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The Determinants of Faculty's Involvement Toward Pasteurian Orientation In Entrepreneurial Universities

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Abstract

The paper examines university-, department-, and individual- factors affect the propensity of faculty towards academic entrepreneurship. By deploying the concept of the faculty in entrepreneurial universities as Pasteurian orientation, the paper uses an instrument to measure the context of university, dual involvement, the nature of disciplines, personal characteristics, the Pasteurian orientation, and performance. Via a survey of the faculty members, 467 respondents originated from 6 universities, are collected. Findings indicate that the department commitment, buffering, discipline, status of tenure, gender, and position contribute the greater commercialization involvement. The higher degree of

Pasteurian orientation in faculty has significantly positive impacts on their overall performance. The results provide managerial implications for developing context to enhance Pasteurian orientation in achieving knowledge creation and commercialization simultaneously. There are specific personal and disciplinary factors resulting different effect with previous researches. The policy to encourage academic entrepreneurship should be aware of these contexts in the university and faculty along with the emerging new governance of S&T.

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Abstract

The paper examines university-, department-, and individual- factors affect the propensity of faculty towards academic entrepreneurship. By deploying the concept of the faculty in entrepreneurial universities as Pasteurian orientation, the paper uses an instrument to measure the context of university, dual involvement, the nature of disciplines, personal characteristics, the Pasteurian orientation, and performance. Via a survey of the faculty members, 467 respondents originated from 6 universities, are collected. Findings indicate that the department commitment, buffering, discipline, status of tenure, gender, and position contribute the greater commercialization involvement. The higher degree of Pasteurian orientation in faculty has significantly positive impacts on their overall performance. The results provide managerial implications for developing context to enhance Pasteurian orientation in achieving knowledge creation and commercialization simultaneously. There are specific personal and disciplinary factors resulting different effect with previous researches. The policy to encourage academic entrepreneurship should be aware of these contexts in the university and faculty along with the emerging new governance of S&T.

Keyword: Faculty entrepreneurship, Entrepreneurial university, Pasteurian orientation

1 Introduction

Accompanying with the change in S&T policy and the transformation in economy, the universities are undergoing to build the third mission that contributes to social and economic development (Etzkowitz, 1998). The entrepreneurial activities in universities involve the process that enables the researches from the laboratories to be disclosed and proven their novelty and originality, and be channelled into the marketplaces, such as patenting, licensing, and spin-off venturing. The rise of academic entrepreneurship enforces the universities to change the policies, structure, resource allocation, and so on, in order to keep original mission going and develop the

new mission (Powers & McDougall, 2005; Shane, 2004)

In this trend, the faculty is asked to involve new mission at the same time. Prior studies propose various affecting factors from the perspective of the institutions to the individuals. There are many researches show that the institution and regulations influence the context of entrepreneurial universities, such as mission, structure, resource allocation, and performance evaluation (Chreim, Williams, & Hinings, 2007; Etzkowitz, 2003; Jain, George, & Maltarich, 2009; Mowery, Nelson, Sampat, & Ziedonis, 2001; Whitley, 2003). Then, some scholars find that organizational support strongly influences the faculty behavior, and including the norm's, peer pressure, behavior of reference group, and specific mechanism agencies (Bercovitz & Feldman, 2008; Haas & Park, 2010; Jain et al., 2009). Otherwise, different academic career stage (Dietz & Bozeman, 2005), the experience (Ambos, Mäkelä, Birkinshaw, & D'Este, 2008), and the resource (D'Este & Perkmann, 2011) would influence individual's engagement in entrepreneurial universities.

The paper develops the notion of Pasteurian Orientation (PO) as a framework in dual development of the faculty. The PO that includes two directions in the works, research and commercialization, explains the feature of faculty that reach the quest of understanding and contribute the quest of practical using simultaneously. Then, this study employs the concept measure the behavior of faculty that they develop new capability to be PO. We focus the research questions what determinants make the faculty involve the commercialization to be PO and how PO influence the performance.

In the next, we review the literatures about the new challenge of universities, describe the change in the behavior of faculty, and propose our hypotheses. Via the survey, this study collects the data from 467 respondents in Taiwan to verify the relationship within the determinants, PO, and performance. Finally, we combine the result with cluster analysis and provide the explanations and implications from this study.

2 Literature Review

2.1 The Rise of Faculty Entrepreneurship

In recent years, the role of universities in the knowledge –based economy has become an important issue by the way of knowledge production has changed from

“Mode 1” to “Mode 2”. (Gibbons, 1994) The universities are forced to make a new social contract to involve the industrial economy. (Geuna, Salter, & Steinmueller, 2003) Since the postwar to 1980’s, the universities played a role that takes the teaching and researching and are funded by the government. Therefore, the universities focused on the basic research to contribute the public knowledge creation.(Stokes, 1997) After the 1980’s, there are some radical change to influence the role of universities. In the government, the financial support is decreased by increasing number of new universities and constraints on public expenditure. In the industry, the firms face the strong competitions in technology development, and stress on connecting with the long-term research and approximating to basic research to cultivate the core competences.

Therefore, the universities face the second revolution to development third mission, which contribute in social and economic development, such as enhancing the innovation, building new technology, creating new venture, and so on. (Etzkowitz, 2003; Etzkowitz & Leydesdorff, 2000; Shane, 2004) In other words, the universities have to transfer the knowledge by capitalization to make more benefits in the society. (Renault, 2006)

However, the behavior of faculty in the universities has also changed in the revolution, and they are asked to response to third mission. They involve into academic-industry linkage, transfer their knowledge, and conduct U-I cooperation based on personal motivations, just like obtaining the resource, building the reputation, and intrinsic satisfaction.(Alice, 2011)

2.2 Typology of faculty’s work and Pasteurian orientation

After 1980’s, S&T policy makers think original viewpoint that research stream as a basic- applied spectrum could not explain ambiguous boundary in some cases for new science governance in third mission. Stokes (1997) cites the research of Louis Pasteur drive toward understanding of microbiologic process and control food spoilage and microbial-based disease as a good example. (Mendoza, 2009) And, he proposes a new matrix (See figure) of consideration in utility and fundamental understanding for strategic research.(Beesley, 2003).

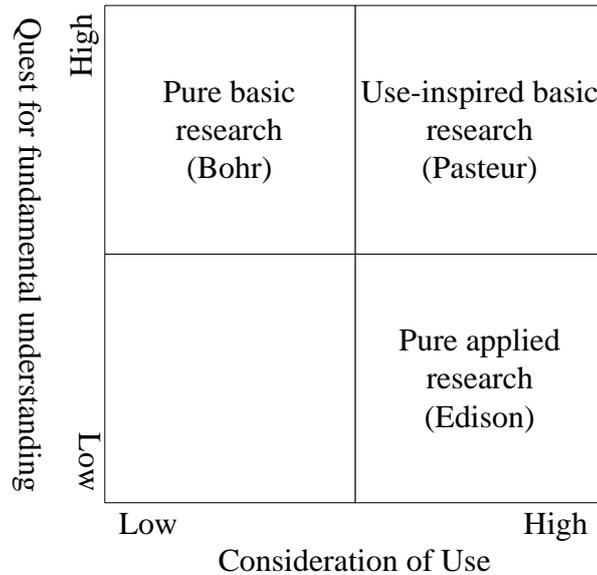


Figure 1 Quadrant Model of Scientific Research

Adopt from stokes (1997)

The upper left cell, the Bohr’s quadrant, focuses on the basic research without the consideration of practical application. Moreover, the lower-right cell, the Edison’s quadrant, concretes at the research of technology development that just considers the utilization of knowledge. Then, Stokes (1997) proposes a new conceptual quadrant, the Pasteur’s quadrant, which focuses on the basic research inspired by understanding and by use. He argues that the researches in Pasteur’s quadrant is the better position for strategic research because the user-inspired basic research could move flexibly to Bohr’s quadrant to increase the understanding and to the Edison’s quadrant to apply into practical using, and the interactions between them forms a revised dynamic model.

In the universities, Etzkowitz (2003) argues that the faculty’s research has transformed gradually to interact between the basic and applied researches in the linear model, and move from the understanding to utilization. In Stokes’ Model, the faculty would make the researches toward to Pasteur’s quadrant. Pasteurian orientation is described the faculty’s attributes that the notion of Pasteurian orientation can be defined as “a faculty develops a dual involvement to achieve the quest of fundamental understanding and practical using.” More specifically, Pasteurian orientation is mean that the faculty keep their researches could contribute the

understanding, and engage into the utilization at the now and future in the industry or society.

2.3 The Determinant of Faculty Involvement

However, the behavior of faculty in commercialization involvement is influenced by many factors, such as the nature of the disciplines, the context of universities, and personal characteristics. First, the ways in which the discipline could contribute to economic and social development vary from area to area. Professional norms in different disciplines influence the focus of research, such as customs, traditions, reward system, and so on. (Beesley, 2003; Renault, 2006) Second, the research disciplines also have their own boundaries in knowledge production (Tierney & Holley, 2008), and every disciplines has its own history, and fulfills solve different questions or needs in the society and industry.

Second, the context of universities shows the setting of universities such as the policy for research commercialization, support mechanisms, and so on. Jain et al. (2009) argue that the faculty needs the support from the university to lower the effort on the business, expect for the research. In addition, the faculty needs the flexibility in their work that they could control by themselves.

Beside the former factors, there are still more individual- related factors to influence the willingness of the faculty. Renault (2006) finds that the belief of faculty would influence their decision, such as research commercialization, and proper role in third mission. Davis, Larsen, and Lotz (2011) find the capability would influence the professors' involvement. Moreover, the different academic career stage (Dietz & Bozeman, 2005), the experience (Ambos et al., 2008), and the resource (D'Este & Perkmann, 2011) would influence individual's engagement. Jain et al. (2009) also find the networks that the faculty could access are important incentives to engage in the

commercialization. However, the professional norms or organizational identities are shaped by the attitude and behavior of reference groups that compose with the colleagues or similar disciplinary scientists would influence the individual's behavior when there is a conflict between the group and the individual. (Bercovitz & Feldman, 2008; Haas & Park, 2010; Jain et al., 2009)

In the sum, the disciplinary attributes are endogenous factors to affect the development of Pasteurian orientation. And, the contexts influence the activities in the universities internally. Finally, the individual factors demonstrate the willingness of the faculty would influence the implementation of Pasteurian orientation.

3 Research Methods

3.1 Questionnaire development

3.1.1 Item development

This study collected the data by asking a large sample of individuals to rate their departments' context and dual development in the individuals. Because no existing measure assessed departments' context and dual development in the individuals, we developed the survey after referred to a few items identified by Ghoshal and Bartlett (1994) and Chang, Yang, and Chen (2009). The questionnaire written in English was translated into Chinese and then back-translated them into English. As suggested by (Brislin, 1980), semantic differences between original and back-translated items were not statistically significant difference. A cover letter attached with the questionnaire explained the research purpose and provided assurances of anonymity and confidentiality.

3.1.2 Judge analysis

We recruited 15 faculty members and doctoral students as subject matter experts to judge the content of the draft questionnaire. Moreover, we held three focus groups to discuss these questions. The percentage of correct assignment was calculated for each item by using items with 60% or higher correct classification. This process continued until semantic equivalence was achieved for all items. Based on descriptions and interviews, 23 questions were chosen to measure the questionnaire. Among those,

there were 10 questions assessed for departments' context, 7 questions for dual development, and 4 questions for performance.

The items of departments' context and dual development in the individuals in the survey were developed in 7-point Likert-style. And, the performance are requested by the respondent's performance in paper, patent, technology, and U-I cooperation form 2006~2008.

3.2 Participants

The sampling criteria focused on university departments of science, engineering, and medical research fields since they have higher potential to commercialize research results. Prior research argued that the goal of theoretical sampling is to choose research targets which are likely to replicate or extend existing theory (Eisenhardt, 1989). Accordingly, six major universities in Taiwan were chosen to reflect the key attributes of universities included: public versus private institution; general versus specified disciplinary field. The original list of 29 schools and 172 departments was collected from the schools' websites.

After checked with the researcher database in the National Science Counsel for the consistency, the total number of survey respondents was 2,574 individuals from these departments. In order to increase the response rate, this study conducted questionnaire collection by means of a systematic approach, including a courtesy pre-survey phone call, a cover letter accompanied with the actual mailing of survey, and finally, a series of three follow-up postsurvey phone calls to nonrespondents. Finally, there were 477 returned questionnaire (a 18.5% response rate). Ten surveys are dropped because not matching the criteria of a valid department. Thus, there were 467 valid questionnaires.

There were 377 male respondents (81% of the respondents). There were 219 full professors (47%), 111 associate professors (23%), and 119 assistant professors (26%). The average tenure for the respondents was 13.6 years in academic works. Moreover, there were 264 respondents (57%) who have been granted as tenured faculty members. Table 1 provides a brief breakdown of the sample.

3.3 Measures

The survey items are initially tested in the study conducted with all faculty members. Exploratory factor analyses of the data from the pilot study indicated that

the meanings of the survey items are clear.

3.3.1 Performance

The survey asked faculty members to assess individual's quantitative performance 2006~2008. The performance indices include research publication and research commercialization. As for the objective approach, this study initially required the respondents to convey their research publication (i.e. journal paper published in the databases of SCI, SSCI, and EI) and commercial outcome (i.e. patent grant, technology transfer, university-industry collaborative project). After reviewed the practical commercial involvement form the returned questionnaires, this study aggregated the number of patent grant, technology transfer, and university-industry collaborative project as the proxy of commercial outcome, as a variable, Commercial Performance. Likely, this study aggregated the number of papers, as a variable, Research Performance.

3.3.2 Variables

At the first, there are four items being condensed to one factor including: (1) "My university have fine supports and incentives for IPR"[.89], (2) "My university have fine supports and incentives for Technology Transfer"[.91], (3) "My university have fine supports and incentives for U-I cooperation"[.88], (4) "My university have fine supports and incentives for new venture"[.81]. The 4 items loaded on a single factor having an eigenvalue of 33.61 ($\alpha = .94$). We renamed the factor as University Support. Moreover, there are three items being condensed to one factor including: (1) "My Leader have high commitment in the commercialization."[.88], (2) "My colleagues have high commitment in the commercialization."[.88], (3) "My department have higher performance in the commercialization than related departments in other universities."[.88]. The 3 items loaded on a single factor having an eigenvalue of 16.24 ($\alpha = .915$). We renamed the factor as Department Commitment. Third, there are three items being condensed to one factor including: (1) "The departments could cut teaching loading for hosting the project."[.64], (2) "The departments encourage us to be a consultant/the board in the firms"[.79], (3) "The departments encourage us to be an employee in the firms temporally."[.83]. The 3 items loaded on a single factor having an eigenvalue of 6.708 ($\alpha = .685$). We renamed the factor as Buffering.

Then, there are four items being condensed to one factor including: (1) “I spend most of time in the research.”[.78], (2) “I often attend the conferences in academic research”.[.67], (3) “My researches includes incremental and radical innovations”.[.83], (4) “My researches fulfill with personal interest and external needs ”.[.74]. The 4 items loaded on a single factor having an eigenvalue of 9.96 ($\alpha = .75$). We renamed the factor as Research Involvement. Finally, there are three items being condensed to one factor including: (1) “I have hosted the projects which are granted by Industry/Research Institute.”[.79], (2) “I have the experiences in Technology transfer/ Licensing.”[.83], (3) “The firms are interest in my researches, and keep contact with me.”[.84]. The 3 items loaded on a single factor having an eigenvalue of 7.367 ($\alpha = .78$). We renamed the factor as Commercialization Involvement.

3.3.3 Pasteurian orientation

The current study conceptualized Pasteurian orientation as two-dimensional constructs comprised of the context of research and commercialization utilization expressed by pursuing the knowledge creation and utilization. We measure Pasteurian orientation the following equation.

$$PO = \frac{\text{Research Involvement} \times \text{Commercialization Involvement}}{\text{Research Involvement} + \text{Commercialization Involvement}}$$

Thus, the higher value means the faculty has the high tendency in dual development.

3.3.4 Control variables

This study employs several control variables to reflect the different characteristics of the individual. First, the gender of faculty, Female counts as a dummy variable (0=male, 1=female). Then, the tenure of faculty, count as a dummy variable (0=Not yet, 1= tenure). Moreover, career year are separate to different periods, and the position are represented lecturer to full professor from 1 to 4. In addition, we create some subfields as dummy variable which the departments belong, including Engineering, Life science, and Medical (e.g. (Ambos et al., 2008; D’Este & Perkmann, 2011)).

3.4 Validity checks

Before proceeding to regression analysis, discriminant validity is established through exploratory and confirmatory factor analysis to verify our constructs using all items from all of the scales. This study conducts confirmatory factory analysis to verify five-factor structure (including University Support, Department Commitment

in Commercialization, Buffering, Research Involvement, and Commercialization Involvement) is tested by using confirmatory factor analysis. The overall chi-square test of model fit is statistically significant ($\chi^2(121) = 392.063$, $\chi^2/df = 3.24$, $p < .001$). The Root Mean Square Error of Approximation (RMSEA) is .069 and the standardized RMR is .001. The Normed Fit Index (NFI) is .922, Non-Normed Fit Index (NNFI) is .913, the Comparative Fit Index (CFI) is .945 and the Goodness of Fit Index (GFI) is .909. The statistical significance of each estimated parameter is also assessed by respective t-values, which are found to be significant ($p < .05$). The completely standardized solution indicates that the convergent validity of all measures is acceptable (Bagozzi, Yi, & Phillips, 1991). The commonalities of all the variables are well above 0.50, and the construct reliabilities for the factors are high. Taken together, these results have suggested that the three scales represent concepts that are not only theoretically, but also empirically, distinguishable.

4 Results

4.1 Descriptive Statistics

Descriptive statistics (means, standard deviations, and correlations) for all the variables are presented in Table 1. Pasteurian orientation is more positive related to Commercialization Involvement than Research Involvement. And, Buffering is moderate positive related to University Support and Department Commitment.

4.2 Regression Analysis

This study tests the relationships between the variables using ordinary least square (OLS) regression.

At the first, in the Model 1 to model 3, the result shows that the nature of disciplines is significant with the commercialization involvement. The faculty in Engineering field are more involvement in the commercialization ($\beta=1.143$, $P<0.01$), but the reverse results are showed in Life Science and Medical. ($\beta=-0.817$, $P<0.01$; $\beta=-0.510$, $P<0.01$)

Then, the personal characteristics are also strongly related to commercialization involvement in Model 4 to Model 12. The statuses of tenure and career year are positively related to commercialization involvement. ($\beta=0.778$, $P<0.01$; $\beta=0.166$, $P<0.01$) It means that the faculty would like involve into the commercialization depend on tenure obtaining, and the years staying in the universities. Moreover, the commercialization involvement in the gender still is different. ($\beta=-0.646$, $P<0.01$) Furthermore, the relationships are measured with multiple personal characteristics, and the result shows that the faculty's position and the status of tenure play important roles on commercialization involvement.

Table 1 Means, Standard Deviations, and Correlations ^a

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.Engineering	0.49	0.50	1														
2.Life Science	0.21	0.41	-.495**	1													
3.Medical	0.14	0.35	-.391**	-.205**	1												
4.Position	3.14	0.93	0.032	-0.052	-0.026	1											
5.Tenure	0.57	0.50	0.032	-0.078	-.109*	.605**	1										
6.Female	0.19	0.40	-.280**	.195**	.211**	-0.078	-.097*	1									
7.Career Year	3.35	1.88	.104*	-0.075	-0.061	.613**	.450**	-0.044	1								
8.University Support	4.52	1.37	.143**	-.129**	-0.068	-0.068	-0.022	-0.08	-0.025	1							
9.Department Commitment	3.96	1.43	.227**	-.110*	-0.039	-.121**	-0.045	-0.071	-0.091	.535**	1						
10.Research Involvement	5.50	0.97	-0.055	0.032	-0.006	.150**	.128**	-0.088	-0.052	.129**	.193**	1					
11.Commercialization Involvement	3.54	1.71	.335**	-.194**	-.104*	.233**	.226**	-.170**	.183**	0.038	.221**	.284**	1				
12.Buffering	3.68	1.38	.207**	-.180**	-.113*	-0.017	0.06	-0.066	0.022	.486**	.463**	.137**	.122**	1			
13.Research Performance	3.18	2.87	.105*	-.104*	-0.036	.394**	.294**	-.125**	.166**	-0.036	-0.027	.251**	.219**	-0.028	1		
14.Commercial Performance	0.91	1.88	.273**	-.116*	-.123**	0.01	0.032	-.110*	0.061	-0.022	0.086	0.07	.436**	0.007	.182**	1	
15.Pasteurian orientation	2.04	0.73	.308**	-.182**	-.096*	.234**	.225**	-.169**	.154**	0.075	.259**	.443**	.970**	.152**	.245**	.395**	1

a. N=467

* p < .05; ** p < .01; two-tailed tests

Table 2 Results of Regression Models in Commercialization Involvement and Faculty's Characteristics ^a

	Dependent Variable: Commercialization Involvement											
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model12
Engineering	1.143*** (.149)											
Life Science		-0.817*** (.192)										
Medical			-0.510** (.227)									
Position				0.430*** (.082)				0.280** (.103)	0.407*** (.082)	0.357*** (.105)		
Tenure					0.778*** (.155)			0.461*** (.194)			0.728*** (.155)	0.620*** (.173)
Female						-0.735*** (.197)			-0.661*** (.193)		-0.646*** (.194)	
Career Year							0.166*** (.041)			0.058 (.051)		0.093 (.046)
C	2.986*** (.103)	3.710*** (.087)	3.613*** (.085)	2.194*** (.271)	3.102*** (.116)	3.683*** (.037)	2.986*** (.158)	2.401*** (.283)	2.390*** (.117)	2.227*** (.272)	3.254*** (.124)	2.881*** (.159)
<i>R</i> ²	0.112	0.037	0.011	0.054	0.051	0.029	0.024	0.066	0.078	0.057	0.073	0.059
Adjusted <i>R</i> ²	0.110	0.035	0.009	0.052	0.049	0.027	0.022	0.062	0.074	0.053	0.069	0.055
ANOVA -F	58.746***	18.115***	5.037*	26.783***	25.063***	13.841***	16.150***	16.353***	19.530***	14.032***	18.340***	14.671***

a. For all models, N = 467. Standardized coefficients are shown.

* $p \leq .10$; * * $p \leq .05$; *** $p \leq .01$

Table 3 Results of Regression Models in Commercialization Involvement, Pasteurian orientation, Context, Faculty's Involvement, and Performance ^a

Dependent Variable	Commercialization Involvement				Pasteurian orientation				Research Performance	Commercial Performance
	Model 13	Model 14	Model 15	Model 16	Model 17	Model 18	Model 19	Model 20	Model 21	Model 22
University Support	0.047 (.057)				-0.035 (.065)					
Department Commitment		0.264*** (.054)								
Research Involvement			0.498*** (.008)				0.331*** (.031)	0.391*** (.003)		
Commercialization Involvement						0.412*** (.005)		0.136*** (.006)		
Buffering				0.152*** (.057)	0.168** (.065)					
Pasteurian orientation									1.019*** (.109)	0.968*** (.177)
C	3.329*** (.272)	2.492*** (.227)	0.798* (.436)	2.984*** (.224)	3.080*** (.287)	0.578*** (.019)	0.219*** (.173)	-0.092** (0.033)	-1.163*** (.238)	1.203*** (.034)
R ²	0.001	0.049	0.080	0.015	0.015	0.941	0.196	0.971	0.156	0.060
Adjusted R ²	0.0007	0.047	0.079	0.013	0.011	0.940	0.194	0.971	0.154	0.058
ANOVA F	0.663***	23.944***	40.780***	7.059***	3.670***	12.838***	5.463***	7915.4***	85.860***	29.660***

a. For all models, N = 467. Standardized coefficients are shown.

* p ≤ .10; * *p ≤ .05; *** p ≤ .01

Third, in Model 13 to Model 17, the context of universities are positively to commercialization involvement, and they include department commitment ($\beta=0.264$, $P<0.01$) and buffering ($\beta=0.152$, $P<0.01$). But, university support is not the relevance with commercialization involvement. Besides, this study finds that research involvement of the faculty is strongly positive with commercialization involvement. ($\beta=0.498$, $P<0.01$)

And, the paper measure the PO that represent dual development of the faculty in Model 18 to Model 20 are high related to involve the commercialization. ($\beta=0.412$, $P<0.01$) With the dual involvement in the research and commercialization are high contributed to PO.

In the final, Model 21 and Model 22, the results show that the PO is high contribute to the performance in research and commercialization. ($\beta=1.019$, $P<0.01$; $\beta=0.968$, $P<0.01$)

5 Discussion

This paper measure the relationship between the nature of disciplines, the context of university, personal characteristics, Pasteurian orientation, and performance in individual's level. The rise of academic entrepreneurship force the faculty involve to the commercialization. And, it would help the faculty develop Pasteurian orientation with high performance.

In the nature of discipline, the paper find that the different disciplines have their involvement in the commercialization, and the engineering field are more possible to involve. Belkhdja and Landry (2007) also finds the faculty are influenced by their disciplines with different rules. And, there are some disciplines are close to science base (e.g. life science, physic, and math) are weak in the commercialization involvement. However, Ding and Choi (2011) summary that the faculty of life science still would involve into the commercialization. In other words, the path of involvement is divergent by different research culture.

In the personal characteristics, the paper finds the academic field, gender, and ages are related to the behavior of the faculty in the commercialization. Gulbrandsen and Smeby (2005) also find the weak relationship in the both. And, Maria Theresa (2011) also find the status of tenure is an important determinant to commercialization. It is high opportunity cost for the faculty who doesn't yet award. (Ding & Choi, 2011; Jain et al., 2009; Renault, 2006)

In the context of universities, this study find the department commitment influences the behavior of the faculty. The peer's attitude would influence the decision of the faculty, so does the director of department. (Grimaldi, Kenney, Siegel, & Wright, 2011; Haas & Park, 2010; Jain et al., 2009) And, the flexibility of career development is also an important issue. The faculty could keep the position, and is employed into the

industry, and reduce the teaching loading for research make the faculty have the buffer to involve the commercialization.(Campbell & Slaughter, 1999; Feller, 2009; Goldfarb & Henrekson, 2003; Jain et al., 2009)

Most importantly, the paper proposed the Pasteurian orientation to describe the faculty involving into entrepreneurial universities which focus on research and commercialization at the same time. Through second revolution, the universities build the third mission make the faculty toward Pasteurian orientation development.

In the final, the paper finds that the faculty with dual involvement has superior performance as same as many ground evidence.(Mowery & Ziedonis, 2002; Perkmann, King, & Pavelin, 2011; Renault, 2006; Van Looy, Callaert, & Debackere, 2006)

6 Conclusion

This study contributed to realize that the nature of discipline, the context of universities, and personal characteristics have positive impact in fostering commercialization involvement that enables faculty members to simultaneously achieve the research and commercialization. And, the faculty of Pasteurian orientation does not just relate to commercialization but also influence research performance. Pasteurian orientation is acting as an important capability that university can foster, and that it can be molded at least in part through supportive university context. It is unlike with the previous studies merely focused on institution and university, and this study conducted faculty as the unit of analysis and verified its intermediate role to stimulate academic entrepreneurship. Moreover, the current contexts of the universities in Taiwan have not persuaded the faculty to be Pasteurian-oriented in stimulating involvement of spin-off activities. This study thus did not include the creation of academic spin-off in measuring commercial performance. Policy-makers are suggested to re-examine the current policy in evaluating universities and researchers that focus mainly on research publication, patent grant, and technology transfer.

Even this study verified commercialization involvement in the faculty to influence the Pasteurian orientation; we would not be too prescriptive to expect the effects to be significant across the countries in international context. Specifically, the effect of Pasteurian orientation in the faculty may be distinct by national-cultural differences between countries. There is, however, little evidence on this point, and it would be useful for future research to verify whether there are national cultural or institutional boundary conditions around the concept of Pasteurian orientation in academies.

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