

University- Industry Collaboration (UIC) in Vietnam

An Empirical Analysis from
Higher Education Perspective

Tran Thi Thanh Lien

PhD Student, APS

Asia Pacific University, Oita, Japan

Outline

- Introduction
- Literature review
- Higher education and UIC in Vietnam
- Analysis
- Findings
- Concluding Remarks

Introduction

■ Background

- Knowledge as a key for economic and social development
- Universities are as knowledge producers
- Collaboration between universities, industries, and government

Introduction

■ Background

Current Trends for University Development:

- . The knowledge-based economy
- . The industrialization and modernization by 2020
- . Budget cut
- . Socialization and privatization
- . Mass education, and
- . Universities are as knowledge producers

Objectives of the Study

- To investigate the collaborations between universities and industries (UIC) in Vietnam.
- To identify the contributive factors for such collaborations.
- To explore the perspectives of people from higher education sectors towards the UIC.
- To identify the most active universities in collaboration with industries, and
- To introduce a model for UIC in Vietnam

Research Questions and Implementation

Qualitative Analysis

- How is the UIC in Vietnam?
- What benefit can universities earn from collaborations with industries?
- Are there any policies or mechanisms in Vietnam that encourage the UIC?

Research Questions and Implementation

Quantitative Analysis

- Which university is most active in the UIC?
- How does budget affect the way that universities collaborate with industries?
- Which interpersonal tools are most frequently used in the UIC?
- Which technological enabled resources (TER) communication means are most frequently used in the UIC?
- How the university's institutional culture has been changed due to the UIC?

Research Scope and Limits

- Population
- Classification Methods
- Data

Legislative and Literature Review

Legislative Review

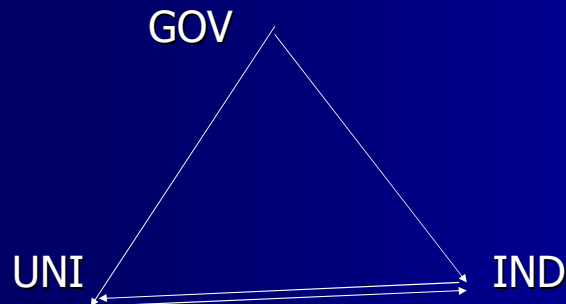
- Education Law 2005
 - . Article 12 on role of the State in promoting higher education development
 - . Article 13 on investment in higher education
 - . Article 14 on autonomy given to higher education and universities
- Science and Technology Law

Legislative and Literature Review

- Resolution 8 of the Central Committee of the Vietnamese Communist Party
 - . UIC as a major force for scientific and technological development in Vietnam
- Central Congress VI on Science and Technology
- Strategy for Science and Technology Development by 2020

Legislative and Literature Review

- The Triple Helix as the theoretical framework for UIC



Legislative and Literature Review

- The Triple Helix as the theoretical framework for UIC
 - . The emergence of the model
 - . The enhancing role of universities
 - . The importance of the emergence

Legislative and Literature Review

■ Literature Review

- . Simon Marginson, Gary Rhoades with "Beyond National States, Markets and System of Higher Education" (2002) on university, research and entrepreneurial shift.
- . Clack (1998, 2004), Tijssen (2007) on universities and conditions for collaboration with industry
- . Tijssen (2007) on University's entrepreneurial culture
- . Van Looy *et al.* (2004) on University research orientation
- . Barbara Sporn (1999) on university and structure
- . Molas Gallart *et al.* (2002) on University and research relevant to industrial demand

Legislative and Literature Review

■ Literature Review

- . From Ivory Tower to Knowledge Factory (S. Oh, 2001),
- . A Higher Education Perspective on Identification of Characteristics that Determine Effectiveness in Collaborations between American Higher Education and Business (Amy L Dufraine, 2001),
- . Using the Analytical Hierarchy Process (AHP) Approach for Assessment of the Strength of University- Industry GRI Cooperation in Vietnam (Cu Duy Tung, AIT, 1999)

Research Process, Analysis and Findings

- Qualitative Analysis (document survey and interview)
- Quantitative Analysis (field survey)

5 Variable Groups

- . Key Actors
- . Investment
- . Interpersonal Tools
- . Means of TER Communication
- . Changes in Intuitional Culture

Research Process

- Phase 1: Qualitative analysis by documents search and in-depth interviews.
- Phase 2: Quantitative analysis by questionnaires with 4,215 respondents in 43 universities in Vietnam.
- **Variables:**
Key actors, investments, interpersonal tools, means of TER communication, and changes in intuitional culture.

Analysis

- Data Description

 - Academic degree of respondents**

 - Undergraduate students: 2,637

 - D.Sc: 41

 - Ph.D: 127

 - MA:606

 - BA: 804

 - Total: 4,215

Data Description

- Academic Ranks of Respondents**

 - Undergraduate Students: 2,784

 - Professors: 19

 - Associate Professors: 41

 - Senior Lecturers: 324

 - Lecturers: 473

 - Assistant Lecturers: 154

 - Master Students: 420

Data Description

Job Description of respondents

- Teaching only: 171
- Research only: 3,075
- Teaching and Research: 679
- Administration Only: 176
- Administration and Teaching: 114

Data Description

Number of Years of Working Experience

- Less than two years: 745 (17.7%)
- From 2 to 5.9 years: 2,131 (50.6%)
- From 6 to 9.9 years: 993 (23.6%)
- More than 10 years: 346 (8.2%)
- Total respondents: 4,215

Data Description

Basic Function of the University

- Training only: 357 (8.5%)
- Research only: 66 (1.6%)
- Training and Research: 3,792 (90.0%)
- Total respondents: 4,215

Table 1. Means and Standard Deviations for five survey items of Investment for UICs (N= 4,215)

	Minimum	Maximum	Mean	Std. Deviation
Collaboration with industry as strategy of the university	1	5	3.76	.840
Current Collaboration with industry	1	5	3.91	1.125
Benefit from Collaboration with industry	2	5	4.16	.544
Collaboration with industry as mission of the university	2	5	3.67	.816
Investment on collaboration with Industry	2	5	3.84	.762

Table 2. Means and standard deviation for five items on key actors for UICs

Table 2. Means and standard deviations of five survey items of key actors' efforts for UICs (N=4,215)

	Mean	Std. Deviation
Efforts of Director Board to the collaboration with industry	4.04	.466
Efforts of Rector to the collaboration with industry	4.10	.447
Efforts of Faculty to the collaboration with industry	3.87	.566
Efforts of Personnel division to the collaboration with industry	3.57	.613
Efforts of other functional division to the collaboration with industry	3.50	.615
Valid N (listwise)	4.215	

Table 3. Means and standard deviation for five items on institutional adjustment for UICs

Means and standard deviation for five items of institutional changes for collaboration with industry (N= 4,215)

	Mean	Std. Deviation
Facilitator for collaboration with industry	4.22	.707
Investment on collaboration with Industry	3.84	.762
Collaboration with industry as mission of the university	3.67	.816
Collaboration with industry as strategy of the university	3.76	.840
Senior Manager (top executives, rector, and faculty)	4.0	.466

Table 4. Means and standard deviation for five items on interpersonal tools for UICs

Table 4. Means and standard deviations of five survey items of interpersonal tools (N=4,215)

	Mean	Std. Deviation
Seminar as a means to promote collaboration with industry	4.15	.497
Consultation as a means to promote collaboration with industry	4.13	.495
meetings as a means to promote collaboration with industry	3.77	.766
Professional Network as a tools to promote collaboration with industry	3.92	.634
other networks as tools to promote collaboration with industry	3.98	.600
Valid N (listwise)	4,215	

Table 5. Means and standard deviation for five items on TER as means of communication for UICs

Table 5. Means and standard deviations of five survey items of TER communication (N=4,215)

	Mean	Std. Deviation
Chat as a tools to communicate with industry	2.98	1.037
Publication as a tools to promote collaboration with industry	3.61	.787
email as a tools to promote collaboration with industry	3.56	.949
telephone as a tools to promote collaboration with industry	4.13	.729
Video conference as a tools to promote collaboration with industry	1.65	.663
Valid N (listwise)	4,215	

Findings

1. Key actors: rector, top executive board and faculty, academics, and academic degrees: different views towards key actors groups (by academic level, ranks, by universities and by regions).
2. Institutional culture: mission, strategy, investments, senior managers, facilitator: different views towards institutional cultural changes (by academic level, ranks, by universities and by regions).

Table 6. Comparing means of investment and key actors by academic degrees

Descriptive Statistics (N=4,215)							
	Mean	Std. Deviation	Mean (by rank)	Mean (BA)	Mean (MA)	Mean (Dr)	Mean (D-Sc)
Current Collaboration with industry	3.91	1.125	3.96	3.70	3.86	4.16	4.49
Benefit from Collaboration with industry	4.16	.544	4.10	4.13	4.42	4.43	4.22
Investment on collaboration with industry	3.84	.762	3.87	3.92	3.66	3.80	3.63
Collaboration with industry as mission of the university	3.67	.816	3.53	3.90	3.75	4.35	4.46
Collaboration with industry as strategy of the university	3.76	.840	3.69	3.87	3.75	4.41	4.59
Top executives' effort towards collaboration with industry	4.01	.507	3.95	4.09	4.07	4.27	4.12
Efforts of Director Board to the collaboration with industry	4.04	.486	3.97	4.35	3.92	3.97	4.07
Benefit earned from collaboration with industry	4.12	.668	4.09	4.23	4.03	4.23	4.34
Efforts of Rector to the collaboration with industry	4.10	.447	4.06	4.24	4.13	4.05	4.07
Efforts of Faculty to the collaboration with industry	3.87	.566	3.85	3.90	3.90	4.02	4.02
Efforts of Personnel division to the collaboration with industry	3.57	.613	3.54	3.70	3.56	3.47	3.29
Efforts of other functional division to the collaboration with industry	3.50	.615	3.45	3.61	3.59	3.52	3.37
Valid N (listwise)							

Findings

3. Inter-personal tools: seminar, consultation and other networks : different views towards inter-personal tools (by academic level, ranks, by universities and by regions).
4. TER Communication: telephone, publication and email : different views towards TER communication (by academic level, ranks, by universities and by regions).

Table 7. Comparing means of interpersonal tools and TER as means of communication by academic degrees

	Descriptive Statistics						
	Mean	Std. Deviation	Mean (no rank)	Mean (BA)	Mean (MA)	Mean (Dr)	Mean (Dr.Sc)
Seminar as a means to promote collaboration with industry	4.15	.497	4.09	4.35	4.08	4.25	4.61
Consultation as a means to promote collaboration with industry	4.13	.495	4.08	4.33	4.01	4.26	4.61
Meetings as a means to promote collaboration with industry	3.77	.766	3.68	4.05	3.71	3.87	4.22
Professional Network as a tools to promote collaboration with industry	3.92	.634	3.94	4.13	3.96	4.12	3.98
other networks as tools to promote collaboration with industry	3.98	.600	3.99	4.04	3.96	4.01	3.96
Chat as a tools to communicate with industry	2.88	1.037	2.89	3.27	2.96	3.08	2.88
Publication as a tools to promote collaboration with industry	3.61	.787	3.65	3.50	3.46	4.03	3.93
email as a tools to promote collaboration with industry	3.56	.949	3.68	3.36	3.31	3.47	3.39
Telephone as a tools to promote collaboration with industry	4.13	.729	4.14	4.07	4.17	4.16	4.00
Video conference as a tools to promote collaboration with industry	1.65	.863	1.71	1.52	1.59	1.57	1.44
Valid N (listwise)	4215						

Findings

5. Types of universities: technology and engineering, unique specialization, regional universities, two national universities.

Table 8. Comparing means of investment by universities

Descriptive Statistics(a) by universities vs general								
Institutional adjustment	Mean (general)	Mean (Hanoi University of Technology)	Mean (Hanoi University of Civil Construction)	Mean (Thainguyen University)	Mean (Hanoi Medical University)	Mean (University of Transportation and Communication)	Mean (Foreign Trade University Ho Chi Minh City)	Mean (Hanoi Pedagogical University)
Current Collaboration with industry	3.91	4.86	4.58	4.37	4.44	4.74	2.03	2.69
Benefit from Collaboration with industry	4.16	4.18	4.22	4.63	4.20	4.26	4.47	4.13
Investment on collaboration with industry	3.84	4.33	4.03	4.86	3.98	4.15	2.81	3.50
Collaboration with industry as mission of the university	3.67	4.08	3.85	4.23	3.72	3.82	2.78	3.33
Collaboration with industry as strategy of the university	3.76	3.99	3.85	4.26	3.57	3.84	3.81	3.30

Table 9. Comparing means of key actors by universities

Senior manager evaluation (a) by universities vs. general

Senior manager	Mean (general)	Mean (Hanoi University of Technology)	Mean (Hanoi University of Civil Construction)	Mean (Thainguyen University)	Mean (Hanoi Medical University)	Mean (university of Transportation and Communication)	Mean (Foreign Trade University Ho Chi Minh City)	Mean (Hanoi Pedagogic University)
Top executives' effort towards collaboration with industry	4.01	4.22	3.91	3.77	4.11	4.24	4.00	4.25
Benefit earned from collaboration with industry	4.12	4.05	4.00	4.23	4.03	4.26	3.72	3.74
Efforts of Director Board to the collaboration with industry	4.04	4.04	3.89	4.00	4.20	4.15	4.19	3.91
Efforts of Rector to the collaboration with industry	4.10	4.24	3.84	4.00	4.18	4.23	4.19	3.81
Efforts of Faculty to the collaboration with industry	3.87	4.40	3.33	4.00	4.08	4.12	4.19	3.58
Efforts of Personnel division to the collaboration with industry	3.57	3.82	3.33	3.60	4.12	3.87	4.00	3.62
Efforts of other functional division to the collaboration with industry	3.50	3.84	3.22	4.14	4.08	3.73	4.00	3.41

Table 10. Comparing means of interpersonal tools by universities

Inter-personal tools evaluation by universities vs. general

Inter-personal tools	Mean (general)	Mean (Hanoi University of Technology)	Mean (Hanoi University of Civil Construction)	Mean (Thainguyen University)	Mean (Hanoi Medical University)	Mean (university of Transportation and Communication)	Mean (Foreign Trade University Ho Chi Minh City)	Mean (Hanoi Pedagogic University)
Seminar as a means to promote collaboration with industry	4.15	4.24	3.97	4.09	3.99	4.23	3.72	3.97
Consultation as a means to promote collaboration with industry	4.13	4.35	4.00	4.23	4.13	4.16	3.38	3.97
meetings as a means to promote collaboration with industry	3.77	4.20	4.00	3.60	3.94	3.77	3.41	3.75
Professional Network as a tools to promote collaboration with industry	3.92	4.24	3.91	3.97	3.91	4.19	3.16	3.78
other networks as tools to promote collaboration with industry	3.98	4.06	3.91	3.60	4.02	3.74	2.97	3.77

Table 11. Comparing means of TER as means of communication by universities

TER as means of communication evaluation by universities vs. general

TER means of communication	Mean (general)	Mean (Hanoi University of Technology)	Mean (Hanoi University of Civil Construction)	Mean (Thainguyen University)	Mean (Hanoi Medical University)	Mean (university of Transportation and Communication)	Mean (Foreign Trade University Ho Chi Minh City)	Mean (Hanoi Pedagogic University)
Chat as a tools to communicate with industry	2.98	3.23	3.66	3.54	3.09	3.02	1.88	4.11
Publication as a tools to promote collaboration with industry	3.61	3.77	3.26	3.43	3.38	2.92	2.50	4.22
email as a tools to promote collaboration with industry	3.56	3.94	3.86	3.86	3.24	3.75	3.16	3.84
Telephone as a tools to promote collaboration with industry	4.13	3.86	3.98	3.51	3.75	4.24	3.34	4.26
Video conference as a tools to promote collaboration with industry	1.65	2.14	1.95	1.37	2.53	2.13	1.50	1.56
Valid N (listwise)	4.215							

Findings

6. Locations: Hanoi, Ho Chi Minh City, industrial zone (Binh Duong), economic focal region (Thai nguyen, Hue, Danang).

Table 12. Comparing means of institutional changes by universities

Descriptive Statistics(a) by universities vs general (N=4,215)

	Mean (general)	Mean (Hanoi University of Technology)	Mean (Ho Chi Minh University of Technology)	Mean (Binh duong University)	Mean (Hanoi University of Natu Sc- VNU)	Mean (Ho Chi Minh Nat University)	Mean (Thainguyen University)	Mean (Damang University of Technology)
Institutional adjustment								
Current Collaboration with industry	3.91	4.86	4.42	2.81	4.92	4.88	2.49	4.40
Benefit from Collaboration with industry	4.16	4.18	4.19	4.00	4.22	4.04	3.13	4.23
Investment on collaboration with Industry	3.84	4.33	4.90	3.00	3.22	4.64	3.00	4.73
Collaboration with industry as mission of the university	3.67	4.08	4.29	4.00	3.36	3.42	3.13	3.00
Collaboration with industry as strategy of the university	3.76	3.99	4.81	4.00	3.14	4.16	3.13	3.93

Table 13. Comparing means of key actors by universities

Descriptive Statistics(a) by universities vs general(N=4,215)

	Mean (general)	Mean (Hanoi University of Technology)	Mean (Ho Chi Minh University of Technology)	Mean (Binh duong University)	Mean (Hanoi University of Natu Sc- VNU)	Mean (Ho Chi Minh Nat University)	Mean (Thainguyen University)	Mean (Damang University of Technology)
Key actors								
Top executives' effort towards collaboration with industry	4.01	4.22	4.20	4.00	4.00	4.00	3.13	4.00
Efforts of Director Board to the collaboration with industry	4.04	4.04	4.12	4.00	4.00	4.00	4.00	4.00
Efforts of Rector to the collaboration with industry	4.10	4.24	4.12	4.00	4.00	4.00	4.00	4.00
Efforts of Faculty to the collaboration with industry	3.87	4.40	4.64	3.00	3.22	3.95	4.00	4.17
Efforts of Personnel division to the collaboration with industry	3.57	3.82	4.10	3.00	3.22	3.70	3.50	3.73
Efforts of other functional division to the collaboration with industry	3.50	3.84	3.76	3.00	3.72	3.70	3.00	3.57

Table 14. Comparing means of interpersonal tools by universities

Descriptive Statistics(a) by universities vs general(N=4,215)

	Mean (general)	Mean (Hanoi University of Technology)	Mean (Ho Chi Minh University of Technology)	Mean (Binh duong University)	Mean (Hanoi University of Natu Sc- VNU)	Mean (Ho Chi Minh Nat University)	Mean (Thainguyen University)	Mean (Damang University of Technology)
Inter-personal tools								
Seminar as a means to promote collaboration with industry	4.15	4.24	4.31	4.00	4.00	4.00	3.50	4.00
Consultation as a means to promote collaboration with industry	4.13	4.35	4.31	4.00	4.00	4.04	4.00	4.23
meetings as a means to promote collaboration with industry	3.77	4.20	4.29	3.00	3.50	3.91	3.13	3.77
Professional Network as a tools to promote collaboration with industry	3.92	4.24	3.63	4.00	3.36	4.00	4.13	3.67
other networks as tools to promote collaboration with industry	3.98	4.06	3.95	4.00	3.86	4.00	4.00	3.83

Descriptive Statistics(a) by universities vs general(N=4,215)

	Mean (general)	Mean (Hanoi University of Technology)	Mean (Ho Chi Minh University of Technology)	Mean (Binh duong University)	Mean (Hanoi University of Natu Sc- VNU)	Mean (Ho Chi Minh Nat University)	Mean (Thainguyen University)	Mean (Damang University of Technology)
TER means of communication								
Chat as a tools to communicate with industry	2.98	3.23	3.03	2.00	3.50	1.96	3.37	1.93
Publication as a tools to promote collaboration with industry	3.61	3.77	4.86	3.00	3.64	4.32	4.13	4.00
email as a tools to promote collaboration with industry	3.56	3.94	4.31	2.00	3.50	4.44	2.87	3.47
telephone as a tools to promote collaboration with industry	4.13	3.86	4.31	4.00	3.86	3.64	3.87	3.03
Video conference as a tools to promote collaboration with industry	1.65	2.14	2.36	1.00	1.22	1.58	1.00	2.90

Summary of findings:

1. Key actors: rector, top executive board and faculty, academics, and academic degrees: different views towards key actors groups (by academic level, ranks, by universities and by regions).
2. Institutional culture: mission, strategy, investments, senior managers, facilitator: different views towards institutional cultural changes (by academic level, ranks, by universities and by regions).
3. Inter-personal tools: seminar, consultation and other networks : different views towards inter-personal tools (by academic level, ranks, by universities and by regions).
4. TER Communication: telephone, publication and email : different views towards TER communication (by academic level, ranks, by universities and by regions).
5. Types of universities: technology and engineering, unique specialization, regional universities, two national universities.
6. Locations: Hanoi, Ho Chi Minh City, industrial zone (Binh Duong), economic focal region (Thai nguyen, Hue, Danang). And,
7. Budget for promoting collaboration with industry

Model Building

Variables:

- The key variables are:
 1. Dependent variable, i.e. the collaboration between university and industry (UICs),
 2. Independent variables are contributive factors for the collaboration, i.e. budget (B), location (L), specialization of universities (S), facilitators (F) and number of research projects collaborated with industry (R).
- **Dependent Variable** (composite indicators of items 3 to 7 {current collaboration, benefit, mission, strategy, investment, senior managers, interpersonal tools, and TER communication})
- **Independent Variables** (budget, location, specialization of universities, facilitators, number of research collaborated with industry and academic foundation)

Model pattern:

- $Y1 (uic1) = \beta_0 + \beta_1 (\text{budget}) + \beta_2 (\text{location}) + \beta_3 (\text{specialization}) + \beta_4 (\# \text{ research projects}) + \beta_5 (\text{aca foundation}) (1) + u$
- $Y2 (uic2) = \beta_0 + \beta_1 (\text{budget}) + \beta_2 (\text{location}) + \beta_3 (\text{specialization}) + \beta_4 (\# \text{ research projects}) + \beta_5 (\text{aca foundation}) (1) + u$
- $Y3 (uic3) = \beta_0 + \beta_1 (\text{budget}) + \beta_2 (\text{location}) + \beta_3 (\text{specialization}) + \beta_4 (\# \text{ research projects}) + \beta_5 (\text{aca foundation}) (1) + u$
-
- $Y34 (uic34) = \beta_0 + \beta_1 (\text{budget}) + \beta_2 (\text{location}) + \beta_3 (\text{specialization}) + \beta_4 (\# \text{ research projects}) + \beta_5 (\text{aca foundation}) (1) + u$

Model pattern:

Where

- Y1 is the collaboration between university and industry in university 1;
- Y2 is the collaboration between university and industry in university 2;
- Y3 is the collaboration between university and industry in university 3;

Model pattern:

- $\beta 1$ is the average budget allocated for research at the university for 5 years from 2000-2005,
 - $\beta 2$ is the location of the university,
 - $\beta 3$ is the classification of the university whether the university is the specialization or conventional university ,
 - $\beta 4$ is the number of research projects that the university has collaborated with industry,
 - $\beta 5$ is the academic capacity (number of PhD degree holders, Prof and Ass Prof. and number of MA and PhD students trained) the university has, and
 - $\beta 6$ is the facilities (laboratories, libraries, and research centers) of the university.
- U is the error terms

Model pattern:

- Summery score= \sum (frequency of variables on each scale value x scale value) \div total number of samples in each university)
- Ex.
 $Y1$ (uic1) (Hanoi University of Technology)=
 \sum (total score for item 3-12 in the questionnaire survey) \div total number of samples in Hanoi University of Technology

Model pattern:

- Where:
- X1 is the frequency of current collaboration of the uni.(item#3),
- X2 is the frequency of benefits earned from the collaboration (item#4),
- X3 is the investment on collaboration with industry (item#5),
- X4 is the emphasis of collaboration with industry as the mission of the Uni. (item#6),
- X5 is the consideration of collaboration with industry as the strategy for development of the Uni. (item#7),
- X6 is the composite indicators of top executives, rectors, director board and faculty as key actors promoting collaboration with industry at Uni. (item#8,9,10),
- X7 is the composite indicators of inter-personal tools, and
- X8 is the composite indicators of TER means of communication.

Implication

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