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LETTER FROM THE EDITORS

It is with great pleasure that we welcome you to this Special Issue of the *Journal of International Business Research*, a journal published by the Allied Academies to support the exchange of ideas and insights in International Business.

This issue features the best papers from those presented at the *Hanoi 2008 International Conference on Business, Economics and Information Technology* on the theme of *"Doing Business in the Global Economy: Economic, Political, Social and Cultural Environments Facing Business."* Founded on a very simple idea, that there is so much we can learn from each other, the conference provided an opportunity for academicians, researchers, students, and representatives from industry and government to get together and exchange ideas in the spirit of scholarship and professional growth.

We thank the University of Guam's School of Business and Public Administration, Penn State Altoona's Division of Business and Engineering, Alfred University's College of Business, and the Vietnam National University's Hanoi School of Business for their support of this Conference and the publication of this journal issue. We are also grateful to the Academy for providing us with the outlet by which we can share our scholarly efforts with those interested in the study of International Business.

Consistent with the editorial practice of the Academy on all of the journals it publishes, each paper in this issue has undergone a double-blind, peer-review process.

This issue includes papers by authors from nine different countries and thus reflects the international reach of Allied Academies.

Information about the Allied Academies, the *JIBR*, and the other journals published by the Academy, as well as calls for conferences, are published on its website. In addition, the website displays the latest activities of the organization. Please visit the site and know that the Academy welcomes hearing from you at any time, as do we.

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FACTORS THAT INFLUENCE SMALL AND MEDIUM ENTERPRISES IN METRO MANILA TO CHOOSE BETWEEN ACCRUAL AND CASH ACCOUNTING

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ABSTRACT

This paper presents the important considerations of SMEs in Metro Manila in using an accounting method, whether accrual accounting as prescribed by GAAP or cash accounting. This paper reports the results from the observations, which identify the method that is more applicable to these entities.

The study provide insights on the applicability of the Exposure Draft of IFRS for SMEs, final standards of which are expected to be issued by the IASB in the second half of 2008. Considering the limited number of observations in this study, regression analysis may not be implemented to test the hypotheses. However, this paper presents a logistic model that will empirically test the hypotheses when provided with sufficient number of observations. This paper then suggests collection of more data and the use of the regression model presented for future researches.

INTRODUCTION

In this age of globalization, the harmonization of financial reporting requirements has become a necessity. The convergence of accounting standards worldwide helps ensure the increased level of confidence among investors and other users of financial information by high quality and globally adopted financial reporting structures.

Based on the fundamental assumptions of accounting, principles are developed. These dictate how economic events are recorded and reported. Generally accepted accounting principles (GAAP) are designed to produce general-purpose financial statements of business enterprises, whether they are large or small. The users of general-purpose financial statements include shareholders, creditors, investors, employees, and public.

Users of financial reports focus on earnings as well as on the financial condition of the enterprise. To measure an organization's performance and reflect its financial condition, two accounting methods are commonly used: accrual accounting and cash accounting.

GAAP require the use of the accrual method of accounting. The accrual method recognizes revenues and expenses in the accounting period in which they are considered earned and incurred regardless of the inflow or outflow of cash. On the other hand, the cash accounting method

recognizes revenue when cash is received and recognizes expenses when they are paid. However, there is a question of whether GAAP is applicable to small and medium enterprises (SMEs), and whether GAAP meet the needs of these companies, as well as the preparers and the users of their financial reports.

Based on literature, there are two major criteria applied in classifying SMEs: asset size and number of employees (PSB ASEAN, 2005). In the Philippines, the SMEs sector are those companies engaged in different areas of business whether cooperative, partnership or corporation that can be categorized by asset size or by employment. Republic Act 9178 provides that the small enterprise ranges from 10 to 99 workers and capitalization of Php3,000,0001 to Php15,000,000; and the medium enterprise has workforce of 100 to 199 and capitalization over Php15,000,000 to Php100,000,000.

This paper presents the important considerations of SMEs in Metro Manila in using an accounting method. Geographically, Metro Manila is the center of Luzon and the capital region of the Philippines. The Cordillera Mountains forms its boundary on the east, Laguna de Bay on the southeast, Central Luzon on the north and Southern Tagalog region on the south. Metro Manila is the general term for the metropolitan area that contains the cities of Manila, Caloocan, Las Pinas, Makati, Mandaluyong, Marikina, Paranaque, Muntinlupa, Pasay, Pasig, Malabon, Taguig, Valenzuela, and Quezon City. The municipalities of Metro Manila are Navotas, Malabon, Pateros and San Juan.

This study examines whether SMEs in Metro Manila comply with or do not comply with GAAP. This study also aims to determine the factors that influence SMEs in Metro Manila to choose between the two accounting methods - accrual and cash. This paper reports the results from the observations, which identify the method that is more applicable to these entities.

The relevance of developing a more comprehensive understanding is becoming more important, especially with the Exposure Draft of IFRS for SMEs, final standards of which are expected to be issued by the International Accounting Standards Board (IASB) in the second half of 2008. Most of the studies pertaining to accounting standards and practices applicable to SMEs have focused on developed countries (IFAC, 2006). No literature was found on the financial reporting of SMEs in the Philippines.

Consequently, this research is pioneering and due to non-availability of previous data, this study is limited to SMEs located in Metro Manila. Surveys were conducted and data were gathered from ten external auditors handling SME clients throughout Metro Manila. These auditors handle 163 SMEs in Metro Manila. The data gathered from the external auditors were corroborated by 17 SMEs in Metro Manila. Sample firms were taken from the list of 2007 registered SMEs in Metro Manila covering the cities of Paranaque, Pasig and Quezon.

While the number of SME respondents was low, given the reasons that the external auditors are the ones who prepare the financial statements for these SMEs, it was considered adequate as the responses from the external auditors suffice in meeting the objectives of the study.

Due to the limited number of observations in this study, regression analysis may not be implemented to test the hypotheses. However, this paper presents a regression model that will empirically test the hypotheses when provided with sufficient number of observations.

RELATED LITERATURE AND HYPOTHESES

Every so often, debate arises whether separate accounting and reporting rules should be set for SMEs (Saythe, 2004). The debate has risen as to whether SMEs should adopt a different set of accounting rules due to reasons such as differing needs of financial users, rapid and widespread developments in financial reporting, compliance costs, and statutory requirements (Mersereau, 2002).

GAAP are imposed on companies so that users have at least a minimum level of consistency in the financial statements they use when analyzing companies for various purposes. Accordingly, the constant evolution of GAAP, therefore, fulfills its mission to disseminate quality financial information. This information obtained from the financial statements, earnings in particular, facilitates investors' valuations and the monitoring of management.

Financial statements for business organizations must be prepared using the accrual accounting basis. This requirement is specified in Philippine Accounting Standards (PAS) 1: Presentation of Financial Statements. Likewise, Section 2.33 of the Exposure Draft of International Financial Reporting Standards (IFRS) for SMEs requires the use of accrual basis of accounting.

However, Jankovic (2007) enumerated several reasons why the application of IFRS is inadequate. These are: (1) users of SMEs' financial statements need less information compared to the users of financial statements of listed companies; (2) particular transactions mentioned in IFRS occur seldom, if ever, in SMEs; (3) the cost/benefit ratio of financial reporting is more favorable in large companies than in SMEs; and (4) IFRS are prone to changes unlike national standards, which results in higher costs of IFRS implementation.

In a study made by Meagher (1982), small businesses claim that although they are conforming to the same accounting standards as large businesses, they argue in favor of a two-GAAP approach, one for large businesses and one for SMEs. The two-set model is consistent with accounting theory, better allows for congruence with policies for SMEs, and ensures that standards reflect important differences and needs.

Furthermore, the Canadian Institute of Chartered Accountants (CICA) Accounting Standards Board commissioned a research to examine how the financial information needs of capital to SMEs might be more effectively met, and the degree to which reporting in accordance with generally accepted accounting principles could be modified to meet those needs (Lavigne, 1999).

The findings of the consultation process demonstrate that only one was acceptable to the SME financial reporting stakeholders consulted – the adoption of differential reporting principle within GAAP (Lavigne, 1999). According to this principle, accounting rules governing SMEs

would be permitted to differ from accounting rules applicable to public enterprises when such rules do not meet the financial reporting needs of SMEs or when the cost of applying the rules would outweigh their potential benefits for these enterprises (Martin, 2000).

This study poses the following research hypotheses:

H_1: Nature of business is a factor that may influence SMEs in Metro Manila to choose between accrual and cash accounting.

Fundamentally, general-purpose financial statements are prepared on the assumption that there are no basic differences in the needs of those who will use them. However, accounts of small companies are prepared primarily for the benefit of owner-managers, their bankers and the revenue authorities who have little interest in the kind of information aimed at users of statements of public companies. The board of directors or other equivalent governing body controls the circulation of financial statements of non-public entities (Mersereau, 2002). Such financial statements are generally restricted to management and lending institutions.

Chan (2003) claimed that traditionally, some governments and businesses have used different accounting methods because they have different goals. Governments prefer to use cash-based accounting to manage and report revenue and spending to a certain period. The private sector, on the other hand, needs to manage financial performance.

Business firms that customarily receive cash advances from customers before the rendering of services or delivery of goods may well find that the accrual basis of accounting is advantageous (Jones & Luscombe, 2002). Churchill (1992) affirms that this method is also used by most corporate and many unincorporated bodies, such as societies, associations and clubs, small government departments, and professional firms because it provides an accurate picture of the company's current condition.

H_2: Convenience in record keeping is a factor that may influence SMEs in Metro Manila to choose between accrual and cash accounting.

Carter (1981) affirmed that the choice between accrual-basis and cash-basis reporting of revenues provides an example of preference in the benefits sense. If a user of accrual-basis statements prefers that revenues be stated on a cash basis, he can simply ignore trade receivables and unearned fees on the balance sheet, and adjust reported accrual basis revenues by the differences between the year's beginning and ending balances in those two accounts, plus the reported uncollectible accounts expense. This calculation provides a cash-basis figure for revenues, and accommodates those users who prefer the cash basis than the accrual basis for reporting revenues.

H_3: Complexity in accounting and disclosure requirements is a factor that may influence SMEs in Metro Manila to choose between accrual and cash accounting.

Tom Kelly of American Institute of Certified Public Accountants (AICPA) says that there is a widespread complaint that accounting standards were too big and too complicated for SMEs (Cheney, 1995). David Sun Tak-Kei, president of the Hong Kong Society of Accountants (HKSA), believes that many of the accounting rules are tailored for large companies. Alerding (2003) stated that SMES have been caught in the wake of increasingly complex accounting and disclosure requirements following the wave of laws and new accounting pronouncements, resulting from the Enron scandals and similar frauds.

Churchill (1992) disclosed that the relative complexity makes it more expensive to implement. Hence, HKSA took the initiative to introduce accounting. standards tailor-made for SMEs in a bid to help them save time and money (Yiu, 2003).

Consequently, Financial Accounting Standards Board (FASB) continues to address the complexity of the GAAP hierarchy in the standards it has issued (Fitzsimons & Thompson, 2005). Meagher (1982) stated that SMEs in Canada conform to the same standards as large businesses but the way in which financial statements are being prepared, to them, is simply too complex. Thus, the Canadian Institute of Chartered Accountants considered three conceptually different accounting models: (1) a single set of GAAP without exclusions, essentially the status quo; (2) a single set of GAAP with exclusions for SMEs; and (3) two distinct sets of GAAP. The primary rationale for the exclusions was to reduce SMEs compliance burden (Feltham & Mathieu, 2000).

H_4: Tax compliance requirements may influence SMEs in Metro Manila to choose between accrual and cash accounting.

The application of accounting standards to SMEs has revolved around one principal issue: whether the standards should apply equally to all financial statements that purport to present a true and fair view or whether small companies should be exempted from the unduly burdensome requirements of certain standards (Allister, 1995).

The U.S. released revenue regulations to ease the burdens of SMEs. Revenue Procedure 2000-22 allows any company, with tests to meet, to use cash method of accounting for tax purposes (Jennings, 2001). Revenue Procedure 2002-28 was issued in May 2002 to reduce administrative and tax compliance burdens and to minimize disputes over the use of the accounting method because on the requirement to account for inventories (Chiavetta, 2002).

H_5: Cost of preparing financial statements is a factor that may influence SMEs in Metro Manila to choose between accrual and cash accounting.

In many cases, the cost of preparing those financial statements is increasing significantly. Sayther (2004) concluded that some companies chose to depart from certain GAAP requirements for them to limit compliance costs. It is believed that the costs of compliance with GAAP exceed the benefits for SMEs (Derieux, 1985).

In 2002, U.S. Small Business Administration reported that companies with 20 or less employees were spending an average of USD1,202 per worker to comply with federal financial reporting mandates. Such amount was more than twice the amount that companies was with more than 500 workers spent on compliance (Sayther, 2004).

In Canada, some companies opted to depart from certain GAAP requirements and settled on qualified audit or review reports, or moved from audited or reviewed statements to compilation engagements just to minimize the cost of engagements (Mersereau, 2002).

Carter (1981) claimed that gross benefit is achieved when the cost of producing and processing the unique information is ignored. He examined the continuing focus on benefits rather than costs of the reporting alternatives and argued that the identification of which of the alternatives fits a particular accounting policy decision should indicate costs of the policy choices.

H_6: *Usefulness in decision-making of the financial statements prepared is a factor that may influence SMEs in Metro Manila to choose between accrual and cash accounting.*

A survey sponsored by American Institute of Certified Public Accountants (AICPA) revealed that respondents said that certain GAAP standards are not relevant and useful enough to help SMEs make management, credit, and investment decisions (Tie, 2005).

Simpson (1992) claimed that businesses rely on the accrual accounting method as the only source for management decision-making (Simpson, 1992). Meanwhile, in the United States, owners of private companies argued that external users of financial statements do not utilize all the information contained in such reports. The extra costs incurred by such private entities were not worth the benefits received.

METHODOLOGY

SMEs consider several factors that would influence them to choose between the two methods – accrual or cash – in the preparation of the entity's financial statements. The perspective of both the external auditors handling SMEs and the SMEs were sought to determine which between the two methods is more applicable to SMEs in Metro Manila. To measure the factors that may influence SMEs to choose between accrual and cash accounting, survey results were analyzed using five-point Likert scale, with 5 as of the most effective level and 1 as the least effective level.

Surveys were conducted and data were gathered from ten external auditors handling SME clients throughout Metro Manila. These auditors handle 163 SMEs in Metro Manila. The data gathered from the external auditors were corroborated by 17 SMEs in Metro Manila. Sample firms were taken from the list of 2007 registered SMEs in Metro Manila covering the cities of Paranaque, Pasig and Quezon.

Due to the limited number of observations in this study, regression analysis may not be implemented to test the hypotheses. Simple descriptive statistics were employed to analyze the limited data gathered. Nevertheless, considering that the external auditors are the ones who prepare the financial statements for these SMEs, the responses gathered from the external auditors suffice in meeting the objectives of the study.

However, if the researcher would have sufficient number of observations, or in the event that some researchers would gather additional information in the future, the following logistic model is suggested to be employed to quantify the results.

A Logistic Model for SME's Choice of Accounting Method

Considering that the choice of an accounting method is qualitative, the regression model involves dummy variable. The dependent variable is a dummy variable, which takes on two values – the choice between accrual and cash accounting.

Let the dummy variable Y_i be defined as:

$Y_i = 1$ if i^{th} SME chooses accrual method
$Y_i = 0$ if i^{th} SME chooses cash method

The focus of analysis would be in modeling the probability P_i of choosing the accounting method, given the perceptions represented by the independent variables $X_1, X_2, \ldots, X_k$ with:

$$P_i = P[Y_i = 1 \mid X_2, X_3, \ldots, X_k]$$

Based on the logistic regression model employed by Beasley (1996), and logit model as illustrated by Maddala (2001), the empirical model for influences to choose between accrual and cash accounting is:

$$\ln [P_i / (1-P_i)] = b_1 + b_2X_2 + b_3X_3 + \ldots + b_kX_k + m_i$$

where

X_2 = nature of business, which refers to the kind of business of SMEs.

This is a categorical independent variable coded "1" through "5", scale to answer the statement, "We consider the nature of our business in choosing the accounting method applied". It is quantified as follows: 5-strongly agree; 4-agree; 3-neutral; 2-disagree; and 1-strongly disagree.

X_3 = convenience, which refers to the level of burden in record-keeping.

This is a categorical independent variable coded "1" through "5", scale to answer the statement, "We consider the convenience in record-keeping to choose between accrual and cash accounting". It is quantified as follows: 5-strongly agree; 4-agree; 3-neutral; 2-disagree; and 1-strongly disagree.

X_4 = complexity, which refers to the burden of accounting and disclosure requirements in reporting to regulatory bodies.

This is a categorical independent variable coded "1" through "5", scale to answer the statement, "We consider the complexity of accounting and disclosure requirements in choosing between accrual and cash accounting method". It is quantified as follows: 5-strongly agree; 4-agree; 3-neutral; 2-disagree; and 1-strongly disagree.

X_5 = tax, which refers to the tax compliance burden.

This independent variable can be measured in terms of ratio to revenues during the period.

X_6 = cost, which refers to the cost of preparing the financial statements.

This independent variable can be measured in terms of ratio to revenues during the period.

X_7 = usefulness, which refers to the valuation of firms of the accounting method with respect to the characteristics of consistency and comparability for decision-making.

This is a categorical independent variable coded "1" through "5", scale to answer the statement, "Usefulness in decision-making of the financial statements prepared is a factor to choose between accrual and cash accounting". It is quantified as follows: 5-strongly agree; 4-agree; 3-neutral; 2-disagree; and 1-strongly disagree.

μ_i = the error term.

This multivariate logistic regression analysis will be employed because it enables to investigate the probability of an event's occurrence in relation to a number of measurable independent variables, with the estimation allowing one to compare the relative importance of each of the variables. This logistic model provides the ratio of probability that accrual was chosen over the probability that cash method was chosen. It expresses the natural logarithm of odds ratio of the two events – accrual and cash method.

Logit model regression will be used because the dependent variable is dichotomous. In addition, the regression analysis will control for differences in influences for SMEs to adopt the chosen accounting method.

RESULTS AND DISCUSSION

Seventy-six percent of the SME respondents use the accrual method while six percent of them use cash method for record keeping, and regularly converts to accrual method for purposes of reporting to regulatory bodies. The remaining eighteen percent, however, use cash method, and the external auditors are tasked to prepare year-end adjustments using accrual method in accordance with GAAP.

From the limited data in this study, which were analyzed using simple descriptive statistics, the following were the results on the factors that influence SMEs to choose between accrual and cash accounting method.

Nature of Business

The nature of the business of the sample SMEs and the clients of the external auditors in this study is scattered across the business of construction, trading, pharmaceutical distribution, real estate, restaurant, communication, printing, and garment manufacturing. Unanimously, SMEs and the auditors strongly agreed ("5") that the nature of business is a factor that influenced SMEs in choosing the accounting method applied. SMEs involved in financing/pawnshops, real estate, construction, and restaurants apply the cash method. Cash basis is generally used when it is difficult to determine the revenue amount at the time of a credit sale because collection is uncertain.

On the other hand, SMEs with the nature of business such as printing, trading, transportation services, and manufacturing concerns like garments use accrual method. Some of these firms customarily receive cash advances from customers before they render services or deliver goods and find accrual method advantageous. In addition, reporting accounts under this method helps them in planning the operating cycle, especially in the management of inflow and outflow of cash.

Convenience

Seventy percent of the practitioners strongly agreed ("5") that the accounting method chosen by their clients was due to the convenience in record keeping, while 30 percent of the practitioners disagreed ("2") that convenience is one of the factors why their clients chose their adopted accounting method. This was corroborated by the SMEs as 76 percent of them strongly agreed ("5") that convenience was a factor considered in adopting the chosen accounting method. Twenty four percent of the SMEs, on the other hand, disagreed ("2") with the statement.

Complexity

Fifty percent of the external auditors disagreed ("2") that complexity in accounting and disclosure requirements is one of the factors why their clients chose their adopted accounting method. Likewise, 70 percent of the SMEs disagreed ("2") with the statement. Forty percent of the external auditors and 24 percent of the SMEs strongly disagreed ("1"). Ten percent of the auditors and six percent of SMEs answered neutral ("3"), which means that to them, the two methods are equal in terms of complexity in reporting and disclosure requirements and this may or may not affect their choice of accounting method.

Tax Compliance Burden

For the purpose of this study, this is a categorical independent variable that was measured using Likert Scale "1"through "5", to answer the statement, "We consider the tax compliance burden in choosing between accrual and cash accounting method". It is quantified as follows: 5-strongly agree; 4-agree; 3-neutral; 2-disagree; and 1-strongly disagree.

Seventy percent of the external auditors disagreed ("2") that tax compliance burden is one of the factors why their clients chose their adopted accounting method. These perspectives were validated by 76 percent of the sample SMEs. However, 30 percent of the auditors and 24 percent of the SMEs claimed that tax compliance burden have the same weight under the two methods and answered neutral ("3).

Cost

For the purpose of this study, this is a categorical independent variable that was measured using Likert Scale "1"through "5", to answer the statement, "We consider the cost of preparing the financial statements in choosing between accrual and cash accounting". It is quantified as follows: 5-strongly agree; 4-agree; 3-neutral; 2-disagree; and 1-strongly disagree.

Twenty percent of the practitioners strongly disagreed (1) to the statement that cost of preparing financial statements is a factor in choosing between the two methods, and 18 percent of the SMEs validated the perspectives of the auditors. Forty percent of the external auditors disagreed (2) to the statement while thirty percent of them answered neutral (3), which means that to them, cost may or may not be a factor that influence the choice of accounting method. Meanwhile, 76% of the SMEs disagreed (2) to the statement. The remaining ten percent of the external auditors agreed (4) that cost is a factor, which was corroborated by six percent of the sample SMEs.

Usefulness in Decision-Making

Sixty percent of the practitioners strongly agreed ("5") that usefulness in decision-making of the financial statements prepared is a factor that influenced their SME clients to choose between the two methods. Fifty-eight percent of the SMEs also strongly agreed ("5") to the statement. Thirty percent of the practitioners agreed ("4") and eighteen percent of the SMEs claimed the same. Ten percent of the practitioners whose clients use the cash method stated that their clients did not consider this variable in choosing the accounting method. Thus, they disagreed ("2"), which was validated by 24 percent of the SMEs.

Other Factors

The respondents were asked to specify other factors that are considered in choosing the accounting method applied. The practitioners consider the method that better reflects the true financial condition of their clients. They consider the method that applies the principle of proper recognition of income, and the principle of matching the revenue recognized with the expenses incurred for the period.

On the other hand, sample SMEs consider the method that is required by Bureau of Internal Revenue. In addition, SMEs consider the method that will be able to produce schedules that support the revenue during the period.

Applicability of the Accrual Method

The respondents were asked regarding the applicability of accrual method, as prescribed by GAAP. The following are the comments of the respondents:

From the Perspective of External Auditors

The accrual method is applicable to SME clients because: (a) it reflects better the true financial condition of the company; (b) clients need a real picture of the business to be used as a tool

in decision-making; (c) of complete monitoring of actual transaction of the business operation and for internal control purposes; (d) it reflects the net income for the period; (e) accrual gives a more accurate picture of the companies financial situation than cash method; (f) it is needed for financial reporting purposes; (g) of the nature of the business; (h) it captures correct charging of expenses at the period when revenue is earned; and (i) of the matching principle of cost and revenue.

Meanwhile, the accrual method is not applicable to SME clients because: (a) of tax purposes, as in Accrued Income already earned but not yet received, the client pays taxes on this income though not yet received; and (b) the client needs to withhold taxes on expenses recognized in the books, although accrued expenses can be part of allowable deductions even if not yet paid.

From the Perspective of SMEs

The accrual method is applicable to SMEs because: (a) it provides a more realistic and accurate analysis of how the company is performing; (b) it reflects the true financial condition of the firm; (c) it is mandatory; and (d) it is in accordance with accounting standards.

Meanwhile, the accrual method is not applicable to SMEs because of tax purposes.

CONCLUSION

From the limited data and results gathered, the following conclusions are drawn:

1. Some SMEs in Metro Manila do not adhere to accrual accounting as prescribed by GAAP.
2. Consistent with the previous studies, the factors that influence SMEs to adopt either accrual or cash accounting are the nature of business, convenience in record keeping, and usefulness in decision-making of the financial statements prepared under the chosen method.
3. In contrast to previous studies, complexity in reporting and disclosure requirements, tax compliance burden, and cost of preparing financial statements are not factors that influence SMEs to choose between accrual and cash accounting.

Results from the survey show that SME uses cash method if the firm is engaged in real estate, financing/pawnshop, real estate, restaurant and construction. On the other hand, accrual method is used when an entity is engaged in trading, printing, transportation, and manufacturing concerns like garments.

The objective of financial statements is to provide information that is useful to a wide range of users in making economic decisions. From the data gathered, cash accounting is used for tax

reporting purposes and accrual accounting is for financial reporting purposes. Some SMEs use cash method because they prepare financial statements primarily for tax authorities, rather than for investment and credit decision making.

In contrast, some SMEs rely on accrual accounting as the only source of information for management decision-making. Financial statements prepared under the accrual method are intended to meet the needs of investors, lenders, creditors, rating agencies, employees, customers, and others outside the business. The general-purpose financial statements serve the managers' needs by providing insights into the business's financial position, performance and cash flows.

Financial statements should be understandable, relevant, reliable, and comparable. Accrual accounting incorporates non-cash information such as revaluations, write-offs, the consumption of assets through depreciation, and pension liabilities. Accrual is based on the idea of accurately presenting a firm's earned income, that is, the actual economic results of its activities, not the cash result of its activities.

The researcher claims that cash-based information has the advantage of being relatively simple and readily verifiable. However, non-cash costs or revenues are not recorded. Non-cash accounts such as receivables and payables arising from the ordinary course of the business are not recorded. Hence, cash basis of accounting does not provide a complete financial picture of the SME the same way the accrual method does. Therefore, information provided under the cash method may not pass the qualitative characteristics of being relevant and reliable. Users of financial statements should be therefore careful in making economic decisions based on the information provided using cash accounting.

Accrual accounting, in contrast to limitations of cash accounting, meets the objectives of the financial statements for being reliable, relevant, understandable, and comparable.

Consequently, despite some difficulties argued by SMEs in using accrual method, they find more advantages in using this method than in the cash method, as evidenced by the 76 percent of the SMEs in this study that use the accrual method.

Therefore, the researcher posits that accrual accounting is more applicable than cash accounting for SMEs in Metro Manila. Hence, the provision of Section 2.33 of the Exposure Draft of IFRS for SMEs that requires the use of accrual basis of accounting is applicable to SMEs in Metro Manila.

RECOMMENDATION

Due to the limited number of observations in this study, regression analysis may not be implemented to test the hypotheses. Readers are cautioned to interpret the findings of this study in the light of this limitation. However, this paper presents a logistic model that will empirically test the hypotheses when provided with sufficient number of observations. This paper then suggests collection of more data and the use of the regression model for future researches.

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CHOICE OF INVENTORY COSTING METHOD OF SELECTED COMPANIES IN THE PHILIPPINES

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ABSTRACT

This study aims to determine whether companies in different industries in the Philippines use different ending inventory valuation methods. Data were gathered from 26 companies that are engaged in retailing or manufacturing nonfood products, drugs and medicines, food and beverages, fast-food outlets and gasoline trading. Descriptive and inferential statistical analyses were conducted to determine significant relationships between the nature of their businesses and the ending inventory valuation method used. The findings of the study revealed that companies whose inventories are subject to obsolescence or expiration, use first-in-first-out (FIFO); companies whose inventories are subject to deterioration use FIFO; companies whose inventories are varied and whose costs of acquiring inventories are unstable use weighted average.

INTRODUCTION

Inventory is defined as a detailed, itemized list, report, or record of things in one's possession, especially a periodic survey of all goods and materials in stock. Inventories are essential for merchandising and manufacturing businesses. Inventories are the life of the business. Inventories are necessary in order to generate sales and, in return, sales generate profit for the business.

Inventories of retail businesses include goods purchased in final form with the intention of reselling them. The inventories of manufacturing companies include raw materials, goods in process and finished goods. The purchase prices of goods and raw materials vary. Keeping up records of numerous purchases is tedious and identifying the cost of specific product or goods sold is cumbersome if not impossible for companies engaged in manufacturing or retailing. The cost of the inventory at the end of an accounting period is crucial because of its effect on the cost of goods sold and ultimately on the computation of profits. The lower the cost of ending inventory, the higher is the cost of goods sold, and vice versa. Higher cost of goods sold will result in lower gross profit and vice versa. Therefore, the choice of inventory costing method has a significant effect on reported income.

A company uses either the perpetual or periodic inventory method to keep track of their inventory. The valuation method used to estimate the cost of the ending inventory varies; namely, specific-identification, first-in-first-out (FIFO), last-in-first-out (LIFO), and weighted average or simple average.

The kind of inventory valuation method chosen to determine the costs of ending inventory is one of the basic decisions all companies engaged in the manufacture and distribution of goods needs to make. Ideally, the method chosen should result in the best measure of a company's income and financial condition. However, there is no one method that is always best for accomplishing these objectives, and in an environment of changing prices, assumptions as to the flow of costs affect reported income, balance sheet amounts, and associated ratios. (White, Sondhi & Fried, 2003). The costs of inventories sold affect the income statement, while the costs of the unsold inventories affect the balance sheet.

Many studies have been conducted and published regarding inventory costing methods used by companies in the United States and in Europe. Most of these studies focused on two inventory methods – FIFO and LIFO.

Cushing and LeClere (1992) conducted a study entitled "Evidence on the Determinants of Inventory Accounting Policy Choice." The study aimed to develop a model that predicts the choice of inventory system through a comparison of long-time FIFO users with long-time LIFO users. The study considered eight factors that potentially affect inventory cost, which are as follows: estimated tax savings, inventory materiality, average tax loss carry forward, inventory level variability, inventory obsolescence, firm size, leverage, and current ratio.

The authors studied a database from COMPUSTAT of 175 FIFO firms and 48 LIFO firms with respect to the eight above-mentioned factors. The results show that in contrast to LIFO-using firms, FIFO-using firms have statistically significant "lower estimated tax savings as a percentage of sales, have larger average tax loss carry forwards, have greater variability in inventory levels, are smaller, are more leveraged and have lower current ratios." FIFO-using firms appear to have greater risks of inventory obsolescence.

The authors further performed regression analysis that incorporated the eight factors to determine predictors of inventory costing choice among the firms. The results indicated that estimated tax savings, inventory obsolescence, current ratio, and firm size were the correct significant predictors of LIFO/FIFO accounting choice. The inventory materiality variable had an unexpected negative sign in the regression. The prediction that a company will use LIFO if it has high inventory level is incorrect.

The study also included a survey of financial executives to determine their rationale for adopting either FIFO or LIFO inventory valuation. The results of the survey showed that the primary reason for using FIFO was for tax savings. The other reasons for using FIFO were: it reflected the actual physical flow of goods, it provided a more accurate inventory valuation on the balance sheet, it was less complex than using LIFO, it was the required method in government contracts, fast turnover of new products, and because foreign subsidiaries were sometimes not allowed to use LIFO.

Cushing and LeClere (1992) concluded that both tax and non-tax considerations influenced the choice of an inventory costing system and that a predictive model for inventory costing choice was still elusive.

Another study on choices of inventory valuation method was conducted by Chung and Narasimhan (2003) entitled "An Empirical Analysis of the Inventory Accounting Methods of U.S. Multinational Companies: Segment Effects." The researchers gathered data from the 2001 U.S. Disclosure database and analyzed 209 multinational companies in the United States. The study incorporated as control variables in their model the ratio of inventory to current assets (INVCA) and measures of debt exposure (LEV). Also integrated in the model were capitalization of assets (CAP), which is measured as a ratio of fixed assets to total assets, and a size variable (SIZE), using total sales revenue reported by the company as a measure.

The results of the study indicated that multinational companies generally chose LIFO for their inventory valuation method. When the amount of inventory increased compared to current assets, companies were more likely to use non-LIFO methods. Companies were more likely to use LIFO when sales increased. Likewise, as the amount of capitalized costs in fixed assets increased, the likelihood that companies will choose LIFO decreased. Companies with large debts were also less likely to use LIFO.

Other studies include Dopuch and Pincus (1988), which examined the differences in accounting numbers and accounting ratios of users of LIFO and FIFO methods. The comparison was made based on amounts reported in their financial statements. The results showed that the choice of LIFO method was more related to tax savings. Hunt (1995) examined the choices of companies that either continued to use FIFO or switched to LIFO during the high inflation period of 1974 and 1975. His study revealed that firms with high levels of debt were more likely to switch to LIFO method to show decreasing income. Finally, Kuo (1993) examined the factors affecting the choice of inventory method in small companies in United States. He concluded that as the size of a company increased, as measured by total sales, it is more likely that the company would use LIFO, while an increase in the debt to equity ratio had an inverse effect. Companies would tend to choose an income increasing method when debt increased due probably to the covenants placed in their debt contracts.

This study will be different from the studies mentioned above. This study does not aim to come up with a predictive model for companies' choice of inventory costing method. Rather, the objective is to look at a particular industry in the Philippine setting and to determine the choice and the rationale behind the choice of inventory costing method used.

To date, no study has been made on the inventory costing methods commonly used by companies in the Philippines. This study will help address that gap in our knowledge. This study will also be relevant to the accounting profession as it will allow the Accounting Standard Council, Board of Accountancy, and Philippine Institute of Certified Public Accountants (PICPA) to initiate additional rules/standards on inventory costing methods. Likewise, government agencies such as the Bureau of Internal Revenue (BIR) and Security and Exchange Commission (SEC) can be guided by the findings in establishing rules/regulations towards standardizing inventory reporting systems for different industries in the Philippines. International accounting standards will also benefit from this

study. Rules and regulations on inventory evaluation methods currently being implemented may be reinforced by this study or reviewed for possible changes, as the case may be.

Inventory Costing Methods

Specific identification method is a common practice with certain big-ticket items such as automobiles and with unique items such as paintings, expensive jewelry, and custom-made furniture (Anthony, Hawkins, & Merchant, 2003). The number of inventory at the end is determined by actual count and the costs by existing record

The LIFO method assumes that the most recently purchased goods are sold first and that the oldest goods are in the ending inventory. The cost of goods sold is based on the cost of the most recent purchases, and the cost of the ending inventory is the cost of the oldest units available.
The FIFO method assumes that the oldest goods are sold first and that the most recently purchased goods are in the ending inventory. The cost of goods sold is likely to approximate the physical flow of the goods because most companies sell their oldest merchandise first. The ending inventory approximates the current cost of the goods, since it is the cost of the most recent purchases.
Average Cost method is the compromise between FIFO and LIFO methods. The average of the cost of goods available for sale is computed, and the units in both cost of goods sold and ending inventory are shown at this average cost. In the periodic inventory method this average is computed for the whole period. In the perpetual inventory method a new average is calculated after each purchase. In either case the average cost is representative of the cost of goods during the period at any given time.

Accounting Standards

The Financial Reporting Standards (FRSs) are standards and interpretations adopted by the Accounting Standard Council (ASC). They consist of: the Philippine Financial Reporting Standards (PFRSs), corresponding to International Financial Reporting Standards (IFRSs); the Philippine Accounting Standards (PASs), corresponding to International Accounting Standards (IASs); and interpretations. The Accounting Standard Council (ASC) approved in November 2004 the adoption of International Accounting Standard (IAS) 2, *Inventories,* issued by the International Accounting Standards Board (IASB) as one of the Philippine financial reporting standards.

The IAS no longer allows the LIFO method of inventory costing. Specifically, IAS No. 2, paragraph 25 states that "The cost of inventories…. shall be assigned by using the first-in, first-out (FIFO) method or weighted average cost formula. An entity shall use the same cost formula for all inventories having a similar nature and use to the entity. For inventories with a different nature or use, different cost formulas may be justified."

The IASB argued that the LIFO method treats the newest items of inventory as being sold first, and consequently the items remaining in inventory are recognized as if they were the oldest.

This is generally not a reliable representation of actual inventory flows. The use of LIFO in financial reporting is often tax-driven, because it resulted in costs of goods calculated using the most recent prices. The Board concluded that the LIFO method "reduces (increases) profits in a manner that tends to reflect that increased (decreased) prices would have on the cost of replacing inventories sold. However, this effect depends on the relationship between the prices of the most recent inventory acquisitions and the replacement cost at the end of the period. Thus, it is not truly a systematic method for determining the effect of changing prices on profits."

It must be pointed out that for financial reporting purposes, LIFO is no longer allowed in the Philippines. For tax purposes, a company can still use any of the four inventory costing methods. The Philippine Congress passes taxation legislation and no pronouncement on the use of or restrictions on inventory costing method has been made as of this time.

OBJECTIVES AND HYPOTHESES

The study's general aim is to determine the ending inventory costing methods being used by selected companies in the Philippines on the basis of their nature of business. Specifically, it seeks to answer the following hypotheses:

Ho: The use of LIFO in Philippine companies has no significant relationship with (or is independent of) saving taxes due to rising prices.

Ha: Philippine companies will use LIFO in times of rising prices to save on taxes.

Ho: There is no significant relationship between obsolescence of goods and LIFO as a choice of inventory method.

Ha: Companies whose inventories are subject to obsolescence or expiration use LIFO.

Ho: There is no significant relationship between perishability of goods and FIFO as a choice of inventory method.

Ha: Companies whose inventories are perishable use FIFO.

Ho: There is no significant relationship between variability of goods and weighted average as a choice of inventory method.

Ha: Companies whose inventories are varied use weighted average method.

Ho: There is no significant relationship between stability of cost of inventory and weighted average as a choice of inventory method.

Ha: Companies whose costs of acquiring inventories are not stable use weighted average method.

METHODOLOGY

The study used the descriptive-survey research method. This approach is appropriate because research sites have varied characteristics and conditions, which may differ among business firms. The method involves gathering of data first to prove the value of facts; and second, to focus attention on the most relevant information so that policy decisions can be arrived at scientifically. Data collection is from cross-sectional sample population to exemplify various companies using a particular type of inventory. Chi-square tests of independence were then conducted to determine if significant relationships exist between choice of inventory valuation and the industry these firms belong to.

Primary data were gathered from 26 companies. A list consisting of 161 companies listed in the Philippines Stock Exchange was initially used. The list was further limited to companies that are engaged in retailing or manufacturing nonfood products, drugs and medicines, food and beverages, fast-food outlets and gasoline. Out of 161 publicly listed companies only 22 firms qualified and only 13 companies out of the 22 agreed to be interviewed. The number of firms was doubled and the additional 13 firms were purposely selected due to time constraint. The additional firms were selected because of their location. Offices of these firms are in Metro Manila.

The respondents consist of Vice-Presidents for Finance, Controllers, Chief Accountants, managers, or warehouse supervisors who are knowledgeable in the inventory costing method used by the company. Only one respondent for each company was interviewed. Respondents were asked the kind of inventory costing methods their companies are currently using, and were also asked to elaborate on their choice and to give their rationale in using the method. The respondents requested that their names and the identity of their companies be withheld in this study.

The rationale in the choice of inventory costing method is influenced by the following factors:

1. Tax savings – the lower the cost of ending inventory, the higher is the cost of goods sold; therefore, the profit will be lower, likewise tax will be lower. In times of rising prices, LIFO will give a lower ending inventory.
2. Inventory obsolescence or subject to expiration – the tendency is for the buyers to purchase the most recent product. It is assumed that the ending inventory will be the cost of products purchased earlier or LIFO is applicable.
3. Inventory perishability – since goods are subject to spoilage, the seller will sell goods that were purchased or prepared earlier. It is assumed that the ending inventory will be the cost of the latest products purchased or FIFO inventory method is used by the seller.
4. Inventory variability – numerous inventories will make a company use the weighted average for easier recording and management.

5. Volatile acquisition cost of inventory or unstable prices will make a company use weighted average for easier recording.

The 26 respondent companies are grouped as follows:

Table 1

Respondents	No.	Type of Inventory	Expected Inventory Method
Companies Engaged in:			
Manufacturing (other than food)	4	Variable	Weighted average
Retailing	2	Obsolescence	LIFO
Food and Beverages	7	Perishable	FIFO
Fast-Food	5	Perishable	FIFO
Drugs and Medicine	4	Perishable	FIFO
Oil	4	Volatile Cost	Weighted average
Total	26		

One of the four companies engaged in manufacturing produces paper products, another is engaged in manufacturing footwear and sports apparel, another one manufactures beauty aids and personal care products, and the other company manufactures ceramics and other household fixtures. Since these products are variable, it is expected that the companies will use the weighted average method of costing their ending inventories.

One company engaged in retailing sells dry goods, while another retailing company is engaged in distributing medical devices, medical equipment, and other pharmaceutical products. These companies have products that are subject to obsolescence. Therefore, it is expected that the companies will use the LIFO inventory method.

Seven companies under food and beverage produce and/or retail agro-industrial products and commodity items like fruit juices, milk, ice cream, processed meat, flour, etc. Five companies are fast-food outlets that are commonly seen all over the country. These companies carry products that are highly perishable. It is expected that they will use FIFO in costing their ending inventory.

The companies classified under drugs and medicine manufacture pharmaceutical products, liquid and semi-liquid cosmetics, consumer healthcare products, and animal healthcare products. Drugs and medicines are subject to expiration. It is expected that these companies will also use the FIFO inventory method.

Finally, companies classified under "oil" are franchised gasoline outlets. This study will focus only on gasoline as their inventory. Prices of oil are volatile. The companies are expected to use the weighted average method.

RESULTS AND DISCUSSION

Table 2: Choices of Inventory Costing Method

Companies engaged in	LIFO	FIFO	WEIGHTED AVE.	TOTAL
Manufacturing (other than food)	0	4	0	4
Retailing	0	2	0	2
Food and Beverages	0	4	3	7
Fast-Food	0	3	2	5
Drugs and Medicine	0	2	2	4
Oil	0	1	3	4
Total	0	16	10	26
Percentage	0%	61.50%	38.50%	100%

Table 2 shows the actual inventory costing method used by the surveyed companies. Although companies in the Philippines are given the option to use any of the four inventory valuation methods for tax purposes, no company had chosen LIFO. The cost of maintaining two accounting methods outweighs the savings a company gets in using LIFO only for tax purposes and another method to comply with the financial accounting standards according to two respondents belonging to manufacturing.

From Table 2, it can be seen that 16 out of 26 companies or 61.5% use FIFO while 10 use the weighted average method. At least one company in every industry surveyed uses the FIFO method. Food and beverage companies, as well as fast food outlets, used FIFO more often than the weighted average method, while companies engaged in drugs and medicine are evenly split in using the two methods. A majority of oil companies uses the weighted-average method.

Unlike the literature previously reviewed, this study cannot conduct regression analysis as no metric data (tax savings, value of inventory, sales, etc.) were gathered. Instead, chi-square tests of independence, a non-parametric statistical tool, were conducted to determine significant relationships between industry and inventory valuation method.

The use of either FIFO or weighted average method, when cross-tabulated with the companies' nature of businesses, yielded a chi-square statistic of 6.2934 which is less than the chi-square critical values of 9.236 and 11.071 at 10% and 5% levels of significance, respectively (at 5 degrees of freedom). Therefore, the null hypothesis that choice of inventory valuation is independent of the industry the companies belong to cannot be rejected, and it must be concluded that the choice of ending inventory valuation is not affected or dictated by the company's nature of business. The two variables appear to be independent of each other. (For the computation of this and succeeding chi-square values, see Appendix 1.)

Next, the study investigated whether the type of inventory is significantly related to a company's industry when choosing FIFO. Table 3 below presents the breakdown of 16 companies which chose FIFO as to their industry and type of inventory:

Table 3

	Choice of FIFO	Inventory Costing Method			
	Method	Rationale			
Companies Engaged in:	Weighted average	Obsolescence/ Expire	Perishable	Variable	Unstable Cost
Manufacturing (other than food)	4	2	0	2	0
Retailing	2	1	0	1	0
Food and Beverages	4	0	4	0	0
Fast-Food	3	0	3	0	0
Drugs and Medicine	2	0	2	0	0
Oil	1	0	0	0	1
Total	16	3	9	3	1
Percentage	100%	18.75%	56.25%	18.75%	6.25%

Companies consider perishability (56.2%) of their inventories as the major reason in choosing the FIFO inventory method, followed by variability and obsolescence (18.75% each). A small percentage (6.2%) considers unstable cost of acquiring their inventories in choosing FIFO.

Companies engaged in food, drugs and medicine consider perishability or life of their products as the main reason in considering FIFO. This is not surprising since their products are mostly consumables and are highly susceptible to spoilage. The companies believe that this method will match the actual flow of goods from the warehouse to the stores. They further maintain that FIFO provides the most accurate estimate of the costs of ending inventories

Businesses engaged in manufacturing, retailing and distribution of goods are divided between obsolescence and variability of their inventories as their rationale in choosing FIFO. These companies rely on fashion or fad or whims of the customers that make their products vulnerable to fast changes. The products they sell are highly seasonal. These types of goods are also subject to stiff competition. They feel that they are motivated by changes to sell faster and forecast the buyers' needs on time. These companies sell their earliest goods as soon as possible; otherwise, they suffer losses due to obsolescence. Accordingly, these companies do not think that they have huge inventories that are out of fashion or are obsolete because of technical changes. They believe that FIFO method will reflect the current costs of their ending inventories.

One oil company believes that FIFO reflects the true value of its ending inventory. This company, however, is contemplating a shift to the weighted average method since the price of oil is unstable.

Chi-square tests of independence on these 16 FIFO companies indicate that there exists a significant relationship between nature of business (or industry) and the reason for choosing FIFO (or type of inventory). The chi-square statistic of 32 is greater than the critical values of 22.307 and 24.996 at the 10% and 5% levels of significance at 15 degrees of freedom. At both levels of significance, we reject the null hypothesis of independence. The reason for choosing FIFO is dependent on one's industry.

Table 4 below shows the breakdown of the 10 companies which chose the weighted average method of inventory valuation, organized according to industry:

Table 4: Choice of Weighted Average Inventory Costing Method

	Method	Rationale			
Companies Engaged in:	Weighted average	Obsolescence/ Expire	Perishable	Variable	Unstable Cost
Manufacturing (other than food)	0	0	0	0	0
Retailing	0	0	0	0	0
Food and Beverages	3	0	1	0	2
Fast-Food	2	0	1	0	1
Drugs and Medicine	2	0	0	2	0
Oil	3	0	0	0	3
Total	10	0	2	2	6
Percentage	100%	0	20%	20%	60%

Majority of the companies consider unstable cost (60%) in acquiring their inventories as the major reason in choosing the weighted average method. During times when acquisition costs are uncertain this method is much simpler and safer to estimate ending inventory. Weighted average method will neither overestimate nor underestimate net income. Twenty percent use the weighted average method due to perishability of goods and another 20% due to variability of their products.

Food and beverage companies consider the perishability of their products and fluctuation of costs in acquiring food products in choosing weighted average. This is the most practical approach for food-related businesses because of the nature of their products.

Drug and medicine companies believe that weighted average is more convenient to use than any of the other methods, given that their products are made out of numerous raw materials.

Oil companies use weighted average because this is the most convenient method in times when there is uncertainty or instability in the price of oil. Inventories are adjusted every month

because of large sales volume. Also, oil companies suffer losses in the process of delivery and pumping of oil. Losses are easier to compute using the weighted average method.

The chi-square tests on the ten companies that chose weighted average is significant at the 10% level (chi sq. = 12.222, critical value = 10.645, df = 6), but not at the 5% level (critical value = 12.592). Therefore, care must be taken before interpreting the relationship between industry and the use of the weighted average method.

SUMMARY OF FINDINGS

No company uses the LIFO method to save on taxes. Therefore, companies are in compliance with the IAS in the costing of their inventories.

Companies engaged in manufacturing, retailing or distributing merchandise use FIFO; majority of the companies engaged in food and beverage are using FIFO; companies engaged in drugs and medicine use either FIFO or weighted average; and most oil companies use the weighted average method.

Companies whose inventories are subject to obsolescence or expiration use the FIFO. Companies whose inventories are subject to deterioration or are easily perishable also use the FIFO.

Companies whose inventories are varied use either FIFO or weighted average method. Most companies whose costs of acquiring inventories are not stable use the weighted average method.

CONCLUSION

Companies' preferred inventory methods vary based on the type of goods that they manufacture and/or market. Obsolescence, perishability of merchandise, variability of merchandise and unstable acquisition costs of inventory are the reasons considered by companies in choosing the type of inventory costing method they use. Companies do not consider tax savings in choosing the type of inventory costing they use.

Since none of the surveyed companies are using LIFO, no conclusions can be made concerning the first two hypotheses of this study. But on the third hypothesis, we have established that a significant relationship exists between FIFO users and the perishable nature of their inventory (reject the null, accept the alternative hypothesis). Companies whose inventory is perishable are more likely to use the FIFO system. Similarly, where hypotheses four and five are concerned, it was established that there is a significant relationships between the nature of inventories and the use of the weighted average system. Tests show that at 10% significance, the null hypothesis has to be rejected and it must be concluded that companies with variable and unstable cost inventory are more likely to use the weighted average method of ending inventory valuation. These conclusions, however, cannot be maintained at the 5% level of significance.

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APPENDIX: CHI-SQUARE TABLES

1. INDUSTRY VS. INV. METHOD

	FIFO	W. AVE.	TOTAL	FIFO	W. AVE.	FIFO	W. AVE.	
MANUFACTURING	4	0	4	2.461538462	1.538461538	0.961538462	1.538461538	
RETAIL	2	0	2	1.230769231	0.769230769	0.480769231	0.769230769	
FOOD & BEVERAGE	4	3	7	4.307692308	2.692307692	0.021978022	0.035164835	6.293392857

1. INDUSTRY VS. INV. METHOD

	FIFO	W. AVE.	TOTAL	FIFO	W. AVE.	FIFO	W. AVE.	
FAST FOOD	3	2	5	3.076923077	1.923076923	0.001923077	0.003076923	
DRUGS/MEDICINE	2	2	4	2.461538462	1.538461538	0.086538462	0.138461538	
OIL	1	3	4	2.461538462	1.538461538	0.867788462	1.388461538	
TOTAL	16	10	26					

2. FIFO VS. REASON

	OBS.	PERISHABLE	VAR.	UNSTB.	TOTAL	OBS.	PERISHABLE	VAR.	UNSTB.	OBS.	PERISHABLE	VAR.	UNSTB.
MANUFACTURING	2	0	2	0	4	0.75	2.25	0.75	0.25	2.083333333	2.25	2.083333333	0.25
RETAIL	1	0	1	0	2	0.375	1.125	0.375	0.125	1.041666667	1.125	1.041666667	0.125
FOOD & BEVERAGE	0	4	0	0	4	0.75	2.25	0.75	0.25	0.75	1.361111111	0.75	0.25
FAST FOOD	0	3	0	0	3	0.5625	1.6875	0.5625	0.1875	0.5625	1.020833333	0.5625	0.1875

2. FIFO VS. REASON

	OBS.	PERISHABLE	VAR.	UNSTB.	TOTAL	OBS.	PERISHABLE	VAR.	UNSTB.	OBS.	PERISHABLE	VAR.	UNSTB.
DRUGS/MEDICINE	0	2	0	0	2	0.375	1.125	0.375	0.125	0.375	0.6805 55556	0.375	0.125
OIL	0	0	0	1	1	0.1875	0.5625	0.1875	0.0625	0.1875	0.5625	0.1875	14.062 5
TOTAL	3	9	3	1	16								

3. WEIGHTED AVERAGE VS. REASON

	PERISHABLE	VAR.	UNSTB.	TOTAL		PERISHABLE	VAR.	UNSTB.		PERISHABLE	VAR.	UNSTB.	
FOOD & BEVERAGE	1	0	2	3		0.6	0.6	1.8		0.2666 66667	0.6	0.02222 2222	
FAST FOOD	1	0	1	2		0.4	0.4	1.2		0.9	0.4	0.03333 3333	
DRUGS/MEDICINE	0	2	0	2		0.4	0.4	1.2		0.4	6.4	1.2	12.222 22222
OIL	0	0	3	3		0.6	0.6	1.8		0.6	0.6	0.8	
TOTAL	2	2	6	10						2.1666 66667	8	2.05555 5556	

CHARACTERISTICS AND SKILLS OF IMPLEMENTING AN ERP SYSTEM IN THE GUAM PUBLIC SECTOR

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ABSTRACT

Enterprise Resource Planning (ERP) systems have been around since the 1980s, and their purpose is to provide for two or more functions to work together. Implementing an ERP system is a difficult task, and if not implemented correctly may use up many of the organization's resources. As an organization implements an ERP system, there are several issues that must be considered for a successful implementation. The purpose of this study was to identify which factors are associated with the successful implementation of an enterprise resource planning system in the government of Guam. Given that most of the data are categorical, univariate linear regressions tests were conducted to establish a predictive relationship between the variables and further analyses were done to test the significance of the correlations using a 0.05 level of significance. The findings revealed that characteristics identified as being associated with the successful implementation of the enterprise resource planning system in the public sector are (a) project team that is knowledgeable and skillful, the project team's ability to manage the change process of the ERP project, the project team's awareness of, and their ability to deal with employee's reactions to the ERP project; (b) the project's clearly defined scope; (c) employee's perception of the project team's support; and (d) confident end users with skills regarding the effective training and technological preparedness.

INTRODUCTION

This study identified the benefits of implementing an Enterprise Resource Planning (ERP) system in the public sector. Some benefits in implementing an ERP system in the public sector would include lower operational costs, timely reporting of financial statements, and easier access to reliable information. These ERP systems became popular during the 1990s (Chen, 2001) but have changed over the years. Vendors continue to address end user issues; one of the major issues that end users face is incompatibility with their existing systems. Organizations do not necessarily purchase all their ERP modules from one vendor, instead, often using several vendors to interface with their existing information system, depending on the module implemented. The primary purpose of ERP is to combine an integrated database, code set, and user interface to tie together essential corporate information and business processes.

ERP systems consist of several integrated suites of software modules that share common data and provide connectivity. Once the data has been recorded, it is available for all the organization's divisions (Adam & Sammon, 2004; Chen, 2001; Sankar, 2006; Tuteja, 2005). According to Nicolaou (2004), the performance of an ERP system may be influenced by how well a firm manages its implementation process. With the frequent introduction of new technologies over the years, vendors are now able to provide ERP systems to the public sector, even though the public sector has limited resources compared to the private sector. There is limited research studies conducted in the public sector. Hence, this present study was conducted to fill the gap in the literature.

Hence, this study focused on the implementation of an ERP system with the Guam governmental financial system. Since the government is not in the business of making a profit, the resources in this environment are very limited.

Most studies have focused on the private sector, such as manufacturing companies, Fortune 500 companies, S&P companies, and other types of firms in the business industry. Harrison (2004) conducted a study that described the implementation of an ERP system comparing the public and private sector organizations. Harrison's study of public and private sectors in North America revealed that the benefits of implementing an ERP system were the ability to access reliable information and redesign the business process. The participants of this study were from private and public organizations who implemented the SAP software.

Fisher (2002) conducted a study that focused on the factors that affected ERP implementation. Her study revealed that some of the barriers to the ERP implementation improper training of employees and faulty monitoring of the information received when developing the application management strategy, application errors, and outage repairs of an application. Fisher (2002) identified one of the successes in implementing an ERP system as the change process. The participants from this study came from Fortune 500 companies and S&P 500 companies.

Jean-Baptiste (2006) conducted a study that addressed the role of accountants during the implementation and maintenance of an ERP system; and sought to find the characteristics, traits, and skills accountants must have to help them succeed in the implementation and maintenance of an ERP system. His study revealed that accountants play a key role in the implementation and maintenance of an ERP system and that accountants who possess technical or IT skills along with their financial expertise were involved in implementing an ERP system. The participants from this study were limited to members of the Institute of Management Accountants (IMA); only 3% of the participants came from the public sector.

METHODOLOGY

A quantitative survey was used to measure the perceptions and attitudes about the implementation of an ERP system. This survey was administered to members of the Association of Government Accountants (AGA), Guam Chapter. The AGA members consisted of individuals from the public sector. According to an AGA representative, there were 59 members that were currently

associated or have been associated with the State Government: 55 members who are currently with the state government and 4 members who formerly worked with the state government out of a total of 110 AGA members. Only members with experience in the public sector were used.

RESEARCH QUESTIONS

1. *What project team characteristics are associated with successful implementation of the ERP system in the public sector?*
2. *What project characteristics are associated with successful implementation of the ERP system in the public sector?*
3. *What employee's perceptions are associated with successful implementation of the ERP system in the public sector?*
4. *What learned skills are associated with successful implementation of the ERP system in the public sector?*
5. *What ERP vendor characteristics are associated with successful implementation of the ERP system in the public sector?*

DATA COLLECTION

The researcher used Web-based software for data collection. This Web-based software is called the SurveyMonkey that designed, collected and analyzed the data of this study. In order for the participants to access the survey instrument, a password was required. The researcher provided the password to the AGA organization who then forwarded it to the AGA members.

SURVEY INSTRUMENT

The survey instrument used for this study was partially based on the instrument used by Harrison (2004) in her dissertation study. Several of the questions were modified to fit the purpose of this study (i.e., public sector). Successful implementation was defined as the dependent variable and the remaining categories were defined as the independent variables. The survey instrument consists of the following:

1. Successful implementation
2. Project team characteristics
3. Project characteristics
4. Employee's perceptions
5. Skill set
6. ERP vendor support

Successful Implementation

Eight questions were used to measure perceived success. All items will be measured using a 5-point Likert-like scale: 1 (*strongly agree*) through 5 (*strongly disagree*). The sum of the scores represents the implementation measure.

1. The ERP system allows me to submit financial reports on time.
2. The ERP system allows me to produce better financial reports.
3. The ERP system allows me easier access to information.
4. The ERP system has eliminated redundant tasks.
5. The ERP system has improved internal communication.
6. The ERP system provides us with the necessary software to adapt easily to changes in the external environment.
7. The ERP system has improved relationships with our constituents.
8. The ERP system has improved relationships with other organizations we work with.

Project Team Characteristics

Six questions were used to measure this variable. All items will be measured using a 5-point Likert-like scale: 1 (*strongly agree*) through 5 (*strongly disagree*). Scores were summed to arrive at the project team measures:

1. The project team was knowledgeable about the ERP system.
2. The project team was knowledgeable about the government processes.
3. The project team had the skills to implement the ERP system.
4. The project team was aware of the employees' reactions to the ERP implementation project.
5. The project team was prepared to deal with the employees' reactions to the ERP implementation project.
6. The project team managed the change process successfully.

Project Characteristics

Three questions were used to measure the project's characteristics. All items were measured using a 5-point Likert-like scale: 1 (*strongly agree*) through 5 (*strongly disagree*). Scores were summed and the sum represents the project characteristics variable:

1. The project had a clearly defined scope.
2. The project was staffed adequately such that the project team was able to meet its required deadlines.
3. The project timetable was reasonable.

Employee's Perceptions

Six questions were used to measure employees' characteristics. All items were measured using a 5-point Likert-like scale: 1 (*strongly agree*) through 5 (*strongly disagree*). The sum of the scores represents the employee's perceptions measure:

1. During the implementation process, the project team dealt with our apprehensions about the ERP project adequately.
2. During the implementation process, the project team answered our questions about the ERP project adequately.
3. During the implementation process, I believed that spending time to learn to use the new ERP system would be advantageous for me.
4. During the implementation process, I was willing to learn the skills needed to use the new ERP system correctly.
5. During the implementation process, I was willing to practice my newly learned skills in order to use the new ERP system correctly.
6. During the implementation process, I was committed to putting in the hours to learn to use the new ERP system.

Skill Set

Three questions were used to measure this variable. All items were measured using a 5-point Likert-like scale: 1 (*strongly agree*) through 5 (*strongly disagree*). The sum of the 3 items represents the skill set measure:

1. The end users were effectively trained to use the new ERP system efficiently.
2. The end users were technologically prepared to use the new ERP system efficiently.
3. The end users were confident enough to use the new ERP system efficiently.

ERP Vendor Support

Three questions were used to measure ERP vendor support. All items were measured using a 5-point Likert-like scale: 1 (*strongly agree*) through 5 (*strongly disagree*). The sum of the three items represents the ERP vendor support measure.

1. The ERP vendor was involved during the implementation process.
2. The ERP vendor modified the software package to meet my agency/department needs.
3. The ERP vendor was available for technological support.

DATA ANALYSIS

AGA members will be used in this study and the researcher will use Social Sciences for Windows (SPSS) software to conduct the data analysis.

In order to analyze the successful implementation, the frequencies of strongly agree to strongly disagree was used to analyze these questions. Descriptive statistics was used to analyze these questions regarding successful implementation. The sum of the scores represents the successful implementation measure and identified as the dependent variable.

In order to analyze the first research question, the frequencies of strongly agree to strongly disagree was used to analyze these questions. Descriptive statistics was used to analyze these questions regarding project manager characteristics. The sum of the scores represents the project manager characteristics and identified as an independent variable.

In order to analyze the second research question, the frequencies of strongly agree to strongly disagree was used to analyze these questions. Descriptive statistics was used to analyze these questions regarding project characteristics. The sum of the scores represents the project and identified as an independent variable.

In order to analyze the third research question, the frequencies of strongly agree to strongly disagree was used to analyze these questions. Descriptive statistics was used to analyze these questions of employee's perceptions. The sum of the scores represents employee's perceptions and identified as an independent variable.

In order to analyze the fourth research question, the frequencies of strongly agree to strongly disagree was used to analyze these questions. Descriptive statistics was used to analyze these questions regarding skill set. The sum of the scores represents the skill set and identified as an independent variable.

In order to analyze the fifth research question, the frequencies of strongly agree to strongly disagree was used to analyze these questions. Descriptive statistics was used to analyze these questions regarding ERP vendor characteristics. The sum of the scores represents the ERP vendor characteristics and identified as an independent variable.

Hypothesis

The following hypotheses were tested in the study:

$H_1 0$: *A project team that is knowledgeable and skillful will not be associated with successful implementation of the ERP system.*

$H_1 a$: *A project team that is knowledgeable and skillful will be associated with successful implementation of the ERP system.*

$H_2 0$: *A project team that manages the change process well will not be associated with successful implementation of the ERP system.*

$H_2 a$: *A project team that manages the change process well will be associated with successful implementation of the ERP system.*

$H_3 0$: *A project team that is aware of and prepared to deal with employees' reactions to the ERP project will not be associated with successful implementation of the ERP system.*

$H_3 a$: *A project team that is aware of and prepared to deal with employees' reactions to the ERP project will be associated with successful implementation of the ERP system.*

$H_4 0$: *A clearly defined project will not be associated with successful implementation of the ERP system.*

$H_4 a$: *A clearly defined project will be associated with successful implementation of the ERP system.*

$H_5 0$: *Employees perceive the Project Team's support will not be associated with successful implementation of the ERP system.*

$H_5 a$: *Employees perceive the Project Team's support will be associated with successful implementation of the ERP system.*

$H_6 0$: *Employee's perceptions regarding the development of own skills, time and commitment will not be associated with successful implementation of the ERP system.*

$H_6 a$: *Employee's perceptions regarding the development of own skills, time and commitment will be associated with successful implementation of the ERP system.*

$H_7 0$: *A confident group of end users will not be associated with successful implementation of the ERP system.*

$H_7 a$: *A confident group of end users will be associated with successful implementation of the ERP system.*

$H_8 0$: *A skillful (effective training and technological preparedness) group of end users will not be associated with successful implementation of the ERP system.*

$H_8 a$: *A skillful (effective training and technological preparedness) group of end users will be associated with successful implementation of the ERP system.*

$H_9 0$: *An ERP vendor that was involved and available during the implementation process will not be associated with successful implementation of the ERP system.*

$H_9 a$: *An ERP vendor that was involved and available during the implementation process will be associated with successful implementation of the ERP system.*

Research Question 1

What project team characteristics are associated with successful implementation of the ERP system in the public sector?

To analyze this, the following hypotheses were tested regarding project team's knowledge and skill; management of the change process and employees reactions to the project:

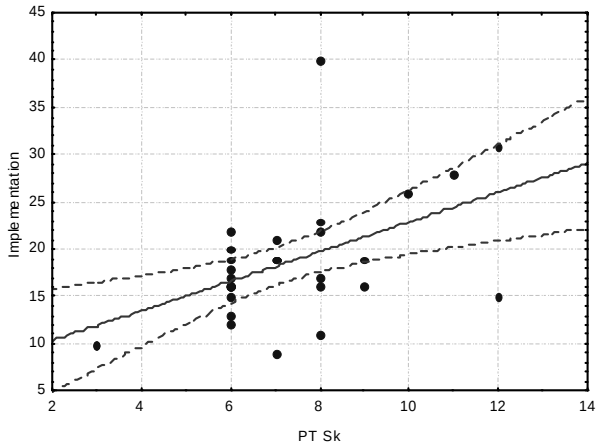
Hypothesis 1

$H_1$0: A project team that is knowledgeable and skillful will not be associated with successful implementation of the ERP system.

H_1a: A project team that is knowledgeable and skillful will be associated with successful implementation of the ERP system.

The diagram shows that there is a positive correlation (r = 0.5104) between successful implementation and the project team's skills and knowledge.

Figure 1: Successfulness of Implementation of ERP system given the skills and knowledge of the Project Team.



General linear regression analysis reveals that project team's skills and knowledge is a significant predictor for successful implementation ($F_{(1;30)} = 10.57008$; $p = 0.0028$) at the 0.05 level of significance, thus the null hypothesis will be rejected in favor of the alternate hypothesis at the 0.05 level of significance.

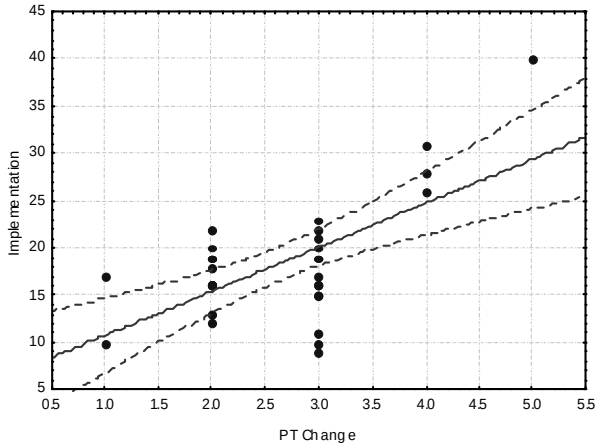
Hypothesis 2

$H_2$0: A project team that manages the change process well will not be associated with successful implementation of the ERP system.

H_2a: A project team that manages the change process well will be associated with successful implementation of the ERP system.

The diagram shows that there is a positive correlation (r = 0.6344) between successful implementation and the project team's ability to manage the change process of the ERP project.

Figure 2: Successfulness of Implementation of ERP system given the Project Team's ability to manage the change process of the ERP project.



General linear regression analysis reveals that project team's ability to manage the change process of the ERP project is a significant predictor for successful implementation ($F_{(1;\ 30)}$ = 20.20181; p = 0.0001) at the 0.05 level of significance, thus the null hypothesis will be rejected in favor of the alternate hypothesis at the 0.05 level of significance.

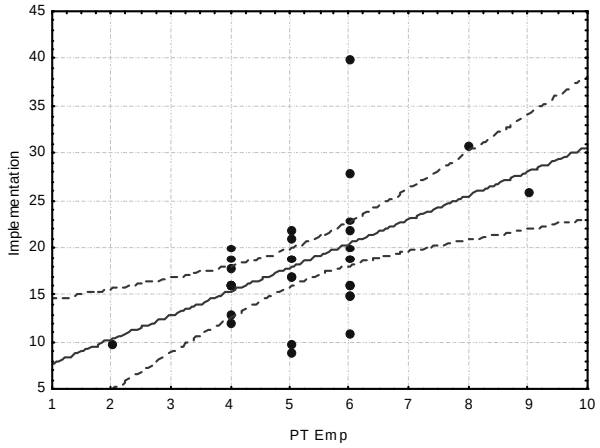
Hypothesis 3

$H_3$0: A project team that is aware of and prepared to deal with employees' reactions to the ERP project will not be associated with successful implementation of the ERP system.

H_3a: A project team that is aware of and prepared to deal with employees' reactions to the ERP project will be associated with successful implementation of the ERP system.

The diagram shows that there is a positive correlation (r = 0.5246) between successful implementation and the project team's awareness of, and their ability to deal with employee's reactions to the ERP project.

Figure 3: Successfulness of Implementation of ERP system given the Project Team's awareness of nd their ability to deal with Employees' reactions to the ERP project.



General linear regression analysis reveals that project team's awareness of, and their ability to deal with employee's reactions to the ERP project is a significant predictor for successful implementation ($F_{(1;\ 30)}$ = 11.38848; p = 0.0021) at the 0.05 level of significance, thus the null hypothesis will be rejected in favor of the alternate hypothesis at the 0.05 level of significance.

Findings Across the Subjects

The main characteristics identified as significant predictors for the success of implementation of the ERP system and government processes are a project team that is knowledgeable and skillful; the project team's ability to manage the change process of the ERP project and project team's awareness of, and their ability to deal with employee's reactions to the ERP project.

In general, regression tests show that the project team across all subjects play a significant role in the Successful Implementation of the ERP System ($F_{(1;\ 30)}$ = 9.727890; p = 0.0039) at the 0.05 level of significance.

Research Question 2

What project characteristics are associated with successful implementation of the ERP system in the public sector?

To analyze this, the following hypothesis was tested regarding project's clearly defined scope; a reasonable timetable and adequate staff to meet the deadlines:

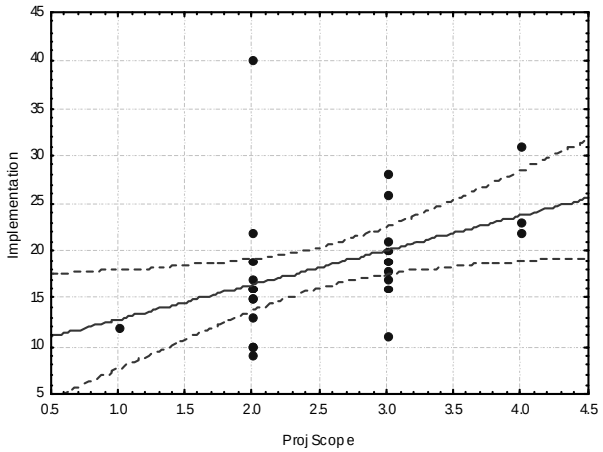
Hypothesis 4

$H_4 0$: *A clearly defined project will not be associated with successful implementation of the ERP system.*

$H_4 a$: *A clearly defined project will be associated with successful implementation of the ERP system.*

The diagram shows that there is a positive correlation (r = 0.4083) between successful implementation and the project's clearly defined scope.

Figure 4: Successfulness of Implementation of ERP system given the Project's clearly defined scope.



General linear regression analysis reveals that project's clearly defined scope is a significant predictor for successful implementation ($F_{(1;\ 30)}$ = 6.002045; p = 0.0203) at the 0.05 level of significance, thus the null hypothesis will be rejected in favor of the alternate hypothesis at the 0.05 level of significance.

Research Question 3

What employee's perceptions are associated with successful implementation of the ERP system in the public sector?

To analyze this, the following hypotheses were tested regarding the how the employees perceived the project team to have been adequately supportive with regard to dealing with apprehensions and answering questions about the ERP system, and also the amount of time and effort they perceive to be required to operate the ERP system efficiently:

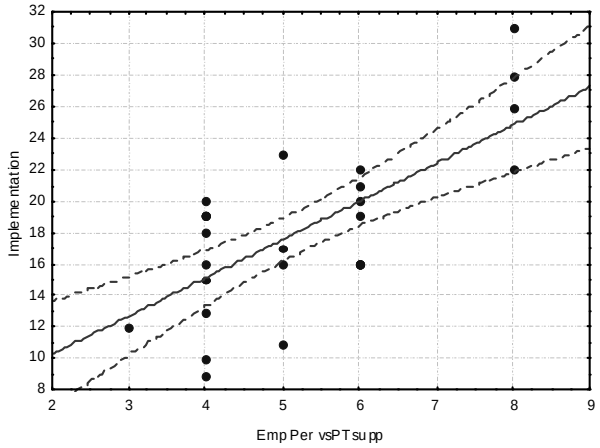
Hypothesis 5

$H_5 0$: *Employees perceive the Project Team's support not be associated with successful implementation of the ERP system.*

$H_5 a$: *Employees perceive the Project Team's support will be associated with successful implementation of the ERP system.*

The diagram shows that there is a positive correlation (r = 0.6984) between successful implementation and the employee's perception of the project team's support

Figure 5: Successfulness of Implementation of ERP system given the Employee's perception of the Project Team's support.



General linear regression analysis reveals that employee's perception of the project team's support is a significant predictor for successful implementation ($F_{(1;28)} = 26.66471$; $p = 0.00002$)

at the 0.05 level of significance, thus the null hypothesis will be rejected in favor of the alternate hypothesis at the 0.05 level of significance.

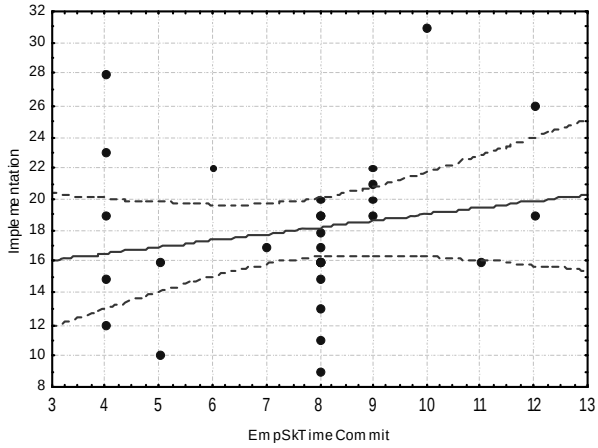
Hypothesis 6

$H_6$0: Employee's perceptions regarding the development of own skills, time and commitment will not be associated with successful implementation of the ERP system.

H_6a: Employee's perceptions regarding the development of own skills, time and commitment will be associated with successful implementation of the ERP system.

The correlation between employee's perceptions regarding the development of own skills, time and commitment associated with successful implementation of the ERP system was not significant (r = 0.1898) at the 0.05 level of significance.

Figure 6: Successfulness of Implementation of ERP system given the Employee's perceptions regarding the development of their own skills and their willingness to spend time, and commit, to learning how to use the ERP system



General linear regression analysis reveals that employee's perceptions regarding the development of their own skills and their willingness to spend time, and commit, to learning how to use the ERP system is not a significant predictor for successful implementation ($F_{(1;28)}$ = 1.04634; p = 0.31511), thus the null hypothesis will not be rejected at the 0.05 level of significance.

Findings Across the Subjects

Employee's perceptions regarding the development of their own skills and their willingness to spend time, and commit, to learning how to use the ERP system was not a significant predictor for the success of the implementation, but their perception of project team's support was significant.

In general, regression tests show that the employee's perceptions across all subjects play a significant role in the successful implementation of the ERP system ($F_{(1;28)} = 8.123531$; $p = 0.0081$) at the 0.05 level of significance.

Research Question 4

What learned skills are associated with successful implementation of the ERP system in the public sector?

To analyze this, the following hypotheses were tested regarding the how end users with skills regarding the effective training and technological preparedness of end users; and their confidence to operate the ERP system efficiently:

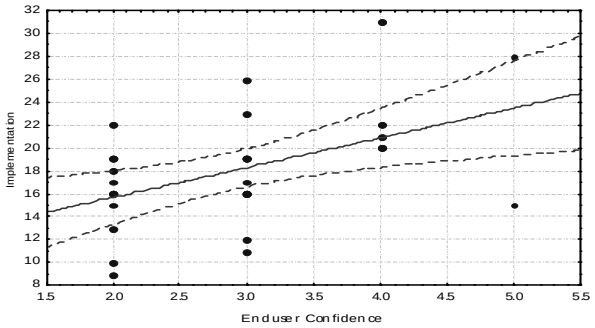
Hypothesis 7

H_70: A confident group of end users will not be associated with successful implementation of the ERP system.

H_7a: A confident group of end users will be associated with successful implementation of the ERP system.

This diagram shows a significant correlation ($r = 0.4837$, $p = 0.0068$) between confident end users and successful implementation.

Figure 7: Successfulness of Implementation of ERP system given a confident group of End Users.



General linear regression analysis reveals that a confident group of end users is a significant predictor for successful implementation ($F_{(1; 28)} = 8.55234$; $p = 0.0068$) at the 0.05 level of significance, thus the null hypothesis will be rejected in favor of the alternate hypothesis at the 0.05 level of significance.

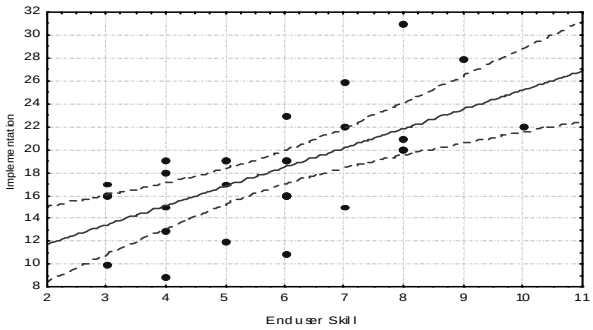
Hypothesis 8

$H_8$0: A skillful (effective training and technological preparedness) group of end users will not be associated with the successful implementation of the ERP system.

H_8a: A skillful (effective training and technological preparedness) group of end users will be associated with the successful implementation of the ERP system.

This diagram shows a significant correlation ($r = 0.6364$, $p = 0.0002$) between a skillful (effective training and technological preparedness) group of end users and successful implementation.

Figure 8: Successfulness of Implementation of ERP system given a skillful group of End Users.



General linear regression analysis reveals that a skillful (effective training and technological preparedness) group of end users is a significant predictor for successful implementation ($F_{(1; 28)} = 19.05951$; $p = 0.00016$) at the 0.05 level of significance, thus the null hypothesis will be rejected in favor of the alternate hypothesis at the 0.05 level of significance.

Findings Across the Subjects

Confident end users with skills regarding the effective training and technological preparedness are significant predictors for the successful implementation of the ERP system.

In general, regression tests show that the skillful and confident end users play a significant role in the successful implementation of the ERP system ($F_{(1;28)} = 16.90624$; $p = 0.00031$) at the 0.05 level of significance.

Research Question 5

What ERP vendor characteristics are associated with successful implementation of the ERP system in the public sector?

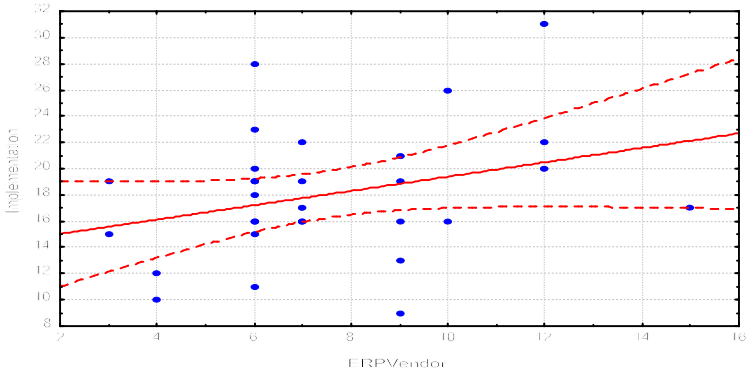
To analyze this, the following hypothesis was tested regarding the ERP vendor's involvement during the implementation process; modification of the software package to meet my agency/department needs and technological support:

Hypothesis 9

H_90: *An ERP vendor that was involved and available during the implementation process will not be associated with successful implementation of the ERP system.*

H_9a: *An ERP vendor that was involved and available during the implementation process will be associated with successful implementation of the ERP system.*

Figure 9: Successfulness of Implementation of ERP systems given a Vendor service.



The correlation between ERP vendor that was involved and available during the implementation process associated with successful implementation of the ERP system was not significant results ($r = 0.3107$) at the 0.05 level of significance. General linear regression analysis reveals that an ERP vendor that was involved and available during the implementation process is

not a significant predictor for Successful Implementation ($F_{(1;28)} = 2.99157$; $p = 0.0947$) at the 0.05 level of significance, thus the null hypothesis will not be rejected in favor of the alternate hypothesis at the 0.05 level of significance.

LIMITATION

This research study was limited to AGA members of the Guam chapter who worked with the Guam public sector. The total possible population of this study was 59 (100%) members at the time this study began, and of that population, 35 (59%) people chose to participate. Majority of the participants came from GPA, GWA, and OPA respectively. At the first opening of this study, a 45.8% (27) return rate was received. During the time of this study, the government of Guam was going through the modification of the current fiscal year budget as well as conducting its required annual independent audit. Most of the participants were from the accounting, finance, and budget department 83.3% (25) where they play an important role with the budget and independent audit process.

FINDINGS

The findings of this study are reported by the research question.

Research Question 1

"What project team characteristics are associated with successful implementation of the ERP system in the public sector?"

The main characteristics identified as significant predictors for the success of implementation of the ERP system and government processes are a project team that is knowledgeable and skillful; the project team's ability to manage the change process of the ERP project and project team's awareness of, and their ability to deal with employee's reactions to the ERP project. Jean-Baptiste's study also revealed that accountant contributes to the success of implementing an ERP system based on their skills. As the demographic revealed in this study, 83.3% (25) were from the accounting, finance or budget department. In general, regression tests show that project team across all subjects play a significant role in the successful implementation of the ERP system.

Research Question 2

"What project characteristics are associated with successful implementation of the ERP system in the public sector?"

There was a positive correlation ($r = 0.4083$) between successful implementation and the project's clearly defined scope. General linear regression analysis revealed that the project's clearly defined scope is a significant predictor for successful implementation of the ERP system.

Research Question 3

"What employee's perceptions are associated with successful implementation of the ERP system in the public sector?"

Employee's perceptions regarding the development of their own skills and their willingness to spend time, and commit, to learning how to use the ERP system was not a significant predictor for the success of the implementation, but their perceptions of project team's support was significant. This findings were opposite from Al-Sehali's study at which employee's proficiency in the computer field as well as adequate training for the new system were important for a successful implementation of an ERP system. In general, regression tests showed that the employee's perceptions across all subjects play a significant role in the successful implementation of the ERP system.

Research Question 4

"What learned skills are associated with successful implementation of the ERP system in the public sector?"

Confident end users with skills regarding the effective training and technological preparedness are significant predictors for the successful implementation of the ERP system. This is the same conclusion that Harrison (2004) revealed in her study. In general, regression tests show that the skillful and confident end users play a significant role in the successful implementation of the ERP system.

Research Question 5

"What ERP vendor characteristics are associated with successful implementation of the ERP system in the public sector?"

General linear regression analysis revealed that an ERP vendor that was involved and available during the implementation process is not a significant predictor for successful implementation.

SUMMARY OF FINDINGS

The main characteristics identified as significant predictors for the success of implementation of the ERP system and government processes were the project team that is knowledgeable and skillful; the project team's ability to manage the change process of the ERP project; the project team's awareness of, and their ability to deal with employee's reactions to the ERP project; the project's clearly defined scope; employee's perception of the project team's support; and confident end users with skills regarding the effective training and technological preparedness.

Characteristics that were not significant contributors to the success of the implementation system were employee's perceptions regarding the development of their own skills, their willingness to spend time and commitment to learning how to use the ERP system and an ERP vendor that was involved and available during the implementation. The statistical results have been summarized in Table 1.

Table 1: Summary of Statistical Results

Research Questions		Hypotheses	Logistic Regression		
			F-Statistic	$p < 0.05$	Result
1.	What project team characteristics are associated with successful implementation of the ERP system in the public sector?	$H_1 0$	$F_{(1;30)} = 10.57008$	0.0028	Reject Null Hypothesis
		$H_2 0$	$F_{(1;30)} = 20.20181$	0.0001	Reject Null Hypothesis
		$H_3 0$	$F_{(1;30)} = 11.38848$	0.0021	Reject Null Hypothesis
2.	What project characteristics are associated with successful implementation of the ERP system in the public sector?	$H_4 0$	$F_{(1;30)} = 6.002045$	0.0203	Reject Null Hypothesis
3.	What employee's perceptions are associated with successful implementation of the ERP system in the public sector?	$H_5 0$	$F_{(1;28)} = 26.66471$	0.00002	Reject Null Hypothesis
		$H_6 0$	$F_{(1;28)} = 1.04634$	0.31511	Accept Null Hypothesis
4.	What learned skills are associated with successful implementation of the ERP system in the public sector?	$H_7 0$	$F_{(1;28)} = 8.55234$	0.0068	Reject Null Hypothesis
		$H_8 0$	$F_{(1;28)} = 19.05951$	0.00016	Reject Null Hypothesis
5.	What ERP vendor characteristics are associated with successful implementation of the ERP system in the public sector?	$H_9 0$	$F_{(1;28)} = 2.99157$	0.0947	Accept Null Hypothesis

CONCLUSIONS

The main characteristics identified as significant predictors for the success of implementation of the ERP system and government processes were (a) the project team that is knowledgeable and skillful; the project team's ability to manage the change process of the ERP project; the project team's awareness of, and their ability to deal with employee's reactions to the ERP project; (b) the project's clearly defined scope; (c) employee's perception of the project team's support; and (d) confident end users with skills regarding the effective training and technological preparedness.

Characteristics that were not significant contributors to the success of the implementation system were (a) employee's perceptions regarding the development of their own skills, their willingness to spend time and commitment to learning how to use the ERP system, and (b) an ERP vendor that was involved and available during the implementation.

FUTURE RESEARCH RECOMMENDATIONS

The purpose of this study was to identify which factors are associated with the successful implementation of an ERP system in the Government of Guam. Based on the findings and conclusions, the researcher's suggestions for future research are as follows:

1. Conduct a study that compares ERP systems that uses the same basis of accounting method (i.e. modified accrual, accrual) in the public sector.
2. Conduct a study that compares different ERP system used within the same industry (i.e., utilities, healthcare, education, etc.) in the public sector environment to determine the successes of implementing an ERP system.
3. Conduct a study that compares the different types of implementation strategies used in the public sector in relation to the success of the ERP implementation.

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APPENDIX A: HYPOTHESIS SUMMARY			
Hypothesis	Description	Null Hypothesis	Alternate Hypothesis
1	A project team that is knowledgeable and skillful will be associated with successful implementation of the ERP system.	Rejected	Accepted
2	A project team that manages the change process well will be associated with successful implementation of the ERP system.	Rejected	Accepted
3	A project team that is aware of and prepared to deal with employees' reactions to the ERP project will be associated with successful implementation of the ERP system.	Rejected	Accepted
4	A clearly defined project will be associated with successful implementation of the ERP system.	Rejected	Accepted
5	Employees perceive the Project Team's support will be associated with successful implementation of the ERP system.	Rejected	Accepted
6	Employee's perceptions regarding the development of own skills, time and commitment will be associated with successful implementation of the ERP system.	Accepted	Rejected
7	A confident group of end users will be associated with successful implementation of the ERP system.	Rejected	Accepted
8	A skillful (effective training and technological preparedness) group of end users will be associated with successful implementation of the ERP system.	Rejected	Accepted
9	An ERP vendor that was involved and available during the implementation process will be associated with successful implementation of the ERP system.	Accepted	Rejected

AN INQUIRY INTO THE CHARACTERISTICS OF ENTREPRENEURSHIP IN INDIA

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ABSTRACT

We investigate the distinctive characteristics of entrepreneurship in India. Based on a review both prior literature on the factor sequences and consequences associated with entrepreneurship and evidence from India, we challenge the assumption that entrepreneurship is not supported by Indian culture; and lastly. Using process mapping methodology, we elaborate on the characteristics of five forms of entrepreneurship, by connecting their origins to historical phases. These phases include pre-1700 (Panchayati Raj), 1700-1950 (British Raj), 1950-1985 (License Raj), 1985-1995 (Jugaad Raj), and 1995-2010 (Invisible Raj). We also discuss the emerging role of women as "cultural entrepreneurs," being stewards of deep cultural knowledge.

INTRODUCTION

A recent hit Hindi film, "Chak De India," about a disgraced soccer star who returns to coach a diverse group of Indian women, and inspires them to win the World Cup, captures the pulse of a new India. The term "Chak De," which means "to pick up something that is down," is rural Punjabi slang used to encourage somebody to rise from adversity— it is a term that applies to the New India. This new India, like the coach in the film, has many inspiring figures— ones that have worked hard to achieve global success. There have been several architects of this new India – with five larger-than-life entrepreneurial leaders that are particularly notable.

Narayana Murthy is the famous entrepreneur icon who shaped India's IT boom. He was one of six founders who started Infosys with a $1000 investment, and turned it into a world-class company valued at $13 billion. He leads an unpretentious lifestyle in his modest residence.

Ratan Tata is the Chairman of the Tata Group, which was founded in 1859. Tata started. As head of the group since 1991, he has expanded the global reach of his family's business, with its revenues growing over sixfold to $25 billion. He is currently leading the charge to launch a car that will only cost $2500.

Lakshminiwas Mittal heads Mittal Steel, that his father Mohan started. Mittal has grown the family business's steel making facilities to fourteen countries, employing more than 150,000 people, and controlling 10% of world's steel production. Currently, the world's fifth wealthiest person, valued at $40+ billion, his daughter Vanisha's wedding in 2004 was the world's most expensive, at $55-million.

Azim Premji heads Wipro Technologies, and has transformed his father's fledgling vegetable oil business into one of the largest software companies in India. Forbes listed Premji as the richest person in India from 1999 to 2005, and his current wealth is $15 billion. He is a champion of universal primary education in India.

Mukesh Ambani heads Reliance Industries, which was founded by his visionary father Dhiru Bhai Ambani. Mukesh Ambani is now India's wealthiest person, valued at $50 billion. In 1981, he initiated Reliance's backward integration from textiles into polyester fibers and then into petrochemicals, creating 60 new, world-class manufacturing facilities and India's largest private sector firm. He then set up Reliance Telecomm - the world's largest and most complex information and communications technology venture. With the world's largest retail initiative, he is now "planning to remake India from its farms to its stores to its biggest cities."

In 1987, India had 1 billionaire entrepreneur, in 2007, Forbes counted 36, vs. Japan's 24. India's top entrepreneurs have taken their family businesses and startup businesses to global heights, and joined the elite company of the wealthiest and most influential in the world-- but they are not solely focused on their own success. Instead, these entrepreneurs work on bringing happiness and power to the grassroots level, with innovative business models. These models range from making all employees, including clerks, into millionaires by offering equity participation, to financing development initiatives in the rural areas, to developing world's cheapest cars, and to providing high quality products at street prices to the masses.

Though India's top entrepreneurs get the most ink in the international media, an even bigger story is quietly unfolding in the nooks and crannies of India. This bigger story is about grassroots and women entrepreneurs. It is a story that needs to be told, as it holds the potential to fundamentally transform the lives of the billions in this world.

THE STORY OF EMERGING INDIAN ENTREPRENEURSHIP

Over the past fifty years, we have seen the emergence of three major entrepreneurial paradigms in Asia – Japanese, Chinese and Indian. Based on anecdotal evidence, entrepreneurs in Japan, China, and India have pursued this opportunity in distinct manner. These pursuits may be loosely encapsulated into the following paradigms:

Japanese "discarded generation" paradigm: Japanese entrepreneurs took control of both peripheral physical and intellectual assets discarded by Western firms. In this endeavor, the entrepreneurs found opportunities for redeploying and repacking these assets into popular products. They then demonstrated how such products could be produced using peripheral assets, such as transplanting factories in Asia and other less attractive regions. The use of peripheral assets is depicted by the Japanese in the 1950s as they bought scrap steel from Western junkyards and reprocessed it in their mini steel plants. Later, during the 1980s, the Japanese partnered with US auto parts suppliers who were subject to huge bargaining pressures from US assemblers. In this

partnership, the Japanese transformed from being suppliers of basic functional vehicles to suppliers of augmented high end vehicles (Gupta, 1998)

Chinese "prior generation" paradigm: Chinese entrepreneurs took control of their previous generation's physical and intellectual assets, which had been transferred by Western firms. Specifically, several Western firms were transferring their older generation's assets into the consumer electronics, auto, and other sectors to China since the cost of losing intellectual property rights was relatively limited (Gupta & Wang, 2004). During this time, the entrepreneurs found opportunities for redeploying the assets more cost-effectively using a range of mass products. In discovering such opportunities, the entrepreneurs demonstrated astute negotiation for huge premiums from Western firms; these Western firms were seeking to acquire their share in the joint ventures, while wanting to give up their own share for a huge discount.

Indian "next generation" paradigm: Indian entrepreneurs are taking control of their current generation's physical and intellectual assets since Western firms are finding them costly to deploy. In this endeavor, the entrepreneurs are transforming the next generation's assets by making them accessible to even the grassroots markets. As Indian entrepreneurs make assets accessible a variety of markets, they are also examining how grassroots can serve global markets. They are discovering how grassroots can use their unique culturally-embedded knowledge, which, until now, has been invisible.

This use of culturally-embedded knowledge is exemplified in a Chicago Tribune article as it states "In farm sheds and machine shops and on small rural plots, India's back-yard inventors are coming up with creations that their backers hope will make it big, solve a few of the world's problems, boost India's exports and continue cutting the country's dismal poverty rate" (Goering, 2007). An example of these back-yard entrepreneurs is Conserve in New Delhi, which employs poor urban rag-pickers to collect, sort, weigh, and clean the plastic bags that litter the streets. The bags are melted together to create a thicker material. Since the bags come in all colors, different designs can be created using strips and cutouts of bags. This recycled trash is then turned into chic handbags that are sold for $50 in European boutiques. By tapping rag-pickers for their business, Conserve helps grassroots women earn three times what they previously made (World Resources Institute, 2007).

To understand this and other emerging forms of entrepreneurship in India, let's first review the literature on the parameters of entrepreneurship, and the evidence on India.

LITERATURE REVIEW

We may categorize the parameters of entrepreneurial literature into two groups. First, factor sequences, which is a theoretical list of personal traits that an entrepreneur ought to have. Second, factor consequences, which are the empirical outcomes of entrepreneurial functions.

Factor Sequences

Theoretically, entrepreneurship rests on three core factor sequences or personal traits. 1) Risk taking propensity (e.g. Cantillon, 1755); 2) achievement motivation (e.g. McClelland, 1961), and 3) human capital (e.g. Romer, 1991).

The first factor sequence is risk taking propensity. Cantillon, who was the first to define "entrepreneur," referred to the term as a specialist in risk-taking. For instance, workers receive an assured income (in the short run, at least), while entrepreneurs bear risks caused by price fluctuations in consumer markets (Cantillon, 1755). Later, Knight (1921) saw that the entrepreneur is able to both "lay off" risks based on knowledge of the market and absorb any uncertainty in exchange for profits.

Empirical studies of different Indian regions indicate that both male and female entrepreneurs in India score rather low on risk-taking propensity measures (Rutten, 2006). This low risk-taking propensity serves as an explanation for the historical preference in India for service ventures - which have lower initial capital outlays and shorter breakeven periods compared to the manufacturing ventures. The studies in the 1960s, notably Berna (1960), Hazlehurst (1966), and Fox (1969), link service preferences to the social origin of Indian entrepreneurs – the traditional Vaishya or trading community ethic.

However, subsequent studies in the 1970s, such as by Veen (1976), highlight the role of structural factors in India, including market imperfections for venture capital and the non-supporting institutional environment for industrial investments. Later, in the 1980s, other studies, including Chadha (1986) and Streefkerk (1985), documented how several artisans, such as blacksmiths, masons, and carpenters, set up small industrial workshops and gradually became industrial entrepreneurs. These studies discredited the assumption that a low risk-taking propensity is an impediment to industrial entrepreneurship in India. More recently, using data from the 62-society GLOBE study, Gupta, Surie and Macmillan (2004) conclude that risk-taking propensity is a cultural-specific entrepreneurship trait, not culturally universal.

The second factor sequence is achievement motivation. McClelland (1961) identified the "need for achievement" as key to entrepreneurship. He, particularly, noted that high achievers are motivated by an enduring desire to succeed and "to exploit opportunities, to take advantage of favorable trade conditions; in short, to shape his own destiny."

Early empirical studies indicated that Indian entrepreneurs have low levels of achievement motivation (McClelland & Winter, 1969). However, more recent studies show fairly high levels of achievement motivation among men entrepreneurs, while only medium level among women entrepreneurs (Shivani et. al., 2006). This disparity between men and women is exemplified in some early studies, which show that small group cohesiveness is far more common among Indian women than men; during this group cohesiveness, a highly respected informal female leader was more frequently present and women tended to be more assertive when denied fairness (James, 1962).

Rather than being only achievement motivated, women in India tend to also build and mobilize support networks for achieving success.

With respect to the temporal shifts, an important factor is the easing of structural restrictions, which began in the 1980s. In fact, a 2007 global survey of 17 nations by Swedish research and consulting firm Kairos Future (2007) reports that Indian youth (16-29 year olds) are the happiest in the world. For example, these youth strikingly exude more optimism about their future and their society's future. Additionally, work comes as top priority for Indian youth, followed by a good career and higher status; these priorities exemplify values of both endurance and entrepreneurship.

The third factor sequence is human capital. Many scholars note technical, human, and conceptual skills as critical to entrepreneurship (Nafziger & Terrell, 1996). However, others deem these characteristics as necessary, but not sufficient. For instance, Hosseini (1990) observes, "The… presence of the most able work force… can be of little use if the individuals are not sufficiently motivated to work hard."

Studies, including one by Leeuwen (2007), show that India lagged behind in human capital during the 20th century, making it difficult for entrepreneurs to adopt new technologies, and for politicians to support new technology-based entrepreneurship without causing social unrest. However, recent data indicate a fairly high level of human capital among men entrepreneurs in India, but only a low level among women entrepreneurs (Shivani et. al., 2006). This low level among women entrepreneurs in India may be associated with a lack mentors and role models to assist them with the acquisition of technical and conceptual skills.

Factor Consequences

Empirically, major consequences of entrepreneurship are innovativeness and growth (Schumpeter, 1934). Many scholars have mistakenly cited India's religion as an impediment to innovativeness and growth (e.g. Weber, 1905). They believe the caste system in India inhibits social mobility and Hindu spiritualism inhibits pursuit of material growth (Anstey, 1952; Morris, 1967). Many empirical studies also indicated a generally low level of innovativeness amongst both men and women entrepreneurs; exemplified by the fact that most entrepreneurs in India were less likely to develop new products or new production methods (Shivani et al, 2006).

A new study by Debroy and Bhandari (2007) has found that 52% of the workforce in India is self-employed. Indian entrepreneurship is thus helping to create new sources of income for even the poorest members of society. Between 1993 and 2004, the average income for the bottom 20% of the population grew by 10%. This is nearly at par with the 12% for the top 20% of the population in rural and urban areas. Both population strata have high rates of self-employment. However, although many areas of India are experiencing an income growth, fixed-income towns experience it the least.

Overall, many, such as Turner (2007), dismiss India's recent dynamism as a temporary phase. For instance, they attribute this dynamism to 1) the returning Indians who have held

leadership positions and/or have access to leading edge technology and exposure to global operations and 2) the US-born children of Indian immigrants leading the new generation of high tech entrepreneurs. Therefore, it would be fruitful to examine the origins of the various emerging forms of entrepreneurship in India.

METHODOLOGY

The long-term variations in entrepreneurial innovativeness are now recognized as a function of the nation's work culture system, including "the economic, political, legal, financial, logistical, and social structures that characterize a society" (Morris, 1998). Along with these structures, work culture system also includes the rules of the game that influence the allocation of entrepreneurial resources "between productive activities such as innovation and largely unproductive activities such as rent seeking or organized crime" (Baumol, 1990). In order to understand the varying forms of innovativeness, one ought to study the shifts in a nation's work culture system, including the rules of game, over time.

For understanding the origins of entrepreneurship, it is important to map the historical development of the rules of the game. A nation's work culture system during any period is not independent of the system in the prior periods. Rather, historical forces tend to have a cumulative and continuing effect on the subsequent rules of the game.

To add rigor to a historical study, process mapping is a useful method. According to the US Environmental Protection Agency (1999: 1), "process mapping is an approach to systematically analyzing a particular process. It involves mapping each individual step, or unit operation, undertaken in that process in chronological sequence. Once individual steps are identified, they can be analyzed in more detail."

We study India's work culture system over five historical phases, and demonstrate the significance of each of these periods on India's current emerging forms of entrepreneurship. These phases are termed as Panchayati Raj, British Raj, License Raj, Jugaad Raj, and Invisible Raj. Raj means rule, and each of these is associated with different rules of the game.

Phase I: Panchayati Raj (until 1700) - The primary unit of work culture system in India is the *panchayat*, which is the community of elders. Historically, the Panchayati Raj system germinated a crafts form of entrepreneurship as each village had different occupation-based community groups, all of which specialized in a particular class of crafts or services. The rural communities in India came to be the repositories of deeply embedded cross-generational craft insights. With these crafts came another important element of the Panchayati Raj--traders who specialized in the international markets. These traders paved the way for a future of global entrepreneurship.

In India today, numerous grassroots innovations are now being discovered under an initiative launched by Prof. Anil Gupta and India's National Innovation Foundation. Grassroots innovations are generally intended to reduce drudgery – the work often given to children and women, and to

empower the poor by solving their problems using the resources to which they already have access. The power of grassroots innovation is well depicted in the life of Jagani, a man who dropped out of his village's school at the age of 10 as a result of financial hardship. During this time, the bulls in his village had little fodder in a drought-affected region and the farmers worried how to cultivate their fields. Jagani hoped to help rectify his village's problems with the use of the powerful Enfield Bullet Motorcycle, which is a common sight in Indian villages. Specifically, Jagani modified the motorcycle by replacing the rear wheel with a $450 cultivating device that had attachments for tilling, weeding, and sowing. After completing all necessary modifications, Jagani was able to sell his product for much less than other cultivating devices, which can cost up to $6,000 (Neelakantan, 2005).

Similarly, Agrawat saw women pulling water from the well with a rope, and noticed that the bucket would rush back down the well if the rope slipped. He added a lever so that the bucket would stay in place, so that women can catch a breath. Chitagopakar and Harshangi developed a modified stick for the visually challenged, that can sense can sense obstructions with different alarm signals. And Saidullah developed a bicycle that not only travels on land, but can also float on water. This helps people easily cross over ponds and rivers (National Innovation Foundation, 2005).

These micro entrepreneurs have provoked an interesting dialogue on the ownership of intellectual property rights on the micro innovations. For instance, some say that ownership resides with the community that passes on the primal skills, others say that the ownership is with the innovative entrepreneur, and yet others believe that ownership resides with those who spotted, perfected, and promoted the micro innovation (Gupta & Chandak, 2005).

Phase 2: British Raj (1700-1950) - During the British period, India's indigenous crafts faced significantly adverse environment. This adversity is well depicted in the historical records, based on which Malhotra and Patel (2003) state,

> *one of the earliest industries relocated from India to Britain was textiles and it became the first major success of the Industrial Revolution, with Britain replacing India as the world's leading textile exporter…. the technology, designs and even raw cotton were initially imported from India while, in parallel, India's indigenous textile mills were outlawed by the British…. Textiles and steel were the mainstays of the British Industrial Revolution. Both had their origins in India.*

At this same time, the British period opened a window of opportunity for entrepreneurship with a global acumen. Recall that one of the main elements of the Panchayati Raj is the traders who specialized in the international markets. For instance, this revival is exemplified in the work of Ranchhodlal Chhotalal, a Brahmin in Ahmedabad, as he took a position as a clerk in the British colonial government in 1842. While working in this position, Chhotalal obtained cost information from London to determine that a local cotton textile mill would be profitable in Ahmedabad. He then found a British investor and a local banker who were each willing to finance 50% of the

necessary funding. His success motivated the local Hindu/ Jain bankers and traders to set up their own mills (Oonk, 2007).

Similarly, World War I cut off the supply of finished consumer goods from the British factories. This shortage of goods created a demand for rails to 1) support both the infrastructure and transportation needs of the British in the war and 2) allow subsequent British expansion in Asia. This demand offered a window of opportunity to JRD Tata's new iron and steel factory to thrive (Oonk, 2007).

The global acumen of entrepreneurs in India remained stifled for the first forty years after independence. However, with the advent of the internet, 'glocal' multinationals have thrived with one friend or family member based in India and another overseas in countries such as the US. Similarly, others have used new technologies or global markets for making local impacts. For instance, an illiterate masseuse, Indu Sharma in Mumbai, bought a cell phone, which resulted in the expansion of her business and a few hundred percent increase in revenue (Bhatt, 2006). More broadly, global acumen is evident in the success of both the Patel community, who owns 60% of the low-end hospitality market in the US, and the Palanpuri Jains community, who owns 50% of the world's rough diamond trade (Godrej, 2005).

Similarly, larger entrepreneurs have found new opportunities in global markets. For instance, in the US and Europe, most tractors are high horsepower, as a result of the farms being much larger. After observing the difference between Indian tractors and U.S. and European tractors, the leading marketing entrepreneurial firm, Mahindra & Mahindra, opened export markets in Africa, South America, South Asia and Middle East since the needs and uses of vehicles are akin to India. The firm has expanded its parts warehouse and assembly production in the US and the UK, as a means of sourcing more advanced features that create 75% of the Western tractors. With a new dealer network in the US and Europe, a new "hobby" farmer segment (farmers who work on farms during weekends and holidays) was created using lower horsepower models. This resulted in a 40% market share in that niche (BBC News, 2001).

Phase 3: License Raj (1950-80) - After independence, a regulatory framework of impediments and compensation was introduced in India. This resulted in the public sector taking command of major investments, while the small scale sector thrived in minor investments. The communities benefited from the public sector enterprise as it offered critical infrastructures and capital goods, while the small enterprise were assured a profitable supply and/or demand linkages.

To regulate the larger private sector's initiatives, the law required approvals for both establishing a new manufacturing unit and for expanding its capacity by more than 25% over a five year period. The larger private sector was forced into a race to obtain licenses in whatever domains it could. For instance, the House of Birlas evolved into a quasi-public company with major shareholdings that extended into many cash-rich businesses in metals, textiles, cement and fertilizer. While evolving into a quasi-public company, the House of Birlas operated according to its philosophy, to pursue any business it could obtain a license for. As a result of this, many of the group's companies became highly fragmented. For instance, its copper company, Indal, owned both

a copper smelter and a fertilizer business. By the late 1970's, India faced substantial consumer goods supply constraints, along with economic stagnation, inflation, educated unemployment, and growing poverty.

Nevertheless, two forms of entrepreneurship thrived under the regulatory patronage: 1) *Kisan* or farm entrepreneurship and 2) *Jawan* or defense entrepreneurship. Consistent with these two patronages, *Jai Jawan Jai Kisan* became the political motto of the era. First, farm entrepreneurship was the basis of Green Revolution, whereby India left behind the famine of the mid-1960s. In this endeavor, the state-supported farm R&D and financing, while the US-style extension networks built the capacity of the farm entrepreneurs to make the nation self-sufficient in foodgrains. Second, the State supported borrowing of defense and allied informatics, transportation, and space technologies from overseas, and the development of local versions by extending capacity building to private entrepreneurs.

Common to both forms of entrepreneurship was the principle of supporting and assembling a network of smaller entrepreneurs. This principle of extension is visible in another emerging form of entrepreneurship in India. K.V. Kamath is the CEO of ICICI, the largest private financial institution in India. He is currently striving to invent a new business model where ICICI can create a distribution base effectively in 600,000 villages in India at one tenth the cost of urban India (i.e. one hundredth the cost of the West). Kamath (2006) depicts his goal by stating,

> *the challenge is to be able to work with partners because we believe that the branch-led model will not work in this context. For example, we might partner with a local financial institution, a micro-finance agency or a company -- someone who is already in the village for a business purpose. We might even partner with someone who is selling fertilizer or seed or tractors.*

His goals are ambitious, for no one – not even the Grameen Bank – until now has gone after a large-scale rural banking model to serve a rural population of 600 million people.

Phase 4: Jugaad Raj (1980-1995) - In the early 1980s, a new factor sequence, the professionals, came on the horizons. Particularly, the license raj had trained a large army of educated professionals through its army of public sector firms, government R&D labs, and technical colleges; however, they lacked the capacity to utilize the individuals in the developmental process. This led to the emergence of two forms of entrepreneurship during the early 1980s [pause] – hardware dealers and designers, and Software developers. The rule of the game in this phase was *Jugaad* – i.e. finding creative short-term workarounds, and then building capacity.

Firstly, many small entrepreneurial firms began importing and assembling Korean and Taiwanese computer kits by exploiting their market reach and knowledge. Additionally, many larger entrepreneurial firms hired professional talent to build their capacity to compete on designs. As a result of such initiatives, a wide range of industries, even the smaller firms, began to offer custom designs and complex solutions over time. With these new opportunities, a small but growing

percentage (currently estimated at about 5%) of engineering and management alums moved into entrepreneurship.

Secondly, many firms began hiring professionals to construct capacity for participating in the national automation projects. For instance, the government helped to link these professionals with the American MNCs, while also offering a captive infrastructure support to others. Over time, closer alliances with the US firms allowed the Indian entrepreneurs to shift the higher cost systems analysis and design work to India. Conversely, the low-skill programming, which involved short-term client interactions, was retained onsite in the US.

All this inspired numerous ancillary ventures in entertainment, media, transportation, hospitality, and infrastructure. Later, the Internet gave rise to several big Indian portals (such as Sify). Additionally, mid-sized challengers with specialized offerings (such as the Hyderabad-based NowPos with voice e-mail applications), startups (such the Bangalore-based RHR Networks that runs many India specific websites), and uncounted casualpreneurs (those with full-time day jobs who created India centric web products in their spare time using internet advertising based revenue models) also blossomed as a result of the internet (Ranjan, 2006).

The idea of specializing in the value-adding activities, founded in the nation's various resource endowments, has become the hallmark of many entrepreneurial initiatives in India. Specifically, this is well-depicted in the growth of Indian entrepreneurship in the country's global bio-tech industry as, according to McKinsey Consulting, the country's clinical trials sector is estimated to be $1 billion by 2010. This growth is associated with the wide array of healthcare facilities in the country, including 221 medical colleges, 700,000 specialty beds, and the largest pool of patients with diseases such as cancer and diabetes. The diversity and depth of Indian's medical community enhances reliability of results and reduces the cost to a fraction of $150 million, which is the amount used for a clinical trials in the U.S (Basu, 2004).

Furthermore, in the West, if there is a disease, firms search for New Chemical Entities (or NCEs) that would cure/treat and then patent them. Conversely, in India, many entrepreneurs now use the nation's software capabilities to scan for all non-patented NCEs, then patent what they discover, and finally license them to Western firms for further analysis. Additionally, many entrepreneurs are venturing into modifying NCEs and discovering new forms and new drug delivery systems. For instance, Hepatitis B, after its development in late 1980s, was priced by the US drug companies at $50 per day of dose. Shantha Biotechnics, an upstart by a computer scientist with no pharma background, developed the drug with less than $1 million investments over a five year period; it was then marketed for $5 per day of dose (Varaprasad, 2001).

India is thus evolving from the world's software programmer to the world's back office where service intensive business processes are performed to the world's laboratory where the quality and availability of knowledge workforce make the cost of risk-taking very affordable for companies around the world. In depicting India's evolution, it is important to note that the private equity investments of Indian firms now stands at $60 billion, with more than $10 billion in 2007 alone; these amounts are a result of the firms' capability to quickly set up strong R&D and back-office

operations. Over 100 multinational firms, including GE, General Motors, Intel, Texas Instruments, Microsoft, and IBM, have set up R&D operations in India (Sinha, 2007).

Phase 5: Invisible Raj (1995-2010?) - By the mid-1990s, the foreign MNCs emerged as an important influence on local entrepreneurship. Many MNCs transferred older technologies and product designs, while pushing them using attractive consumer credit. They offered higher compensation to lure away experienced employees. Consequently, the survivalist form of entrepreneurship became pervasive as many were forced to form micro-enterprises. These enterprises had limited life span and produced serial opportunistic ventures. Specifically, if a paint factory underperformed, the entrepreneur opened a paint shop; if that too failed, he may move into the realestate business.

In this scenario, it is obvious that new generations of entrepreneurs are rethinking the fundamentals of business strategy. For instance, they are solving manpower, supply chain, and distribution constraints by extending the training, recruitment, and value chain networks of the country's interiors. Thus, they are giving eyes to the previously invisible resources and opportunities. For instance, Aravind Eye Hospital, with a mission to provide quality healthcare to the needy, has grown to be the largest provider of eye care services in the world. In total, on average, it treats two free patients for every one fee paying patient. It charges only $20 per eye surgery, compared to $2000 in the US, and it has a success rate comparable to that in the US, while still generating 40% operating margins. (Express Healthcare, 2007).

A major factor sequence being discovered as a result of the deep-extending value chain networks is the hitherto invisible and unacknowledged power of women. For instance, in India, in late 1990s, about 6% of those in managerial positions were women; this percentage has now more than doubled. India has been dealing with two generations of gender issues. The first generation was defined by the lack of managerial opportunities for women, because of an assumption that they were only good for easy jobs. Furthermore, the second generation issue was the oppression of women using subtle barriers, even in the face of equal opportunity policies. These barriers include paucity of mentors and role models and the masculine policies such as working late nights and rigid hours. However, the introduction of flex work and other gender-sensitive policies have allowed women to enter in non-traditional jobs and sectors.

As a third generation issue, women's need for varying work-life balance over their careers has remained unaddressed. Insensitivity about this need has resulted in a growing new perception amongst the Indian men that the gender sensitization policies are over-hyped. It has made many Indian men uncomfortable about working with women bosses, feeling that they will be asked to do extra work while the women bosses will have it easy. Women are addressing this issue by becoming entrepreneurs—both within and outside of corporations. This parallels the development in the US, where the rate of women entrepreneurship is growing twice as fast as male entrepreneurship; and, the number of women business owners is now about the same as male business owners (National Association of Women Business Owners, 2007).

WOMEN AS CULTURAL ENTREPRENEURS

In India, women are pioneers in "cultural entrepreneurs" -- women have always been the stewards of cultural knowledge, and are in charge of cultivating this knowledge amongst children and other family members. In the new India, women are also taking charge of culturally-embedded opportunities outside of the traditional male domains. And they are doing so in a diverse array of organizations: multinational firms, the large private sector, family businesses, their own start-ups, and micro-ventures.

Firstly, multinational firms in India, particularly the US ones, have set aggressive percentage goals for hiring, retaining, and advancing women as a means of addressing a rapidly expanding workforce requirement. All concerns about the business case for such initiatives have been put to rest by women like Indira Nooyi, ranked by Fortune as the world's most powerful businesswomen in 2006. Non-cola beverages are culturally preferred over the cola beverages in India for health reasons, and sensing health conscious in the West, she co-authored Pepsi's 21st century transformation by successfully moving it into non-cola beverages.

Secondly, the large private sector firms have been prodded by diverse teams of overseas clients to include women amongst their top teams. The Senior Vice President of Satyam – a top Hyderabad computer firm, notes, "it is a little awkward if you don't have a single woman leader, particularly when the customer might have 4-5 women in their group."

Thirdly, as they face intensified competition, the family businesses are calling upon their daughters and daughter-in-laws to take charge of exploiting new opportunities using their culturally sensitive insights. For instance, Hero Group, a leader in the motorcycle business, called upon the family daughter, Shefali Munjal, to champion a new firm offering IT solutions to small and medium auto businesses; in only a short period of time, she successfully made this new firm a market leader. Not surprisingly, the group thereafter decided to diversify into the scooters segment; to accomplish this goal, the company developed Just4her women-only showrooms, women friendly product designs, and women supervisors and sales executives.

Fourthly, there are now stories of start up women entrepreneurs such as Kiran Mazumdar Shaw, who is counted among the Fortune's top 50 powerful global businesswomen. In the 1970s, after obtaining her master's degree in microbiology, Shaw wanted to be a master brewer following her father; however, was denied entry into the male bastion. She resolved to start Biocon, a biotech firm, in her garage with a budget of $1000. Shaw brought in biotech research and clinical trials from overseas firms. Within time her firm achieved a first-day market cap of $1 billion, making her the wealthiest woman of India.

Finally, women are leaders in micro ventures as well, focusing on leveraging key cultural resources such as the one exemplified by the rag picker story. Women account for more than 90% of all micro loans, and have more than 95% repayment rates.

As cultural entrepreneurs, women are guided by socially sensitive leadership. They focus on sustainability, as opposed to short term profits, and are acutely aware of the impact of their decisions

on various participants in the cultural system, including suppliers, buyers, and employees, in addition to the members of their families and communities, and the environment.

DISCUSSION & CONCLUSIONS

A paradigm of entrepreneurship, distinct from earlier generations' Japanese and Chinese paradigm, appears to be emerging in India. The Japanese model of entrepreneurship was based on the use of globally discarded materials and manpower; conversely, the Chinese model has been based on the cost-effective use of earlier generation's global machinery and methods. The emerging Indian model will be based on the making of the next generation's products and services accessible to the grassroots (Prahalad and Hammond, 2002), and creating new products and services by leveraging the intellectual properties of the grassroots.

We have specifically identified five major emerging forms of entrepreneurship, with their roots in the different work-cultural phases of India:

The five emerging forms taken together may help develop an inclusive program for entrepreneurship—one that would include first identifying the hitherto invisible deep-rooted knowledge of each local community though Grassroots Entrepreneurship. Second, it would connect the local knowledge with global technologies and/or the global markets, with Glocal Entrepreneurship. Third, with emerging Extension Entrepreneurship, it would develop extension-style networks to assemble and augment diverse pools of complementary local knowledge. Fourth, it would use global relational links and local knowledge pools to externalize cost-escalating activities offshore, and to internalize value-adding activities inshore, with Value-adding Entrepreneurship. Finally, this program would utilize Cultural Entrepreneurship to transform the heuristics that are impeding the entrepreneurial potential of diverse participants. As demonstrated by our study of women entrepreneurs, this comprehensive paradigm has the power to substantively revitalize gender roles, families, and communities.

Of course, it may not be feasible to spot deep-rooted knowledge pools in all communities as the patterns of poverty, terrorism, migration, and other exogenous factors may have acted to thin these pools. In such milieus, one may need to begin by first acknowledging the potential of diverse families and groups within a community (Cultural Entrepreneurship). Thereafter, the community may be involved in specific value-adding activities (Value-adding Entrepreneurship). Extension networks may then be formed to broaden and deepen the participation of the members of the community, through targeted support (Extension Entrepreneurship). Several communities across international boundaries may then be linked together for mutual exchange (Glocal Entrepreneurship). This will thicken the local knowledge pools and build the capacity of the hitherto isolated communities to solve their grassroots challenges (Grassroots Entrepreneurship).

Table 1: Major Emerging Forms of Entrepreneurship in India	
Form	Description
Grassroots entrepreneurship	where people in the street respond to the problems of the street with novel and innovative solutions; in creating such solutions, the people are able to make a living. They do so using their deep-rooted and specialized crafts knowledge.
Glocal entrepreneurship	where people transform their apparent resource deficiencies into their strength for competing alongside dominant participants in global markets and in localized niches. They do so using their trading acumen for combining local resources with global technologies or markets.
Extension entrepreneurship	where the challenge of cost escalation in reach and upgrading quality is resolved by forming extension-style networks with those who understand local environments, communities, and endowments.
Value-adding entrepreneurship	where activities best performed by global markets are externalized; the activities where the value may be added are diligently internalized.
Cultural entrepreneurship	where those hitherto engaged in the cultural roles –and excluded from the market roles – join in to translate their culturally-embedded knowledge into transformative solutions.

Is the above paradigm a viable one? The New India believes it is. In fact, Bagchi (2005), a leading Indian entrepreneur underlines the following lesson from the celebrated Indian entrepreneurs: "It is about ordinary people delivering extra-ordinary results." More than a billion people worldwide live on less than $1 a day. A little girl living among these people innocently asked the President of India in 2006 if there is a hope for her in the new India. The President of India had no answer. However, the analysis here can provide us with a path to get to a possible answer. It shows that first, we need an entrepreneurial vision for the development and exchange of culturally-embedded grassroots know-how. Second, we need an institutional framework that acknowledges the rights of communities to these grassroots intellectual properties.

In the next ten years, about 100 million youth will be starting their careers in India. Some will enter the corporate workforce—but many more will go on to start business ventures of their own. The emerging forms of entrepreneurship hold promise for this population to have meaningful and sustainable human rights tomorrow. Just like the disgraced soccer star in "Chak De India," the new India has had to overcome many challenges. And, in rising up from adversity, India can serve as a global model for creating big visible entrepreneurial solutions out of invisible nothingness.

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TRENDS OF LABOUR DEMAND FOR HIGH-SKILLED WORKERS AND THEIR WAGES IN THAILAND

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ABSTRACT

Higher demand for high-skilled workers is expected to realize as being driven by dynamically structural changes in businesses under rapid industrialization. This paper aims to investigate the changing feature of demand for high-skilled and low-skilled workers and to observe its change in the Thai labour market. The relative employment and wage trends between high-skilled and low-skilled one are compared among that of Thailand, China, the US, and Germany.

During the 1991 - 2006, the study found the constant trend of the rising employment for the high-skilled workers relative to the low-skilled ones. The Thai labour market during 1991-1995 showed a significant increase in the employment and wage trend. However, a decrease in relative wages of high-skilled workers emerged clearly during 2002 – 2006, while other countries remain their wage trend.

A possible explanation for the declining relative wages could be placed on the explosive number of supply of high-skilled ones in Thailand. The number of new graduates entering the labour market has increased significantly since the late 1990s. It is possible to question on lower quality of graduates, and mismatching between a number of graduates and the demand of the labour markets.

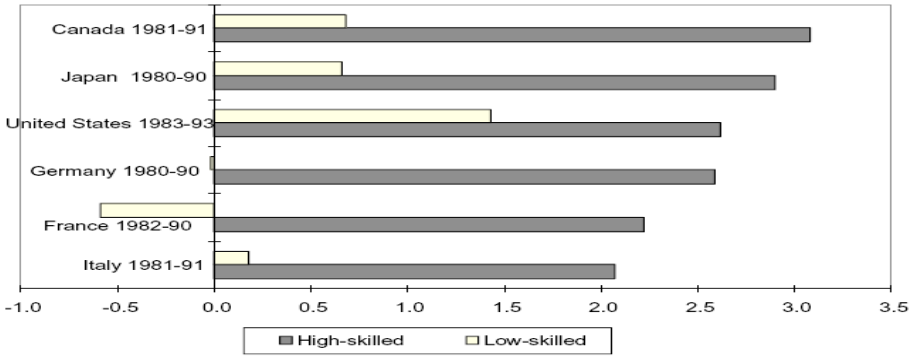
Key Words: Labour demand, High-skilled workers, Low-skilled workers, Wages, Education, and Globalization

INTRODUCTION

Under rapid industrialization and globalization, not only final product and service markets, but also the labour markets are making their adjustment to response to the globalization. The impact of the globalization on the labour market can be classified into 2 main brackets, which are demand for labors and their wages.

In the first bracket, the employment growth of high-skilled and low-skilled workers in the OECD countries during 1980-1993 demonstrated a significant difference between 2 types of workers as shown in Figure 1. This phenomenon appears globally in both developing and developed countries.

Figure 1: Employment growth of high-skilled and low-skilled workers (Average annual growth rates)

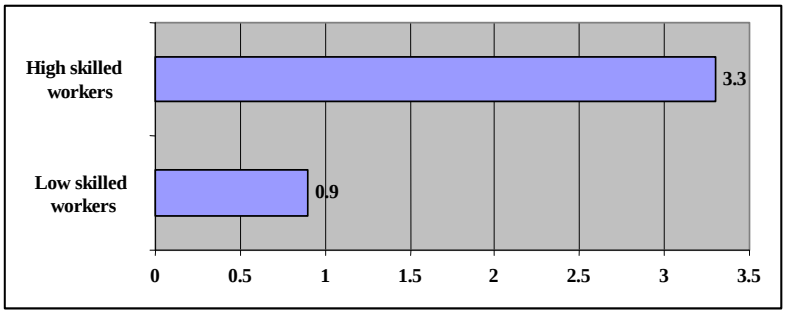


Note 1: "High skilled" workers are defined here as those in the following occupational groups: Legislators, senior official and managers (ISCO-88 Group 1); Professionals (ISCO-88 Group 2); Technicians and associate professionals (ISCO-88Group 3). All remaining occupational groups are classified as "low-skilled". For Germany, ISCO-88 Group 1 covers legislators and senior officials only and ISCO-88 Group 3 excludes teaching associate professionals so that high-skilled workers are underestimated.

Source Colecchia, A. and G. Papaconstantinou (1996): 25

There is no exception for Thailand where the increasing trends in the employment of high-skilled and low-skilled workers appeared during the first half of 2000s (Figure 2). The employment growth of high-skilled workers was 3.3 compared to 0.9 of low-skilled ones.

Figure 2: Average growth of employment classified by high-skilled and low-skilled workers 2002- 2005.



Note: High skilled workers are legislators, senior officials and managers, professionals, technicians and associate professionals, clerks, service workers, shop and market sales workers. The rest occupations are regarded as low-skilled workers. The data is derived from the third quarter of the year, the highest employment among the other quarter, to avoid seasonal effects.

Source Thai Labor Force Survey.

The other bracket regards to the wage. It has been found in a number of literatures that trade widens income gap between high-skilled and low-skilled workers. For example, the relative wages of nonproduction workers (as a proxy for high-skilled workers) to the production workers (as a proxy for low-skilled workers) in the US have explicitly increased since 1980s. Not only the highly developed countries but also the developing countries are found increasing in high-skilled and low-skilled wage gaps. A great number of studies emphasized on the wider gaps of skilled premium and the larger income inequality; for instance, Zhu and Trefler (2003) Filho, Gonzaga and Terra (2001).

Most empirical studies claimed that these impacts are due to one major structural change in the labour market, which is a shift-up trend towards demand for high-skilled workers (For instance, De Laine, Laplagne, and Stone, 2000).

The principle explanations for the adjustment of demand for high-skilled workers in the globalization are rationalized into 2 ways: trade hypothesis, and technical-change hypothesis. The first concept assumes that an increase in the relative demand for goods and services requiring high-skilled workers to make them pushes the demand for high-skilled workers. On the other hand, the lower demand for low-skilled workers is due to a decrease in the demand for goods and services provided by them. This implication is called the trade hypothesis.

The second explanation is that a technical progress leads to a change in production process and organizational changes. The progress enhances the working process and the labour relation through the information and communication technologies. The technological change increases the demand for high-skilled workers economy wide as the new and advance technologies are biased toward this group of workers. The overtime changes then benefit the employment and wage prospects of high-skilled workers relative to the lower ones. This implication is known as the Skill Biased Technical Change (SBTC) hypothesis.

Not only the demand for workers but also the supply of workers as well as characteristics of the labour market are important to the labor market adjustment. Since changing environment on labour markets is a vital factor effecting on the cost of production. This study aims to investigate the changing feature of the demand for and supply of high-skilled and low-skilled workers and observe its change in their wages in Thailand.

The structure of the study is divided into 5 parts. The first part is to introduce the motivation and the objectives. The second part is to explore the trend in high-skilled and low-skilled wages together with relative employment trends of Thailand in an international comparison. It is interestingly found that the relative wage trend of high-skilled to low-skilled workers in Thailand had changed since the 2000s. This changing trend was different from the other countries particularly the US. The fact finding in the second part then inspires the later section to investigate possible reasons of the switching wage trend. So, the literatures and theoretical backgrounds investigated in the third part emphasized on the influential factors of demand for labor and wages. The forth part is to determine the possible factor responsible for the change in the relative wage trend. The fifth part describes the concluding remarks.

RELATIVE EMPLOYMENT AND WAGES BETWEEN HIGH-SKILLED AND LOW-SKILLED WORKERS: AN INTERNATIONAL COMPARISON

As we aim to explicitly describe the changing trend of employment and wages of Thailand, the trend of the relative employment and relative wages between high-skilled and low skilled workers is explored. It also attempted to compare the data to other countries i.e. China, the US, and Germany. The result implies that only the relative wages of Thai labour market in the 2000s has moved to the different direction to the previous period.

Source of Data for an International Comparison

The data for the international comparison is based on 2 main sources: the International Labor Organization's Annual October Inquiry and the Freeman and Oostendorp Occupational Wages around the World (OWW). We complimented these 2 data sets together to compare the relative wages and employment of high-skilled and low-skilled workers of selected occupations during 1991 – 2006 among China, the US, Thailand, and Germany. The US data during 2002 -2006 are derived form Occupational Wages Survey, Bureau of Labor Statistics.

The classification of each skilled group is selected by occupations as below. High-skilled workers include mathematics teachers (third level), teachers in languages and literature (third level), teachers in languages and literature (second level), mathematic teachers (second level), technical education teachers (second level), general physicians, dentists (general), professional nurses (general), medical X-ray technicians. It is also included semiskilled workers who are garment cutters, wooden furniture finishers, office clerks, machinery fitter-assemblers, salespersons, and bank tellers. Low-skilled workers include laborers

Relative Employment and Wages: An International Comparison

The data is classified into 2 periods during 1991-1995, and 2002 – 2006 to present the fact in the last 2 decades (Table 1). The data during 1996 – 2001 is intentionally excluded throughout the study to avoid the period of the economic crisis of Thailand, which made the flotation of the currency in July 1997.

During 1991 – 1995, the employment trends in Germany, Thailand and the US all showed the increasing trends. While the relative wages of the US increased, those of China and Thailand also tended to increase as well. Nevertheless, the relative wages of Germany was decreasing due to the greater level of wage rigidities than other countries.

Remarkably, the wage gap between low-skilled and high-skilled workers in Thailand was quite high well nigh 2.07 – 2.88, while those in other countries were less than 2.00. Yet, the relative employment of Thailand was small with only less than 0.1, whereas the developed countries are mostly about 0.4- 0.6.

Please note that the Thai data had been tested whether there was a significant difference between the relative employment of high-skilled and low-skilled workers with and without registered immigrants. The result shows the insignificant difference. It is due to the small number of registered immigrants. Then, the immigrants were disregarded as the main reason for the structural change of relative employment and wage.

Interestingly, the relative wage between low-skilled and high-skilled workers in Thailand during 2002-2006 showed a declining trend. This trend was different from the prior years and from the other countries, whose trends have remained the same. The relative wages had constantly declined since 2000. At the same time, the employment gap of Thailand was greater from less than 0.1 to approximately 0.16 – 0.18.

Since the relative wage in the 2000s showed the inconsistent trend to the 1990s, the following part then sought for the explanation through literature reviews and theoretical background.

Table 1 Relative employment and wages between high-skilled and low-skilled workers (1991 – 2006)

Country	Relative	1991	1995	Trend	2002	2006	Trend
China	Eh/ El	n/a	n/a	Unable to define	n/a	n/a	Unable to define
	Wh/Wh	0.99	1.30	Increase	n/a	n/a	Unable to define
United States	Eh/ El	0.42	0.46	Increase	0.53	0.53	Increase
	Wh/Wh	1.82	1.91	Increase	2.06	2.08	Increase
Thailand	Eh/ El	0.06	0.08	Increase	0.16	0.18	Increase
	Wh/Wh	2.07	2.88	Increase	3.04	2.89	Decrease
Germany	Eh/ El	0.57	0.59	Increase	0.70	0.74	Increase
	Wh/Wh	1.73	1.86	Decrease	1.77	n/a	Decrease

Note: Eh/ El represents the relative employment of high-skilled and semi-skilled to low-skilled workers, while Wh/Wl shows the relative wages of high-skilled to low-skilled workers. Employment data of Germany in 1991 was substituted by 1993 data, and the relative wage in 2002 was substituted by 2001.
Countries were selected upon data available. However, as China has increased its importance in the world economy. Though the data did not complete in the series of relative employment, its relative wages showed the increasing trend during 1991-1995.
The classification of skill and low-skilled is based on occupations. The employment is classified by International Standard Classification of Occupations (ISCO-1988) where laborers (category 9) are low-skilled workers.

Source: International Labor Organization's (ILO) the Annual October Inquiry and the Freeman and Oostendorp (2000) Occupational Wages around the World (OWW)

LITERATURE REVIEWS AND THEORETICAL BACKGROUND

This part aims to seek the reasons for the changing trend of relative wages of the Thai labor market. The explanation can be grouped as the 2 main reasons: demand for and supply of laborers.

Demand for laborers

The relative demand for high-skilled and low-skilled workers was considered in the realm of trade hypothesis or technological changes. In the study we classified into 2 sections: (1) changes due to trade (without any technological change) (2) changes due to Skilled Biased Technological Changes (SBTC) (with technological changes)

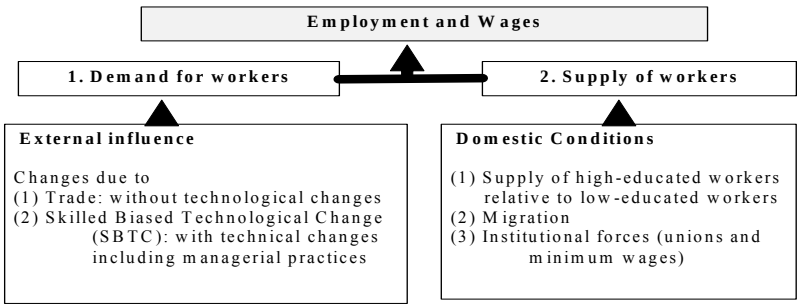
Supply for laborers

The factors effecting supply of the relative supply of high-skilled and low skilled workers in the globalization are various. However, in this study we included only the "shock factors" which is a sudden change and unpredictable through time. For the predictable factors, for instance birth rates or rates of health status, the labour market is assumed to automatically adjust its equilibrium. The important shocks in the last decade were the easier accessibility to education, and the worker movement between countries.

It should be noted that labour markets can be rigid. The rigidity of the labour market, so called market inflexibility, is claimed as an obstacle of the labor market operation by limit the necessary adjustments in the market (Evidence mostly based on the case of the labour market of the US and EU; for example Slaughter and Swagel, 1997). The cause of the rigidity is an institutional influence, which includes unions (collective bargaining) and minimum wages.

Therefore, the important factors are listed as the following points: (1) supply of high-educated workers relative to the lower ones (2) migration and (3) Institutional forces. The conceptual framework is depicted in Figure 3.

Figure 3 Conceptual framework: Factors affecting on employment and wages



Demand for Labour

Trade Effects (Without Any Technological Change)

The theoretical background concerning the demand for labour due to trade is composed of 3 essential elements: the Heckscher- Ohlin Endowment Model (HO), the Stolper-Samuelson Theorem (SS) and the Skilled Biased Technological Change (SBTC).

The HO, one of the most influential theories in the international trade, argues that trade is based on different factor endowments across countries. The typical model based on this theory determines trade between two countries that use the same production technologies to produce two consumer goods. The model predicts that countries that are relatively rich in low-skilled workers will specialize in the production of goods that are unskilled-labour intensive. According to HO Model, it can be concluded that the trade liberalization should cause reallocation of labors.

The SS makes predictions about the correlation between prices and wages of certain types of workers when they are not used intensively. According to the SS, if the price of one product rises, the price of the factor used intensively in that product will also rise while the price of the other factors will fall.

Most papers applied the SS to explain the effect of the trade liberalization on wage gaps between high-skilled and low-skilled workers. Since it demonstrates how changes in output prices affects on the prices of the factors when positive production and zero economic profit is maintained in each industry. The rising wage gaps in the globalization are partially because of the change in the relative prices of goods. This change is influenced by changes in prices in the world market. If a country is open to international trade, the price change in the domestic market will be affected by the price change in the world market.

The factor content and the product price approach are the empirical tools to evaluate the trade effects. According to countries' endowments, the high-skilled worker abundant country will produce high-skilled products. The demand for low-skilled workers will decline, while the demand for high-skilled workers will increase. As a result, the wages for high-skilled workers will also increase automatically.

An elasticity of substitution between skilled and unskilled labors is applied to show an implicit change in relative skills that are supplied from trade. However, this approach tends to have a low impact of trade on the relative demand for low-skilled workers. To calculate a number of labors replaced by trade, the assumptions concerning the labour requirements to produce those imports are required. These assumptions have been criticized (Wood, 1994) that a lot of goods imported from developing countries are no longer produced in industrialized countries. Therefore, the factor requirements to be used should be those of the developing country and the relative demand for low-skilled labors turns out to be greater. In other words, in a developing country where low-skilled labors are abundant, a decrease in tariff of the product requiring low-skilled workers will decrease their wages.

Skilled Bias Technological Effect (With Technological Changes)

The other reason for the greater demand and hence higher wages for high-skilled workers is on the basis of a changing structure of production requirements so called skill bias technology. Since new technologies, knowledge and skill intensives require a compatible workforce. The introduction of new technologies in lower income countries implies reallocation of labors from low to high productivity activities which are generally both more capital and skill intensive.

The SBTC claims that the continuously technological advances are introduced into the labour markets, so high-skilled labors will be demanded for these advances. It will effect on the demand for low-skilled workers that will be substituted by higher ones. Most studies in the 1990s to the 2000s preferred to the SBTC. For example, Berman, Bound, and Griliches (1994) Berman, Bound and Machin (1998) Berman and Machin (2000) De Laine, Laplagne, and Stone (2000) and Sasaki, and Sakura (2005) claimed that higher demand for high-skilled workers was due to the SBTC.

The capital-skill complementarity with technological change is one of the essential tools to show the existing of the SBTC. The complementarity between technologies and skills was often extrapolated to the whole economy commonly referred to the SBTC (Johanson, 2004). From a theoretical point of view, however, micro-level complementarities between the skills and technology do not necessarily translate into macro-level relationships. The overall impact will depend on substitution effects of both factors and product markets (Colecchia and Papaconstantinou, 1996).

Berman, Bound, and Griliches (1994), and Berman, Bound and Machin (1998) examined a sample of developed and developing countries, specifically an industry share of production and non-production workers to argue that the demand for low-skilled workers had plunged due to the SBTC. Most high and middle income countries showed the SBTC in the 1980s. Their industries increased the proportion of high-skilled workers despite generally rising or stable relative wages. It was also found that the same manufacturing industries simultaneously increased demand for skills across countries.

In Australia, De Laine, Laplagne, and Stone (2000) investigated the reason for an increase in demand for workers, excluding elementary workers, since 1978. The findings were also consistent with those of other studies in other countries, which supported the SBTC. The interesting finding was that the equations using wage bill shares provided stronger evidence than those using employment shares. In addition, they revealed that imports did not influence the relative demand for high-skilled workers. On the contrary, exports were positively associated with the demand for high-skilled workers. This implied that increasing exports were leading to a widespread change in the relative demand for workers.

Most evidences had confirmed that the increase in the demand for high-skilled workers is attributable to the SBTC. However, the study of Berman, Somanathan, and Tan (2005) did not explicitly support the SBTC in the case of a low-income economy, namely India. The reason contributed to the matter of time. They used the panel data which was disaggregated into industry and state from the Annual Survey of Industry (ASI). The result confirmed that while the 1980s had

a decrease of skills demand, the 1990s showed generally rising demand for skills with variation across states. The increasing output and the capital-skill complementarity were mentioned to be the best explanation of skill upgrading in the 1990s. As the economy underwent a sharp reform and a manufacturing boom in the 1990s, it raised the possibility that technology absorption accelerated. Skill upgrading did not occur in the same set of industries in India as it did in other countries. They suggested that an increase in the demand for skills in Indian manufacturing sector was not due to the international diffusion of the SBTC.

The later literatures attempted to integrate both trade and technological changes by various proxies such as tariff rates as the globalization and machinery imports as technological changes. Galiani and Sanguinetti (2003) applied a Computable General Equilibrium (CGE) to the UK data in the past globalization period (1880-1913). The results showed that a trade shock and a skill biased technology shock were compatible with the observed decrease in the proportion between skilled and unskilled labour wages. The possible reasons were other off-setting factors such as education, migration and capital accumulation. For that to be possible, other off-setting factors such as education, migration and capital accumulation must have occurred. This is different from current situations in developed and developing economies, where all these off-setting factors do not seem to be at work (Betrán, Ferri, and Pons, 2007).

In Japan, Sasaki, and Sakura (2005) examined the demand shift towards university graduates in terms of the SBTC and globalization. Using the major groups of panel data of Japanese manufacturing in 1988-2003, they demonstrated that the increase in the relative demand for university graduates was closely related to the R&D expenditures ratio (treated as the SBTC) and the import ratio from the East Asian countries (treated as the foreign production ratio or a globalization index). They concluded that the demand shift toward highly educated workers in the Japanese manufacturing sector was due to both SBTC and globalization.

In this present, the interrelationship between trade and technological changes is still on the debate. If this interrelationship persists, these two factors will be impossible to disaggregate their effects separately. However, at the moment there is no solid evidence providing the correspondence between the trade and technological changes.

Supply of Labour

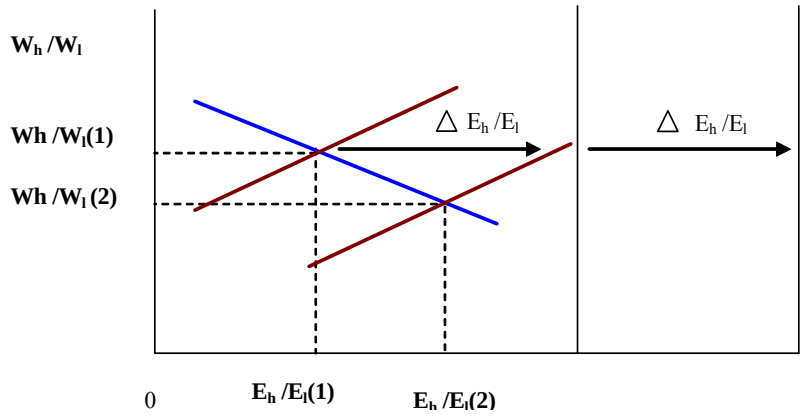
The dynamic labour markets can be well explained by a demand and supply framework, especially these days when every country attempts to relax inflow and outflow rules of goods and factors of production. In a closed economy, which keeps all things equal, the employment and wage rates are determined by the relative supply of high-skilled and low-skilled workers. An increase in the supply of skills will decrease the returns to them as wage rates are purely determined by the equilibrium of the domestic labour market.

Figure 4 explains the shifting up of the supply of high-skilled workers. If the relative workers of high-skilled to low-skilled workers increases (from Eh /El (1) to (2)) by an openness of the

economy, the relative wages will decrease (from Ws /Wu(1) to (2)). Vice versa the outflow of the high-skilled workers, which declines the relative high-skilled to low-skilled workers, results in an increase in the relative wage.

Please note that the elasticity of the labour demand and supply curves is important to the scale of outcomes to the labour market. The flatter the demand curve, the larger the impact of shifts in the equilibrium of the employment and wages, especially the relative employment.

Figure 4 Relative labor supply changes in a closed and an open economy



Note Wh/ Wl is the relative wages of high-skilled to low-skilled workers Eh /El is the relative workers of high-skilled to low-skilled workers

Three main groups of the influential factors in the last decade on the labour market are listed below.

Number of Educated Persons: the Potential Supply of High-skilled Workers

The educated persons represent the potential labour supply for high- skilled workers. The simple empirical evidence suggests that larger wage gaps between high-skilled and low-skilled workers in the US and the UK can be explained by a reduced supply of more-educated workers in the 1980s and the 1990s. This was compared to very stable conditions on the relative supply side in continental European countries (Freeman, 1994).

For the individual decision, the investment in education which is finally a human capital accumulation is influenced by many factors such as his personal belief, his physical and mental conditions. The studies about individually occupational and educational selections were not much widely explored. The results of these studies were mostly concluded as wages are not the only factor effecting on the decisions (For example, Hoffman and Low, 1983). However, the current studies in economics mainly recognize an amount of financial return as a major force of occupational and educational selection of individuals.

Migrations

In these days, domestic workers can be more easily replaced by foreign workers due to an increase in trade and globalization. As a result, the bargaining power of workers has been declining. The erosion of workers' bargaining power could also have an effect on a country's formation of skills, as it effects on workers' and companies' incentives to invest in training.

In the US, the effects of immigration are much stronger in low-skilled than the high-skilled occupations. For the 23 percent of natives employed in these occupations (about 25 million workers), a 1 percent increase in the immigrant composition of their occupation reduced wages by 0.8 percent. Since these occupations were 15 percent immigrants, this implicitly suggested that immigration may reduce average wages of the natives in a low-skilled occupation by perhaps 12 percent (Camarota, 1998).

Institutional Forces

Institutions play a significant role in wage setting and thus the labour market distortion. This accounts for the lower half of the wage distribution and to differences in the magnitude of educational wage differentials (Freeman and Katz, 1994). This section will be classified into 2 main forces: unions (privates' influences) and minimum wages (government's influences).

Unions play an important role in wage determination in all advanced countries both directly through collective bargaining and indirectly through government policies. They typically negotiate contracts that allows for less variation in pay than that of occurs in the nonunion sector. As the unions are much less prevalent in the US, an overall variance in wages in the US is supposed to be stronger than that in Europe.

The US has a business-oriented union movement largely based on relatively autonomous local unions which bargain for better conditions from an individual employer. In Europe, unions (Except the case of the UK, where is claimed that the UK has very decentralized wage-setting mechanisms) play a smaller role in the local firm and a larger one at the industry or national level with a broader coverage of wage setting for non-union members (Freeman, 1994). Thus, wage bargaining in Europe has a greater institutional influence.

As a result of negotiation between unions and employers, the amount of labour cost tends to increase as the higher labor's standard, benefits and trainings are required. Since, trainings will result in higher productivity of workers and thus the surplus that workers and employers will divide when they bargain. It will not increase only the surplus of the current worker-employer combination, but also the surplus generated when the trained worker works with other employers after leaving his current employer. This will lead to inefficiencies when it comes to the training decision. Assume a two period world, in which the decision to train is taken in the first period; the training will increase the worker's productivity in the second period. But in the second period the workers may not be in the paid-for-training firm in the first period. It is found that an average period a worker

stays with one employer decreases as the specific training is invested. Another important feature is the apprenticeship system. Culpepper (1999) pointed out that the success of the apprenticeship system in some countries such as Germany, depended crucially on certain institutional features of the German political economy such as its industrial relation system. The German firms were organized in employers' organizations and co-operated in order to guarantee the amount of investment that would be optimal for all (Jansen, 2000).

The minimum wages, a directly government intervention on labour markets, are set to a minimum wage rate for the whole economy. It aims to reduce wage inequality by raising wages in the lower end of the wage distribution. (See Machin and Manning, 1992; Neumark and Wascher, 2006).

CHANGES IN RELATIVE WAGE OF HIGH AND LOW SKILLED WORKERS AND THE SUPPLY OF HIGH SKILLED WORKERS

One striking fact that has altered the environment of the Thai labour market was a sharp increase of graduates in the labour market. As the study of Thailand Development Research Institute Foundation (2006) estimated the demand for labors in 2007 – 2016, the figures showed that the estimated demand for bachelors during 2007 - 2011 is 161,140 graduates per year and during 2012 – 2016 for 145,348 graduates per year.

Explicitly, the gap between the estimated demand and the actual supply of education has increased greatly. Considering only bachelor's degree, the bachelor graduates in 2006 exceeds the forecasted demand in 2007 of almost 100,000 persons. The great number of bachelors implied the accumulation of the excess supply. Inversely, the vocational graduates were found to be shortage. Not only the bachelor degree, a number of PhD. graduates in master degree and diploma was shooting at about 45 – 55 percent per year. (Table 2)

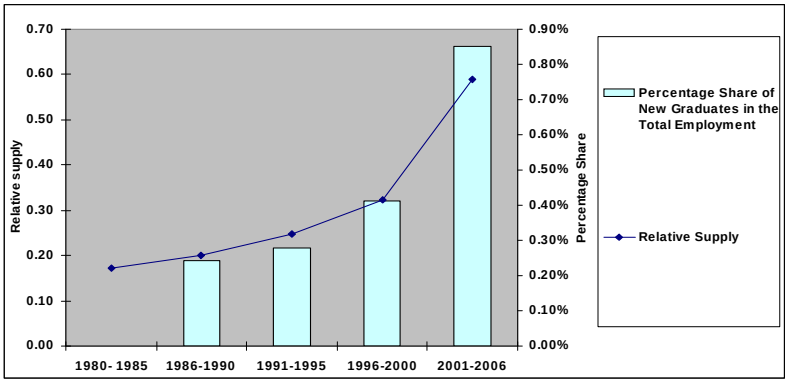
Table 2 Number of Graduates in Thailand (The 1993 - 2006)

	1990s		2000s	
	1993	1995	2003	2006
Total	86,266	103,549	302,606	304,813
Bachelor's	77,289	90,227	255,786	256,518
Graduate Diploma	n/a	n/a	3,090	8,091
Master's	8,873	13,113	43,185	47,872
Ph.D.	104	209	545	1,670

The data in the 1990s is calculated by summing up the graduates from private and public universities.
The graduate diplomas are included in the master graduates.
After 2000, the data is summed the total graduates up by the source.
The data excludes graduates from abroad.
Source: Commission on Higher Education, Ministry of Education of Thailand.

The push factor of a tremendous number of graduates during that time can possibly be explained by a great number of universities established. In 1990 – 1998, at least 8 public universities were established (excluding private universities). Moreover, in 1995 teacher colleges (41 institutes in 2001 data) were promoted to be institutes where be able to produce bachelor graduates. Additionally, in 2003 these institutes had been changed to universities. Therefore, the steep trend of share of new graduate in total employment had shooting up since the beginning of 2000s (Figure 5).

Figure 5: Relative supply of high-skilled to low-skilled workers and share of new graduates in total employment



Note: The data of new university graduates during 1980 – 1985 is not available. The relative supply of high-skilled to low-skilled workers is classified by occupations. High-skilled workers include legislators, senior officials and managers, professionals, technicians and associate professionals, clerks, service workers and shop and market sales workers. On the other hand, the low-skilled workers account for the rest occupations. The relative figures are averaged during the period of time.

Source: Thai Labor Force Survey, and Commission on Higher Education, Ministry of Education of Thailand.

For an extensive picture, the relative supply, the relative wages and the relative wage bills of high-skilled to low-skilled workers are shown in the Table 3. During 1980 – 2006, the relative supply and wage bills demonstrated the increase in the number of high-skilled to low-skilled workers significantly, whereas the relative average wages tended to decrease. It implies that the supply of high-skilled workers overwhelm the lower one. The data also shows that the relative supply grows significantly during 2001 – 2006, nearly twice time from 1996-2000.

Some studies reaffirmed that a decrease in relative wages found in the US during the late 1960s and early 1970s was due to the oversupply of educated workers. The supply of educated persons in a number of student enrollments in college overwhelmed the increase in demand for more educated workers. (Freeman, 1994; Katz and Murphy, 1992). This phenomenon was also found in

OECD countries in 1970s. However, in the US the sizable and accelerated shifts in demand for high-skilled workers in the 1980s and the 1990s were concurrent with the shrinking growth in their relative supply. The demand for high-skilled workers as well as their wages has increased significantly since then.

In this present, the condition of the rapid increase in supply of graduates can be widely seen in developing countries in this present. For instance, China has faced the excess supply of collage graduates. The Chinese public planner's aimed to decrease the expansion of graduates from 20 percent to 6-8 percent by adding admission conditions of the universities. Cambodia also has encountered a problem of mismatched education. Only one tenth of graduates were able to find a job. The graduates, produced without educational planning, have caused the labour mismatch. In addition, most graduates are lack of quality and choose their fields of education without labor market concerns (Chareonwongsak, 2006).

Table 3 Changes in the relative wages, wage bills, relative supply of high-skilled and low-skilled workers (1980 - 2006)

	Relative Wages	Relative Wage Bills	Relative Supply
1980- 1985	5.103	0.882	0.173
1986-1990	4.905	0.987	0.201
1991-1995	4.432	1.089	0.247
1996-2000	3.650	1.183	0.323
2001-2006	2.614	1.539	0.589

Note High-skilled workers include legislators, senior officials and managers, professionals, technicians and associate professionals, clerks, service workers and shop and market sales workers. On the other hand, the low-skilled workers account for the rest occupations. The relative figures are averaged during the period of time.

Source: Thai Labor Force Survey, calculated by the author

CONCLUDING REMARKS

A data set on adjusted high-skilled and low-skilled wages, based on Freeman and Oostendorp Occupational Wages Around the World (2000), the International Labor Organization's (ILO) in the Annual October Inquiry as well as the Thai Labour Force Survey are used to explore the relative wage and relative employment between high-skilled and low-skilled workers of Thailand comparing to that of various countries, namely, China, Germany, the US.

During 1991 – 2006, the employment trends of high-skilled workers in each country show the congruous increase. The wage trends in 1990 – 1995 are also consistent to the trend in 2001 - 2006. However, the data of Thailand during the 2000s showed that only the relative wages changed its trend from an increasing trend in the previous decade to a decreasing trend. The decrease in

relative wages coincided with the increase in the employment of high-skilled workers seems to support the evidence of the excess supply of high-skilled workers in Thailand.

The relative supply shows the significant increases in high-skilled workers overwhelming the increase in the relative demand. The conclusion of the study claimed that the oversupply of graduates is one of the main results changing employment structure and wage trends in Thailand. It can be claimed that due to the twice increases in bachelor graduates during the 2000s, the supply of potential high- skilled labors has increased greatly. This phenomenon influences on the structural changes in the Thai labour market.

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SME DEVELOPMENT AND TECHNOLOGY UPGRADING IN MALAYSIA: LESSONS FOR THE PHILIPPINES

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ABSTRACT

As developing countries striving for greater economic competitiveness in a global business environment, both Malaysia and the Philippines have formulated policies and implemented programs to support small- and medium-scale enterprises (SMEs) – the backbone of vibrant economies.

The Philippines can learn from the experience of Malaysia, which has clearly linked SME development efforts to its industrial development goals, and has set up effective mechanisms to coordinate various efforts to assist SMEs. Worth noting are programs to improve productivity and product / service quality, to encourage innovation and technological upgrading among local firms, to encourage SME linkages, and to develop human capital.

INTRODUCTION

Small- and medium-scale enterprises (SMEs) play a significant role in developing economies. Among their contributions are as follows: (a) they address poverty by creating jobs and by increasing incomes; (b) they disperse economic activities in the countryside, and provide broad-based sources of growth; (c) they serve as suppliers and providers of support services for large enterprises; (d) they stimulate entrepreneurial skills among the populace; and (e) they act as incubators for developing domestic enterprises into large corporations.

SMEs typically comprise the bulk of business enterprises in both developed and developing countries. They also employ a large segment of a country's workforce, and contribute significantly to national output (see Table 1).

It is acknowledged that a strong, dynamic and efficient SME sector plays a key role "in creating international competitive advantage" (Hall, 2003), and ensures sustainable economic development (APBSD, 2004). However, SMEs in developing economies face various issues and constraints (e.g. limited financial resources, lack of managerial expertise and competent personnel; limited access to market information) that threaten their sustainability.

A key challenge for most SMEs is being able to engage in innovative activities and to upgrade their technological capabilities in order to meet more demanding market requirements for better quality and lower prices, to adapt to changes in consumer profiles and preferences, and to

keep up with increasingly stiff competition. To succeed in this endeavor, they must overcome several obstacles, including high innovation costs, low customer interest in product innovation, high risks related to innovation activities, absence of financial resources, absence of skilled workers, regulations and technical standards, organizational constraints, absence of information on technology, and absence of market information (Caputo, Cucchiella, Fratocchi, Pelagagge, and Scacchia, 2002).

There is, therefore, a need to create a business environment that will encourage SMEs to not only improve their organizational capabilities to innovate and upgrade, but also to leverage on the resources of other organizations such as government agencies, universities, financial institutions, and other private firms.

Table 1: Contribution of SMEs to selected Asian economies

Country	Measures used in definition of SME	% of total number of firms	% of total workforce	% of SME contribution to GDP
China (2004)	Employment, sales and assets	99	75	56
Indonesia (2006)	Employment, sales and assets	99.9	99.6	57
Korea (2003)	Employment and assets	99.8	86.5	49.4
Malaysia (2005)	Employment and sales	99.2	56.4	32
Philippines (2003)	Employment and assets	99.6	69.9	32
Singapore (2004)	Employment and fixed assets	90	45	25
Thailand (2002)	Employment and fixed assets	99.6	69	38.9
Vietnam (2002)	Employment	99.9	77.3	n/a

Sources:

China www.sme.gov.cn - Small and Medium Size Enterprises Main Source of Jobs
Indonesia APEC – SME Profile (http://www.actsetsme.org)
Korea www.smba.go.kr - Small and Medium Business Administration (SMBA)
Malaysia Census of Establishment and Enterprises 2005
Philippines www.dti.gov.ph - 2003 Census on Business Establishments
Singapore www.sme.gov.cn - Financing Environment for SMEs in Singapore
Thailand White Paper on SMEs in Thailand 2002, OSMEP
Vietnam www.business.gov.vn – GSO Establishments Census 2002

Not surprisingly, governments have given increased attention and resources to SME development for a variety of reasons. Poverty alleviation and employment generation have typically been cited as goals in supporting SMEs in developing Asian economies, especially during the 1970s and the 1980s. However, when the Asian financial crisis of the late 1990s exposed the vulnerability

of affected economies, support directed at SMEs shifted to programs that encouraged technological upgrading so as to broaden and deepen the industrial structure. This is especially critical for the second-tier newly-industrializing economies (NIEs) of Southeast Asia (i.e. Indonesia, Malaysia, Thailand, the Philippines, and Vietnam), which cannot anymore rely on resource-based and low-cost labor advantages to sustain their economic growth.

This paper looks into the key programs and activities undertaken by the Malaysian government to overcome important challenges in promoting technology upgrading and innovation in its SME sector.[1] It is hoped that the Philippines' own efforts to enhance the competitiveness of its SMEs through technology upgrading will benefit from insights gained from the experience of Malaysia, which has made significant inroads in coordinating its SME development efforts and linking these closely to overall socio-economic goals.

This paper begins with a brief review of some basic concepts that underpin this study. It proceeds to discuss the key issues concerning technology upgrading of SMEs in Malaysia, followed by a description of specific programs and activities that have been undertaken to address the constraints faced by Malaysian SMEs. By juxtaposing the Malaysian experience with available literature on SME development and technological upgrading in developing economies, we derive several insights that might be relevant to policymakers and other key players involved in SME development efforts in the Philippines and in other similarly situated developing economies.

CONCEPTUAL FOUNDATIONS

Innovation and the innovation process

McAdam and Armstrong (2001) defined innovation as "the harnessing of creative ability within individuals and the workforce in response to change, by doing things differently or better across products, processes or procedures." Their definition is an attempt to integrate previous definitions derived from literature (Mogee and Schact, 1980; Drucker, 1985; Mole and Elliot, 1987; and Brown, 1994).

For other authors, 'innovation' must be distinguished from 'upgrading'. Kaplinsky and Morris (2003), for example, defined 'innovation' as the ability "to ensure continuous improvement in product and process development" and 'upgrading' as innovation that is placed in a relative context, i.e. how fast the process is undertaken compared to competitors. Giuliani, Pietrobelli, and Rabellotti (2003), on the other hand, defined upgrading as "innovating to increase value added", one that can be achieved "by entering higher unit value market niches, by entering new sectors, or by undertaking new productive (or service) functions."

Tidd, Bessant and Pavitt (1997) offer a useful framework for determining the type of innovation adopted by firms. They said that innovation can be reckoned in terms of what is changed (i.e. product, service, or process) and of the perceived extent of change (i.e. incremental transformation and radical transformation). An alternative would be the classification scheme

utilized by Kaplinsky and Morris (2003) and by Humphrey and Schmitz (2003), who identified four trajectories that firms can adopt in pursuing the objective of upgrading: process upgrading, product upgrading, functional upgrading, and chain (or inter-sectoral) upgrading. These categories, according to Humphrey and Schmitz (2003) "are finding rapid acceptance in the international debate", and suggest that firms can, indeed, follow a hierarchy of upgrading as suggested by Gereffi (1999).

For Virasa and Tangjitpiboon (2000), technological innovation activities are all those scientific, technological, organizational, financial and commercial steps that actually, or are intended to, lead to the implementation of new or improved products and processes. The main activities involved are the acquisition of knowledge (patents, licenses, technical services, etc.), the acquisition of machinery and equipment, and various other preparations for production delivery, including tooling up, staff training, marketing, and R&D.

Gudmundson, et. al. (2003) concluded that "the innovation process is complex," an observation shared by other innovation scholars such as Tidd, et. al. (1997), who said that "technological opportunities and threats are often difficult to identify, innovation strategies difficult to define, and outcomes difficult to predict." This is due to the large number of variables that have been associated with innovation in a number of studies such as those undertaken by Damanpour (1991), Link and Bozeman (1991), and Scherer (1991). In fact, there are several innovation models, as summarized by Gudmundson, et. al. (2003), that attempted to explain the innovation process within organizations. These include the models developed by West and Farr (1989), by Woodman, Sawyer, and Griffin (1993), and by Hauser (1998).

The context of innovation

Innovations undertaken by firms do not take place in a vacuum, since firms are open systems that operate within a broader business environment. Businesses must take into consideration the industry and sector to which they belong, their relative size within their industry, the life cycle of technology, and their relative position in supply chains. Worth noting, therefore, are the studies done by Gereffi (1994, 1999 and 2001), and other scholars building on his work (Lee and Chen, 2000; Schmitz and Knorriga, 2000; Bair and Gereffi, 2001; Bazan and Navas-Aleman, 2001; Kishimoto, 2002; and Humphrey and Schmitz, 2003). These studies provide empirical evidence that innovation and upgrading practices of firms are influenced by how they are inserted in global value chains and by their relationships with other productive players in the chain.

There has also been increasing awareness that innovation "implies processes of change undertaken by firms that are affected by a broad set of economic, political, social, cultural, scientific and technological issues" (Arocena and Sutz, 2000). It is in the general framework or "climate" generated by these issues that firms decide and undertake innovative activities. This gave rise to the concept of national innovation system (NIS), which can be defined as:

> *"an interactive system of existing institutions, private and public firms (either large or small), universities and government agencies, aiming at the production of science and technology within national borders. Interaction among these units may be technical, commercial, legal, social, and financial as much as the goal of the interaction may be development, protection, financing or regulation of new science and technology" (Niosi, et. al., 1996).*

An NIS has also been defined "as a historically grown subsystem of the national economy in which various organizations and institutions interact with and influence one another in the carrying out of innovative activity" (Balzat and Hanusch, 2004).

The various definitions of NIS recognize the need to reckon innovative activity beyond the product and process innovations of firms and industries. Other factors such as "learning processes, incentive mechanisms, or the availability of skilled labor", as well as the interplay between organizations and institutions, are highlighted as well (Balzat and Hanusch, 2004).

Over the years, the NIS approach "disseminated rapidly through the economics of innovation literature" having been applied to reveal the structure of, and the main actors involved in, innovation processes not only in highly industrialized countries but in developing countries as well (Balzat and Hanusch, 2004). This led to the introduction of related approaches, some of which have gained currency in the innovation literature over the past few years. Among the alternatives to the concept of national innovation systems are the following: regional innovation systems, sectoral innovation systems, technological systems, and industrial clusters.

In line with the spirit of innovation systems, Virasa and Tangjitpiboon (2000) proposed a conceptual model that illustrates the context within which firms undertake innovation activities. According to them, a firm's innovation activities are determined by firm-specific conditions, demand conditions, country-specific conditions, and supporting conditions, which, in turn, are influenced and surrounded by the intermediate environment and the greater environment related to the firms' business operations.

Approaches for supporting innovation and technology upgrading

A good starting point to promote innovation is to improve a country's absorptive capacity. Public policy can initially focus on enhancing knowledge flows in an economy. Among the strategies identified by Feinson (2003) to address this goal are the following: (a) acquiring foreign technology (i.e. importing capital goods; attracting foreign direct investments); (b) using and diffusing technologies (i.e. establishing institutions and networks that dissipate the tacit and codified knowledge underlying novel technological systems; subcontracting); (c) improving and developing technology (i.e. incremental improvements in processes, inputs, or equipment; formal R&D once developing firms reach a certain stage of technological proficiency); (d) investing in human capital from the primary / secondary level to the university level; (e) establishing R&D laboratories to

undertake reverse engineering, to tailor technologies that fit the needs of specific customers, and to keep pace with international and industry trends.

Carlsson (2002) suggested that public policy should focus on removing obstacles to creativity and on fostering entrepreneurship, rather than on taking new initiatives (e.g. formation of new clusters). He argued that formation of new clusters can be facilitated, but not directed, and that planning cannot replace the imaginative spark that creates innovation. However, once clusters form, "a comprehensive set of facilitating policies, from information provision and networking to revision of existing tax codes, regulations, labor laws, etc., may be necessary." In short, the primary role of public policy is to create incentives to filling gaps of competence blocs, removing bottlenecks, achieving critical mass, and addressing deficiencies in the entrepreneurial climate.

Changes in the global business environment, differences in the levels of economic development, and unique cultural contexts have led to a variety of approaches in formulating policies and implementing programs that support innovation and technology upgrading in developing countries, particularly in Southeast Asia. According to Turpin, et. al. (2002), significant developments that have contributed to these new approaches include the following:

> *Recognition that there is little national economic benefit in strengthening knowledge producing and support institutions independently from technology capacity building in wealth creating firms. This has reinforced a growing trend among governments to focus explicitly on firms as the prime agents of innovation supported by specialist capabilities and technical services provided by public institutions.*
>
> *Majority of important decisions within firms concerning what to produce and how to produce it is crucially influenced by the way in which the owners and managers of firms respond to the incentives available to them. There has been a growing emphasis in most countries to design and introduce financial incentives to stimulate technology development in firms that can maximize the flow of technical skills and knowledge throughout (as well as beyond) the sector in which they are operating.*
>
> *Recognition that learning and technology acquisition is a continuous, cumulative and incremental process. Associated with this has been the need to bridge local, national and international knowledge and innovation systems, rather than focusing on developing an isolated national innovation system.*
>
> *Recognition of the importance of industry clustering in the process of collective acquisition of skills and the diffusion of technology among smaller firms. This has moved the policy focus away from single sectors and toward the identification of clusters of sectors and interacting firms and institutions and emphasized the salience of knowledge networks rather than simply technology itself in driving innovation.*
>
> *Technological systems vary in character and extentwithin national economies and consequently lead to different technological capabilities. In some regions there are particularly dynamic innovation environments where information and knowledge are rapidly diffused. This raises the capacity of firms and support institutions and reduces uncertainty and risk.*

While the globalization of multinational firms has progressed there has been a trend toward increased localization of many decisions within these firms and an industrial reliance on knowledge intensity rather than capital or labour intensity.

SME DEVELOPMENT IN MALAYSIA – POLICY ENVIRONMENT AND INSTITUTIONAL SET-UP

Policy environment

Among the thrusts of the Ninth Malaysia Plan (9MP), which covers the period 2006-2010, are to move the economy up the value chain, to raise the capacity for knowledge and innovation, and to address persistent socio-economic inequalities constructively and productively. Part of the initiatives being undertaken to achieve these goals are strategies aimed at SME development, which has been identified as one of the government's key priorities. Under the 9MP, the principal SME policy is "the development of a competitive, innovative and technologically strong SME sector that is able to contribute to the domestic economy and to compete globally" (SME Annual Report 2006). Strategies are directed at acquiring technologies to propel SMEs up the value chain in the manufacturing, agriculture and services sector.

Priority has been given to programs that encourage collaborative ventures among MNCs, government-linked companies (GLCs) and SMEs to facilitate technology transfer and skills development and marketing, and that create links to enable SMEs to become reliable suppliers for global outsourcing networks. Moreover, entrepreneurship programs, including advisory and outreach services, have been expanded to equip SMEs with new and improved management and business practices, methods in production, quality improvement, marketing and distribution. Also given attention are programs that further develop technical skills amongst SMEs, especially in generating innovation and creating economic value from knowledge application.

The priority given to SME development is likewise reflected in the Third Industrial Master Plan (IMP3). The IMP3 recognizes the need to strengthen the core competencies of SMEs, to enhance their entrepreneurial skills particularly in financial management and marketing, to upgrade their technological capabilities, to help them conform to international regulations and standards needed to successfully penetrate overseas markets, and to create a conducive business environment by providing a supportive regulatory and institutional framework.

To provide a roadmap for government ministries and related agencies involved in SME development, the National SME Development Council established the national SME Development Blueprint, an annual action plan (first implemented in 2006) that outlines objectives, strategies and targets, as well as key programs and financial commitments, for SME development in a particular year.

The Blueprint "acts as a coordinated platform" for concerned ministries and agencies to implement comprehensive programs meant to support SMEs in a holistic manner. The following strategic thrusts were identified to guide the implementation of these programs: (a) enhancing the competitiveness of SMEs; (b) capitalizing on outward investment opportunities; (c) driving the growth of SMEs through technology, knowledge and innovation; (d) instituting a more cohesive policy and supportive regulatory and institutional framework, and (e) enhancing the growth and contribution of SMEs in the services sector.

Institutional set-up

In Malaysia, policymaking is the responsibility of the National SME Development Council (NSDC), which was established in June 2004 during the 8MP and IMP2 periods. The Council, chaired by the Prime Minister, represents the Government's top-level commitment to promote SME development.

Specifically, the NSDC aims to formulate broad policies and strategies to facilitate the overall development of SMEs across all sectors; review the roles and responsibilities of government ministries and agencies (i.e. the "stakeholders") responsible for SME development; enhance cooperation and coordination, as well as guide stakeholders to ensure effective implementation of SME development policies and action plans; encourage and strengthen the role of the private sector in supporting the overall development of SMEs; and provide emphasis to the development of Bumiputera SMEs across all sectors of the economy (http://www.smeinfo.com.my).

There are at least 12 ministries and 38 agencies supporting the government's SME development efforts. Each of these organizations has been tasked with specific development objectives aimed at particular target groups.

Taking the lead in the implementation of SME development programs is the Ministry of International Trade and Industry (MITI), which has several attached agencies, namely the Malaysian Industrial Development Authority (MIDA), the National Productivity Corporation (NPC), the Malaysia External Trade Development Corporation (MATRADE), the Malaysian Industrial Development Finance Berhad (MIDF), and the Small and Medium Industries Development Corporation (SMIDEC).

Other government ministries that are involved in programs that address SME concerns are as follows: Ministry of Agriculture and Agro-based Industry, Ministry of Domestic Trade and Consumer Affairs, Ministry of Entrepreneur and Cooperative Development, Ministry of Human Resources, Ministry of Plantation Industries and Commodities, Ministry of Rural and Regional Development, Ministry of Science, Technology and Innovation, Ministry of Tourism, Ministry of Culture, Arts and Heritage, Ministry of Housing and Local Government, and Ministry of Higher Education.

Also performing critical roles in SME development are other government agencies such as Bank Negara Malaysia, Export-Import Bank of Malaysia Berhad, Malaysian Venture Capital

Management Berhad, and Malaysia Debt Ventures Berhad; the accredited skills development centers located throughout the country; and the various industry associations led by the Federation of Malaysian Manufacturers (FMM) and the National Chamber of Commerce and Industry of Malaysia (NCCIM).

SME DEVELOPMENT IN MALAYSIA – KEY CHALLENGES AND GOVERNMENT RESPONSE

Many of the strategies and programs implemented by government have resulted into positive gains for the SME sector in Malaysia, as can be gleaned from official statistics of the number of programs administered, the amount of money released, and the total number of beneficiaries. In 2006 alone, a total of 213 major programs, involving a total expenditure of RM7.8 billion, were implemented. These programs focused on enhancing the capacity and capability of SMEs, particularly in the areas of entrepreneurship development, marketing and promotion, product development and technology enhancement. It was estimated that the implementation of these programs benefited more than 287,000 SMEs (SME Annual Report 2006).

These gains notwithstanding, there remains a lot to be done to further strengthen the innovative capacity and global competitiveness of Malaysian SMEs, and to ultimately deepen the country's industrial structure. In fact, Bank Negara Malaysia's SME Survey in 2001 revealed that Malaysian SMEs are still mostly inward-looking and are faced with constraints in management and technological capabilities, limiting their ability to compete and to add value effectively. This is consistent with an earlier observation of Lall (1999) that the bulk of the Malaysian industry sector "consists of small traditional firms using low-technology and low-skill technologies."

In this section, we focus on developments in three major areas: (1) providing financial assistance for technological upgrading; (2) strengthening SME linkages with large firms and universities; and (3) developing human capital. Since these areas have been the target of various programs and incentives, it would be interesting to examine the efforts that have been undertaken and to see the progress that has so far been made.

Financial assistance for technological upgrading

Recognizing the financial constraints faced by many SMEs, the government offers incentives in the form of grants and soft loans that are provided by various ministries and their agencies. Funds are also channeled through developmental financial institutions as well as commercial financial institutions. Worth noting are the various matching grants that are meant to finance product and process improvement, quality certification and management system improvements, market development, skills upgrading, factory audit, and acquisition of strategic technology (see Table 2). An example of these grants is the MOSTI-administered Technology Acquisition Fund (TAF). The Fund aims to promote technology upgrading through the introduction and utilization of technologies

in the manufacturing and physical development of existing and new products or processes; and to increase wealth creation and technology content of Malaysian companies through the acquisition of foreign technology (i.e. licensing, non-exclusive purchase of technology, or outright purchase of technology).

Project proposals eligible for consideration under the TAF must be listed in the following priority technology clusters: biotechnology, agriculture, ICT, and industrial (e.g. advanced materials, advanced manufacturing, alternative energy). Funding is up to a maximum of 50% of project cost or RM2 million, whichever is lower, depending on the merits of each application. In 2006, eight companies were recipients of funds worth RM8 million.

Aside from grants, the government also offers a variety of loans, such as the Fund for Small and Medium Industries 2, New Entrepreneurs Fund 2, Rehabilitation Fund for Small Businesses, Bumiputera Entrepreneur Project Fund, New Trade Finance Products for SMEs, Soft Loan for Small and Medium Enterprises, Soft Loan Scheme for Factory Relocation, and Soft Loan Scheme for ICT Adoption.

Table 2: Financial assistance for Malaysian SMEs

Name of grant / fund	Description
Matching Grant for Business Start-Ups	Government shoulders 50% of approved project cost. Maximum grant per application: RM40,000. Eligible expenses include the following: preparation of business plan, related feasibility studies, rental of incubators and business premises up to 24 months, rental of equipment and machineries related to incubator rental, development of prototype, and product sample and testing
Matching Grant for Product and Process Improvement	Government shoulders 50% of approved project cost. Maximum grant per application: RM500,000. Eligible expenses include: technology feasibility studies, fees for technology transfer, development of prototypes and system design, product testing, product registration, marking and labeling, machine and equipment testing and calibration, initial patent registration / patent search / IP protection, etc.
Matching Grant for Certification and Quality Management System	Government shoulders 50% of approved project cost. Maximum grant per application: RM250,000. Eligible expenses include those incurred in obtaining certification and quality management systems such as ISO 13485, ISO 14000, ISO 22000, Hazard Analysis Critical Control Point (HACCP), Halal certification, Good Manufacturing Practice (GMP), Occupational, Safety and Health Management System (OSHA), etc.
Grant for Enhancing Marketing Skills of SMEs	Government shoulders 50% of the cost of training. Scheme covers the participation or training fees for approved courses under the following general categories: Sales Performance Training, Customer Services Training, and Marketing.
Matching Grant for Enhancing Product Packaging	Government shoulders 50% of approved project cost. Maximum grant per application: RM200,000. Eligible expenses include cost and services for designing, packaging, marking and labeling, and expenses incurred for trade mark and patent registration, and purchase of related machinery and equipment.

Table 2: Financial assistance for Malaysian SMEs	
Name of grant / fund	Description
Matching Grant for Development and Promotion of Halal Products	Government shoulders 50% of approved project cost. Maximum grant per application: RM150,000. Expenses incurred in developing halal products are eligible, including: product development and product formulation, sample testing, acquisition of machinery and equipment, renovation expenditure for compliance to halal certification requirement, etc.
Grant for Skills Upgrading	Government shoulders 50% of the cost of training. Remaining costs can be claimed through HRDF. Scheme is aimed at enhancing the skills of SMEs in the technical and managerial levels, particularly in critical areas such the electrical and electronics, information technology, industrial design and engineering fields.
Grant for RosettaNet Standard Implementation	Government shoulders 50% of approved project cost. Maximum grant per application: RM100,000. Provides assistance for local companies to implement the complete RosettaNet Standard, the adoption of which allows companies to conduct business electronically through common codes for sourcing parts and components with their partners, suppliers and buyers.
Matching Grant for Market Development	Companies can obtain a 50% reimbursable matching grant on the approved cost of the eligible activities, which include the following: participation in trade and investment missions, export market study, participation in local or overseas international trade fairs, initial cost of setting up office overseas, etc.
Brand Promotion Grant	Aims to develop and promote in the international market, brand names owned by Malaysian companies for products and services originating from Malaysia; 100% reimbursable grant for the development and promotion of brand up to RM1 million (for SMEs).
Source: SMIDEC Policies, Incentives, Programmes and Financial Assistance for SMEs, summarized by author	

SMIDEC, in its 2005 Annual Report, revealed the following:

The number of approvals for grants and soft loans in 2005 increased by 48.4 per cent to 1,465 compared with 987 approvals in 2004. The total value of loans increased from RM42.9 million in 2004 to RM104.6 million in 2005. Of the 1,465 approvals, 1,316 were for grants, amounting to RM19.8 million, while 149 were for soft loans valued at RM84.8 million.

From the total grants approved, RM6 million were for the Market Development Grant, comprising 881 projects. This was followed by 324 projects under the Productivity and Quality Improvement and Certification Grant, valued at RM7.7 million, and 61 projects under the Product and Process Improvement Grant, valued at RM4.8 million.

Some grants had few takers, such as the Matching Grant for Business Start-Ups. According to SMIDEC, the low response was due to the perception that undertaking the studies is costly and has no immediate benefit to business operations.

Under the soft loan schemes, a total of RM84.8 million were disbursed to MIDF to assist SMEs in fixed assets, working capital, and project financing. A total of RM4.5 million loans were disbursed under the Soft Loan for Factory Relocation, which encouraged SMEs to relocate their operations to approved industrial sites. Moreover, a total of RM2.8 million was disbursed under the Soft Loan for ICT Adoption, enabling 16 successful SME applicants to invest on requisite software, hardware, and ICT training.

Table 3: Summary of approved grants for SMEs

Name of grant / fund	No. of approved applications	Value (RM)
Matching Grant for Certification and Quality Management System	324	7.68 million
Matching Grant for Market Development	881	6.0 million
Matching Grant for Product and Process Improvement	61	4.84 million
Matching Grant for Development and Promotion of Halal Products	10	1.54 million
Matching Grant for Enhancing Product Packaging, Design and Labelling Capabilities	16	490000
Grant for RosettaNet Standard Implementation	18	390000
Matching Grant for Business Start-Ups	2	25000
Source: SMIDEC Annual Report 2005, summarized by author		

Strengthening SME linkages

As mentioned earlier, SMEs must not only seek to improve their organizational capabilities, but also learn how to leverage on the resources of other organizations, especially large firms and producers of knowledge such as universities and research institutes.

Linkage with MNCs

An important strategy to promote 'technological deepening' through technology spillovers is encouraging linkages among large firms (particularly MNCs) and local SMEs. The expectation is that through subcontracting linkages, SMEs are able to benefit from the technical assistance, information, and training provided by large foreign and local companies to their suppliers.

The influx of MNCs in Malaysia during the FDI boom of the late 1980s and early 1990s, however, did not result in the expected degree of technology transfer. While Malaysian companies have increasingly mastered operational technologies due to their relationship with MNCs either as suppliers or as service providers, few have graduated to higher-value activities such as designing, branding, and high-level R&D because these activities were being done by the MNCs themselves. In short, local firms have succeeded in undertaking process and product upgrading because of the

requirements of their MNC clients, but they are not likely to engage in functional upgrading because this would mean encroaching on their clients' turf. Many of these local firms belong to captive value chains, in which "radical product and functional upgrading may be restricted by the interests of the lead firm" (often the large MNC) (Humphrey and Schimtz, 2000; 2003).

To address this situation, the Malaysian government revised its industrial development policy to encourage technology spillovers and to speed up industrial deepening. One major program geared towards this goal is SMIDEC's Industrial Linkage Program (ILP), which fosters partnership between SMEs and large-scale industries (LSIs). Under the ILP, support is given to enhance the capacity and capability of local SMEs in meeting quality, technical specifications and delivery schedules, as well as in maintaining cost and price competitiveness. By participating in the ILP, SMEs are expected to achieve a high level of competency in supplying parts and components required by the LSIs, which could pave the way for their entry into the regional and global markets.

According to the SMIDEC Annual Report 2005, 1,088 SMEs from various sectors were registered under the ILP, out of which 415 SMEs (38.1%) were linked to MNCs and large companies. In 2005 alone, the 157 SMEs that were linked to LSIs generated potential sales amounting to RM96.8 million. During the same period, a total of 108 SMEs in the food and non-food sectors were linked by SMIDEC to hypermarkets as potential suppliers. Out of these, 31 SMEs have been appointed, with total sales valued at RM2.1 million. Six have progressed to become suppliers to the hypermarkets under their in-house brand.

Another key program is the Vendor Development Program (PPV), which is administered by the Ministry of Entrepreneur and Cooperative Development (MECD). Launched in 1998, the PPV supports the localization program emphasized by government in order to increase local content of manufactured goods.

Under the program, SMEs are given opportunities to become vendors through outsourcing activities established by anchor companies (local conglomerates, GLCs and MNCs). Facilities such as financing, training and technical support services are provided by government, with cooperation from technical agents, anchor companies, as well as banks and financial institutions. The PPV's main objective is "to develop SMI entrepreneurs as component manufacturer and suppliers, as well as service providers, to local conglomerates and MNCs for local and international markets (MECD Annual Report 2005).

In implementing the PPV, the MECD has established industrial networks and collaboration with certain industries to identify new potential sectors for vendor development. It also collaborates with technical agencies, specifically SIRIM Berhad, Kulim Technology Park Corporation (KTPC), National Productivity Centre (NPC) and Malaysian Timber Industrial Board (MTIB) to increase product quality, productivity, as well as the technical and technological knowledge of the vendor companies.

For the 8MP, MECD had targeted to appoint and develop a total of 175 SMI vendor companies. As of the end of 2005, the total number of vendors developed reached 135 companies, an achievement of 77%. From 1998 to 2005, a total of 391 SMI vendor companies had been

appointed and developed in various fields (see Table 4). Of the total, 255 companies (65%) are still operational. Most of which are involved in domestic markets, while a few have already exported their products to the international markets. According to MECD, "continuous efforts are being made to assist SMI vendor companies to increase sales through market acquisition from non-anchor companies."

Table 4: Number of vendor companies by sector until 31 December 2005*

No.	Fields	Vendors	%
1	Wooden furniture	91	23.3
2	Automotive including motorcycle	76	19.4
3	Electrical and electronics	75	19.2
4	Building equipment	34	8.7
5	Shipbuilding and repair	24	6.1
6	Filming	23	5.9
7	Petroleum and gas	22	5.6
8	Telecommunications	17	4.3
9	Food	11	2.8
10	Services	10	2.6
11	Multimedia	5	1.3
12	Machinery and engineering	3	0.8
	Total	391	100.0

* Cumulative total since 1988; Source: MECD 2005 Annual Report

From 1998 to 2005, 94 anchor companies had been listed as participating under the PPV (see Table 5). The anchor companies' participation helps Bumiputera (native Malay) SMI entrepreneurs to increase the existing vendor companies' sales and market coverage, as well as to increase the volume of purchase of Bumiputera products by MNCs and GLCs. This is reflected in the increase of 17.5% in the percentage of estimated sales from vendor companies to anchor companies in 2005 compared to 2004.

Table 5. Total number of anchor companies by sector in 2005*

No.	Sector	Vendors	%
1	Electrical and electronics	41	43.6
2	Wooden furniture	14	14.9
3	Building equipment	6	6.4

Table 5. Total number of anchor companies by sector in 2005*			
No.	Sector	Vendors	%
4	Automotive	5	5.3
5	Film production	4	4.3
6	Telecommunications	3	3.2
7	Food	3	3.2
8	Services	3	3.2
9	Shipbuilding and repair	2	2.1
10	Aerospace	2	2.1
11	All others	11	11.7
* Cumulative total since 1988; Source: MECD 2005 Annual Report			

However, the participation of MNCs in the PPV has decreased, given the voluntary nature of the program. MECD attributed this to "the absence of attractive incentives offered by the government to draw the MNC's interests to join PPV." MECD acknowledged that "the existing incentives such as income tax reduction on expenditures involving training, development and product testing upon SMI vendor companies are quite insignificant in terms of value." A more compelling reason is that MNCs would rather acquire components' supply from external sources with more competitive pricing. This implies that many local SMI vendors, in spite of the support they got from the PPV, have yet to achieve a certain level of competitiveness in relation to foreign suppliers.

SME linkages – the Penang experience

Much has been written about the success of Penang in strengthening the capabilities of local firms through technology absorption and diffusion (Rasiah, 1995; 1999; 2001; Narayanan, 1997; Lall, 1999; Best, 2007). Linkage development became evident in Penang by the late 1980s, during which a number of semiconductor MNCs sponsored the growth of some locally-owned machine tool suppliers. This was followed by the establishment of several assembly subcontractors who formed long-term supply relationships with local audio companies and computer electronics MNCs.

According to Felker and Jomo (2007), the Penang Development Corporation (PDC) played a pivotal mediating and supporting role in encouraging linkage growth. As MNC's local sourcing grew, the PDC surveyed likely supplier firms, published sourcing guides, helped suppliers locate in the FTZs, and assisted them in winning investment incentives from the federal investment agency, MIDA.

Today, Penang has world-class manufacturing capabilities in mass production, including JIT and TQM systems, with a number of examples of flexible mass production. More importantly, there

has been a transition to a regional supply base with a growing degree of local horizontal integration. Proof is the emergence of a locally-owned supplier base with increasing capabilities in technology management (Best, 2007). In other words, there is a relatively higher level of technology diffusion in Penang (as compared to the Klang Valley), as evidenced by a much higher proportion of local outsourcing by local firms to second and third tier suppliers (Rasiah, 1994; Narayanan, 1997; Best, 2007).

Linkages with universities and public research institutes

Ideally, collaboration between producers of knowledge (i.e. universities and public research institutions) and users of knowledge (i.e. firms) will allow both parties to leverage on the physical and human resources of each other. More importantly, this collaboration is essential "so that the fruits of public R&D can contribute towards the acquisition and strengthening of the nation's technological capabilities" (Thiruchelvam, 2004).

However, a government survey of 5,232 research projects carried out during the 1990s in public research institutes (PRIs) and universities found that only 5.1 per cent had resulted in commercial applications (Utusan Malaysia, 24 January 2004, as cited by Felker and Jomo, 2007). This was largely due to the weak linkage between universities and PRIs with the private sector.

Among the reasons for the weak linkage, according to Thiruchelvam (2004), are as follows:

Heavy dependence of universities and PRIs on funding provided by the Intensification of Research in Priority Areas (IRPA) program. Since funding is quite easy to obtain, there was no motivation for universities and PRIs to aggressively reaching out to industry.

Failure to enforce self-financing targets for research undertaken by PRIs and universities due to weak implementation capacity
Lack of incentives for researchers to collaborate with industry, coupled with the perception that working with industry is 'second class' compared to doing academic research

Industry's lack of confidence in the ability of universities and PRIs to address their problems due to several factors, including poor adherence to tight timelines by university staff, and lack of customer-service mentality among universities and PRIs

Inability of PRIs and universities to address the need of industry for simple adaptations or improvements to existing processes rather than for sophisticated technologies

Inability of PRIs and universities to promote their research findings in terms that businesses best comprehend, i.e. cost savings or increased profits / sales

Government funding mechanisms only cover core research aspects of a project and not subsequent related activities that are crucial in transforming it to a form readily-adopted by the end-user. Funding for pre-technical, prototype construction, design/engineering, technical

extension and marketing activities undertaken by PRIs and universities are not provided. As a result, most research outputs, especially from universities, are at a stage where further development work is required before they can be adopted by industry.

Several steps have been taken to strengthen the linkage between universities / PRIs and industry. For example, several public universities in Malaysia have set up Innovation and Commercialization Centers (ICCs) that are tasked not only to find commercial applications for technologies developed by academic staff, but also to promote collaboration between university researchers and corporations (or entrepreneurs) that are interested in licensing these technologies or developing these technologies further into commercially viable products.

These initiatives, however, are still at the initial stages and are hampered by several problems (e.g. capability of university researchers to translate their research jargon into a language understandable to business people; managing the expectations of interested companies / entrepreneurs concerning the readiness of prototypes to be produced in commercial quantity, and settling intellectual property issues)[2]

Other government initiatives that address the above-mentioned constraints are the Technology Development Cluster Program and the Commercialization of Research and Development Fund (CRDF).

The Technology Development Cluster Program, which is spearheaded by the Malaysian Technology Development Corporation (MTDC), aims to develop a cluster of high-technology companies operating within universities and research institutes in an environment that enables interaction and enhances collaboration. It is hoped that this collaboration will accelerate the commercialization activities of both local universities and research institutions.

Three incubation centers are fully operational. These are the UPM-MTDC Technology Center (located at Universiti Putra Malaysia in Selangor), which specializes in ICT, multimedia, and agricultural biology; the UKM-MTDC Technology Center (located at Universiti Kebangsaan Malaysia in Selangor), which specializes in biotechnology; and the UTM-MTDC Technology Center (located at Universiti Teknologi Malaysia in Johor), which specializes in advanced engineering and life sciences (MTDC, 2007). As at end 2006, these three centers host a total of 48 companies.

Also administered by the MTDC is the Commercialization of Research and Development Fund (CRDF), which has been redesigned in line with the goals of the 9MP. Among its goals are to increase the commercialization of science, technology, and innovation (STI) products and processes developed by universities, research institutions, and companies; to increase wealth creation and technology content of SMEs and large corporations through the commercialization of R&D done by local universities and research institutions; and to foster greater collaboration between universities / research institutions and industry.

Funds are available to parties that intend to commercialize public sector R&D results via a start-up company, or to existing SMEs that want to engage in commercial production of any locally-

generated R&D results. To ensure the effective utilization of the funds, approved grants are disbursed either on a matching or reimbursement basis according to the claims submitted by the grant recipient, and in stages, subject to the satisfactory progress of the project in terms of deliverables and milestones reached.

Developing human capital

Human capital development is a key element in upgrading the technological capabilities of firms. Recognizing this, the Malaysian government has initiated various training programs to enhance the skills and quality of personnel in SMEs. While some of the training courses offer general business skills and management training, the majority are specifically designed to upgrade human resource skills needed in certain industries.

Coordination of training requirements of SME

The National SME Development Council has mandated Pembangunan Sumber Malaysia Bhd. (PSMB), an agency under the Ministry of Human Resources (MOHR), to co-ordinate and to oversee training and human resource development for SMEs. Under PSMB, training needs are analyzed and programs are kept in line with SME requirements, from the most basic to the more technically advanced. PSMB also administers the Government's Human Resources Development Fund (SME Annual Report 2006).

Among the major initiatives of PSMB in 2006 are as follows: (a) Introduction of an SME Training Accreditation System into the Myskill Card in order for SME employers to keep a record of employee training; (b) Establishment of six training committees were established by PSMB to identify SME training needs and to ensure that courses met specific and targeted requirements; (c) Train-the-Trainer and "Evaluation of Training Effectiveness" sessions for up to 250 government officers who disseminate information to SMEs about training programs; (d) Launching of the HRD Portal, a web-based portal that acts as an online training resource centre for employers, employees and training providers. The portal allows SMEs to register for training courses, to access up-to-date information on available courses, seminars, conferences, and events on human resource training. The portal also disseminates information on the training programmes offered by 29 Ministries and Agencies that are involved in capacity building for SMEs.

Productivity training

In 2006, the National Productivity Corporation (NPC) conducted a total of 215 training programmes benefiting 3,542 SMEs, focusing on Quality Management Systems, Leadership and Management Development, Production Management, Process Improvement and Customer Excellence. To further strengthen its efforts, the NPC linked up with the regional Asian Productivity

Organization (APO). Aiming to enhance the productivity and competitiveness of SMEs located in its member countries, the APO has established a Best Practice Network (BPN), which generates, shares, and transfers knowledge on best practices for the use of national productivity organizations like the NPC. The APO Best Practices Network developed a set of key performance indicators (KPIs) for SMEs to generate, share and transfer knowledge on best practices that will assist organizations in enhancing productivity and competitiveness.

Skills Development Centers

Responding to MNCs' complaints, the government acted to build a network of industrial skills institutions responsive to the changing needs of high-technology investors. In 1989, the Penang State government helped to found Penang Skills Development Center, which is managed by a committee of representatives from the firms, and supported by the State government in the form of land and personnel. The PSDC provides advanced training to industrial workers, technicians and engineers in one of Malaysia's major electronic industrial zones. Under the auspices of the Penang Development Corporation (PDC), the PSDC has played the role of "expanding the supply of technically trained workers 'in synch' with the development of technology management capabilities of enterprises in the state" (Best, 2007). Using this as a model, the federal government encouraged other states with industrial concentrations, including Selangor, Kedah, and Johor, to set up similar industry-managed training centers during the 1990s.

The federal government matched these initiatives by negotiating with the British, German, French, and Japanese governments to set up specialized training institutes, as Singapore had done a decade earlier. By 2001, the state skills development centers had trained 153,455 workers, and the 'bilateral' training institutes had graduated 7,374 trainees. Four private sector centers had enrolled 122,107 trainees, the vast majority of them in the Federation of Malaysian Manufacturers' Institute of Manufacturing courses (Felker and Jomo, 2007).

Grant for Skills Upgrading

The Scheme is aimed at enhancing the skills and capabilities of employees of SMEs in the technical and managerial levels, particularly in critical areas such as the electrical and electronics, information technology, industrial design and engineering fields. SMIDEC has appointed 22 training providers to undertake technical skills for SMEs, including skills development centers (SDCs) in Sarawak, Johor, Penang, Terengganu, Pahang, Kedah, Perak, Selangor, Negeri Sembilan, Malacca and Sabah. Other accredited training institutes are the following: German-Malaysian Institute (GMI), Malaysia Finance Institute (MFI), SIRIM Bhd, Technology Park Malaysia (TPM), Malaysian Institute for Nuclear Technology Research (MINT), National Productivity Corporation (NPC), Kumpulan IKRAM Sdn Bhd, National Institute of Occupational Safety and Health (NIOSH),

Institute of Global Management (IGM), Bureau of Innovation and Consultancy, and University of Malaya Center for Continuing Education (UMCCed).

Assistance is given in the form of a matching grant where 50% of the cost of training is borne by the government and the remainder by the applicant. In addition, the remaining costs can also be claimed through the Human Resource Development Fund (HRDF).

In 2006, a total of 1,447 SME employees attended various skills development training programs implemented by the 22 SDCs appointed by SMIDEC under the Skills Upgrading Program. The variety of available courses from these appointed SDCs range from technical skills to soft skills in marketing and management in critical areas such as the electrical and electronics, information technology, industrial design and engineering fields. SDCs were also required to install a tracking mechanism to monitor the career progress of their trainees.

Human Resource Development Fund

Recognizing that an acute shortage of skilled labor was a basic constraint on technological upgrading, the government reformed incentives related to human capital formation. In 1993, the government replaced an existing tax incentive for corporate training expenses with the Human Resources Development Fund (HRDF), an industry sector-wide payroll levy and training subsidy scheme. Firms employing more than 50 workers were required to contribute one per cent of their payrolls to the Fund, and could apply for reimbursement of a percentage of expenses on approved training programs or submit their in-house annual training plans for approval.

Over the next decade, the Fund collected some RM1.03 billion in employer payroll levies. In 1996, the government extended the scheme to small and medium sized industries (SMIs), with a RM20 million allocation to offer an enhanced training subsidy. By the end of 2001, though, only 17 per cent of these funds had been disbursed, and only 3 per cent of the country's SMIs had enrolled in the training program (Felker and Jomo, 2007).

Talent crunch remains

According to Jomo (2007), Malaysia has decent primary education, high literacy rates and widespread acquaintance with the English language. It also has rising enrolments at higher levels of secondary and tertiary education. All these have provided a trainable and efficient basic workforce, which sustained industrial development quite effectively before the 1990s. However, this level of formal skill creation is not sufficient to meet the technological needs of the expanding high technology sector, or to manage a large increase in the technological levels of SMEs.

There is growing evidence of skills shortages at all levels, particularly in technical fields. Businesses complain about the constraints to upgrading and deepening posed by the lack of particular skills, and by high turnover rates for middle level skilled employees (Jomo, 2007). These are symptoms of weaknesses in Malaysia's higher educational structure, which has tended to neglect

industry's technical needs. Tertiary enrolment rates, especially in technology-related subjects, leave much to be desired. According to Lall (1995, as cited by Jomo, 2007), there are large gaps between demand and supply at all levels of skill and for all types of education. For example, Malaysia lacks engineering and science graduates, and needs a tenfold increase in science and engineering graduates as a proportion of the population to achieve the same levels found in Singapore, South Korea, and Taiwan (Best, 2007).

Reforms, however, are underway especially with the formulation of the National Higher Education Strategic Plan 2007-2010 and the National Higher Education Action Plan 2007-2010, which are meant to transform the state of higher education in Malaysia.

SME DEVELOPMENT POLICY AND EFFORTS IN MALAYSIA: INSIGHTS FOR THE THE PHILIPPINES

Before I list down insights gained from the Malaysian experience, a brief comparison of the SME environment in Malaysia and the Philippines is in order. In terms of SME profile, SMEs (including micro-businesses) constitute 99.2% in Malaysia and 99.6% in the Philippines. SMEs account for 56.4% of total employment in Malaysia compared to 69.9% of total employment in the Philippines. SMEs in both countries contribute about one-third of value-added to their respective economies.

In terms of the legal framework, the Philippines has special laws for SMEs, such as the Magna Carta for Small Enterprises (R.A. No. 6977 as amended by R.A. No. 8289) and the Barangay Micro Business Enterprises Act of 2002 (R.A. No. 9178). This is not the case in Malaysia. Both countries, though, have included incentives for SMEs in their investment laws, tax laws, and free zones acts.

Table 6: Overview of SME policy, framework, and development efforts - Malaysia and the Philippines compared

Areas of comparison	Malaysia	Philippines
Legal framework	Laws • Promotion of Investments Act of 1986 • Income Tax Act 1967 • Customs Act 1967 • Sales Tax Act 1972 • Excise Tax 1976 • Free Zones Act 1990	Special laws for SMEs • Magna Carta for Small Enterprises • Barangay Micro Business Enterprises Act of 2002 Laws • RA 7916 – Special Economic Zones Act • RA 7227 – Clark and Subic Special Economic and Freeport Zone • RA 8424 – Tax Reform Act

Table 6: Overview of SME policy, framework, and development efforts - Malaysia and the Philippines compared

Areas of comparison	Malaysia	Philippines
		• EO 226 – Omnibus Investment Code; Investment Priorities Plan • RA 7459 – Programs on Science and Technology, Investors and Invention Incentives Act • RA 7844 – Export Development Act of 1994
SME policy	SME development blueprint closely linked to overall economic goals; explicit reference to Ninth Malaysia Plan (9MP) and Industrial Master Plan (IMP3)	SME development plan has no explicit reference to country's Medium-term Development Plan (MTDP)
Institutional framework	Policy making: National SME Development Council (NSDC) Lead agency: Ministry of International Trade and Industry No. of ministries involved: 11 Support network: special government agencies, commercial and developmental financial institutions, skills development centers, various industry associations	Policy making: SME Development Council (SMED) Lead agency: Department of Trade and Industry No. of departments involved: 5 Support network: special government agencies and training institutions, commercial and developmental financial institutions, local government units, private sector services, NGOs, various industry associations
Resources for SME development	Comprehensive set of programs and incentives supported by financial resources	Limited funds for SME development due to fiscal constraints
Strategic thrusts	SME development driven by need to enhance competitiveness in regional & global arena.	SME development largely driven by the intent to address poverty and to provide domestic employment
Priority sectors	Increased attention given to potential growth areas, especially services (e.g. transport services and logistics, professional and management services, ICT)	Priority given to the traditional sectors (e.g. food industry, organic and natural products, wearables)
Infrastructure support	More developed infrastructure for human capital development, technological upgrading, industrial linkages, and SME advisory services	Less developed infrastructure; limited funding for public universities; limited programs for technological upgrading

Table 6 shows that while the institutional frameworks of the two countries are quite similar, there are marked differences in several areas.

First, SME development efforts in Malaysia are closely linked to overall economic goals as evidenced by the explicit references made by the SME Development Blueprint to the Ninth Malaysia Plan and the Industrial Master Plan. In the Philippines, the SME Development Plan does not refer to the Medium-Term Development Plan, at all, probably because the overall goals for SME development are spelled out in the special SME laws that were mentioned earlier.

Second, the strategic thrust of Malaysian SME development is clearly to enhance SME competitiveness in the regional and global arena, as can be gleaned by the programs and incentives offered by various government agencies. While the SME Development Plan of the Philippines also states the need to develop managerial and technological capabilities to enhance competitiveness in global markets, support programs and incentives are clearly aimed towards poverty reduction and employment generation. Moreover, the increased priority given to potential growth areas (e.g. manufacturing-related services, medical devices, metal products, transport services and logistics, professional and management services, ICT) supports the global aspirations of the Malaysian government for its SMEs. SME development efforts in Philippines, on the other hand, still prioritize the traditional sectors (e.g. food industry, organic and natural products, wearables), which is consistent with its welfare goals.

Obviously, the SME development efforts in the two countries are largely influenced by their levels of economic development. Given the relatively advanced state of its economy, Malaysia has the resources to provide a comprehensive and integrated package of programs and incentives for its SME sector. The Philippines, on the other hand, has to deal with scarce resources that might be better spent for basic infrastructure, which has been neglected over the past few years.

The differences in economic development, notwithstanding, there are useful insights that the Philippines can derive from the Malaysian case.

Link SME development efforts to overall socio-economic goals

This has allowed the Malaysian government to design a comprehensive set of programs and incentives that reinforce each other. Having a coordinating agency like SMIDEC also helps in reducing duplications and in maximizing the effectiveness of programs offered to SMEs. To be sure, some of the programs offered by the government (particularly those administered by the MECD) are still driven by the spirit of the National Economic Policy (NEP), which aimed to increase the wealth of the indigenous Bumiputera population through affirmative action programs. However, the goals and strategies stated in both the 9MP and IMP3 have served to redirect resources to more growth-oriented programs.

Adjust policies and programs to fit environmental realities

Over the years, Malaysia has adapted its technology policy "in response to evolving global about key sources of competitiveness" (Felker and Jomo, 2007). For example, the failure of the 'science push' model of innovation led the government to a more systemic approach to national innovation. This is clearly shown in the new policies and institutional reforms that were introduced to make public technology agencies and programs more responsive to the needs of industry. Policies to attract FDI have also been revised to speed up technology diffusion, particularly in identified industrial areas.

Design support programs and incentives to fit the specific needs of SMEs

According to the National Survey of Innovation 2000-2001 conducted by the Malaysian Science and Technology Information Centre (MASTIC, 2003), around 95% of the innovating companies (or 245 firms) reported that they did not receive any government support or incentives. MASTIC concluded that government support, though important for some firms, are deemed as completely irrelevant by other companies. This explains why some government programs (e.g. Matching Grant for Business Start-Ups) are not fully-utilized despite the availability of funds.

In the MASTIC survey, it would appear that the innovating companies are encouraged by market-driven factors to innovate. The main reasons firms engage in innovation are the following: (a) to improve product quality, (b) to extend product range, (c) to open up new markets or to increase market share, (d) to improve product flexibility, and (e) to fulfill certain regulations or standards. By designing programs to cater to the specific needs of industry, resources could be channelled from underutilized programs to those that would have greater impact on firms. This is a valuable lesson for the Philippines, which could not afford to pour in its limited resources on ill-designed government programs (Habaradas, 2007).

Strengthen the formal education system

The human capital deficiencies that are beginning to affect high-technology businesses in Malaysia highlight the importance of strengthening the formal education system. The reforms spelled out in the National Higher Education Strategic Plan 2007-2010 and the National Higher Education Action Plan 2007-2010 are a step in the right direction. The success of these plans, however, is largely dependent on the financial resources provided by the Malaysian government to its public universities. This might be difficult to replicate in the Philippines, where government subsidy for public universities has been dwindling over the years.

Encourage private sector participation

Forging consensus among stakeholders is imperative. The experience of Penang clearly shows the importance of closely engaging the private sector in coming up with initiatives that are meant to benefit them. Recognition must be given to the Penang State government for its success in establishing the trust needed to sustain this public-private sector partnership. It is conceivable that the same collaborative spirit can be nurtured in several areas in the Philippines, especially in cities and provinces that have been blessed with dynamic local government officials. The economic successes of Cebu, Davao, and Naga, among others, are testaments to this.

In conclusion, we can say that setting up the appropriate legal framework and providing the physical infrastructure is important in promoting technological upgrading among SMEs in a developing economy. However, building the social infrastructure is the more critical challenge. This requires a sustained effort in nurturing trust and in fostering the spirit of collaboration among the key actors (i.e. government, educational and training institutions, financial institutions, and businesses) of the national innovation system.

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ENDNOTES

[1] This paper utilized secondary data (e.g. annual reports, publications and program brochures) collected from various government ministries and agencies (e.g. MITI, MECD, MOSTI, MOHR, MOHE, MIDA, SMIDEC, NPC, MATRADE, MTDC, MDeC, SME Bank, and Bank Negara Malaysia), and primary data gathered through personal interviews with key government personnel, businessmen, and academics during the author's four-and-a-half month research fellowship in Malaysia, which was sponsored by the Nippon Foundation's Asian Public Intellectuals (API) Fellowship Program.

[2] Communication with Dr. Fauziah Md. Desa, Deputy Director of the Innovation and Commercialisation Centre of Universiti Putra Malaysia; Dr. Bahari Belaton, Acting Research Dean, Office of Research Platform of Universiti Sains Malaysia; Mr. V.V. Sarachandran (Corporate and Legal Manager), Mr. Abdul Hamid Abd. Wahab (Group Marketing Manager), and Mr. Azizi Ibrahim (Group Marketing Executive) of USAINS Holding Sdn Bhd.

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AN ALTERNATE WORLD: THE DEVELOPMENT OF A VIRTUAL U.S. BANK

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ABSTRACT

The Biz/ed site (www.bized.co.uk) based in the United Kingdom is a comprehensive website developed to support business education. While the site's central focus has been on providing educational material for the U.K., the extent and the quality of the material, as well as the fact that access is free, has encouraged educators from other countries to use the site in support of their own efforts. One of the better known components of the website is the Virtual Bank of Biz/ed. The Virtual Bank presents a full range of information and educational activities related to business banking in the U.K., the operation of the U.K.'s Central Bank and the U.K. Treasury, and their ongoing effect on the U.K. economy.

Texts on banking note similarities between banking practice in the United Kingdom and the United States, especially when compared to banking practice in France, Germany, or Japan. Based on these affirmations, the author researched the Virtual Bank of Biz/ed to see whether it could be used in support of a course in Money and Banking focused on U.S. banking practice. While there was much overlap, the differences between the history of banking development in the U.K. and the U.S., and the different political development in each country, made for significant differences in the corresponding banking systems. However the developers of the Biz/ed site were interested in the possibility of expanding the Biz/ed site to a broader audience. The author was asked to help create a separate Virtual U.S. Bank of Biz/ed using the existing U.K. based Virtual Bank of Biz/ed as a starting point. This paper discusses how the Virtual U.S. Bank of Biz/ed was built. The effort provides a model of how web material developed for one time and place can be expanded for a broader, even more international audience.

INTRODUCTION

American academic lore identifies the ideal educational model as having someone like Mark Hopkins on one end of a log and a student on the other (Kunitz, 1964). Unfortunately the image overlooks the use of technology developed to overcome the limitations of time and space inherent in the image. A lifespan limits even the work of the outstanding, and on any day a professor is able to only sit on so many logs and see so many students. Even in the 19th century, when Mark Hopkins lived, printed texts and student notes could be substituted for the professor on the log. Since then technology such as TV, videos, and the WEB have been used to supplement, and sometimes supplant, the work of educators. While perhaps arguably imperfect, such technology provides ways

to overcome some of the limitations of time and space. This article provides an example of using a new but widely available technology, the WEB, to support modifying educational material developed for one country and historical context, so that it can be used in other countries and contexts.

BIZ/ED AND VIRTUAL BANKING

In 1996, the Biz/ed site (www.bized.co.uk) was started in the United Kingdom. The objective was the development of a broad set of Internet-based learning materials that could be freely used in support of business education across the U.K. In 2002 the U.K.'s Joint Information Systems Committee (JISC), a consortium of publically funded educational entities, agreed to further support the site. In 2006 the site was purchased by Thomson Learning (now Cengage Learning). Since its founding, the site has developed an extensive body of business education materials in economics, finance, accounting, and tourism. For example the site offers free access to an extensive unit on financial ratio analysis that can be easily used in undergraduate and graduate business programs (http://www.bized.co.uk / compfact / ratios / index.htm). A similar unit on cash flow includes an animated representation of cash flow as well as a cash flow game using an example from a small business.

The Biz/ed site has also developed a set of "Virtual Worlds" where students can try to run a factory, a family farm, or even a virtual country. One of the best known of the Virtual Worlds is the Virtual Bank of Biz/ed which provides an extensive set of educational material about both commercial banking and central banking within the U.K.

Texts on money and banking written for the United States typically mention that banking in the U.S. is similar to banking in the U.K., especially when compared to banking practices developed in Germany, Japan, and France (Ritter, Silber, & Udell, 2004; Ceccheti, 2007). The typical money and banking text in the U.S. is over 600 pages long, has twenty or more chapters, and is priced between $125 and $200. There is too much material for a standard one semester course. In a search for alternatives to the use of such texts, I researched the Virtual Bank of Biz/ed at the Biz/ed WEB site to determine whether it could be used by students in the U.S. in place of a standard text on money and banking.

I was disappointed. While some of the Biz/ed sections could be used in a U.S. based course in money and banking, enough differences existed making it impossible to ask U.S. students to simply adjust to the differences.

DIFFERENCES BETWEEN U.S. BANKING AND U.K. BANKING

Closer examination of the Virtual Bank of Biz/ed site (http://www.bized.co.uk/virtual/bank/index.htm) brought to light a number of significant differences between the banking systems in the two countries. The initial differences involved spelling practices.

Table 1: Spelling and Numbering Differences	
United States Practice	United Kingdom Practice
Specializing	Specialising
Defense	Defence
Organization	Organisation
Labor	Labour
Judgment	Judgement
Check	Cheque
Behavior	Behaviour
Billion 1,000,000,000	Billion 1,000,000,000,000
The "Short Scale" Approach to a billion	The "Long Scale" Approach to a billion
Note: in 1974 the UK government adopted the "Short Scale" approach	

U.S. Students could be expected to adapt to spelling differences and introductory college math texts often note the differences between U.S. and U.K. definitions of numbers. However it also became clear the two countries used different words to describe similar functionality.

Table 2: Differences in Word Usage	
United States Practice	United Kingdom Practice
Financial Leverage	Financial Gearing
Unemployed	Claimant
U.S. Treasury Bonds	Gilts
Social Security	National Insurance
President	Prime Minister
Secretary of the Treasury	Chancellor of the Exchequer
Federal Open Market Committee	Monetary Policy Committee
U.S. Dollar $	Pound Sterling £
Budget Deficit	Public Sector Net Cash Requirement
Investment evaluation	Investment appraisal
Points (on a test)	Marks (on a test)
Gasoline	Petrol
Internal Revenue Service	Inland Revenue
Corporation	Public Limited (corporation)
Sole proprietor	Sole Trader

Using the Virtual Bank of Biz/ed in its existing form would also require learning different words and terms. In addition, as words like "President" and "Prime Minister" make their way on the list of differences, it became apparent that there were additional differences affecting the way banks in the U.S. and the U.K. operate. Banks in the U.S. and the U.K. work with different tax systems and even with different definitions of money.

Table 3: Differences in Definitions of Money and Taxation Usage	
-	"M0" and "M4" are the traditional definitions of money used in the U.K. M0 is the U.K.'s "narrow money supply" defined only as cash in circulation and on deposit with the Bank of England. M4 is the U.K.'s "broad" money supply and is defined as M0 plus money held in all bank accounts including checking and savings accounts. The U.S. defines money differently, as "M1" and "M2". M1 represents the narrow money supply but it is made up of cash in circulation plus checking account deposits, something quite different than M0. M2 includes M1 plus only small, time related deposits (under $100,000), plus savings deposits, and retail money market funds, something much less than M4. Differences in measures of the money supply are important because they determine what elements a central bank will be trying to influence as it takes action to affect the overall money supply.
-	Value Added Tax: This kind of tax is used in the U.K. but not the U.S.
-	Monitory Regulatory Committee (MRC): This committee was set up in the U.K. to determine how the U.K. would relate to development of the European Union and the common European currency. The U.S. had less immediate concerns about the development of the Euro.

Identification of these kinds of differences led to the understanding that the very political structure in each country made for differences in banking practice.

Table 4: Difference in the Political Systems	
-	When the Federal Government was set up by the States, a tripartite structure was created with distinct legislative, executive, and judicial branches. Because of the way the branches were separated and because of the use of overlapping, and fixed terms for presidential and legislative elections, it was easily possible in the U.S. for one political party to be in control of the executive branch and a different political party to be in control of the legislative branch. In practice this has meant that the executive branch and the legislative branch can, at the same time, be advocating contrary views on economic policy. The lack of a consistent economic policy supported by common executive and legislature action created difficulties for bankers.
-	On the other hand the U.K. uses a parliamentary form of government in which the prime minister comes out of the majority party or majority coalition. Elections can be held when the prime minister no longer has the majority support in parliament or the ruling party no longer has the support of voters. This means the central executive can more easily speak with a single voice about economic policy.

It quickly became clear that differences between a presidential government and a parliamentary government affected banks, and by extension, also affected educational material intended to provide instruction about banking. This led to consideration of the different structures in the two banking systems.

Table 5: Differences in Commercial Banking Structures	
-	When the States set up the Federal Government, the States kept many powers including the power to issue bank charters. Since the Federal Government was also able to issue bank charters, this meant that the U.S. developed a "dual" banking system consisting of federal banks and state banks. In addition, because of the size of the U.S., the large number of states, and laws against branch banking, the U.S. developed a banking system characterized by the large number of smaller, community based banks. For many years no bank was able to operate across state lines. This made it more difficult for banks to service large commercial enterprises.
-	The U.K. and other countries typically have developed systems with a few large banks with multiple branches. In contrast to the U.S. banking system, U.K. banks could more easily service loans for large companies.

Finally modern countries develop central banks as a mechanism to influence a country's level of economic activity. A central bank tries to accomplish this by influencing the growth of the money supply, the level of interest rates, and the level of inflation. Given the other differences identified, it was clear that both the U.S. and the U.K. would have differences in the way central banking was carried out.

Table 6: Differences in Central Banking Practice	
-	The U.S. Federal Reserve was created in 1913 after several earlier attempts to create a central bank for the U.S. The "Fed" was set up as a quasi governmental entity with significant political independence from Congress and the Executive Branch. The Federal Reserve Chair and six others are appointed by the President to the Board of Governors. Because of the size of the U.S., the Fed is further divided into twelve districts each with its own nine member board. The District Board chooses a District President who, with staff, is responsible for overseeing commercial bank operations within the district as well as assisting with clearing checks between banks. The Federal Open Market Committee (FOMC) made up of the Board of Governors and five presidents chosen from the districts regularly meets to set interest rates and monetary policy for the country.
-	The Bank of England (BOE) dates to 1694. Since its foundation the BOE has gone through several restructurings. Most recently a Monetary Policy Committee (MPC) was given responsibility to set interest rates. The BOE is expected to manage interest rates and inflation rates within a set of targets imposed by Parliament. This is unlike the Fed which has resisted the imposition of targets in the name of greater operational flexibility. In the U.K. check clearing is handled by a consortium of commercial banks rather than the BOE. In addition, unlike the Fed, bank regulation is the responsibility of another government agency.

The range of differences between U.S. banking practice and U.K. banking practice was such that it was clear that material developed to help educate future bankers in the United Kingdom would not be useful in the United States without significant modification. However, identification of the differences that had to be considered left some hope that the WEB pages that represented the Virtual Bank of Biz/ed could be modified to develop a set of pages that could be used in the U.S. With that understanding I wrote to the Biz/ed site editor and asked for permission to use the existing Virtual Bank of Biz/ed as a model for a Virtual U.S. Bank.

Understandably the Biz/ed site was unwilling to lose copyright control of the Virtual Bank of Biz/ed. The Biz/ed site had noticed that over the years more and more people from outside the U.K. were using their site. They recognized that by offering a separate Virtual U.S. Bank of Biz/ed, they could increase the site's appeal to American students. The Biz/ed then asked whether I would be willing to develop a Virtual U.S. Bank which they would agree to add to the Biz/ed site. I considered the proposal and after some discussion we drew up an agreement.

The pay was minimal but an agreement was included that my work and my university would be recognized by the Virtual U.S. Bank of Biz/ed. The agreement also included an understanding that if the Biz/ed site would start charging for access to the Virtual U.S. Bank, the students at my university would receive five years of free access to the site.

DEVELOPMENT OF THE SITE

The development of the new site was quickly initiated. An electronic copy of the Virtual Bank of Biz/ed site was transmitted as an e-mail attachment. The decision was made to make the changes in Microsoft Word rather than by using HTML or a WEB development program. Although the other approaches were possible, it was easier to work directly in MS Word and leave the actual development of the new site to the Biz/ed support staff.

Review of the Virtual Bank site showed that it had several component units for which different development strategies would be required. The first component was the Data Unit. This Unit had an extensive set of time series data related to U.K. banking. While the data was correct, it had no direct relevance to U.S. banking. In addition the data had been incorporated in the existing virtual bank along with its own site search engine. Creation of a similar unit within the Virtual U.S. Bank of Biz/ed would have been possible but a simpler alternative was chosen. The Saint Louis Federal Reserve District (http://research.stlouisfed.org/fred2/) maintains over 15,000 sets of various time series data that are easily accessible. Instead of copying this kind of data within the Virtual U.S. Bank of Biz/ed, instructions were developed about how to use the Saint Louis site to find needed macroeconomic data.

The original virtual bank had a Glossary Unit with an extensive list of financial terms. This was a real positive but spelling convention issues were again raised. To simplify the approach, the decision was made to continue to use the spelling conventions of the U.K. but also, where necessary, identify alternate ways to spell a word. In addition a brief discussion of this approach was included

at the beginning of the Unit, explaining the approach and asking for the consideration of those from outside the U.K.

The glossary unit also included a section of over 230 economic diagrams. These were all individually reviewed to determine whether they could be use with the Virtual U.S. Bank of Biz/ed. A few were found that utilized the sign for the U.K. pound (£). Again, to simplify the WEB development, the decision was made to make all components currency neutral. In effect the currency identifier was dropped everywhere except in those sections of the site that discussed currency exchange issues.

This raised the question of how to deal with the amounts in the money problems that were used to test student understanding. Fortunately, even though the British Pound will buy more than a U.S. Dollar, it was not necessary to change any of the amounts in any of the money problems. The problems gave the same answers whether the person working on the problem was thinking in dollars or pounds.

The glossary unit also contained an extensive section on acronyms. Again in the interest of simplicity, all existing acronyms were left in place, even those that were only used in the U.K. Instead acronyms used in U.S. banking were added. This way the list can be used for both virtual banks.

The Virtual Bank of Biz/ed also had a separate "In the News" Unit that incorporated a large number of articles on issues in finance, economics, and banking. Similar to the approach used with the Data Unit, explanations of how to search for and find such material on the WEB were substituted.

CURRENT STATE OF THE PROJECT

Doing the actual review and conversion of the over 200 individual WEB pages took the most time. A few pages required only one or two short changes to the header. About half the pages needed one or two sentences and sometimes a whole paragraph changed. Another half of the pages required extensive changes, especially those that summarized the history of the U.S. Federal Reserve and the politics behind U.S. banking practice. Once these changes were made and documented, the files were returned to Biz/ed, again as an e-mail attachment. As of this point in time (8/31/2008) the Biz/ed Website has set up the initial Virtual U.S. Bank of Biz/ed. This site is still under security access because it is still in the process of being finalized. In addition the site has had a complete edit. While it is good to be able to see work that has already been accomplished, I look forward to the completion of the project within a few months.

CONCLUSION

Development of the Virtual U.S. Bank of Biz/ed has been a significant learning experience for me. I have had to opportunity to explore differences in banking practice in two countries that are

the center of much of the world's banking. That exploration has given me a better appreciation of the validity of different approaches to banking. I have also been able to gain significant experience in developing a complex, online education effort. I have also had the opportunity of working with a major Internet site that supports business education. Given the value of this experience, I recommend that as we search for websites for material to use to support our educational efforts, we also broaden our view and look for situations where we could become involved in modifying Internet material in support of a wider audience.

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