
Research

THE IMPACT OF UNIVERSITY INTERNAL FACTORS ON ACADEMIC ENTREPRENEURSHIP: EVIDENCE FROM UNIVERSITY RESEARCH

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Abstract

Academic entrepreneurship, as a practice and a field for scholarly investigation, provides an opportunity to challenge questions and rethink about the nature and scope of publication. This paper puts forward an aspect for the research universities of Pakistan that can result in new value generation and job creation. Academic entrepreneur is missing forms of entrepreneurship in the relatively higher priority given to promoting or capturing economic value. Current research aims to fill this gap by adapting the corporate entrepreneur as a construct for academic entrepreneurship and internal environment as a motivational factor in order to propose a model for this study. Findings support that university reward system; support, leadership, and organization structure are the key indicator of academic entrepreneur within these research universities. Results provide evidence that academic entrepreneurship has a positive influence on research commercialization and technology transfer for these higher education institutes.

Keywords: Corporate entrepreneur, academic entrepreneur, internal environment.

JEL Classification: Z000

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Introduction

This study helps institutions and higher education commission to review the factors that cultivate more academic entrepreneurial culture within institutions through adapting academic entrepreneur in teaching-research universities.

Academic entrepreneurship is an emerging theme in the higher education institutes of Pakistan. These institutes could be the most important source for deriving knowledge based economy through adapting entrepreneurial creation or academic entrepreneur. However, despite of having significant publications by universities they still lack in implementing knowledge based economy or lacking the ability to utilize the research into useful products. Can institutions improve it through the internal environment; which gives rise to entrepreneurial culture construct? In this paper academic entrepreneurship is addressed as source of creating economic value through adapting organizational creation, renewal, or innovation that occurs within or outside the university that will complete the research commercialization and technology transfer at society level (Yousaf, Siddiqi & Nor, 2009; 2010; 2012)

Academic entrepreneur is the process within the boundary of university that enables the university to transfer its technology to the society through collaboration with the industry. Consistently, academic entrepreneurship will encourages greater number of technology transfer through industry collaboration. This research was followed with the view that universities which undertake both teaching and research with innovation and entrepreneurialism through providing vast resources that can be used for the resource generation through supporting communities.

With focus on organizational context and internal environment, this study examined the internal factors of academic entrepreneurship in different University campuses by adapting the lens of corporate

entrepreneurship and measured academic entrepreneurship as an organization level construct. Organization frame work is constructed on the theory that internal factor which consist of control system, Reward, university structure and leadership behavior influence academic entrepreneurship in Pakistani university setting. More specifically research undertakes to determine:

- Investigate the relationship between internal factors and academic entrepreneurship in a Pakistani university.
- Test the propose model of academic entrepreneurship within a Pakistani university.

Literature Review

Yousaf, Siddiqi and Nor (2012) indicate that internal factor of corporate might affect the creation of new phenomena in the organization through fostering academic entrepreneurship constructs. Most importantly, the review of literature was undertaken to explain university internal construct that may strongly influence academic entrepreneurship within the university setting; identifying the construct of academic entrepreneurship. Literature relates team and organization to entrepreneur apart from the individuals which link the entrepreneurship to value creation and addition (Yusof, et al., 2012). Research on entrepreneur began from focusing on student intention to organization. Entrepreneurship studied varied from franchising to family business which give rise to entrepreneurial behavior (Gregoire, Sdhildt, (2006) & Yusof, et al., (2012). Importance of entrepreneurial act gives new insight to organization (Stevenson, 1990). Corporate entrepreneur is one of the most cited theme in the entrepreneurial practice that gain conceptual convergence supported by studies published in the Entrepreneurial theory and practice (Gregoire, 2006).

Through extensive importance of corporate entrepreneurial this is adapted as base theory for this study. This study follows corporate entrepreneur literature within the overall discipline of corporate entrepreneurship to explain the academic entrepreneurship within university context. The reason for selecting the corporate entrepreneur theory is because it is centered on the role of organizational cycle theory (Yusof, et al., 2012). Further more the theory has more potential in explaining the organizational context and the nature of academic entrepreneurship (Wood & Clarysse, 2011). Literature identifies three aspect of university level academic entrepreneurship namely “Entrepreneurial University”, “academic entrepreneurship”, and university technology transfer, these concept are highlighted by O’Shea, (2004) & Yusof, et al., (2012).

Previously research focused on the academic entrepreneurship by targeting institutional policies and environment. This study contribute to the literature by focusing on the research transformation at the society level through testing the university level entrepreneurship within Pakistani university as tested by Yousaf, et al., (2012) in Malaysian university.

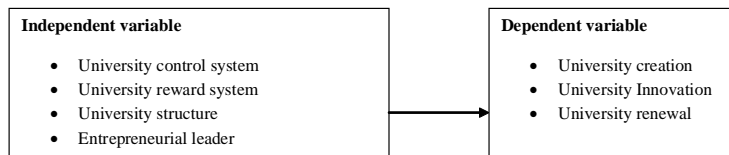
Gap related to impact of university internal factor on academic entrepreneurship in university setting, the unavailability of uniformed scale to measure academic entrepreneur at university level this study using corporate entrepreneurship as theoretical lens, absence of academic research to explain the phenomenon in the Pakistani context, gap related to understanding the importance of entrepreneurial leadership in academic entrepreneur and the lack of research this study considered construct of internal environment consist of control system, organization structure and reward system. Based on Corporate entrepreneur climate instrument by (Ireland, et al., 2006a; 2006b) which conceptualized corporate entrepreneur is stimulated and supported by internal environment factor of organization. Following framework is proposed for this paper where dependent variable is the organization level constructs

Dependent variable

- University creation
- University Innovation
- University renewal

Independent variable

- University control system
- University reward system
- University structure
- Entrepreneurial leader

Theoretical Framework

Source: Zahra, (1996) and Ireland, et al., (2006a; 2006b).

In addition of proposed framework the main challenge is developing the essence of academic Entrepreneurship. By keeping in mind need for entrepreneurial leadership; it is proposed in the Study that must be an unambiguous factor in the framework because entrepreneurial leader need to create an environment that ultimately encourages people to think differently(Yusof, et al., 2012). This study focusing on academic entrepreneur as university process that lead toward the commercialization and transferring hope toward the society

(Yousaf, et al., 2012). These involve action of creation, innovation and renewal of existing resources at organization level. This paper uses the process approach in defining the academic entrepreneurship within university setting that result in the enhancing the university research transformation at society level. In this regard research commercialization is the end product of academic entrepreneur rather than limiting it to just new venture creation.

From the proposed framework the following hypothesis are derived in order to check the significance of independent variable on the dependent variable:

H1: University control system is positively related to the academic entrepreneurship within Pakistani university.

H2: University structure positively associated with the level of academic entrepreneur within university.

H3: Reward system which perceives to encourage entrepreneurial behavior positively associated with academic Entrepreneur within university.

H4: Entrepreneurial leader in university significantly influence the academic entrepreneur among University academia.

Research methodology

This study involves collection and analysis of quantitative data and implementation of design that is referred by Brennan, (2005) to conceptualized the phenomenon of academic entrepreneurship; relating these categories to academic entrepreneurship to assess the phenomenon within the university setting (Yousaf, et al., 2012).

This study extended the categorization of university entrepreneurial phenomenon based on the dimension of corporate entrepreneurship by modifying (Zahra, 1996) measure of academic constructs. Literature postulated academic entrepreneurship as internal or external corporate venturing but phenomenon may occur at individual's level as part of university system, which tends to involve in innovation creation within or outside the university (Yousaf et al. 2012). Table 2 explains the important dimension of academic entrepreneurship at university level.

Table 1

Dimension of Academic Entrepreneur	Description	Source
Organizational creation	Expanding current services in market through university collaboration at society level	(Yousaf, et al., 2012) (Zahra, 1996) (O' shea, et al., 2001)
Organizational innovation	University commitment to pursue research as source of generating profit as the organization level.	(Powers & McDougall, 2005) (Yousaf, et al., 2012) (Zahra, 1996)
Organization renewal	Transformation of existing academic ideas in a way in which they are built.	(Etzkowitz & Klofsten, 2005) (Yousaf, et al., 2012) (Zahra, 1996) (Etzkowitz, 2003)

Internal university environment can affect the desire for being entrepreneur itself this aspect was not given so much attention in the previous work (Yusof, et al., 2012). Ireland (2006) and Yusof, et al., (2012) propose an array of reward system, structure, and control as a construct of organization environment. This Study adapted this frame work in the Pakistani culture to check the influence of environmental construct on academic entrepreneurship, table 3 explains the detail of environmental construct.

Table 2:

Dimension of Internal Construct

Internal Factors	Description
Organization Structure	<ul style="list-style-type: none"> • Broader span of control • Few layers • Decentralization • Less-formalization • Open communication flow • Sense of smallness.
Control system	<ul style="list-style-type: none"> • Control based on no surprise. • Loose-tight control • Resource slack • Mutual trust • Open information sharing.
Reward system	<ul style="list-style-type: none"> • Long term reward system • Appraisal and reward criteria based on innovation • Individual and group rewards. • High employee appraisal.

Source: Adopted from Zahra 1992, Muhammad Yousaf et al. 2012, Kuratko (2006a, 2006b)

These factors can act as barrier to entrepreneurial development within university due to inherent nature of teaching culture among the higher education institutes (Yusof, et al., 2012). This study included leadership suggested by Thornberry and Victor (2006) that give rise to environment that encourage entrepreneurial mind among the members of the organization. Ireland, et al., (2006a; 2006b) recommended the need for the entrepreneurial leadership in order to raise the entrepreneurial mind among their members. Kuratko, (1998), and Thornberry and Victor (2006) address the importance of entrepreneurial leadership for twenty first century. Study adapting corporate entrepreneurship as base theory that gives rise to critical relationship between university internal environment and individual behavior. This interaction can be affected by the presence of entrepreneurial leadership (Yusof, et al., 2012).

Methodology

Sampling Strategy

This study has targeted the Pakistani faculty which includes professors, associate professors, and lecturers of public and private sector universities. This study obtained the quantitative results from convenient sampling. The reason for choosing convenient sampling was the time and financial constraint.

Data collection

A survey method was chosen to collect the data from the target population. This study uses the self administered survey design. Self administered survey is the way of data collection in which respondent read the question and provide his or her response (Hair & Irwin, 2009). Questionnaire has been designed into two parts in the first covers the demographic and the second part includes the measure of internal environment and determinant of academic entrepreneurship adapted from Zahra, (1996); Ireland, et al., (2006) & Yousaf, et al., (2012). Entrepreneurial leader behavior is adopted from the ELQ

(Entrepreneurial leader questionnaire) by Thornberry, (2006). Likert scale measures the respondent responses that vary from strongly disagree to strongly agree. A pilot study was conducted to check variables fit in the model in order to access the reliability and validity shown in table 4.

Demographic Profile

The target group of this research is full time employees as lecturers of universities. The associates in universities distributed the questionnaires as coordinators among lecturers. Total 318 participants have been selected from public and private universities. The proportion of respondents is 180 from private universities and 130 from public sector universities. Eight surveys were omitted from the total because of incompleteness. The remaining 310 questionnaires were included in data analysis process. The participants have to complete a survey about their demographics, gender, age, work experience etc. Some specific demographic information of both organizations (public and private) is shown in Table 2.

Analysis of the measurement scale

This section covers the descriptive result of the measurement scale for each of the individual variables in the study. The description of each variable is presented in the form of skewness, kurtosis. Normality test is important which access through skewness and kurtosis because violation of this result in invalidate statistical hypothesis testing (Hair, et al., 2000; 2009) & (Yousaf, et al., 2012). The value of skewness and kurtosis of less than 1.65 is considered as items that are normally distributed which means there is no need for further transformation of data (Yousaf, et al, 2012).

Table 3:
Sample characteristics (N1+N2=310)

Gender universities	Public universities	Private
Male	150(48.38%)	30 (9.67%)
Female	10 (3.22%)	120(38.70%)
	Age	
21-25	26 (8.38%)	10 (3.22%)
26-30	52 (16.77%)	10 (3.22%)
31-35	44 (14.19%)	10 (3.22%)
36-40	44 (14.19%)	30 (9.67%)
40+	54 (24.19%)	30 (9.67%)
	Educational level	
Undergraduate	0	0
Graduate	23 (7.41%)	8 (2.58%)
Masters	48 (15.48%)	68 (21.9%)
M.Phil	38 (12.25%)	9 (2.90%)
Ph.D.	48 (15.48%)	68 (21.9%)
	Type of organization	
Public	0	2 (33.33%)
Private	4 (66.66%)	0
Semi-Government	0	0
	Work experience	
1-5	34 (40.0%)	13 (15.3%)
6-10	29 (34.1%)	28 (32.9)
11-15	12 (14.1)	23 (27.1%)
16-20	8 (9.4%)	11 (12.9%)
21-25	2 (2.4%)	10 (11.8%)
More than 25	0	0

Table 4:
Reliability

Variables	Reliability
Structure	0.521
Control	0.739
Reward	0.921
Leadership	0.820
Organization creation	0.821
Organization innovation	0.921
Organization renewal	0.722
Academic entrepreneurship	0.859

Control System

The scale consists of eight questions to measure what academia feel about the budgetary control of research.

Table 5:
Value of skewness and kurtosis

Items of control system	Mean	Skewness	Kurtosis	S.D
1. Ones budgets for research and development are accepted, they are difficult to revise.	3.20	-0.23	-1.02	1
2. Academicians have a lot of discretion in how they do their jobs	3.10	0.12	-0.21	0.82
3. Academicians feel trusted by the management when it comes to using organizational resources.	3.13	-1.02	0.91	1.20
4. The lines of command clearly allocate authority to each faculty or department.	3.22	-0.54	0.34	1.21
5. There are several options for individuals to get financial support for innovative projects.	3.90	-0.21	1.32	0.82
6. To talk openly with others about ways to improve projects	3.00	-0.12	0.23	1.05
7. My university is quick to use improved work methods that are developed by workers.	3.00	-0.12	0.23	1.05
8. In my university developing one's own idea is encouraged for the improvement of the corporation.	3.41	-0.92	-0.12	1.03
	3.31	-0.82	-0.14	1.0

Results of table 5 indicate that university academia perceive flexible research control system as the value of mean and S.D strongly indicates academia's felt trusted and were given freedom to do research by availing campus level facilities. On the Other hand there is a strong need for effective control system in order to promote academic entrepreneurship and innovation among the faculty member.

Organization Structure

The scale consists of eight questions to measure what academia feel about the university structure regarding research.

Table 6:

Value of skewness and kurtosis

Items of organization Structure	Mean	Skewness	Kurtosis	S,D
1.University structure facilitates open communication flow	3.21	-0.22	0.32	0.87
2.University structure takes away our ability to be entrepreneurial	3.01	-0.65	0.11	0.45
3. Faculties are organized in a way that encourages us to independently manage our research projects.	3.91	-0.11	-0.82	0.99
4.In universities there are many level of management				
5.University structure is flexible				
6.University chain of command limits our ability to experiment with new ideas	3.21	0.21	-0.32	1.20
7.University administration believe in delegating decision making responsibility	3.34	-0.62	0.11	1.02
8.University structure is clearly defined	3.56	-0.32	-0.91	1.10
	3.10	-0.12	0.99	0.78
	3.21	-0.36	0.45	0.89

University reward system

Reward system was measured by using 7 items that check the university environment regarding financial appreciation for innovative ideas, reward for taking certain risk, job definition, evaluation procedure for the promotion and all other aspect are measured by the given 7 items.

Table six reveal the following results: Academia's strongly disagree with effective organization structure as each statement has low value of standard deviation like the faculty is not agree about

that university structure is clearly defined. Administration didn't believe in delegating decision making to the faculty (S.D = 0.78). But overall responses indicate despite of having no effective organization structure still it does not hinder the entrepreneurial ability of the university and its academia.

Table 6:

Value of skewness and kurtosis

Reward items description	Mean	Skewness	Kurtosis	S.D
1. University incentives for innovation are high.	3.02	-0.32	-0.22	1.01
2. University academicians who take calculated risks are rewarded.	3.01	-0.21	0.32	1.05
3. University jobs tend to be broadly defined with considerable discretion in how tasks are performed.	3.50	-0.32	-0.22	1.20
4. University academicians can pursue multiple career paths.	3.21	-0.45	-0.12	1.05
5. University developed creative potential of academicians.	3.51	-0.12	0.43	1.20
6. University annual performance appraisals include an evaluation of employee innovativeness.	3.42	-0.13	-0.91	1.02
7. In university there is more concern with the process than with the performance.	3.14	-0.25	-0.24	0.92

According to Table 7 university faculty perceive them values as innovation supporter as each item has S.D of above 1 except the last item which showed university has more concern with the process and with the quality of performance. All the results of independent variables close to the study result of Yousaf, et al., (2012) that was conducted in the Malaysia universities.

Entrepreneurial Leader

Table 7 shows entrepreneurial leader is not an effective determinant of academic entrepreneurship because all the items have low value of mean and S.D; reflect the academia disagreement with the entrepreneurial leadership in the university environment.

Table 7:

Value of skewness and kurtosis

Items Description	Mean	Skewness	Kurtosis	S.D
1. University entrepreneurial leader promote an environment where risk taking is encouraged.	3.21	-0.11	-0.12	0.82
2. University entrepreneurial leader willingly listen to suggestions from others about how to do things differently	2.77	-0.31	-0.31	0.77
3. Entrepreneurial leader encourages entrepreneurial orientation at work.	2.98	-0.31	-0.11	0.78
4. University Entrepreneurial leader willingly move ahead with a promising new approach when others might hold back	2.99	1.01	0.12	0.88

University innovation

Dependent variable is measured through using Zahra scale of corporate entrepreneur; results represented in the Table 8.

Table 8:

Value of skewness and kurtosis

Items	Mean	Skewness	Kurtosis	S.D
1. Our university has spent heavily on R & D.	3.51	0.21	-0.11	0.89
2. Our university has maintained world class R&D.	3.36	-0.32	-0.12	7.09
3. Our university has increased the amount of knowledge transfers to the industry through R&D.	3.23	-0.14	0.45	6.54
4. University has been successful while comparing with other university at commercializing the inventions.	3.10	-0.41	0.32	0.88

Academies indicate the lack of facilities at campus level to enhance the academic entrepreneurial mind among the faculty members in the Pakistani university so there is need to focus on updating the facility in order to take benefit from research into resource generation. On the other hand Pakistani universities have less emphasize on the commercialization of ideas that can be source of fund generation.

University creation and innovation are show in the Table 10 and 11 which reveal Pakistani universities tend to be less interested in the new venture creation that is another area where Pakistani institutions need to be work if they want to productive from their own

activities of research activities and the Table 11 conclude Faculty disagrees with university effort to improve department progress but mean of 3.11 indicate effort has been initiated that might take time to realize at the faculty level. The results indicate at Pakistani level there is no such initiative felt by academia to spread the essence of academic entrepreneur with in universities.

University creation

Measure of academic entrepreneur is assessed through Zahra scale that provided the following result:

Table 9:

Value of skewness and kurtosis

Items	Mean	Skewness	Kurtosis	S.D
1. University facilitated the creation of entrepreneurial from student's research group.	3.10	-0.41	0.11	0.78
2. University has received sponsorship from the industry to establish applied research with the industry	3.12	-0.32	-0.31	0.89
3. University has undertaking internal venture development through contract research with the industry	3.13	-0.21	-0.43	0.98

University renewal

Items were measured through using the corporate entrepreneur scale that has the following findings about the Pakistani university:

Table 10:

Value of skewness and kurtosis

Items of renewal	Mean	Skewness	Kurtosis	S.D
1. University has maintained several unprofitable faculties departments because of public interest	3.91	-0.42	-0.11	0.72
2. Universities have initiated programs to improve the productivity of departments.	3.11	-0.12	-0.13	0.88
3. University seems to have expanded its mission to include economic enterprise in addition to teaching and research	3.41	-0.30	0.11	0.60

Reliability analysis

Reliability of scale was calculated using SPSS 17; Control system showed lower value of alpha while the academic entrepreneurship had highest value of alpha. Result in Pakistani universities was close to study conducted in Malaysia universities where the control system showed lower score among other scale (Yousaf, et al., 2012).

*Table 11:***Reliability analysis**

Variable	Cronbach's Alpha
Control system	0.72
Structure	0.78
Reward system	0.82
Entrepreneurial leadership	0.92
Academic entrepreneurship	0.95

Simple linear regression

Simple linear regression was conducted to test the proposed hypothesis which showed each independent variable significantly predict the academic entrepreneurship within Pakistani universities. Results in 2 Pakistani semi government universities verify and extend the result of previous study conducted in different countries universities without any cultural barrier that internal environment has strong influence on the level of academic entrepreneurship (Etzkowitz, 2003; Bernnan, et al., 2005; Llano, 2006; Bercowitz & Feldman, 2008; clarysse, 2011; Yousaf, et al., 2012). However the relationship between each independent and dependent variable is not very strong these findings also prove the previous work on internal environment (Yousaf, et al., 2012).

Hypothesis derived in the Table1 is proved by performing the simple regression which is described in the table 12 along with the adjusted R square:

Table 12:
Hypothesis testing

Hypothesis	Results	Adjusted R square
H1: University control system is positively related with the academic entrepreneurship within Pakistani university.	Supported***	0.356
H2: University structure positively associated with level of academic entrepreneur within university.		
H3: Reward system which perceive to encourage entrepreneurial behavior positively associated with academic Entrepreneur within university.	Supported***	0.328
H4: Entrepreneurial leader in university significantly influence the academic entrepreneur among University academia.	Supported***	0.420
	Supported***	0.281

Note: ***P<0.001 Result from simple linear regression indicate that if Pakistani universities want to become more efficient in resource generation they need to improve and indulge control system, structure, reward system in order to rouse, support, foster the more entrepreneurial mind among the academia. As Pakistani universities lacking in availing sufficient fund from the government so they can be self productive through adapting the essence of academic entrepreneur among their culture of teaching.

Discussion

Result from Descriptive and simple regression analysis provide the evidence of appropriate relationship among the university internal environment and academic entrepreneurship hence findings support aptness of using the organizational framework of academic entrepreneurship to measure the influence of internal environment in stimulating the essence of academic entrepreneurship among the Pakistani university. Results of Pakistani university are in line with overall work in the area of academic entrepreneurship of Etzkowitz, (2003); Bernnan, et al., (2005); Llano, (2006); Bercowitz & Feldman, (2008); clarysse, (2011); Yousaf, et al., (2012).

There are several limitations to the research; firstly the universities selected were teaching university in order to work on the future recommendation of Yousaf, et al., (2012) that provide extension in the literature from the aspect of academic entrepreneur essence in Pakistani universities. No research designated universities were included in the study.

Secondly, Convenience sampling was used to collect the data that might miss the academies that would be actively involved in the research activities and academic entrepreneurship but not conveniently available at the time of data collection. Third, the current investigation is limited to only two public universities; therefore generalization is limited to context of Pakistani public universities. Fourthly, the research design for this quantitative study was cross-sectional so all the variables in the frame work is measured at single point in time. Therefore future research through longitudinal study provides further significant insight into study.

Fifth the study didn't check the individual impact of variable on the dependent variable that might give more detail about the key predictor of academic entrepreneur within research universities. Finally university culture was not included in the study frame work that would provide more detail about the appropriateness of model within public university.

Conclusion

Little research has been done from the aspect of academic entrepreneurship among Pakistani universities. This study provides fresh insight into literature from the view Point of Pakistani University. There were few studies on the antecedents of technology transfer. This study brought the elements of university internal environment into single framework. Study provides convincing evidence of academic entrepreneur to measure the impact of internal environment

in stimulating the level of academic entrepreneur in the Pakistani university. As result we know about kind of entrepreneurship is likely under the university internal system and entrepreneurial leadership behavior within context of teaching university.

Further this study extends the future recommendation into Pakistani culture that provided the integrative perspective of corporate entrepreneur. This study highlight the factors that university academia think to reconsider in order to improve and encourage entrepreneurial mind among the university faculty by the higher authority.

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