

A Difference Analysis on E-Commerce Curriculum Offered in Taiwan, U.S.A. and Japan Using the BNAM Model

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ABSTRACT¹

The development of E-commerce has been highly anticipated over recent years. Research data released by the Department of Commerce, Ministry of Economic Affairs confirms that e-commerce will still dominate the business opportunities in U.S.A., Mainland China and Japan in the future. Some of the innovative applications empowered the booming of e-commerce; such as the virtual groups formed in Facebook, group-shopping that benefits consumers as well as retailers, and bonus sharing. Moreover, since Apple Inc. has expanded the functions in its smart electronic mobile devices, there has been a great progress in the development of downloadable Apps. In addition, the academic field has put extensive efforts to meet the demand for e-commerce professionals by offering e-commerce certification or establishing e-commerce departments/graduate schools as part of the educational programs. This study is based on the curriculum plan observed from various universities in Taiwan, with primary discussions on the questionnaire responses gathered from both academics and industries. A further gap analysis was conducted using BNAM (Borich Needs Assessment Model) to identify the gap between academics and industries among the three countries.

The BDN analysis on the e-commerce management courses in-demand from all three countries indicates evident discrepancy between the views from the 1000 biggest companies and professors.

Only three courses show no discrepancy, including Information and Society, Logistics Management, and Management in Digital Era.

The analysis on technology courses all present apparent discrepancies (over 55%) between the 1000 biggest companies and professors among the three countries. Specifically, the result from Japan has a high 76% discrepancy, which would require further study to better identify the causes.

There are four courses that show no discrepancy at all, including Information and Society, Logistics Management, and Management in Digital Era, Information Exploration Basics.

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To summarize the state of affairs in U.S.A., Japan, and Taiwan, it is believed that academics should devote more resources to the training on Mobile Commerce, Information Security and High-Level Internet Programming in the future.

Introduction

The internet is said to be the third industrial revolution. Countries worldwide spare no effort in the application and development of e-commerce. According to the Plan of Electronic Commerce Development in the New Era of the Internet 2011 by the Department of Commerce of the Ministry of Economic Affairs, e-commerce business, both Business to Customers (B2C) and Customer to Customer (C2C), has been growing over the past three years. In 2010, the market value of domestic e-commerce reached 46.19 billion dollars, and is anticipated to peak in 70 billion in 2012. Despite the global financial crisis, the e-commerce market worldwide is still expanding. The increased on-line shopping business in the North America and Europe from 2008 to 2009 is a good example of this expansion. Although the rate of growth is lower than it was in previous year, China—the new economic power with a rapidly expanded market—continues to boost the global e-commerce market.

Additionally, Wong(2010), using the data from the US's Department of Commerce, points out that in the US, even though e-commerce business in the first half of 2009 decreased due to the global financial crisis, business in the second half climbed up, which is a positive sign to the overall development of e-commerce. Meanwhile, e-commerce market in China has continued to grow. According to the data from China's Taobao website, the 2009 C2C volume was 200 billion RMB and that of B2C was RMB 10 billion, RMB 210 billion in total, roughly US\$ 29.4 billion (Wong, 2010). Kao (2010) also points out that the Japanese market value of e-commerce in 2009 was 7 trillion yen, approximately RMB 500 billion or US\$ 73.3 billion. Moreover, according to the research of Nomura Research Institute (NRI) of Japan, in 2009, the annual market value of Japanese B2C e-commerce was 6,754.4 billion yen, which was 15.5% higher than that in 2008 despite the negative influence caused at the time by the global financial crisis. The total amount of consumption of

Japan exceeds 280 trillion yen, but its rate of "e-commercialization" is still lower than 2%, which means that there is an enormous e-commerce market waiting to be explored. As a result, the NRI predicts that though slower than previous years, the Japanese B2C market in the next five years will grow steadily by roughly 10 % per year and reach a total value of 12 trillion Yen in 2014 (Kao, 2010).

Although e-commerce is namely another link of technical application of information management, the fact that it uses applied theory to lay all over the enterprise's entire operation model makes the training of e-commerce talents become more complicated (Durlabhji & Fusilier, 2002). The development of e-commerce courses cooperated with the relevant department of information management to give a course in the early stages, it slowly develops into a single course (Liang & Li, 2000). Until these one or two years, graduate school of e-commerce and academic degree & certificate from e-commerce department have been established independently; even though some scholars pointed out that the courses and academic degrees of e-commerce did not need to be planned or established independently, most of the

scholars proposed that the development of e-commerce should be more specialized (Leonhardt, 2000; Tabor, 1999).

The above reasons drove this study to investigate issues regarding the supply of e-commerce talent. However, the literature related to this research area is limited. Most of the studies were conducted between 1999 and 2001. Few studies within the past five years were found. The comparative analysis of e-commerce curricula and the needs of industry by Li, et al.,(2007) was the only recently published research. In light of the wide range topics covered by e-commerce curricula and the difficulty of planning related courses, this study was carried out to make a full investigation. It analyzes the viewpoints of academics and industry regarding e-commerce education and practice, and conducts cross-national research so as to provide domestic academics and industry a clearer perspective and deeper understanding of the current situation in Taiwan and overseas.

LITERATURE REVIEW

1) Development of e-commerce

E-commerce will continue to be an economically promising sector. Countries will put resources into the development of e-commerce to maintain as well as increase its business competitiveness. It needs continual development and improvement. From the time of general web (Web 1.0) ten years ago to the more recent popular personal websites and blogs (Web 2.0), and social-networking sites such as Facebook that have facilitated the recent development of virtual communities, e-commerce has been evolving. The past Internet-based business model valued only the selling and purchasing of products. Nonetheless, diversified Internet business strategies nowadays such as win-win group buying, marketing and bonuses, or the extended usage by Apple Inc. of portable intelligent devices, which led to the development of wireless application (app), downloads, have all made people attach more importance to the growth of e-commerce.

According to 2010 Annual Report of E-Commerce by the Department of Commerce of the Ministry of Economic Affairs, the e-commerce practice of general enterprises can be divided into B2B and B2C. In the part of B2B, as the electronic survey conducted by the Department of Statistics of Ministry of Economic Affairs in 2008 points out, roughly 65% of 4000 manufacturing employed information system in business conduct. In terms of e-commerce practice, enterprises should aim at original design manufacture (ODM), own branding & manufacturing (OBM) and enhance the ability of applying e-business in high valued added operations such as global research and development, logistic of global brands, and channel management. They should also integrate multiple systems such as mobile commerce and ICT applications. In terms of technical issues, internet services should be improved, and 3G mobile communication, RFID, Service-Oriented Architecture (SOA), International Financial Reporting Standards (IFRS), electronic receipt, and cloud computing should all be adopted to improve the information application of manufactures of a value chain so that the operation of a value chain can be faster and more flexible. Judging from the current situation, the application of B2B will be the development trend in future (Department of Commerce of the Ministry of Economic Affairs, 2010).

2) Areas of Study for E-commerce

The foundation of e-commerce includes information technology and management technology, it does not only have simple technological problems or management problems; constructing website is only simple technological problems, and e-commerce involves problems such as Commercial Flow, Logistics, Payment Flow, and Information Flow; however, without websites, e-commerce does not exist. Therefore, the areas of e-commerce are very extensive; it is mainly based on information technology, with enterprise's management method to reach the commercial transaction in order to obtain profits.

Durlabhji's study (2003) divides e-commerce courses into four big categories, including class of course e-commerce, including "Business", "E-commerce Business

Tech", "E-commerce Business Nontechnology", and "Technology", which are shown in Table 1. From Table 1, one can know that learning e-commerce completely involves technology such as data communications, user interface design, software and program; it also involves Business, for instance: Management of operations and supply chain, plan of enterprise resources, and financial affairs; and it involves the particular relevant E-commerce Business Tech including e-commerce marketing, e-commerce business strategy, and system development; it also involves E-commerce business nontechnology including E-Business Marketing, E-Business Strategy, and E-Business Management.

TABLE 1. E-COMMERCE TYPES OF COURSES.

Business	E-commerce Business Tech
Operations and Supply Chain Management	E-Business Technology
Enterprise Resource Planning	E-Business Systems Development
Financial	E-Business Practicum
E-commerce Business Nontechnology	E-Business Security
E-Business Marketing	Electronic Payment Systems
E-Business Strategy	Technology
Introduction to E-Business	Data Communications
E-Business Management	Data Management
Entrepreneurship in E-Business	Interface Design
E-Business Economics and Markets	Java and Object-Oriented Programming
Global E-Business Management	Intelligent systems
Business Process Reengineering in E-Business	Computer Ethics
Legal and Regulatory Issues in E-Business	
Business Models in E-Business	
Business to Business	

Source of materials: Durlabhji (2003)

In practice of e-commerce, Luan and Luo divide e-commerce into six classes, including commercial flow, logistics, payment flow, information flow, design flow, and service flow. In Davis' study (2003), it regards professional manpower of e-commerce to consider the needs of e-commerce and divides the needs into two classes, including operation management and information technology. For operation management, its need is non-technological-oriented, and the manpower of this part relatively needs general managerial staff, such as operational analyst, enterprise administrator, management consultant, and other personnel (as Figure 1). For the manpower needs in information technology, it involves professionals in information technology, including Internet database, Internet planning, website design, website management, and manpower for relevant technical support (as Figure 2).

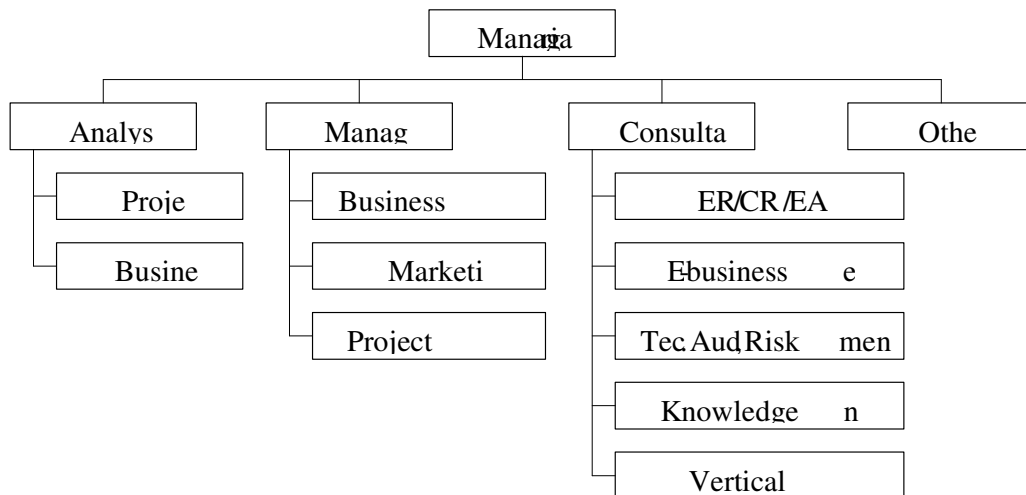


Figure 1. The manpower needs of e-commerce for operation management; Source of materials: Davis (2003).

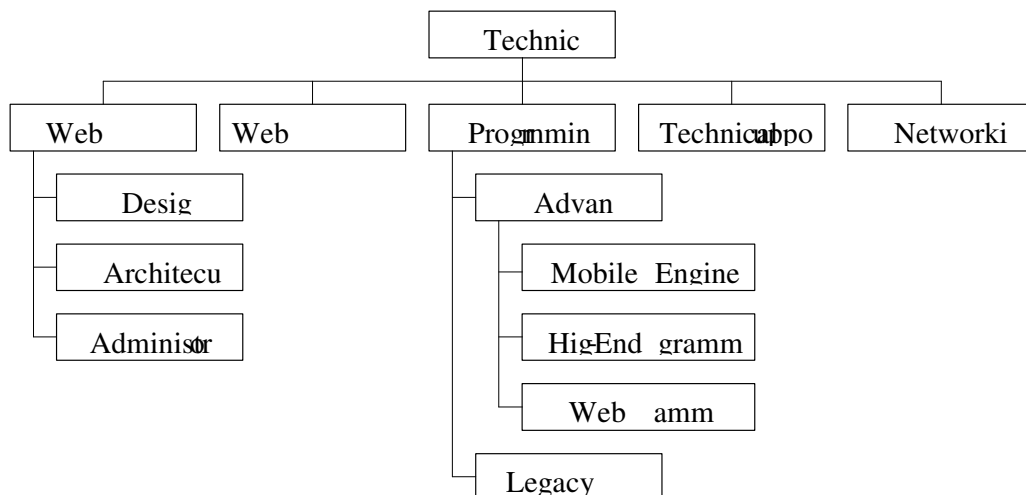


Figure 2. The manpower needs of e-commerce for information technology; Source of materials: Davis (2003).

Relevant studies that focus on e-commerce courses are uncommon domestically and internationally. The discussion that Liang and Li proposed in 2000 in accordance

with the courses of information management was the main domestic study, this study also compared and discussed with the e-commerce courses in America, England, and Australia. Since Taiwan did not have any planning for e-commerce course at that time, the main method of learning relevant courses was taking the information management courses that were closely linked with e-commerce (There are nearly 103 information management departments domestically at present). After six years, e-commerce courses have been opened in many universities in Taiwan. Inquiring through Internet, this study finds out about 75 schools have e-commerce courses; the data from Ministry of Education regarding the statistics of national institutes and universities in 2006 shows that there are 3 graduate schools of e-commerce and 6 e-commerce departments. After six years, the institutes and universities in Taiwan open relevant e-commerce courses in a great deal, which is such a big change. The study from Fusilier & Durlabhji (2003) also finds out e-commerce courses in U.S.A. grow considerably after 2000, so this study believes that it is necessary to study it again.

On the other hand, Chang and Li (2005) focus on e-commerce courses and compliance of industry needs to compare and analyze, they understand the supply of e-commerce professionals through the study on e-commerce courses from top business schools in U.S.A. and universities in Taiwan, and they also confirm the needs of e-commerce talents through studying famous recruitment websites in U.S.A. and Taiwan, so as to compare the differences between them. Among them, the gap of management supply and demand in Taiwan is that there is a lack of Internet marketing personnel and general managers are more sufficient. For the gap of management supply and demand in U.S.A., it is seriously insufficient of ERP/CRM/EAI consultants but there is an excess of marketing manpower. For the gap of technology supply and demand in Taiwan, it is seriously insufficient of JAVA and object-oriented programmers, but there is an excess of technology support. For the gap of technology supply and demand in U.S.A., there is an excess of information technology personnel, but it is insufficient of JAVA and object-oriented programmers.

He, Li, and Liang (2004) regard content analysis to discuss the credits and different types of new courses for e-commerce in Taiwan's universities, this study collects the data from e-commerce courses of 16 universities in Taiwan, its analysis finds out the difference of total credits is not significant, and the total credits that private schools require are more than public schools, and management courses are significantly more than technology courses.

Courses of e-commerce are complicated, it is necessary to distinguish information technology and management practice. The course study that is carried out by Durlabhji & Fusilier with regard to 67 graduate schools of business management in U.S.A. points out that the new course emphasis should be placed in non-technological courses, and e-commerce course should be blended with every kind of course, namely in each management specialized field, e-commerce will become a subsidiary course but not the major course (Durlabhji & Fusilier, 2002). In addition, the e-commerce course discussion that Fusilier & Durlabhji carried out in 2003 with regard to bachelor degree courses in America's universities, master courses in North America, and foreign master courses pointed out although e-commerce began to be bubbled in 2000, the e-commerce courses in school grew dramatically; it also found out bachelor degree courses in America's universities and foreign master courses laid particular stress on technological courses more, while master courses in North America did not

focus on technological side that much (Fusilier & Durlabhji, 2000). Comparing these two phenomena, it seems that courses in the graduate schools should pay attention to management courses, while bachelor degree courses should take technology as the direction.

3) The Perceived Gap between Academia and Industrial Circles towards E-Commerce Courses (gap)

The rise of e-commerce has not merely offered another way for enterprise management. It also brings impact to the educational circles because educational circles need to provide what is demanded by the circle timely and whether the courses and training that are provided by the educational circles are tallied with the manpower needs of circles is the subject that deserves to be discussed.

The academia provides courses, teachers, and education to training talents of e-commerce so as to foster the manpower that fits in with the enterprise's expectation; in fact, after the enterprise receives the graduates from school, whether the graduates' knowledge and abilities can meet the professional ability that enterprise requires or not.

T-test, ANOVA and the 1980 Borich Needs Assessment Discrepancy Model (BNAD) published by Borich are adopted to compare e-commerce curricular contents with the needs of industry and to assess the importance of a course.

This study would regard BNAM (Borich Needs Assessment Model) that was announced by Borich in 1980 as the method of evaluating course needs, this method has already been applied successfully to the educational circles and business circles. The basic method of this model is to carry out investigation towards students who had taken relevant courses. First, questionnaire concerning the understandability towards course would be carried out, and then questionnaire regarding the cognition towards the course's importance would be undertaken; next, the numbers from these two questionnaires would be transformed into formula and thus Borich Discrepancy Number (BDN) has been obtained; finally, the one with higher BDN value would be the course that has larger needs.

Lu & Larry (2002) made use of BNAM to investigate the knowledge, importance, educational needs of teaching skill, and comparison of teachers' cognition from the teachers in Ohio's and Taiwan's institutes of technology. Edward (1999) inquires teachers' behavior on 163 teaching abilities and their training needs on each ability through the electronic questionnaire, the result is then arranged in order. Next, the second questionnaire is carried out, teachers are asked to arrange the importance of these abilities in order, and then Borich's Needs Assessment Model-Mean Weighted

Discrepancy Score (MWDS) is used to carry out ranking study. In Garton's study (1996), it uses Borich's Needs Assessment Model to find out 12 agriculture teachers who only teach 1 to 2 years in Missouri of U.S.A. from 50 specialized abilities to carry out questionnaire investigation, trying to find out the most necessary training need in agricultural teaching and the prioritized order of needs. Besides, Waters & Haskell (1998) utilize BNAM to attempt to find out the training needs of the teaching and administrative staff of agriculture cooperative society. Newman &

Johnson 1994) also utilize this method to carry out study to the training needs of agricultural pilots. Scholars such as Thompson & Balschweid (2000), Edwards, Briers & Rohs (2004), and Ricketts (2005) have ever used this method to carry out the study of teaching needs. Wolfskill (2011) used BNAM model to learn about the opinions of teachers regarding the importance and inclusiveness of scientific researches. Pesticides(2012) used BNAM model to learn about the safety procedures of applying new pesticides. Wedel, et al (2012) used BNAM model to analyze the difference at the growth of members' leadership ability and self-awareness. Jackson (2009) used BNAM model to examine the need of occupational skills training over the area. Uricchio (2011) used BNAM need analysis model to investigate the need of farming labors in New England. Maiga (2011) conducted a research on the competitive ability of college graduates majoring in farming and communication in République du Mali. It was found that an ideal curriculum should include courses covering publishing and editing, broadcasting, ethical beliefs, farming and writing skills. Kitchel, Cannon & Duncan (2010) used a descriptive approach to conduct their research on required skills found in college graduates majoring in farming/food industry and natural resources. The research utilized BNAM model to identify the important courses to be enhanced. The courses were Problem Solving, Time management, Communication and Negotiations, and Constructive Criticism. Kitchel, Cannon & Duncan, (2009) attempted to identify the educational needs of teachers in business management and marketing in Idaho. The goal of the study was to identify the need of professional development for Idaho's business management and marketing teachers, and to gain directions on the development of pre-employment curriculum and on-site trainings.

4) The Interpretation of BDN Analytical Method

The analytical method makes use of suggestion investigation to allow participants bring up their opinions and ideas. In the questionnaire, a certain course is proposed and workers of the industrial circles answer the importance of course and their understanding level towards the course. The calculation of BDN is to subtract the understanding level towards course from the importance level of course, and the obtained difference is multiplied by the importance of course, namely $BDN = (\text{Average of course importance} - \text{average of course understanding}) * \text{average of course importance}$. Papritan (1985) explains its content, a high negative number shows that the course is very enough; while a high positive number shows that the course at that time is needed very much, but the course is not enough. For example, if one subject is JAVA design program, the people being investigated thinks that their understanding level towards the content of this course is 1, and they think the important level of this course is 4, $BDN = (4-1)*4$; $BDN = 12$. This value shows that the JAVA course is important and the quantity of relevant new courses must be increased. In addition, if a course is webpage design, the people being investigated thinks that their understanding level towards the content of this course is 4, and they think the important level of this course is 2 on average, $BDN = (2-4)*2$; $BDN = -4$.

Such value shows that webpage design course is enough; schools can reduce the quantity of relevant new courses slightly.

The questionnaire used in this study is divided into two parts: importance level and demand level. It is analyzed statistically by BDN of BNAM and ANOVA respectively. The results of these two statistical analysis methods are compared in order to correctly identify the gap.

STUDY METHOD

1) The study framework

This study is based on the questionnaire developed by Wu and Li (2009) for obtaining an overall picture of the e-commerce curriculum provided by departments/graduate schools of Information Management or E-Commerce and E-Commerce Certification programs. The questionnaire in use was distributed in Taiwan, U.S.A. and Japan to gather views from academics and industries. The further data analysis was conducted using t-test、ANOVA and BNAM to identify the cognitive gap. Another comparison was done to seek the synthesized views toward the importance and needs of e-commerce curriculum provided among the three countries.

The following graphic illustrates the research framework of this study:

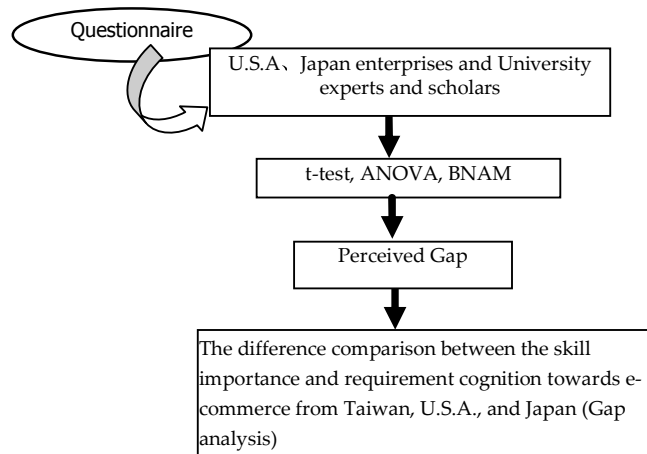


Figure 3. The study framework.

2) Questionnaire Development

First of all, this study utilized the thesis published in TANET by Wu and Li (2008), in which the analysis on e-commerce curriculum offered by departments/graduate schools of Information Management or E-Commerce was conducted. The questionnaire in use was then developed combining the views from the journal paper published by Liang (2000).

Questionnaire design of this study is based on the content of the first stage and is translated into English and Japanese version so as to collect data from American and Japanese research subjects.

3) Cross-national comparative analysis

Analyze the differences between the academics of Taiwan, the US, and Japan and the top 1000 enterprises in terms of the importance each party attach to e-commerce courses

4) Study Subjects

The study subjects in this section are 1) professionals of the top 1000 enterprises and professors of the universities or colleges in Taiwan, 2) top 50 American business colleges published by Business Week and professionals of the top 1000 enterprises in America, 3) top 40 professors of universities or colleges published in 2010 by Diamond –the leading economic magazines in Japan, and professionals of top 300 enterprises among the top 1000 enterprises of Japan published in 2010 by Taiwan Institute of Economic Research.

5) Data Collection

Questionnaire used in the first stage is the main method of data collection in this section and is translated into both English and Japanese version. Study subjects in the US were surveyed via the internet. On the other hand, because emails are not very accessible in Japan, only 35 professors were surveyed in Japan via the internet and 250 professors by filling out the questionnaires mailed to them. The top 1000 enterprises of Japan do not have emails; therefore, only the top 300 enterprises of the top 1000 were surveyed by filling out the questionnaires mailed to them.

6) Method of Data Analysis

Quantity statistics is adopted here to analysis data. To analyze the result of questionnaires completed by professionals and industries of the mentioned three countries, ANOVA is used to carry out variance analysis of course importance and BNAM (Borich Needs Assessment Model) to variance analysis of demand. Firstly, a comparative analysis of experts and industries in the three countries was conducted; then that of three countries was carried out to identify the differences between their demand for and viewpoints on e-commerce curricula.

7) Reliability and Validity Analyses

The questionnaire used in this study is an extension of the first stage; hence, it has a certain degree of reliability. With respect to validity analysis, “accumulated explanatory variance” of Factor Analysis is adopted and the statistical software SPSS is used afterward to examine to what degree the question items of the questionnaire affect the “accumulated explanatory variance”. In doing so, the validity of the questionnaire can be ensured.

RESEARCH RESULTS

This study conducted the cross-country comparisons to identify the different

views on curriculum needs between academics and industries based on the questionnaire answers gathered in U.S.A., Japan and Taiwan.

TABLE 2. USA, JAPAN AND TAIWAN COLLECTED QUESTIONNAIRES.

Respondents	Number of Questionnaires Delivered	Number of Questionnaires Returned	Number of Valid Questionnaires	Valid Response rate
University Professors in U.S. A.	368	56	56	15%
Top 1000 enterprises in U.S.A.	836	128	128	15%
University Professors in Japan	285	47	47	16%
300 Biggest Companies in Japan	295	55	49	17%
University Professors in Taiwan	442	114	114	25.8%
Top 1000 enterprises	885	198	191	22.4%

TABLE 3. RELIABILITY STATISTICS.

	Cronbach's α value	Number of Items
University Professors in Taiwan	.984	142
Top 1000 enterprises	.985	142
University Professors in U.S. A.	.923	142
Top 1000 enterprises in U.S.A.	.916	142
University Professors in Japan	.954	142
300 Biggest Companies in Japan	.841	142

From the table above, it was learned that the α value within the variables of each curriculum were all greater than 0.9. The overall Cronbach's α coefficient are 0.9847; 0.9854; 0.913; 0.916; 0.954; 0.841, respectively.

To examine its validity, this study utilized SPSS to generate the cumulative percentage of variance accounted for the current and all preceding principal in the research context. The result is provided in Appendix 19. The valid value of this research ranges from 0.750 to 0.999, indicating that the validity of the questionnaire items were within recognized standards.

1) The t analysis on the BDN Value of Curriculum from Corporations and Academics of U.S.A., Japan and Taiwan

The following chart provides a synthesized analysis on the variation and ratio of BDN Values of the curriculum from corporations and academics in U.S.A., Japan and Taiwan. Among the three countries, Japan shows the greatest discrepancy (76%), while Taiwan and U.S.A. have lower discrepancies of 60% and 52% respectively.

TABLE 4. A SYNTHESIZED ANALYSIS ON THE VARIATION AND RATIO OF BDN VALUES OF MANAGEMENT COURSES AND TECHNOLOGY COURSES FROM CORPORATIONS AND ACADEMICS OF U.S.A., JAPAN AND TAIWAN.

	U.S.A		JAPAN		TAIWAN	
	NUMBER	RATIO	NUMBER	RATIO	NUMBER	RATIO
MANAGEMENT COURSES	21	50%	26	62%	24	57%
TECHNOLOGY COURSES	16	55%	28	97%	19	66%
TOTAL COURSES	37	52%	54	76%	43	60%

2) The ANOVA Analysis on the BDN Value of Management Courses

There are 42 management courses analyzed. All three countries show high discrepancies between the views held by large corporations and professors: Japan (50%), Taiwan (57%), and U.S.A. (62%).

The multiple comparative analyses on the BDN values calculated based on the questionnaire responses from corporations and professors in the three countries recognizes 8 courses of high discrepancies, which totaled 19% of the courses offered. Please refer to table 5 for details. Furthermore, there are three courses that show no discrepancy at all, including Information and Society, Logistics Management, and Management in Digital Era.

TABLE 5. THE MULTIPLE COMPARATIVE ANALYSIS ON BDN VALUES OF MANAGEMENT COURSES FROM THE PERSPECTIVES OF 1000 BIGGEST CORPORATIONS AND UNIVERSITY PROFESSORS IN U.S.A., JAPAN AND TAIWAN.

NO.	COURSE TITLE	MEAN DIFFERENCE (I-J)	STD. ERROR	SIG.
1	E-COMMERCE REGULATING AND MANAGEMENT	-1.523	.606	.012 *
2	E-COMMERCE REGULATING MODEL	-1.932	.664	.004 **
3	TECHNOLOGY PROJECT MANAGEMENT	1.408	.654	.032 *
4	INFORMATION SYSTEM DEVELOPMENT	1.930	.677	.005 **
5	E-BUSINESS ADMINISTRATION	-1.368	.618	.027 *

6	NEW INFORMATION TECHNOLOGY RESEARCH	1.554	.684	.023 *
7	ADVANCED BUSINESS MANAGEMENT	1.776	.659	.007 **
8	INFORMATION AND SOCIETY	1.317	.602	.029 *

“ * ”, THE CUT-OFF VALUE ON GAP ANALYSIS WAS P<0.05.

“ ** ”, THE CUT-OFF VALUE ON GAP ANALYSIS WAS P<0.005. DATA SOURCE: CURRENT STUDY

3) The ANOVA Analysis on the BDN Value of Technology Courses

There are 29 management courses analyzed. In regards to the distinctive gap between numbers of courses offered and ratios using BDN values, it is found that all three countries show a level of high discrepancies over 55%. Among which, the greatest discrepancy (97%) is revealed between the different perspectives from the 1000 biggest corporations and professors in Japan.

In addition, the multiple comparative analyses on the BDN values calculated based on the questionnaire responses from corporations and professors in the three countries recognizes 8 courses of high discrepancies, which totaled 27% of the courses offered. Please refer to table 6 for details. Moreover, only Information Exploration Basic shows no discrepancy in this analysis.

TABLE 6. THE MULTIPLE COMPARATIVE ANALYSES ON BDN VALUES OF TECHNOLOGY COURSES FROM THE PERSPECTIVES OF 1000 BIGGEST CORPORATIONS AND UNIVERSITY PROFESSORS IN U.S.A., JAPAN AND TAIWAN.

NO.	COURSE TITLE	MEAN DIFFERENCE (I-J)	STD. ERROR	SIG.
1	ELECTRONIC COMMERCE APPLICATION TECHNOLOGY	-2.946	.590	.000 **
2	WEB TECHNOLOGIES	-1.866	.640	.004 **
3	SEMINAR ON INFORMATION SECURITY TECHNOLOGY	-2.170	.716	.003 **
4	MOBILE NETWORK PROGRAMMING	-3.978	.705	.000 **
5	INTRODUCTION TO WIRELESS NETWORK	-1.426	.717	.047 *
6	COMMUNICATION NETWORK AND MULTIMEDIA APPLICATION	-1.283	.626	.041 *
7	WIRELESS MULTIMEDIA COMMUNICATION	-1.593	.591	.007 **
8	MULTIMEDIA FUNDAMENTALS	-1.288	.599	.032 *

“ * ”, THE CUT-OFF VALUE ON GAP ANALYSIS WAS P<0.05.

“ ** ”, THE CUT-OFF VALUE ON GAP ANALYSIS WAS P<0.005.

4) The Comparative Analysis on BDN Values of Courses to be Enhanced from the Perspectives of 1000 Biggest Corporations and University Professors in U.S.A., Japan and Taiwan

TABLE 7. COMPARISON OF BDN VALUES FROM THE PERSPECTIVES OF CORPORATIONS AND ACADEMICS IN U.S.A.

RANK	TOP 1000 ENTERPRISES OF U.S.A.		UNIVERSITY PROFESSORS OF U.S.A.	
	MEAN VALUE	COURSE TITLE	MEAN VALUE	COURSE TITLE
1	3.85	INFORMATION SYSTEM DEVELOPMENT	6.55	MOBILE COMMERCE STRATEGIES
2	3.63	NEW INFORMATION TECHNOLOGY RESEARCH	6.39	MOBILE NETWORK PROGRAMMING
3	3.47	PLANNED CHANGE MANAGEMENT OF INFORMATION SYSTEM	6.35	INTRODUCTION TO MOBILE COMMERCE
4	3.47	DATA ANALYSIS	5.25	INFORMATION SYSTEM CONTROL AND EVALUATION
5	3.44	NETWORK SPECIAL TOPICS ON ENTREPRENEURSHIP	5.22	ADVANCED NETWORK PROGRAMMING
6	3.4	ENTERPRISE RESOURCE PLANNING	4.82	E-COMMERCE AND LAW
7	3.37	NETWORK ECONOMY AND BUSINESS INTELLIGENCE SEMINAR	4.75	E-COMMERCE STRATEGIES
8	3.33	KNOWLEDGE MANAGEMENT	4.65	ADVANCED INFORMATION SECURITY
9	3.32	INTRODUCTION TO MOBILE COMMERCE	4.65	SEMINAR ON INFORMATION SECURITY TECHNOLOGY
10	3.3	ADVANCED DATA MINING APPLICATION	4.59	ADVANCED NETWORK FORMULA DESIGN

TABLE 8. COMPARISON OF BDN VALUES FROM THE PERSPECTIVES OF CORPORATIONS AND ACADEMICS IN JAPAN.

RANK	300 BIGGEST COMPANIES OF JAPAN		UNIVERSITY PROFESSORS OF JAPAN	
	MEAN VALUE	COURSE TITLE	MEAN VALUE	COURSE TITLE
1	5.76	INTRODUCTION TO NETWORK FORMULA DESIGN	5.34	SUPPLY CHAIN MANAGEMENT SYSTEM
2	5.27	INTRODUCTION TO INFORMATION SECURITY	4.11	NETWORK ECONOMY AND BUSINESS INTELLIGENCE SEMINAR

3	5.27	ADVANCED NETWORK PROGRAMMING	4	INTRODUCTION TO MOBILE COMMERCE
4	5.24	WIRELESS NETWORK RESEARCH SEMINAR	3.81	E-BUSINESS ADMINISTRATION
5	5.22	DECISION SUPPORT	3.77	KNOWLEDGE MANAGEMENT
6	5.2	ADVANCED NETWORK ACCESS SERVER MANAGEMENT	3.55	NETWORK SPECIAL TOPICS ON ENTREPRENEURSHIP
7	5.16	OBJECT ORIENTED PROGRAMMING	3.49	ADVANCED BUSINESS MANAGEMENT
8	5.12	MOBILE NETWORK PROGRAMMING	3.38	DATA ANALYSIS
9	5.1	ADVANCED DECISION SUPPORT SYSTEMS	3.19	MOBILE COMMERCE STRATEGIES
10	5.08	INFORMATION SYSTEM DEVELOPMENT	3.06	INTRODUCTION TO INFORMATION SECURITY

TABLE 9. TOP 10 BDN MEAN VALUES OF COURSES IN DEMAND FROM THE PERSPECTIVES OF CORPORATIONS AND ACADEMICS.

RANK	UNIVERSITY PROFESSORS		TOP 1000 ENTERPRISES	
	MEAN VALUE	COURSE TITLE	MEAN VALUE	COURSE TITLE
1	4.11	E-COMMERCE AND LAW	3.80	MOBILE COMMERCE APPLICATION AND DESIGN
2	3.53	INTRODUCTION TO TECHNICAL LAW AND POLICY	3.70	E-COMMERCE AND LAW
3	3.21	INTRODUCTION TO INFORMATION SECURITY	3.66	ADVANCED INFORMATION SECURITY
4	2.97	SEMINAR ON INFORMATION SECURITY TECHNOLOGY	3.49	INTRODUCTION TO WIRELESS NETWORK
5	2.85	ADVANCED INFORMATION SECURITY	3.34	E-COMMERCE REGULATING MODEL
6	2.74	ADVANCED DATA MINING APPLICATION	3.24	ADVANCED NETWORK PROGRAMMING
7	2.61	ADVANCED NETWORK PROGRAMMING	3.20	INTERNET MARKETING
8	2.56	DATA WAREHOUSING AND MINING	3.07	TECHNOLOGY PROJECT MANAGEMENT
9	2.56	MOBILE NETWORK PROGRAMMING	3.02	ADVANCED DATA MINING APPLICATION
10	2.53	Data mining	2.99	Logistics management

Table 7,8,9 on the list for the USA, Japan and Taiwan 3 countries, enterprises and

university professor of curriculum BDN average. The curriculum should be strengthened in order to analyze findings:

- 1) The top 3 courses recognized by American Corporations were Theories of Information System Development, New Information Technology Research and Influence from Information System on Management.
- 2) American professors placed great emphasis on courses about portable businesses, including Portable Business Strategy, Portable Internet Programming, and Introduction of Portable Business. Besides, they also desired to strengthen courses on information security.
- 3) Japanese Corporations stressed courses of internet programming and management, including Basic Internet Programming, Advanced Internet Programming, Advanced Internet Management Field Studies, Portable Internet Programming and Object-Oriented Programming.
- 4) Japanese researchers listed Supply Chain Management, Internet Economics and Corporate Wisdom Seminars, and Introduction of Portable Business (or Portable Business Strategies) as the top 3 courses.
- 5) The 10 courses in high demand from the perspectives of Corporations and academics. Three courses were both ranked by both fields: E-Commerce Business and Laws, Advanced Security Information and Advanced Internet Programming. Specifically, E-Commerce Business and Laws was ranked as number 1 and 2 by university professors and Corporations respectively, a sign of its high demand.
- 6) In addition, courses on portable businesses were also needed due to the fact tha

Top 1000 enterprises ranked Portable Application and Design number 1, and university professors ranked Portable Internet Programming as number 9. On the other hand, both Corporations and university professors included courses on information security on their to-be-enhanced list.

CONCLUSION

The top 3 courses recognized by American Corporations were Theories of Information System Development, New Information Technology Research and Influence from Information System on Management. American professors put great emphasis on courses about portable businesses, including Portable Business Strategy, Portable Internet Programming, and Introduction to Portable Business. Besides, they also desired to enhance courses on information security. Japanese Corporations stressed courses of internet programming and management, including Basic Internet Programming, Advanced Internet Programming, Advanced Internet Management Field Studies, Portable Internet Programming and Object-Oriented Programming. Japanese researchers listed Supply Chain Management, Internet Economics and Corporate Wisdom Seminars, and Introduction of Portable Business (or Portable Business Strategies) as the top 3 courses. From the top 10 courses to be enhanced listed by professors in Taiwan, there were three identical ones: E-Commerce and Laws, Advanced Information Security, Advanced Internet Programming. E-Commerce and Laws

was ranked number 1 and 2 by university professors and Corporations respectively, indicating its high demand.

In addition, Top 1000 enterprises and medium to small sized businesses ranked Portable Business Application and Design number 1 and 3, respectively. University professors also ranked Portable Internet Programming as number 9, which enhanced the view towards the need of curriculum on portable business. Furthermore, Corporations and university professors also desired for enhanced courses on information security.

To combine the discoveries made from information gathered in U.S.A., Japan and Taiwan, it is found that both information security and portable businesses are the two areas for future enhancement. In addition, the majority involved in this study deems advanced courses on internet programming as course in demand. To fulfill the needs of various Corporations, academics should be aware of these trends in order to cultivate expertise in e-commerce, portable business, information security and advanced internet programming.

The main purpose of this study is to stimulate more thinking and to encourage more discussions among experts of e-commerce of more countries. As e-commerce continues booming on its way, it is predictable that more Internet activities will shape the formation of portable businesses using portable devices such as cell phones, computer pad, and small laptops. It is recommended to include portable businesses for future studies in the areas of curriculum development, human resources and information technologies.

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