
	Renewal	844.683	25	33.787	1.962	.021
Error	Innovation	971.121	51	19.042		
	Creation	895.845	51	17.566		
	Renewal	878.343	51	17.222		
Total	Innovation	33868.695	77			
	Creation	30592.948	77			
	Renewal	34137.682	77			
Corrected Total	Innovation	2458.769	76			
	Creation	2156.673	76			
	Renewal	1723.026	76			

a. R Squared = .605 (Adjusted R Squared = .411)
b. R Squared = .585 (Adjusted R Squared = .381)
c. R Squared = .490 (Adjusted R Squared = .240)

Descriptive Analysis of the Responses to the Construct on Leadership Behavior

Table 6 depicts a tabulation of the means and standard deviation of responses to the 9 items that measure respondents' general perception of entrepreneurial leadership behavior exhibited by academic leaders at various levels of the universities.

Table 6: Mean & Standard Deviation of Responses to Leadership Behavior variable (n = 77)

Items	Mean	SD
Moves ahead with new approach	3.12	1.08
Listen to suggestions from others	3.09	1.03
Use different approaches to overcome obstacles	3.08	1.05
Promote risk-taking environment	2.99	1.01
Demonstrate entrepreneurial orientation	2.91	0.99
Encouraging bending of rules	2.86	0.97
Get things done even by going around system	2.83	1.08
Encourage others to outwit bureaucracy	2.57	1.03
Actively fight bureaucracy	2.51	0.93

The items have been arranged according to a descending order of the mean scores. The highest mean score (Mean=3.12; SD=1.08) is obtained for the item on 'In general, academic leaders at various levels of the university willingly move ahead with a promising new approach when others might hold back'. On the other hand, the lowest mean score (Mean=2.51; SD=0.93) is obtained for the item on 'In general, academic leaders at various levels of the university actively fight the encroachment of bureaucracy in the university'. The results demonstrate that the respondents/ academicians perceive that people in leadership role in these universities exhibit weak leadership behavior for the latter and strong leadership behavior for the former. However, the highest score being around 3 signifies that there is not a very strong entrepreneurial leadership behavior for any of these items which could further explain the reason for the level of leadership behavior to be low (Mean=25.94; SD=6.41) and the level of academic entrepreneurship to be moderate (Mean=59.93; SD=14.55) in these universities as shown by their mean scores in Table 4.

Rules, systems and bureaucracy seem to be major obstacles in fostering entrepreneurial behavior among academic leaders as demonstrated by the means scores of item 6, 7, 8 and 9. These factors are hindering academic leaders in these universities to act entrepreneurially or to undertake entrepreneurial activities and opportunities. In fact, there is moderate level of entrepreneurial orientation among the leaders. Further, the promotion and encouragement for risk-taking is also moderate. Nevertheless, items 3, 6 and 9 which are closely related, demonstrate that academic leaders may have a slightly high sense of perseverance in moving ahead and in utilizing different approaches in overcoming obstacles. This is supported by a positive attitude and open-mindedness in listening to suggestions from others.

Conclusion

Entrepreneurial behavior among academic leaders can represent a significant enabler to academic entrepreneurship in the local public research universities, especially when academic leaders are able to unleash their entrepreneurial mindset, thinking, approach and potential. The results of this study confirm that a higher level of entrepreneurial behavior among academic leaders will commensurate in a higher level of academic entrepreneurship in these universities. Support was generated for all the hypotheses. Results of this study have also confirmed the findings of previous studies which found positive relationship between leadership behavior and academic entrepreneurship in a university setting (Clark, 1998; O'Shea et. al., 2004; Bercovitz and Feldman, 2004).

While the results show, in general, a slightly high level of academic entrepreneurship in these four public research universities, the current state of entrepreneurial leadership behavior in these universities is still very moderate. The challenge for these universities is to redefine the organization's concept of leadership. Inevitably, academic leadership role will be in conflict with entrepreneurial leadership role. Academicians' first priority and responsibility will be towards teaching

and research. Nevertheless, the entrepreneurial mindset and approach can be adopted and inculcated through innovative teaching and consulting activities, and by identifying opportunities and understanding market demand before a research is undertaken in order for the research output or technology to have a higher potential of being commercialized and transferable to the industry. The direction towards this mindset and approach needs to be supported and encouraged through strong entrepreneurial leadership behavior capable of overcoming various hierarchical and internal constraints.

Strong leadership is required in fostering academic entrepreneurship especially in these public universities which are governed by rules, regulations, procedures and systems set by the government. Government intervention is going to be difficult to overcome especially when funding and budget are provided for by the government. Pursuing entrepreneurial and commercialization activities may not be important unless there is a very strong desire and vision founded on the understanding of the benefits that these activities bring to wealth creation and nation building. Apart from academic entrepreneurship, entrepreneurial leadership characteristics can help to strengthen the universities' commitment to excellence. Thus, continuous motivation, training and leadership support are needed to build the culture of academic entrepreneurship, innovation and commercialization.

The study contributes to the literature by examining the theoretical connection and relationship between leadership behavior and the level of academic entrepreneurship in Malaysian public research universities. Needless to say that the study is exploratory in nature and suffers from limitations. One of the limitations of the study is that the questionnaire relied upon self-reports and perceptual data of academicians towards their universities. Moreover, the sample size is small thus generalizability of the results is problematic. Further work is needed with a more appropriate sample size and to identify the underlying dimensions of entrepreneurial leadership behavior. In addition, the dimensions of academic entrepreneurship investigated in this study need to be further validated.

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