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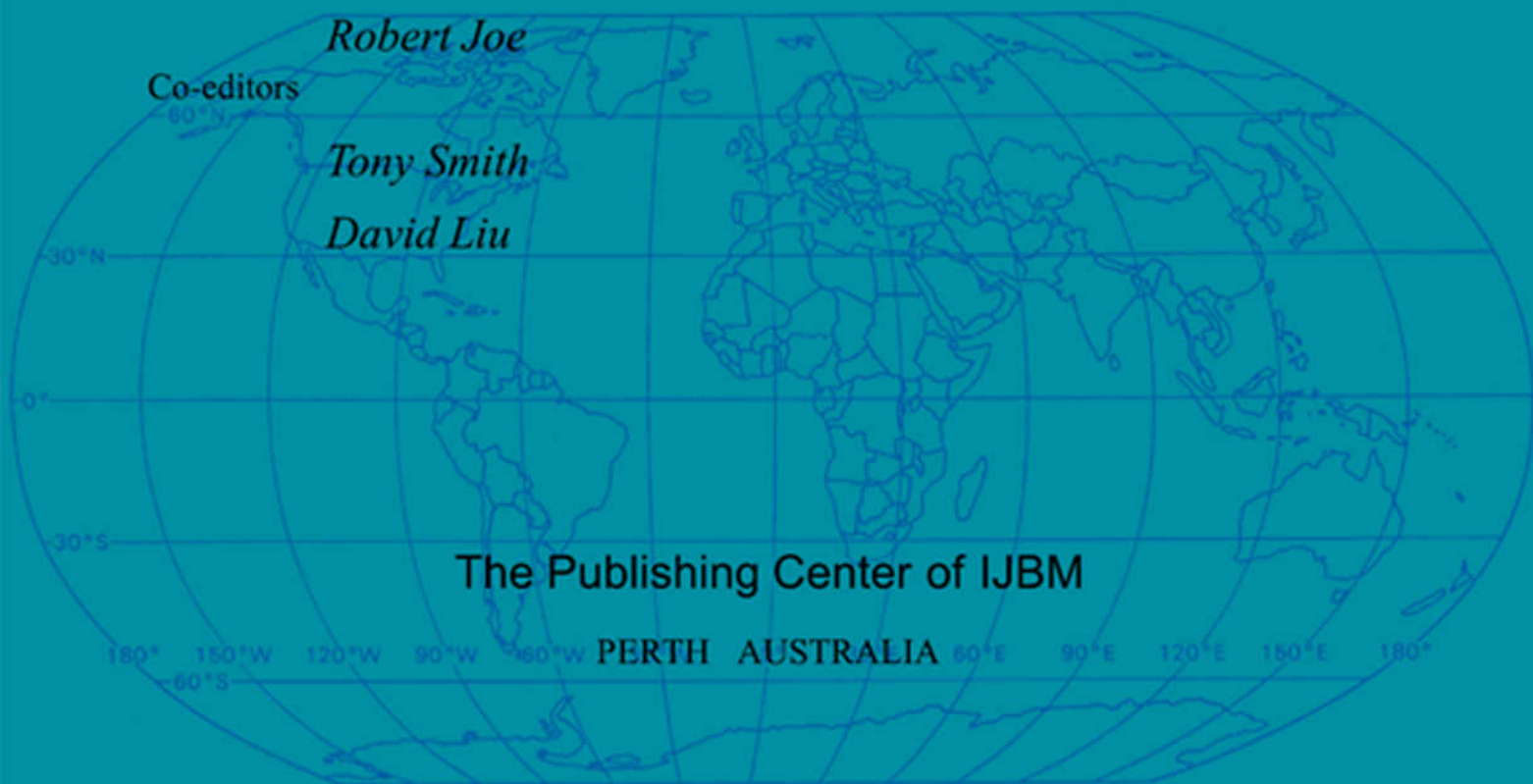# Business and Management

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Contents

Projects and Their Management: A Literature Review

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Abstract

Over the years and more importantly in the recent past projects have been used as a delivery mechanism to do business and accomplish objectives. No wonder it has become one of the fastest growing professions in the world. Although the understanding of what constitutes a project and what doesn't continues to be a topic of debate. This paper attempts to provide literature search on what is a project, its classification, characteristics, its life cycle, phases, tools etc.

Keywords: Projects, Project Management

Every one of us is a manager of projects! From a house wife to a production employee to financial analyst, from banker to physician, from engineer to administrator, from teacher to student, we all work on various tasks with deadlines. Regardless of our occupation, discipline, or location in an organization, we all work on tasks that are unique and involve people who do not usually work together. The project may have a simple objective that does not require many people or a great deal of money, or it may be quite complex, calling for diverse skills and many resources. But the bottom line is that every one of us manages projects!

1. What is a Project?

While there are several definitions of projects in the literature, one of the best has been offered by Tuman (1983), who states:

"A project is an organization of people dedicated to a specific purpose or objective. Projects generally involve large, expensive, unique, or high risk undertakings which have to be completed by a certain date, for a certain amount of money, with some expected level of performance. At a minimum, all projects need to have well defined objectives and sufficient resources to carry out all the required tasks."

In lines of the definition provided by Pinto & Slevin (1988), and accepted for the purpose of this research, a project can be defined as possessing the following characteristics:

(1) A defined beginning and end (specified time to completion)

(2) A specific, preordained goal or set of goals (performance expectations)

(3) A series of complex or interrelated activities

(4) A limited budget

Diallo & Thuillier (2003) reviewed the project management literature outlined a set of evaluation dimensions which appear regularly although not with the same occurrence:

(1) Respect to the three traditional constraints

(2) Satisfaction of the client

(3) Satisfaction of the objectives as outlined in the logical framework

(4) Project impacts

(5) Institutional or organizational capacity built in the organization by the project

(6) Financial returns (in the case of productive projects) or the economic or social benefits (in the case of public sector projects), and

(7) Project innovative features (outputs, management or design)

In the words of Turner (1999), "a project is an endeavour in which human, financial and material resources are organized in a novel way to undertake a unique scope of work, of given specification, within constraints of cost and time, so as to achieve beneficial change defined by quantitative and qualitative objectives."

As defined in A Guide to the Project Management Body of Knowledge (PMI, PMBOK® Guide, 2000), a project is a temporary endeavor undertaken to create a unique product or service. Temporary means that every project has a definite beginning and a definite end. Unique means that the product or service is different in some distinguishing way from all other projects or services.

Declerck et al., (1983, 1997), illustrate the political perspective of projects in this way: "a project is a whole of actions limited in time and space, inserted in, and in interaction with a politico-socio-economic environment, aimed at and tended towards a goal progressively redefined by the dialectic between the thought (the project plan) and the reality."

Gittinger (1972) defines projects as a whole complex of activities involved in using resources to gain benefits. Gittinger (1982) explains that generally projects form a clear and distinct portion of a larger, less precisely identified program. The whole program might possibly be analyzed as a single project, but by and large it is better to keep projects rather small, close to the minimum size that is economically, technically, and administratively feasible. If a project approaches program size, there is a danger that high returns from one part of it will mask low returns from another. Project is an activity for which money will be spent in expectation of returns and which logically seems to lend itself to planning, financing, and implementing as a unit. It is a specific activity, with a starting point and a specific ending point, intended to accomplish specific objectives. Usually it is a unique activity noticeably different from preceding, similar investments, and it is likely to be different from succeeding ones, not a routine segment of ongoing operations. It will have a well-defined sequence of investment and production activities, and a specific group of benefits, that we can identify, quantify, and usually determine a money value for. Often a project will have a partially or wholly independent administrative structure and set of accounts and will be funded through a specially defined financial package.

As maintained by Nilsson & Söderholm (2005), planning and plans are intrinsic features of projects. Plans are meant to constitute and guide project team members as they work on realizing what ever project goals that have been set out for them. A plan can, however, only have a certain degree of sophistication. When project management practices on a day-to-day basis are examined, plans seem to dissolve and become less prescriptive.

2. Characteristics of a Project

Typically, most projects share most if not all of the five characteristics listed below.

(1) A start and a finish
(2) A time frame for completion
(3) An involvement of several people on an ad-hoc basis
(4) A limited set of resources
(5) A sequencing of activities and phases

3. Classification of Projects within Categories and Sub-Categories

(1) Project size

(2) Project complexity

(3) External or internal customer

(4) Degree of customer involvement in the project

(5) Levels of risk in projects

(6) Major and minor projects within a category

According to Gareis and Huemann (2000) the Project-oriented Company (POC) is an organisation which defines "Management by Projects" as an organisational strategy, applies temporary organisations for the performance of complex processes, manages a project portfolio of different project types, has specific permanent organisations to provide integrative functions, applies a "New Management Paradigm", has an explicit project management culture, and perceives itself as being project-oriented. Thus POCs do have specific processes, such as assignments of projects and programmes, project management, programme management, quality management of projects and programmes,   project portfolio co-ordination, networking between projects, personnel management in the POC and organisational design of the POC.
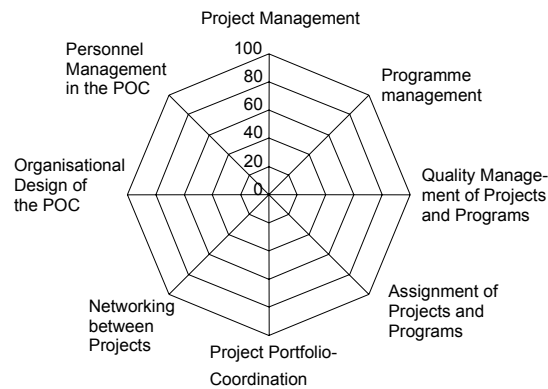
Exhibit 1: Specific Processes of the Project-oriented Company, Gareis and Huemann (2000).

4. Project Management as defined by some leading writers

"Project Management as knowledge field is both an art and a science"

(Bredillet, 2004 a&b)"

According to PMI (1994), project management involves applying knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations. It is the art of directing and coordinating human and material resources throughout the life of a project to achieve project objectives within specified constraints.

Lock (2003) explains that a large industrial project involves numerous differentiated activities that must focus on one final target. From the commencement of the works to the completion and delivery of the plant, the organizational structure must run smoothly on the basis of cooperation and interaction to meet the obligations undertaken towards the client. With this aim in view, it is essential for a company to possess great capability and experience in planning and optimizing the various project activities, as well as highly advanced management tools and methodologies to control time and cost constraints and to meet the challenging requirements of growing efficiency.

Project management is a specialized branch of management which has evolved in order to co-ordinate and control some of the complex activities of modern industry. The changing business environment of the twenty first century increases the range of activities coming under the periphery of project management techniques and the way projects are managed. Projects are open systems because they exist in an open environment and have to respond to the ever changing dynamics of situations requiring it to become much more adaptive than ever.

According to Seymour et al. (1992) project management is a central strategy in the changes that many organizations are undergoing as they adapt from a stable, machine like model to a more dynamic one in face of environmental turbulence and change. Project managers face difficult task of both fostering flexibility, adaptability and the acceptance of change as a permanent state, and providing support for team members to enable them to live with a process they may experience as stressful and disorientating.

Kerzner (2003) defines project management as the planning, organizing, directing, and controlling of company resources for a relatively short term objective that has been established to complete specific goals and objectives. Project Management is the application of knowledge, skills, tools and techniques to project activities to meet project requirements. Project management is accomplished through the use of the processes such as: initiating, planning, executing, controlling, and closing. The term project management is sometimes used to describe an organizational approach to the management of ongoing operations also referred to as management by projects. In the same many aspects of ongoing operations are treated as projects so as to apply the project management practices easily to them.

5. Projects vs. operations: the nature of projects

Every organization acts according to two fundamentals modes: 1. an operational mode, aiming at the exploitation of competitive advantage and current position on the market and providing profits and renewal or increase of resources and 2. an entrepreneurial mode, or project mode, focusing on the research of new position and new competitive advantage, consuming money and resources. To ensure their sustainability and development, all organizations need to combine both modes. (Declerk in Ansoff, Declerk, & Hayes, 1976).

It is now appropriate to look at the way an organization is linked to its environment. We can define strategy as a function of linkage between an organization and its environment (Ansoff, 1975). If we consider the operational

mode, the problem is to optimize performance of the function that is the strategy of penetration of the organization regarding its environment and to optimize the internal performance. On the other hand, in the entrepreneurial mode, the problem is to look at opportunities of expansion and/or diversification and/or reconfiguration, choosing, among a set of possible strategies, the most effective function, and select, among a set of possible organizational structures, the most efficient.

6. Plans and Projects

As stated by Gittinger (1982), projects provide an important means by which investment and other development expenditures foreseen in plans can be clarified and realized. Sound development plans require good projects, just as good projects require sound planning. The two are interdependent.

Sound planning rests on the availability of a wide range of information about existing and potential investments and their likely effects on growth and other national objectives. It is project analysis that provides this information, and those projects selected for implementation then become the vehicle for using resources to create new income. Realistic planning involves knowing the amount that can be spent on project activities for a particular kind of investment.

Well-analyzed projects often become the vehicle for obtaining outside assistance when both the company and the external financing agency agree on a specific project activity and know the amount of resources involved, the timing of loan disbursements, and the benefits likely to be realized. But project analysis should not be confined to only those investments for which external financing will be sought. In the words of Gittinger (1982), if carefully designed and high-yielding projects are offset by essentially unplanned investments, then he net contribution to the organizational objectives is substantially undermined.

Projects are a part of an overall development strategy and a broader planning process. Within the broad strategy, analysts must identify potential projects that address the policy and organizational priorities. Generally there are more than one project alternatives available with a company for investment, of these; all the projects being prepared and analyzed should use a consistent set of assumptions about such things as the relative scarcity of investment funds, foreign exchange, and labor. All the project analyses should use the same assumptions about the company policies and objectives to be reflected.

7. Project Life Cycle

As maintained by PRINCE2 (2002): "A sequence of phases through which a project must pass.   There are a variety of definitions that generally reflect different industry practices… The generally accepted sequence is: pre-feasibility validation of concepts); feasibility (detailed investigation of viability) design; contract (procurement); implementation; commissioning; handover and operation.

Project life cycle generally defines:

(1) The tasks to be accomplished in each phase or sub- phase

(2) The team responsible of each of the phases defined

As advocated Archibald & Voropaev (2003), there is a general agreement that the four broad, generic project phases are (common alternative terms are shown in parentheses):

(1) Concept (initiation, identification, selection.)

(2) Definition (feasibility, development, demonstration, design prototype, quantification.)

(3) Execution (implementation, realization, production and deployment, design/construct/ commission, installation and test.)

(4) Closeout (termination, including post-completion evaluation.)

The number of phases in a project life cycle depends on a variety of factors like nature of industry, type of output, size of project etc. Kerzner (2003) has developed a theoretical sequence of phases that may be identified with most of the projects as is outlined below:

(1) Conceptual

(2) Planning

(3) Testing

(4) Implementation or Execution

(5) Closure

It is generally better in planning projects to analyze successive increments or distinct phases of activity; in this way the return to each relatively small increment can be judged separately. Like products follow a product life cycle, projects follow a project life cycle that has certain phases of development.

Dividing a big project in manageable chunks makes the complex task of managing projects easier, these chunks in a sequential form can be termed as project phases which can further be divided into sub-phases and a collection of these phases makes what is called as a project life cycle. Each project phase is marked by completion of one or more deliverables. Although many project life cycles have similar phase names with somewhat similar deliverables required, few are identical. Most have four or five phases, but some have nine or more. Sub-projects within projects may also have distinct project life cycles. Importantly, these phases are not always consecutive in nature but are more simultaneous. Though researchers have suggested certain representative project life cycles, for example, the waterfall model and Muench et. al's (1994) spiral model for the software development life-cycle, Morris's (1994) construction project life cycle and Murphy's (1989) representative life cycle for a pharmaceutical project.

As per Kulkarni et al. (2004), the projects, especially the ones having a longer lifecycle, could be categorised into many phases depending on the functions. For convenience and simplicity points of view, the three commonly known phases is utilised, namely:

(1) Procurement phase: From inception to the financial closure and beginning of works (tendering; dealing with governments, lenders, insurers, pressure groups, experts)

(2) Execution phase: Project execution (site installation till routine processes are reached, significant completion)

(3) Operation and handover phase: From significant completion till the end of defect liability period and handover

As said by Flaatten, McCubbrey, O'Riordan and Burgess (1992), 'project execution' (also known as 'project implementation' phase) is the phase where project manager is responsible for allocating work to the various team members, making sure that the team resources are used where most needed, and ensuring that the workload is balanced. As intermediate deliverables are completed, they are reviewed for verification (that they are correct and abide by project standards) and validation (that they conform to previous work).

Wideman (1987) describes; each of these phases are unique in terms of:

(1) People allotted to them

(2) The budget available for carrying out these phases

(3) Specific time available to finish each of the phases.

8. Characteristics of a project life cycle

Risk and uncertainty is highest at the beginning stages of a project and reduces thereafter as the project continues.

The ability of the stakeholders to influence the final characteristics of the project's product and the final cost of the project is highest at the start and gets progressively lower as the project continues. Also the cost of correcting an error increases as the project goes along.

9. Project Management Tools

What these tools are used for?

Good project management deals with three factors: time, cost and performance. Projects are successful if they are completed on time, within budget, and to performance requirements. In order to bring the many components of a large project into control there is a large toolkit of techniques, methodologies, and tools. These techniques provide the tools for managing different components involved in a project: planning and scheduling, developing a product, managing financial and capital resources, and monitoring progress. However the success of a project will always rest on the abilities of a project manager and the team members.

Work Breakdown Structure (WBS)

This tool is related to planning and scheduling a project. Basically it is a functional decomposition of the tasks of the project. The total work of the project is broken down into the major subtasks. It starts with the end objective required and successively subdividing it into manageable components in terms of size and complexity: program, project, system, subsystem, components, tasks, subtasks, and work elements.

Gantt charts

Developed by Harry Gantt in 1916, these charts give a timeline for each activity. They are used for planning, scheduling and then recording progress against these schedules.

PERT/CPM (Critical Path Method)

Both methods show precedence relationships explicitly. Although the two methods were developed independently during the fifties, they are surprisingly similar. Both methods, PERT and CPM, use a graphic representation of a project that it is called "Project Network" or "CPM diagram", and it is used to portray graphically the interrelationships of the elements of a project and to show the order in which the activities must be performed.

Conclusion

Therefore we can summarize that projects are unique in nature and much depends on the industry, size, location, nature, complexity, business environment etc. in which they operate. The truth appears to be that the concept of 'one size does not fit all' is a good point to start with in certain cases.

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The Earning Persistence of High Tech Enterprise

And Market Efficiency of China Capital Market

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Abstract

The paper investigates the extent to which current earnings performance persists into future is depended on the components of earnings and try to find out whether stock price reflects the information of earnings. Comparing to accrued components of earnings, cash flow components of earnings substantially has more explanatory ability for abnormal returns and with higher persistence, especially for high tech industry. Eventually we find that investors' inability to distinguish correctly between the components of earnings. Constructing a portfolio based on the magnitudes of accrued components of earnings, we can earn 4% and 13% of excess returns for high tech industry and general industry.

Keywords: Earning persistence, Accrual, Market efficiency

1. Introdudction

Ball and Brown (1968) first find the relationship between unexpected earning and excess return. According to the development of internet, a new economy period (NEP) company such as high tech company change the production cycle from real product to unreal assets such as software. Under this circumstance, how will the value relevant of component of financial report change?

According to above, the paper investigates the extent to which current earnings performance persists into future is depended on the components of earnings and try to find out whether stock price reflects the information of earnings and set up a trading strategy to the different earning quality of company to acquire excess return.

2. Prior Research and Hypothesis Development

Whether accounting earnings predict stock return is based on the assumption that accounting information will change the expectation of investor and influence stock future return. Ball and Brown (1968) find the positive relationship between unexpected earning and excess return. The result explains that stock price will reflect the information content.

Sloan (1996) investigates whether stock prices reflect information about future earnings contained in the accrual and cash flow components of current earnings. The extent to which current earnings performance persists into the future is shown to depend on the relative magnitudes of the cash and accrual components of current earnings. However, stock prices are found to act as if investors "fixate" on earnings, failing to reflect fully information contained in the accrual and cash flow components of current earnings until that information impacts future earnings. Under the development of high tech knowledge, economic nature changed these years. Fama and Frech (2002) estimate the equity premium using dividend and earnings growth rates to measure the expected rate of capital gain. Their estimates for 1951 to 2000, 2.55 percent and 4.32 percent, are much lower than the equity premium produced by the average stock return, 7.43 percent. Their evidence suggests that the high average return for 1951 to 2000 is due to a decline in discount rates that produces a large unexpected capital gain. Their main conclusion is that the average stock return of the last half-century is a lot higher than expected.

Trueman (2001) provide insights into the manner in which (relatively sparse) accounting information, along with measures of Internet usage, is employed by the market in the valuation of the Internet firms. They do not find a significant association between bottom-line net income and their sample firms' market prices, consistent with the claim made by some investors that financial statement information is of very limited use in the valuation of Internet stocks. However, when they decompose net income into its components, they find that gross profits are positively and significantly associated with prices. In addition, they find that in most instances both unique visitors and page views, as measures of Internet usage, provide incremental explanatory power for stock prices, over and above net income and its components. They also separately analyze the e-tailers and the portal and content community firms in our sample and find significant valuation differences with respect to both their financial data and the measures of Internet usage. As a result, how will the earning persistence influence valuation is a interesting topic to develop under the circumstance.

According to prior research, the accrual component will be inversed in future. As a result, the accrual component will negatively influence next period earnings and reduce the persistence of earnings. High tech company set up lately with simple stock holder structure. Earning will better reflect the operating result in high tech industry. This paper predicts:

H1 The persistence of earning is decreasing with the magnitude in accrual component of earnings and increasing with the magnitude in cash component of earnings. Furthermore the persistence accrual component of earnings and cash component of earnings or high tech industry is better than those of general industry.

If investors "fixate" on earnings, failing to reflect fully information contained in the accrual and cash flow components of current earnings. It exist a arbitrage chance. This paper predicts:

H2 Constructing a portfolio based on the magnitudes of accrued components of earnings, we can earn excess returns for new economic industry and general industry.

3. Sample analysis

3.1 Sample selection

The sample comes from the Wind database of financial information and stock return from 1998-2005. We select those companies listed in Shanghai and Shenzhen stock exchange firm. We define high tech company according to the information and technical industry in the wind first level industry classification standard. We classify the other industry to general industry company. We rid off those ST, PT company and finance industry. We have 388 high tech company and 5862 general company observations in our sample.

3.2 Variable definition

Hribar and Collins (2002)find it is better to use cash flow item in statement of cash flow than calculation in balance sheet. We define the accrual component as follows:

$$Accruals = Earnings - CashFlows$$

Earning is defined as operation income and cash flow is defined as cash flow from operating. We use market adjusted return to compute excess return and event day is defined as the first day in may for sure that investor acquire the information of financial statement declare. We separate 5 groups for each high tech company and general company base on the magnitude of accrual component.

4. Empirical Results

4.1 Test of H1

We regress next year earning on current earning by ordinary least square method (OLS) as following equation:

$$Earning_{t+1} = \alpha_0 + \beta_1 Earning_t + v_{t+1} \qquad (1)$$

We can see the result in table 1 panel A. we find the coefficient of earning $_t$ is 0.526 and 0.546, for high tech company and general company, respectively. Because the coefficient is small than 1, it implies earning reverting.

We furthermore regress next year earning on current earning by ordinary least square method (OLS) as following equation:

$$Earning_{t+1} = \alpha_0 + \beta_1 Accruals_t + \beta_2 CashFlow_t + v_{t+1} \qquad (2)$$

We expect β1 is smaller than β2.. We can see the result in table 1 panel B. the coefficient of accrual component of high tech company and general company is significantly 0.463 and 0.338. The coefficient of cash component of high tech company and general company is significantly 0.526 and 0.47. It interprets that the persistence accrual component of earnings and cash component of earnings or high tech industry is better than those of general industry.

4.2 Test of H2

We test whether investors' inability to distinguish correctly between the components of earnings. We constructing a portfolio based on the magnitudes of accrued components of earnings, we can earn 4% and 13% of excess returns for new economic industry and general industry with significant test of Kruskal-Wallis.

5. Conclusion

This paper find that the stock price result is inconsistent with traditional efficient market review that stock price fully reflects all public information. Comparing to accrued components of earnings, cash flow components of earnings substantially has more explanatory ability for abnormal returns and with higher persistence, especially for

new economic industry. Eventually we find that investors' inability to distinguish correctly between the components of earnings. Constructing a portfolio based on the magnitudes of accrued components of earnings, we can earn 4% and 13% of excess returns for new economic industry and general industry.

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Table 1. next year earnings regression current earnings by ordinary least square method(OLS)

PanelA $Earning_{t+1} = \alpha_0 + \beta_1 Earning_t + v_{t+1}$

	coefficient		t value		Sig.	
	high tech company	general company	high tech company	general company	high tech company	general company
α	0.01	0.0046	3.5	3.49	.0005	.0005
β_1	0.526	0.546	15.6	41.05	<.0001	<.0001
Adjusted-R^2	0.3686	0.2232				

PanelB $Earning_{t+1} = \alpha_0 + \beta_1 Accruals_t + \beta_2 CashFlow_t + v_{t+1}$

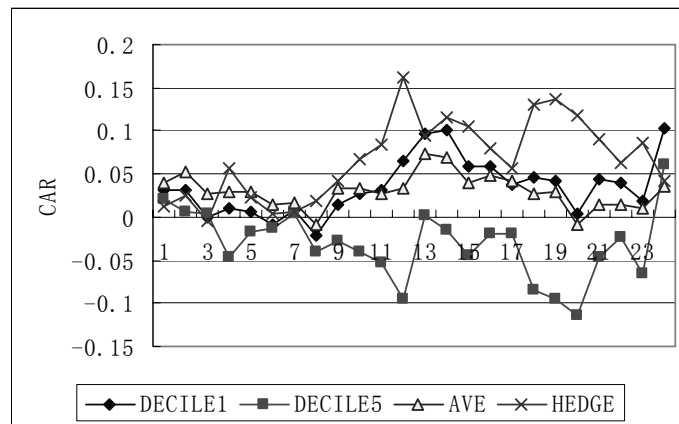|	coefficient		t value		Sig.	
	high tech company	general company	high tech company	general company	high tech company	general company
α	0.018	0.0128	5.76	10.12	<.0001	<.0001
β_1	0.463	0.338	10.79	29.78	<.0001	<.0001
β_2	0.526	0.47	12.8	32.28	<.0001	<.0001
Adjusted-R^2	0.2566	0.15				

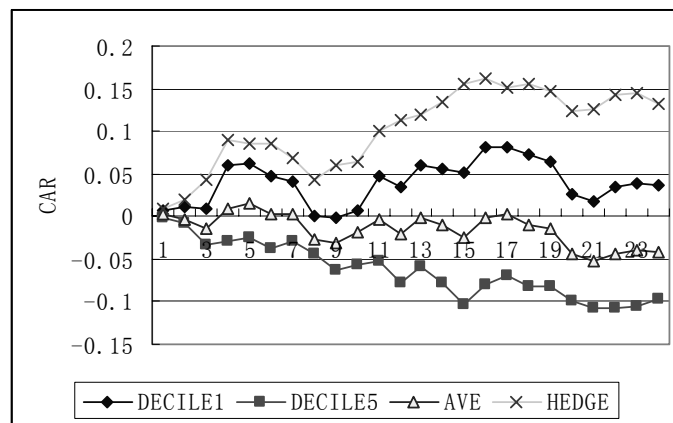Figure 1. Time series properties of Car in high tech company

Figure 2. Time series properties of Car in general company

Tests on the Relationship of Fund

Performance and Net Fund Flow

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Abstract

The relationship between net fund flow and performance of open-end funds was studied in this paper. The empirical tests on the performance and size of open-end funds in China show that the net fund flow of funds is positively correlated with pre-performance of funds, while the performance of funds is negatively correlated with the net fund flow of funds. These empirical studies imply that investors chose funds according to their historical performance, while the growing size decreases the funds' capability of achieving excellent performance.

Keywords: Open-end funds, Net fund flow, Performance

1. Introduction

Since China issued the first open-end funds, Huaan Innovation, in September, 2001, open-end funds have gained fast development. The size of open-end funds has already been larger than that of close- open funds that has a longer history. Till 30th, June, 2005, there are 54 close-end funds, valuing 77 billion Yuan, and 127 open-end funds, valuing 340 billion Yuan (calculated according to data from Fundlab. Open-end funds include monetary funds, etc.). Open-end funds have already become one of the main institutional investors in China's security market.

The primary difference between open-end funds and close-end funds is that the size of open-end funds is changing. Investors can purchase or redeem open-end funds at any time. Then, what factors will influence the size of open-end funds? Or, in other words, what factors will help investors to make a decision on purchasing or redeeming which one of open-end funds? For that question, the most direct answer is "performance". Surely, investors choose to invest in funds with better performance. And the funds with better performance can attract more investors than the funds with worse performance. Naturally, the size of funds with better performance will increase rapidly. The first goal of this paper is to test this answer by practical data. The second problem is whether the performance of funds is affected by the size or not. Or, what are the effects of changes of funds' size caused by new fund flow on the performance? For that question, the answer is not so direct. We will give the answer based on a test for real data.

2. Theory

2.1 Evaluation index for funds' performance

The simplest evaluation index for funds' performance is the rate of return. Investors can judge the funds by directly searching their rate of return. However, this index neglects the risks of funds investment. After the emergence of CAPM theory, funds' performance evaluation begins to take risks adjustment into consideration. The three traditional models for funds' performance evaluation, namely Sharpe (Sharpe W. E., 1966, p119-138), Treynor (Treynor J., 1965, p63-75), and Jensen (Jensen M., 1968, p389-416), aim at adjusting the return of funds by different risks measures based on the CAPM, what can serve as the index for funds' performance evaluation. In addition, because the CAPM merely considers the general risks of market, it can not explain the abnormal phenomenon in market (such as the small-enterprise effect, the one-month effect, etc.). Fama & French (Fama E.F. & French K.R., 1993, p3-56) construct a three-factor model, taking the effects of market, size, and book-to-market ratio on funds' performance into consideration. Based on this three-factor model, Carhart (Carhart M.M., 1997, p57-82) adds a new factor, the momentum of return on investment, and constructs a four- factor model, in hopes of evaluating funds' performance more exactly.

All these models mentioned above use one single index to describe the funds' performance. Treynor & Mazuy (Treynor J. & Mazuy F., 1966, p131-136) think that the funds' performance is determined by the ability of finding mispriced stocks and the ability of grasping market opportunities, using the ability of stock selecting and the ability of market timing to reflect the funds' performance. Later, Henriksson & Merton (Henriksson R. & Merton R., 1981, p513-533) advance a similar model to reflect funds' ability of stock selecting and the ability of market timing.

In China, the security market does not have a long history. Most investors do not know much about modern financial

theories. They prefer to use more direct methods to judge the funds instead of complex index as they determine an investment. Therefore, this paper chooses four indexes, rate of return, Sharpe, Treynor, and Jensen, for funds' performance evaluation. For the influences of changes of funds' size on the performance, because the size affects the performance funds managers, we take the ability of stock selecting and the ability of market timing in the TM and HM model into consideration.

2.2 Funds' net fund flow

Changes of funds' size are caused by two aspects: one is the return or loss on investment, and the other is the new purchase and redemption. This paper is chiefly to study how investors determine their investments according to funds' performance. Therefore, here we just consider new purchase and redemption, namely the relationship between so-called net fund flow and funds' performance.

Many empirical studies prove that investors will choose to purchase or redeem funds according to the former performance of funds (for example, researches of Sirri & Tufano (Sirri E.R. & Tufano P., 1998, p1589-1622), Shu et al (Shu P.G., Yeh Y.H. & Yamada T., 2002, p583-600), Kliger et al (Kleger D., Levy O. & Sonsino D., 2003, p341-363), etc.). In other words, there is a positive correlation between funds' net fund flow and funds' former performance. In theory, if the stock market is efficient, funds should not sustain continuous excess return. Therefore, the former performance of funds can not determine the future performance. According to Malkiel's studies on the persistence of funds' performance (Malkiel B., 1995, p549-572), although funds' performance shows its relatively strong persistence in 70s in 20th century, this persistence disappears in 80s, which indicates the improvement of market efficiency. In China, some empirical studies prove that the persistence of funds' performance is not significant (Qifang Wu, Shou Chen & Hui Lei, 2003, p33-37. Hu Wei, Ni Shuguang, & Zhang Ming, 2004, p44-48) and even there is a reversing phenomenon (Suyun Ni, Hui Xiao & Chongfeng Wu, 2002, p41-44). In this condition, whether is it meaningful or not if investors determine their investments based on funds' former performance? Berk & Green (Berk J.B. & Green R.C., 2004, p1269-1295) advances a model and thinks that funds' ability of realizing excess return connects with the size of funds. As the funds achieve better performance, it will attract more investments and the size of funds becomes larger. At this moment, funds managers have to bear greater costs as they exert their abilities of choosing stocks and grasping opportunities in trading stocks. As a result, the funds' performance will decrease as the size becomes larger. Therefore, the second proposition that will be tested in this paper is: whether the changes of size will affect funds' performance or not.

3. Data samples and description of variables

This paper takes open-end funds (include stock-oriented fund and stock-and-debt balanced fund) that chiefly invest in stocks in China's security market as samples for test. The size of funds and the types data are from the website of Huaan Fund Management Cooperation, and the funds' return of net value from the Fundlab database. The calculation is accomplished by SAS software.

Because we only can get the quarterly data of funds' size, the test is based on quarterly data. All variables are quarterly data.

The performance indexes include:

(1) Return of net value

$$Return_{p,t} = (NetValue_{p,t} + D_{p,t}) / NetValue_{p,t-1} - 1 \qquad (1)$$

Here, $Netvalue_{p,t}$ means the net value per unit of fund p at the end of quarter t. $D_{p,t}$ means the dividend of fund p at the quarter t.

(2) Sharp Index (Sharp W.E., 1966, P119-138)

$$Sharpe_{p,t} = (Return_{p,t} - R_{F,t}) / \sigma_{p,t} \qquad (2)$$

Here, $R_{F,t}$ means riskfree rate (in this paper it is a constant: 2% per year). $\sigma_{p,t}$ means the volatility of funds' return on investment, which can be calculated according to funds' daily returns at current quarter.

(3) Treynor Index (Treynor J., 1965, p63-75)

$$Treynor_{p,t} = (Return_{p,t} - R_{F,t}) / \beta_{p,t} \qquad (3)$$

Here, $\beta_{p,t}$ is the funds' Beta value, which can be calculated by a regression of the daily return at current quarter to the index (it refers to the composite index of shanghai stock exchange) daily return.

(4) Jensen Index (Jensen M., 1968, p389-416)

$$Jensen_{p,t} = Return_{p,t} - [R_{F,t} + \beta_{p,t} \cdot (Return_{M,t} - R_{F,t})] \qquad (4)$$

Here, $Return_{M,t}$ means the return of market index at the quarter t.

(5) Ability of stock selecting (a_tm) and ability of market timing ($b2\_tm$) in TM model (Treynor J. & Mazuy F., 1966, p131-136)

$$r_p = \alpha_p + \beta_{1p} \cdot r_M + \beta_{2p} \cdot r_M^2 + \varepsilon_p \qquad (5)$$

Here, r_p is the excess return of fund p (r_p = fund's return of net value – riskfree rate). r_M means the excess return ratio of index. Estimate the coefficient of the regression equation discussed above by daily data in every quarter and get the index value that evaluates fund's ability of stock selecting and the ability of market timing in one quarter.

Ability of stock selecting: $a\_tm_{p,t} = \alpha_p$

Ability of market timing: $b2\_tm_{p,t} = \beta_{2p}$

(6) Ability of stock selecting (a_hm) and ability of market timing ($b2\_hm$) in HM model (Henriksson R. & Merton R., 1981, p513-533)

$$r_p = \alpha_p + \beta_{1p} \cdot r_M + \beta_{2p} \cdot \max(r_M, 0) + \varepsilon_p \qquad (6)$$

Estimate the coefficient of the regression equation discussed above by daily data in every quarter and get the index value that evaluates fund's ability of stock selecting and ability of market timing in one quarter.

Ability of stock selecting: $a\_hm_{p,t} = \alpha_p$

Ability of market timing: $b2\_hm_{p,t} = \beta_{2p}$

Use the total net value (value) to represent the size.

$value_{p,t}$ = fund's total net value at the end of one quarter (in unit of 100 million Yuan)

The net fund flow (flow):

$flow_{p,t}$ = total shares at the end of one quarter / total shares at the end of last quarter – 1

The table 1 shows us the average of each variable above in each quarter during the sample period. From this table, we notice that most Jensen indexes are positive, what indicates that these open-end funds, in general, obtain positive excess return after the risks adjustment. In the figure 1, the comparison between the return fund and the return ratio of market index reflects that the volatility of fund's return is smaller than that of the market return. Therefore, we can conclude that probably the fund beats the market because it controls risks properly. In the figure 2, we notice that: the average size of open-end funds that invest in stocks is decreasing from 2001; the average size is no less than 2 billion Yuan at present; and the average of fund flow indicates more redemption and less purchase (here, it does not include the purchase of newly-issued funds. As a matter of fact, except for few quarters, the overall size of whole funds is increasing due to the issue of new funds).

4. Empirical test

In this paper the empirical test includes two parts: one is how funds performance affects net fund flow affects, and the other is how net fund flow affects funds performance.

4.1 Effects of former performance on net fund flow

For the first part, how funds performance affects net fund flow, we can review the effects of last quarter's performance on current quarter's net fund flow. Because the funds' overall performance is different at different time and the market environment is far different, here we adopt the cross-section regression method to observe the relationship between funds' ability of absorbing new investments and their former performances in same market environment. The specific regression equation is:

$$flow_{p,t} = a_t + b_t \cdot Perform_{p,t-1} + \varepsilon_{p,t} \qquad (7)$$

Here, $Perform_{p,t-1}$ is the performance index (one of *Return, Sharp, Treynor*, and *Jensen*) of fund p in last quarter. a_t and b_t are regression parameters. $\varepsilon_{p,t}$ is the residual. It is an independent identical distributed random variable with an average zero. According to the expectation, the coefficient b_t should be larger than zero.

Because there were less open-end funds early, we have chosen data since the third quarter in 2003 as samples and made section regression. The result of regression is in the table 2.

4.2 Effects of net fund flow on performance

According to Berk & Green's model (Berk J.B. & Green R.C., 2004, p1269-1295), funds' management ability should have persistence. The reason for the poor persistence of performance is that the increasing size makes it more difficult to turn the management ability into performance. Therefore, we test it by make autoregressive on the time series of one fund's performance. The specific regression equation is:

$$Perform_{p,t} - Perform_{M,t} = a_p + b_p \cdot flow_{p,t} + v_{p,t} \tag{8}$$

Here, $v_{p,t} = -c_p \cdot v_{p,t-1} + \varepsilon_{p,t}$

$Perform_{p,t}$ is the performance index (one of *Return, Sharpe, Treynor, Jensen, a_tm, b2_tm, a_hm,* and *b2_hm*) of fund p in current quarter. $Perform_{M,t}$ is the market index's performance index in current quarter (for the market, Jensen, *a_tm, b2_tm, a_hm,* and *b2_hm* are equal to zero. But *Return, Sharpe,* and *Treynor* are not equal to zero) (in the time series regression, what we should consider is the excess return as a matter of fact. Because the market environment is different at different time, Return, Sharp, and Treynor are not the excess return though we make risks adjustment. Therefore, we use the difference of the fund performance over the market as the excess performance). a_p, b_p, and c_p are the regression parameters. $\varepsilon_{p,t}$ is the residual. It is an independent random variable with an average zero. According to the expectation, the coefficient b_p should be negative.

Because most open-end funds have a short history, we choose funds that were issued more than half and two years ago as samples to make time series regression. We choose fifteen funds. For the sake of length, here we only list the average of fifteen funds' estimated regression parameters instead of all regression result for each fund (see table 3).

Besides, according to Berk & Green's opinion (Berk J.B. & Green R.C., 2004, p1269-1295), as nearing the balance state, the funds managed by managers with strong abilities have larger size. In other words, the abilities of managers determine the size of funds. At this moment, funds' performance can not reflect managers' abilities any more, neither relate with the size of funds. In order to study the relationship between funds' performance and size, we should introduce a size variable *value* into the regression equation of time series.

$$Perform_{p,t} = a_p + b_p \cdot flow_{p,t} + d_p \cdot value_{p,t-1} + v_{p,t} \tag{9}$$

According to expectation, the regression coefficient d_p should be close to zero. The average of regression results is in table 4.

5. Result analysis

According to the test result for former performance's effects on net fund flow (see table 2), the average result indicates that former performance has a positive effect on net fund flow. As we use Jensen index to represent performance, this effect is significant statistically, which is in accord with our expectation: investors will increase investment in funds with better performances and decrease investment in funds with poor performance.

Then look at the time. During the second quarter respectively in 2004 and 2005, as we use any index to represent performance, the positive effect is significant statistically. While from the third quarter in 2004 to the first quarter in 2005, the effect is negative (the only exception is that use the return on investment to represent performance in the third quarter in 2004. In other situations, the effect is insignificant statistically). Together with the data in table 1, we find that there is relatively nice correlation between these coefficients and net fund flow (see figure 3). For example, at the third quarter in 2004 the funds' average net fund flow is the largest, either the effect of former performance on net fund flow. From the third quarter in 2004 to the first quarter in 2005, funds' average net fund flow is negative. And the effect of former performance on net fund flow is negative but not significant. At the second quarter of 2005, funds' average net fund flow is still negative, but much better than ever. And the effect of former performance on net fund flow is back to positive and significant. These characteristics prove that investors usually are affected much by funds' former performance as they purchase funds but less as they redeem funds.

According to the test result for the effects of net fund flow on current performance (see table 3), except for the index for the return of net asset (*Return*) and two indexes for the ability of stock selecting and the ability of market timing, other indexes are affected negatively and significantly by net fund flow. In other words, the more the net purchase increases in current period, the more the performance decreases, which is in accord with our expectation: the rise of funds' size caused by the increasing net fund flow will restrict managers' abilities, what may lead to the decrease of performance, which indicates that the rise of funds' size will restrict abilities of funds managers in obtaining excess return by adjusting risks and identifying stocks. Use the return index and two market timing indexes to make regression on net fund flow. Although the coefficient is positive, the result is not significant. The two market timing indexes do not be affected by net fund flow. The rise of funds' size does not restrict funds managers to gain returns by predicting market trend. Maybe that is because the average size of funds is not large enough to impact the stock market comprehensively. Besides, as funds' size is rising, funds managers may sustain higher returns by taking more risks. Therefore, as we use the return of net asset to measure the performance, we can not get the effect of net fund flow on performance.

In table 4, the regression coefficient (c_p) of net fund flow is equal to the result in table 3. The regression coefficients (d_p) of funds' size is insignificant totally. It indicates that the size does not affect funds' performance, which is also in accord with our expectation: it is the changes of size, instead of the size, that affects performance. If the size does

not change, funds' performance will not change either no matter whether the former size is large or small.

6. Conclusions

Based on an empirical test for the relationship between the domestic open-end funds' performance and the net fund flow, we can draw these conclusions as follow:

(1) As investors choose funds and make investment, they are affected by funds' former performance. The funds with better former performance can attract more investments.

(2) In the purchase of funds, the effects mentioned above are relatively significant, but in redemption insignificant.

(3) As fund absorb new investments, the ability of stock selecting decreases and either the excess return after risks adjustments, what indicate that funds mangers' ability of realizing excess return is affected by changes of funds' size.

(4) Funds' ability of market timing does not be affected by changes of funds' size, which indicates that the stock market has a large capacity that permits funds to trade stocks in quantities and makes the stock market free from being affected.

(5) The size of funds does not affect funds' performance, which proves that abilities of funds managers have persistence.

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Table 1. Average of Funds' performance indexes, sizes, and net fund flows

Date	Number	*Return*	*Sharpe*	*Treynor*	*Jensen*	*a_tm*	*b2_tm*	*a_hm*	*b2_hm*	*value*	*flow*
Dec-2001	1	1.10 (-)	7.68 (-)	45.03 (-)	0.57 (-)	2.00 (-)	-0.24 (-)	2.99 (-)	-3.08 (-)	50.65 (-)	- (-)
Mar-2002	3	2.06 (0.28)	4.37 (0.54)	7.86 (1.05)	1.25 (0.61)	3.50 (0.84)	-0.32 (0.45)	2.43 (2.00)	-0.21 (3.96)	38.14 (5.53)	-0.04 (-)
Jun-2002	3	5.54 (0.95)	8.65 (0.63)	14.54 (1.21)	2.24 (0.63)	2.40 (1.00)	0.53 (0.17)	-0.60 (1.28)	8.00 (2.31)	39.93 (3.85)	0.03 (0.04)
Sep-2002	6	-4.53 (0.48)	-12.70 (0.82)	-10.00 (0.71)	-0.50 (0.17)	-0.80 (0.65)	0.07 (0.90)	-0.56 (0.94)	-0.81 (2.74)	37.54 (4.12)	0.11 (0.05)
Dec-2002	13	-5.09 (1.04)	-10.35 (1.99)	-32.12 (8.54)	-1.44 (0.31)	-5.90 (0.84)	2.96 (0.44)	-9.11 (1.25)	16.32 (2.39)	28.98 (3.10)	0.00 (0.05)
Mar-2003	15	6.38 (0.56)	10.56 (0.65)	14.80 (1.17)	1.43 (0.43)	2.76 (0.84)	-0.11 (0.42)	3.66 (1.35)	-2.53 (2.97)	25.02 (2.88)	-0.10 (0.03)
Jun-2003	18	1.81 (0.65)	1.23 (0.82)	1.68 (1.13)	2.55 (0.62)	1.80 (1.00)	1.69 (0.49)	0.79 (1.26)	7.42 (2.34)	18.70 (2.18)	-0.19 (0.02)
Sep-2003	28	-3.02 (0.33)	-6.91 (0.58)	-8.76 (1.50)	1.15 (0.29)	1.05 (0.45)	1.32 (0.54)	1.04 (0.48)	2.59 (1.73)	15.02 (1.63)	0.03 (0.04)
Dec-2003	35	10.17 (0.61)	14.47 (0.62)	20.04 (1.06)	5.27 (0.52)	9.49 (1.02)	-0.61 (0.27)	8.95 (1.06)	-0.58 (1.21)	14.32 (1.64)	-0.17 (0.02)
Mar-2004	39	11.96 (0.45)	11.38 (0.42)	15.49 (0.64)	0.17 (0.46)	-0.67 (1.16)	0.64 (0.51)	2.95 (1.32)	-5.31 (2.28)	15.88 (1.70)	0.02 (0.04)
Jun-2004	47	-11.28 (0.64)	-13.96 (0.52)	-19.54 (0.57)	0.91 (0.27)	1.21 (0.71)	0.24 (0.27)	0.50 (0.97)	2.15 (1.40)	22.10 (3.68)	0.08 (0.03)
Sep-2004	53	5.37 (0.35)	5.98 (0.33)	8.80 (0.56)	4.64 (0.34)	4.71 (0.60)	1.09 (0.15)	3.67 (0.66)	6.29 (0.86)	22.23 (3.20)	-0.03 (0.02)
Dec-2004	70	-2.77 (0.39)	-3.62 (0.50)	-5.78 (0.67)	1.31 (0.23)	-0.47 (0.43)	1.58 (0.18)	-2.26 (0.48)	9.44 (0.95)	20.57 (2.56)	-0.07 (0.01)
Mar-2005	75	0.02 (0.43)	-0.07 (0.53)	-0.58 (0.85)	3.52 (0.38)	4.34 (0.64)	1.28 (0.15)	0.29 (0.71)	12.97 (1.17)	18.37 (2.25)	-0.07 (0.01)
Jun-2005	82	-3.23 (0.36)	-2.34 (0.29)	-5.45 (0.51)	1.79 (0.32)	-1.89 (0.55)	1.21 (0.10)	-9.82 (0.92)	18.41 (1.26)	16.57 (1.90)	-0.02 (0.02)
Sep-2005	97	4.02 (0.38)	5.23 (0.39)	6.77 (0.71)	1.11 (0.20)	-1.69 (0.42)	1.92 (0.16)	-5.81 (0.52)	14.48 (0.87)	16.50 (1.74)	-0.07 (0.01)

Notice: (1) In the "Date", use the last month of one quarter represents the quarter; (2) The average's standard error is in the parentheses; (3) Because the calculation of *flow* needs the data at the end of last quarter, the fund must be in market since last quarter. Therefore, as we calculate the average of *flow*, the number of samples are listed in last quarter; (4) The variables, Return, Sharp, Treynor, and Jensen, are calculated from the quarteral return, and *a_tm, b2_tm, a_hm*, and *b2_hm* from daily return in one quarter. They have relatively smaller absolute values. And in this table, values of these variables have been magnified one hundred times.

Table 2. Result of cross-section regression.

Date	Sample size	Return	Sharpe	Treynor	Jensen
Sep-2003	18	0.34(0.29)	-0.19(-0.20)	0.09(0.13)	0.96(0.79)
Dec-2003	27	0.33(0.22)	0.49(0.59)	-0.14(-0.45)	1.46(0.87)
Mar-2004	35	1.67(1.46)	1.28(1.12)	0.84(1.28)	2.21(1.68)
Jun-2004	39	3.25(3.97)*	2.21(2.27)*	1.44(2.27)*	2.18(2.49)*
Sep-2004	46	-0.74(-2.04)*	-0.81(-1.83)	-0.48(-1.20)	-0.82(-0.97)
Dec-2004	53	-0.44(-0.90)	-0.65(-1.27)	-0.43(-1.44)	-0.41(-0.83)
Mar-2005	70	-0.53(-1.34)	-0.37(-1.19)	-0.27(-1.17)	-0.05(-0.08)
Jun-2005	75	1.09(2.26)*	0.86(2.20)*	0.67(2.81)*	1.60(3.05)*
Sep-2005	96	0.97(2.43)*	1.30(2.63)*	0.46(1.70)	0.69(1.56)
Average		0.66(1.57)	0.46(1.33)	0.24(1.11)	0.87(2.36)*

Notice: This table shows us the value of the regression parameter b_t in the regression equation (7). Values in parentheses are the t test values of this parameter. * means significant under 95% confidence. The last line lists the average of parameters above. The dependent variable is $Flow_{p,t}$, and the independent variables are $Return_{p,t-1}$, $Sharpe_{p,t-1}$, $Treynor_{p,t-1}$, and $Jensen_{p,t-1}$.

Table 3. Time series' autoregressive result I.

Autoregressive variable	a_p	b_p	c_p
$Return_p$-$Return_M$	3.34(10.90)*	0.02(0.53)	0.14(3.46)*
$Sharpe_p$-$Sharpe_M$	3.00(9.39)*	-0.07(-2.99)*	0.04(0.58)
$Treynor_p$-$Treynor_M$	0.05(0.11)	-0.16(-3.89)*	0.26(4.86)*
$Jensen$	2.04(6.79)*	-0.07(-3.64)*	0.15(2.66)*
A_tm	0.91(1.90)	-0.14(-3.37)*	0.13(2.63)*
$b2\_tm$	1.43(11.00)*	0.01(0.66)	0.20(3.38)*
A_hm	-1.33(-2.77)*	-0.14(-3.29)*	-0.12(-2.00)
$b2\_hm$	8.89(14.16)*	0.00(0.01)	-0.14(-2.15)*

Notice: (1) This table lists the average of regression parameters that are calculated by equation (8) based on fifteen funds' data. The value in parentheses is the t test value of this parameter. * means significant under 95% confidence. (2) Values of a_tm, $b2\_tm$, a_hm, and $b2\_hm$ have been magnified one hundred times. The reason is the same with that in table 1. (3) The dependent variable is $Flow_p$ and the independent variables are listed in the first column.

Table 4. Time series' autoregressive result II.

Autoregressive variable	a_p	b_p	d_p	c_p
$Return_p\text{-}Return_M$	1.36(0.72)	0.01(0.32)	0.13(1.14)	0.17(3.29)*
$Sharpe_p\text{-}Sharpe_M$	4.35(3.25)*	-0.07(-3.48)*	-0.02(-0.28)	0.10(1.54)
$Treynor_p\text{-}Treynor_M$	5.18(2.29)*	-0.17(-3.69)*	-0.28(-1.84)	0.26(4.67)*
$Jensen$	4.20(3.62)*	-0.08(-4.25)*	-0.10(-1.64)	0.20(3.68)*
a_tm	4.35(1.79)	-0.16(-3.86)*	-0.18(-1.27)	0.22(4.50)*
$b2\_tm$	0.74(1.28)	0.01(1.30)	0.07(1.66)	0.26(5.19)*
a_hm	0.84(0.25)	-0.15(-3.19)*	-0.09(-0.41)	-0.03(-0.73)
$b2\_hm$	10.28(2.03)	0.02(0.23)	0.00(0.00)	-0.05(-0.76)

Notice: (1) This table lists the average of regression parameters that are calculated by equation (9) based on fifteen funds' data. The value in parentheses is the t test value of this parameter. * means significant under 95% confidence. (2) Values of a_tm, $b2\_tm$, a_hm, and $b2\_hm$ have been magnified one hundred times. The reason is the same with that in table 1. (3) The dependent variable is $Flow_p$ and the independent variables are listed in the first column.
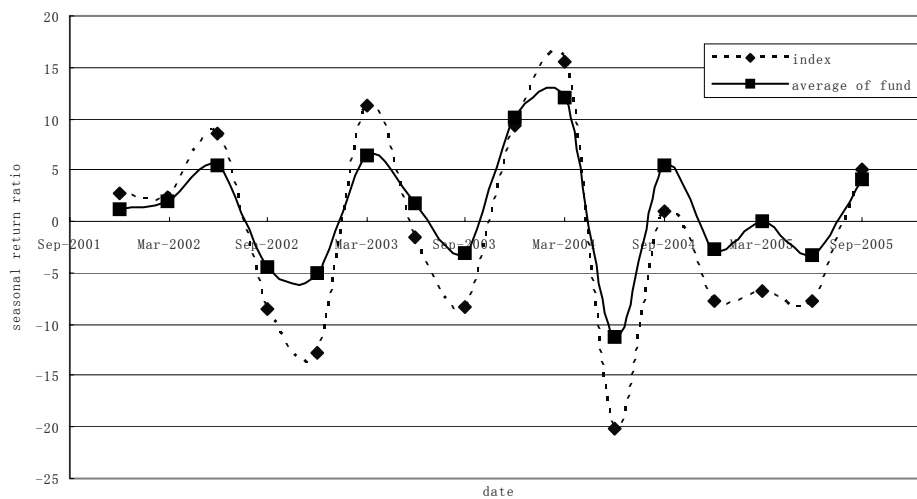

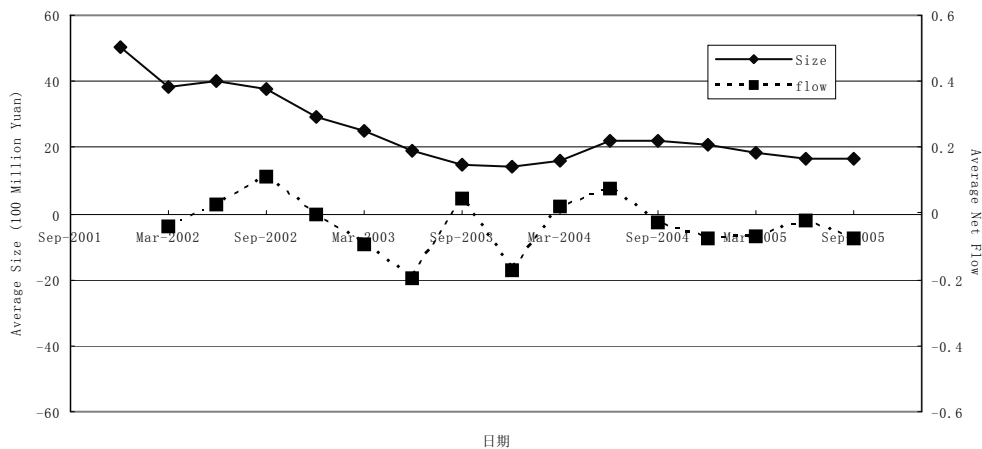Figure 1. Comparison between the Average Return of Fund and the Return of Market Index.

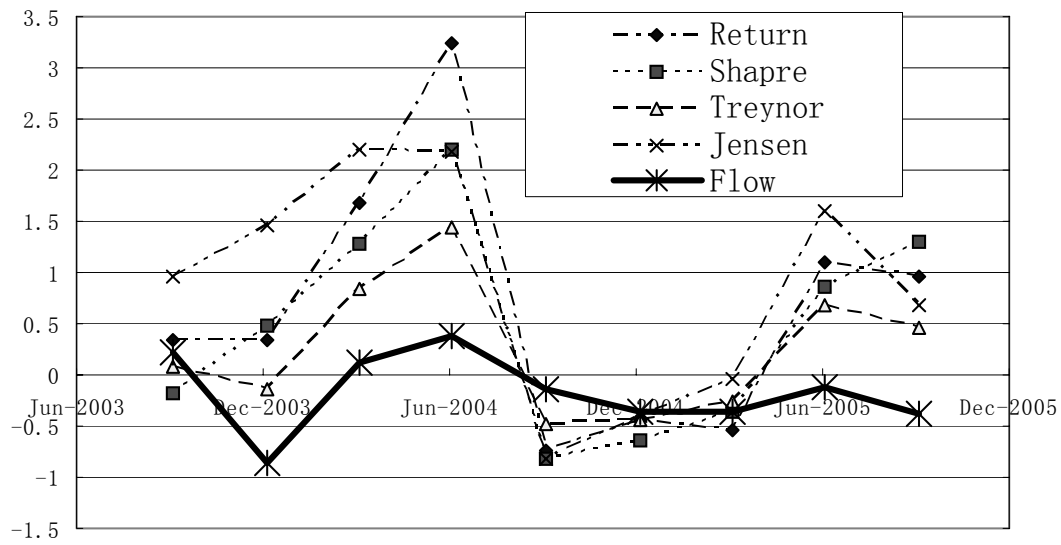Figure 2. Average Size of Funds and Average Fund Flow.

Figure 3. Section Regression Parameters and Net Fund Flow

(the net fund flow (*Flow*) is magnified five times).

Competing on Innovation: How Exemplary Innovators

Leverage Their External Environment to Harness

Innovation and Create Value

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Abstract

The author begins the article with the presentation of sources and factors that contribute to firm innovation. Second, he uses the contingency theory of firm innovation as the intellectual underpinning for the analysis in this paper. Third, the author discusses how exemplary innovators find their creative ideas. Fourth, he analyzes the role of strategic networks in fostering external innovation. Fifth, he outlines how exemplary innovators match their strategies with their innovation ecosystem and leverage open-market innovation as critical sources of competitive advantage. Sixth, the author examines the relationship between exemplary innovators and their customers in harnessing innovation, and in dealing with partnership challenges to accelerate innovation.   He concludes the paper by outlining strategies for would-be innovators wishing to adopt the concepts of ecosystem and open-market innovation in other to create value for themselves and for their external partners.

Keywords: Firm, Innovation, Ecosystem, Open-market, Strategy, Networks

1. Introduction

1.1 Definition and Role of Innovation in Firm Performance

Following prior research, the author defines innovation as used in this paper, as a process that begins with an invention, proceeds with the development of the invention, and results in the introduction of a new product, process or service to the marketplace (Edwards and Gordon, 1984).   Innovation begins when a firm chooses an invention for development, with the ultimate goal of introducing it to the market (Kuznets, 1962).   This definition is also consistent with Schumpeter's description: "The making of the invention and the carrying out of the corresponding innovation are, economically and sociologically, two entirely different things" (1939, p. 85).

The role of innovation in creating firm value has long been recognized.   Firms undertake investment in research and development in hopes of developing innovative products and services that lead to increase performance.   Prior research has found a positive correlation between innovation and firm value (Griliches, 1981; Pakes, 1985).   For example, Griliches (1981) reported that investment in innovation can yield returns of 200 percent over the long run. Similarly, much has been written on factors that contribute to the innovative success to firm (see Brown and Eisenhardt, 1995; Damapour, 1991; Fiol, 1996).   Some of these factors are aspects of an organization's structure and culture, project team composition, within-firm and within-team knowledge flows, and top management and project leadership skill, commitment, and attitudes toward change (Griliches, 1990). More specifically, technological innovations often follow a "trajectory"—a related stream of technological development (Dosi, 1982; Winter, 1984).   Continuous exploration and continuous exploitation are both necessary for a firm to progress along a technological trajectory (Puranan, Singh and Zollo, 2006).

1.2 Sources of Firm Innovation

There are, of course, innovations that spring from a flash of genius.   Most innovations, however, especially the successful ones, result from a conscious, purposeful search for innovation opportunities, which are found only in a few situations.   Four such areas of opportunity exist within a company or industry: unexpected occurrences, incongruities, process needs, and industry and market changes.   The additional sources of opportunity exist outside a company in its social and intellectual environment: demographic changes, changes in perception, and new knowledge.   True, these sources overlap. Different as they may be in the nature of their risk, difficulty, and complexity, the potential for innovation may well lie in more than one area at a time.   Together, they account for the great majority of all innovation opportunities (Drucker, 2002).

2. Theoretical Background

The author uses the contingency theory as the intellectual underpinning of the analysis of firm external innovative behavior in this paper. Contingency theory has a long tradition of discussing how different dimensions of the external environment interact with organizational attributes such as the degree of competition in an environment (Pfeffer and Leblebici, 1973), the availability of financial resources (Pfeffer and Salancik, 1978), manufacturing intensity (Thompson, 1967), and market size (Lawrence and Lorsch, 1967). All of the above dimensions are especially relevant to a firm's external innovation.

3. Exemplary Innovators and their Creative Ideas

Studies indicate that exemplary innovators (from now on EIs) usually have a pretty clear idea of the kind of competitive edge they're seeking. They have thought long and hard about what's practical in their particular business. And just as hard about what is not (Pearson, 2002). For example, by drawing new product ideas out of current products—and tapping existing skills and technologies—reduces the chance that a firm will come up with ideas that are impractical to produce or market. And using systematic patterns, rather than the preconceptions of customers or marketers, to generate ideas liberates a firm's innovation process from the straitjacket of existing concepts and assumptions (Goldenberg, Horowitz, Levav, and Mazursky, 2003). However, the process of generating and finding innovative ideas is not an easy task in most firms.

How then do EIs find good, concrete ideas? Brainstorming is one approach. Good ideas most often flow from the process of taking a hard look at their customers, their competitors, and their business all at once. So in looking for ways to innovate, EIs concentrate on (a) what is already working in the marketplace that they can improve on as well as expand (b) how they can segment their markets differently and gain a competitive advantage in the process, and (c) how their business system compares with their competitors'. Looking hard at what's already working in the marketplace is the tactic likely to produce the quickest result. Normally, outside ideas are useful simply because their competitors are already doing the market research for them. That is, their rivals are proving what customers want in the marketplace, where it counts. Research shows that good ideas come from all over—conventional competitors, regionals, small companies, even international competitors. For example, most of PepsiCo's major strategic successes are ideas borrowed from the marketplace—often from small regional or local competitors. More specifically, Doritos, Tostitos, and Sabritos were products developed by three small chippers on the West Coast of the United States (Pearson, 2002).

Another strategy employed by EIs is to look at how to create segments or markets for their products. It sounds simple, but it takes a lot of creativity and skill to segment a market beyond simple demographics, ferret out what individual groups of consumers really want, and actually create distinctive product performance features. For instance, at Taco Bell, the biggest Mexican fast-food chain in the United States, the management found that working women were avoiding its outlets like the plague. Women felt Taco Bell's food was too heavy, too spicy. So the company developed a taco salad served in a light flour tortilla and seasoned very mildly. The addition of that salad increased per-store sales more than 20%, with 70% of the sales coming from women—mostly new customers. It also added about $100 million to Taco Bell's sales in its first year (Pearson, 2002). In addition to devising approaches to explore creative and innovative ideas, EIs also develop strategic networks to support their external innovation initiatives. The author looks at this process in the section below.

4. EIs Strategic Networks and External Innovation

EIs believe in the power of networking. This is because successful innovation requires the ability to harvest ideas and expertise from a wide array of sources. For EIs, that means bringing in insights and know-how not just from outside parties but from other businesses. They understand that the need for external perspectives seems almost self-evident: If they stay locked inside their own four walls, how will they be able to uncover and exploit opportunities outside their existing businesses or beyond their current technical or operational capabilities? Yet perhaps even more self-evident to EIs is the need to lock in their innovation initiatives to protect them from competitors. They do this by establishing a network of strategic intermediaries. This is because intermediaries facilitate the exchange of information about innovation among companies while keeping their secrets. The intermediaries can be trusted to maintain confidentiality because if they ever violated the terms of an arrangement no company would hire them again.

That said, no company is, of course, hermetically sealed. Outside perspectives and competencies flow into and out of organizations through many routes: partnerships with universities, alliances and acquisitions, external venture investments, recruiting and hiring, customers and suppliers, and the relationships and curiosity of individual employees. These sources of external influence are valuable and important. It could be argued, in fact, that they have played pivoted roles in all instances of corporate innovation (Wolpert, 2002). Similarly, to the extent that

innovation is necessary for the population to thrive, inter-organizational structures that support diffusion processes are crucial. Diffusion reveals a network's suitability for innovation transfer. The speed with which an innovation diffuses affects the level of payback to early adopters because faster diffusion extends the benefits more quickly to others. Network impacts on diffusion speed are equally relevant for early movers who want to deter diffusion and for decision makers who would rather speed innovation through the field (Gibbons, 2004).

Moreover, as an organizational population develops, networks of relations form among its members. Adaptive change can diffuse through these networks (Kraatz, 1998). However, structural disparities may determine whether an innovation sweeps through the field or languishes in obscurity. Studies suggest that networks of cooperating and competing actors do not emerge all at once because of the actions of one or even a few key individuals (Hargrave and Van De Ven, 2006). And that important knowledge boundaries as well as social or identity boundaries inhibit the diffusion of innovations (Ferlie, Fitzgerald, Wood, and Hawkins, 2005). This can also affect a firm's strategic alignment with its ecosystem. In the section that follows, the author analyzes how EIs match their strategy with their ecosystems.

5. Matching Strategy with Innovation Ecosystem

Innovation ecosystem is defined as the collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution. Enabled by information technologies that have drastically reduced the costs of coordination, innovation ecosystems have become a core element in the growth strategy of firms in a wide range of industries. While leading exemplars tend to come from high-tech setting (e.g., Intel, Nokia, SAP, and Cisco), ecosystem strategies are being deployed in industries as varied as commercial printing, financial services, basic materials, and logistics provisions (Rigby and Zook, 2002).

Study confirms that mapping their innovation ecosystem is one best way EIs determine whether they have set realistic performance expectations for their innovation strategy. They deploy the following steps to reveal where delays in getting the innovation to market might interfere with their success: (1) Identify all the intermediaries that must adopt their innovation before it reaches the end consumer. (2) identify all the complements (other innovations needed for EIs innovation) required for EIs and each of their intermediaries to move the offer forward to the end consumer. (3) Estimate the delays caused by their interdependence with their complementors (those adding to EIs innovation with their own innovations). (4) Estimate the delays caused by the adoption process and by the time it takes each intermediary to integrate EIs solution into its decisions, design cycle, products, and so forth (processing time). (5) Estimate the delays caused by the intermediaries' interdependence with their own complementors and the integration hurdles these intermediaries face in terms of adoption and processing delays. (6) On the basis of those estimates, EIs arrive at a time-to-market for their innovation. (7) After EIs have identified these delays (the interdependence and integration risks), they reassess their initial performance expectations and innovation strategy. If the expectations EIs set at the beginning of the process now seem unrealistic in light of the risks, then they consider their options for closing the expectation gap (for example, change their expectations, markets, partners, or strategy) (Adner, 2006).

5.1 Strategy in Ecosystems

It should be noted, however, that crafting strategy in an ecosystem as mentioned above requires EIs to consider traditional questions in somewhat nontraditional ways. For example: (1) Where to compete. When ecosystem risks are high, markets are uncertain regardless of a firm's confidence in its own innovation. In prioritizing market opportunities, it becomes increasingly important to assess both the project and the system. A complete assessment may show that an opportunity with low internal risks and high external risks is inferior to one with the opposite risk profile. (2) When to compete. Development costs often rise exponentially when schedules are compressed. Such costs are justified when being first to market offers significant advantage. In an ecosystem, however, being ready with a component ahead of one's direct rivals may not confer any advantage if those complementors are not ready when one is. Correct expectations of innovation interdependence and value chain integration may lead EIs to slow their development cycle and, in doing so, both conserve their resources and benefit from opportunities to update their strategies over a longer time period. (3) How to compete. Operating in an ecosystem takes the issue of boundaries (determining which activities to undertake within the firm, which to undertake with partners, and which to take to the open market) to a new level of complexity. Therefore, beyond assessing incentives and capabilities, EIs also address the question of ecosystems leadership. This is because EIs face a choice between taking an active or a passive role in guiding ecosystem development. EIs understand if they lead an ecosystem, they will have a chance to tailor its development to their own strengths. However, EIs are also award that attempting to take the leadership role carries its own risks: It often requires massive resource investments over long period of time before they find out whether the opportunity is real and whether they have managed to secure the orchestrator's role. Taking a less ambitious ecosystem role also requires new choices—which leadership

candidates to follow, how aggressively to commit, how to defend turf.   In all cases, a clear understanding of the full ecosystem and its dynamics is critical for EIs successful strategy (Adner, 2006).   Like an ecosystem, an open-market innovation plays a critical role in influencing an EI's external innovation processes.   The section that follows discusses how EIs leverage their open-market innovation as a source of sustainable competitive advantage.

5.2 Leveraging Open-Market Innovation as a Critical Source of Competitive Advantage

Research shows the conventional methods to spark corporate innovation are falling short and that global executives know the best ideas are not always coming out of their R&D labs. Studies also indicate that some of the fastest growing and most profitable industries are finding open-market innovation to be a critical new source of competitive advantage.

Open-market innovation is defined as an approach that uses tools such as licensing, joint ventures, and strategic alliances to bring the benefits of free trade to the flow of new ideas. By systematically opening their innovation borders to vendors, customers, and even competitors, businesses are increasing the import and export of novel ideas. As they do, they improve the speed, cost, and quality of innovation.   What's more, open-market innovation lets firms set realistic market values for their internal ideas, helping them to better define their core business (Adner, 2006).

Why do EIs innovate with outsiders?   Open-market innovation is fostered by several complementary business and technology trends and offers EIs four distinct advantages.   First, importing new ideas is a good way to multiply the building blocks of innovation. If those responsible for innovation in EIs have more ideas to choose from and different kinds of expertise available to them, it can improve the cost, quality, and speed of innovation.   Therefore, it should come as no surprise that companies that collaborate with outsiders on their R&D reap a higher percentage of their total sales from new products than companies that don't collaborate. The experience of Tetra Pak, one of the world's largest suppliers of packaging systems for milk, fruit juices, and other food products, exemplifies the wisdom of importing expertise (Hegell and Brown, 2005).

Second, exporting ideas is a good way for EIs to raise cash and keep talent. A case in point, in 1980, the market for patent licensing was about $3 billion.   Today, it is about $110 billion and growing rapidly.   IBM earns nearly $2 billion a year in royalties from the patents it exports.   But the money may be less important than what the patent exports signal to the organization: Act fast on promising ideas, or risk seeing them offered to outsiders, even competitors.   Exporting ideas adds urgency to the innovative enterprise and improves motivation and loyalty among employees.   Creative people are more likely to stay on board when they know their good ideas won't get buried but instead may find a home in the outside world. Similarly, BellSouth's faith in the power of exporting innovation runs so deep that it sells its technologies to competitors.   Management decided to license its telecommunication technologies to maximize returns while creating industry standards that favor BellSouth's technology platform (Rigby and Zook, 2002).

Third, exporting ideas gives EIs a way to measure an innovation's real value and to ascertain whether further investment is warranted.   As the flow of exports grows, EIs can look at their innovation initiatives through market-hardened eyes that often reveal where the business is headed and where the company holds advantages over its rivals.   For instance, pharmaceutical company Eli Lilly offers licenses for some compounds under development, when the therapeutic and business value of the drugs is still unclear and the competition for the resources to develop new products is keen.   Fourth, exporting and importing ideas helps EIs clarify what they do best. Companies often delude themselves into thinking that their core business is broader than it really is.   A sustainable core must have economic advantages that will let the business produce something at lower cost, or with higher quality, than other companies in the open market can.   When a company starts collecting actual market data about its capabilities relative to competitors, executives often discover that they are stronger in some areas and weaker in others than corporate lore had led them to believe.

An example is Boeing.   When Boeing CEO Phil Condit took over in 1996, he urged his managers to increase the return on every R&D dollar by focusing more intently on innovations they could develop better than anyone else. As Boeing executives began testing what they could profitably buy, sell, and trade with others, they found that their true comparative advantage was not in manufacturing but in systems integration.   That said, open-market innovation also seems to require formalized decision processes that demand outside data.   Indeed, open-market innovation becomes part of a company's soul when nobody can approve a strategic plan or a budget without talking about what's going on in the outside world. Cargill is moving in that direction: The company has established a coordinated, three-tier approach that speeds up the decisions made about outside deals and alliances. Commitments at the scale of the Cargill Dow initiative are driven and managed from the top (Rigby and Zook, 2002).

In addition to working with their external partners, EIs also leverage their relationship with their customers to bring about innovation that add value to both parties. In the next section, the author analyzes this mutually beneficial relationship between EIs and their customers.

6. Leveraging Customers as Strategic Partners in Innovation

Academic investigation suggests that a firm's ability to produce multiple product innovations in quick succession is critical in high-velocity environments (Brown and Eisenhardt, 1997). For this reason, EIs adopt external development strategies in order to avoid the time-consuming, path-dependent, and uncertain processes of internally accumulating capabilities for producing streams of innovation (Dierickx and Cool, 1989; Leonard-Barton, 1995). However, it is not important to note that outsourcing product development to an external partner, such as customers, does not eliminate EIs commitment to learning by doing— nor should it. What it does is make traditional product development better and faster for EIs—for two reasons. First, EIs can bypass the expensive and error-prone effort to understand customer needs in detail. Second, the trial-and-error cycles that inevitably occur during product development can progress much more quickly because the iterations will be performed solely by the customers.

However, developing the right tool kit for customers is hardly a simple matter. Specifically, tool kits must provide four important capabilities. First and most important, they must enable customers to complete a series of design cycles followed by learning by doing. Computer simulation, for example, allows customers to quickly try out ideas and design alternatives without having to manufacture the actual products. Below are five steps employed by EIs for turning customers into innovators. (1) They develop a user-friendly tool kit for customers. The tool kit must enable customers to run repeated trial-and-error experiments and tests rapidly and efficiently. The technology let customers work in a familiar design language, making it cheaper for customers to adopt EIs tool kit. The tool kit includes a library of standard design modules so customer can create complex custom designs rapidly. The technology is adapted to EIs production processes so that customer designs can be sent directly to EIs manufacturing operations without extensive tailoring. (2) EIs increase the flexibility of their production processes. Their manufacturing operations are retooled for fast, low-cost production of specialized designs developed by customers. (3) EIs carefully select the first customers to use the tool kit. The best prospects are customers that have a strong need for developing custom products quickly and frequently, have skilled engineers on staff, and have little experience with traditional customization services. These customers will likely stick with EIs when EIs are working out the system's bugs. (4) EIs evolve their tool kit continually and rapidly to satisfy their leading-edge customers. Customers at the forefront of technology will always push for improvements in EIs tool kit. Investments in such advancements pay off for EIs, because many of their customers will need for tomorrow what leading-edge customers desire today. (5) EIs adapt their business practices accordingly. Outsourcing product development to customers will require EIs to revamp their business models to profit from the shift. The change might, for instance, make it economically feasible for EIs to work with smaller, low-volume customers. Tool kits will fundamentally change EIs relationship with customers. Intense person-to-person contact during product development will, for example, be replaced by computer-to-computer interactions.

EIs prepare for these changes by implementing incentives to reduce resistance from their employees. A variety of EIs use this approach. For example, Bush Boake Allen (BBA), a global supplier of specialty flavors to companies like Nestle', has built a tool kit that enables it customers to develop their own flavors, which BBA then manufactures. In the materials field, GE provides customers with Web-based tools for designing better plastic products (Thomke and von Hippel, 2002). In the section below, the author discusses how EIs maintain their innovation edge with their customers.

6.1 Cementing Innovation Advantage with Customers

EIs understand that they cannot successfully innovate and grow unless they systematically invest in customer R&D. In doing so, they must take both an offensive and a defensive approach. The offensive strategy has three phases: Establish a deep relationship with core customers, then extend the number of customers beyond the core, and, finally, stretch into new customer realms. The defensive strategy focuses on continually scanning for potential competitive disruptions (Selden and McMillan, 2006).

6.2 Moving Beyond Customer R&D

Customer centricity is not just a slogan. It's a prerequisite for sustainable profitable growth. But it's the rare organization that understands what it means to be customer-centric, and true customer-centric innovation includes two additional efforts that both frame and go beyond the customer R&D endeavors. For this reason, one of the most important first steps EIs take, even before embarking on customer R&D, is to measure and manage customer profitability. For instance, EIs such as Tumi, a leading global marketer of high-end luggage and accessories, have tried to discern which customers are profitable and which aren't by fully allocating all invested capital and expenses

to individual customers. They do such analysis on a regular basis and make customer ROIC (return on invested capital) a central metric for business performance. EIs do so because it helps them get a solid idea of who their customers really are in the first place and where and why they make a profit or don't.   Similarly, EIs such as Dell, Best Buy, Royal Bank of Canada have set up customer segment units led by individuals who are responsible and accountable for the financial performance and customer satisfaction of those segments.   These EIs develop strategies for their segments and allocate resources with the goal of growing their markets and achieving a high customer return on invested capital from customer R&D (Selden and MacMillan, 2006).   Dealing with customers and other external partners is not always easy.   This is because each party has its strategic interest to protect. However, EIs use this partnership complexity to facilitate innovation. Below the author analyzes how EIs leverage partnership difficulty to accelerate innovation successfully.

6.3 Dealing with Partnership Difficulty to Accelerate Innovation

Between enterprises there are often difficult problems that both parties have a stake in solving—the most important of which involve finding new ways to meet customer's needs. Different enterprises bring different perspectives and competencies to tackling a problem.   And the potential for innovative solutions rises when people from diverse specializations interact. It should be noted, of course, that productive friction does not usually happen so naturally. It cannot be relied on to carry the day. This is because when people with different backgrounds, experiences, and skills set engage with one another on problems, misunderstandings arise, arguments occur, and time is consumed before resolution and learning take place.   Too often, in fact, the friction becomes dysfunctional.   Misunderstanding hardens into mistrust, and opposing sides focus on the distance that separates them rather than the common challenges they face.   How then do EIs harness this potentially destructive force so as to accelerate learning, generate innovation, and builds capabilities?   Below are three strategies deployed by EIs for dealing with destructive forces:

First, EIs keep all eyes on the Prize.   One thing that allows collaborating companies to move forward quickly is a shared sense of what must be achieved.   In product development, productive friction is enhanced when teams have clear and aggressive performance targets but few, if any, constraints are imposed on how the product design might meet these targets. The more restrictions there are—for example, a specification that the product design must use certain components—the less room there is for problem solving and the greater the potential for dysfunctional friction. To make performance requirements tangible and immediate, EIs adopt a concept that is termed the "action points": A specific product must be introduced, performance shortfall addressed, or operations breakdown resolved. In some way, concrete actions must be at stake.   Otherwise, it is far too easy to produce abstract answers or perspectives that give the appearance of resolution but gloss over profound disagreements or misunderstandings.

Second, EIs leave the evolution of productive friction to the people involved. Productive friction ultimately depends on the people involved.   If they don't have relevant specializations and diverse perspectives, their problem solving will be weakened, and they may not even be able to tackle the issues at hand.   Yet different skill sets and experiences can create misunderstanding and undermine trust.   Since time is usually at a premium, identifying and connecting with people who have relevant specialization is often a challenge. This is why, in some cases, local ecosystems are hotbeds of productive friction.   But even then, specialized knowledge brokers may be required to determine who should be involved and to bring these people together. This challenge becomes even more acute in distributed operations like global process networks or dispersed field operations.   Hence, to mobilize the right people, EIs use knowledge brokers who are well versed in the practices at hand.   Even more fundamentally, knowledge brokers help bridge participants' knowledge gaps. This was the case at GaSonics, a developer and manufacturer of semiconductor-processing equipment. Back in 1999, GaSonics had acquired Branson, which made similar equipment.   The two companies had perfected different approaches handling a certain stage of semiconductor manufacturing.   Unfortunately, neither method could deliver the required performance as customers moved to new generation of semiconductor technology.

Each company's engineering team was determined to refine its own approach. Fierce battles broke out over which system should prevail. Dave Toole, the CEO of GaSonics at the time and an executive with extensive industry experience, was the knowledge broker.   Recognizing that both sides were stuck on processes that just could not resolve the issues, Toole urged the teams to look at the problem from a new perspective and consider a two-part solution. This reframing helped the engineers discover that a hybrid approach could be used in the initial phase of processing.   By intervening and reorienting the teams at a critical stage in their discussions, Toole was able to help them generate solution that built upon both sides' experiences.   It was an important breakthrough because it facilitated the move to subsequent generations of semiconductor technology (Hagell and Brown, 2005).

Third, EIs Rub shoulders with the best.   A firm's ability to generate productive friction with its suppliers and customers is a source of competitive advantage now—but over time; it will become a competitive necessity. Why?

Because specialization is the way of the world. As information technology makes it easier for companies to contract with outsiders for more and more of the business tasks that once needed to be performed in-house, organizations sharpen their focus on what it is they do uniquely well. Companies that hew to their old forms will truly find themselves jacks of all trades and masters of none—and this will cripple them in two ways. First, their own core strengths will fall increasingly short of world-class; second, they will not be availing themselves of world-class capability in peripheral functions. Meanwhile, for the companies that specialize, the name of the game will be capability building. Once they have chosen to focus their resources on a particular function, the imperative is to be the best—and to keep getting better at a faster rate than the competition. How will they accomplish this? Not in isolation, but through productive friction with other specialized players. For instance, EIs such as Dell is thinking along these lines, as can be seen in its approach to relationships with Taiwanese original design manufacturer (ODMs). When Dell uses ODMs, it works closely with them, sharing knowledge in formal meetings that occur throughout the product life cycle. These interactions are structured so Dell can systematically integrate its expertise with that of its suppliers and, in the process, build new capabilities (Hagell and Brown, 2005).

7. Concluding Remarks

For firms wishing to adopt the concept of ecosystem or open-market innovation, here are six steps to follow during the data collection and analysis process to support the initiative. First, management must start with the company's business objectives. Which activities will be central to the company's future and must be strengthened? Which are less critical? Second, management must analyze the company's innovation projects and categorize how those efforts support the main business objectives. Which innovation areas are core, adjacent, or distant? Where has the company's track record in open-market innovation tended to succeed or fail? Management must ask itself: "Were we the barrier to success? Why?" Third, management must map the hot spots for relevant innovation around the periphery of the business. Management must ask itself: "How many innovations burst on the scene from the periphery and surprised us?" Fourth, management must survey people inside the company about what they think are the barriers to innovation. Management must also do the same with important vendors and customers to gauge how working with your company compares to working with others. Management must ask itself: "Where are the main bottlenecks in the organization? Who can offer solutions?" Fifth, management must define, with numbers, the gap between what management expects the company to achieve with its innovation initiatives in the next three to five years and what it thinks competitors will achieve. How may key enabling technologies could be sourced more efficiently or effectively from outside of the company? Finally, management must identify the ten most important innovations in the company and in the industry in recent years. Understand the origins of these ideas. Management must ask itself: Could any open-market techniques have given the firm greater access to these external innovations?

Once a firm has conducted this kind of ecosystem or innovation audit, it can begin building the basic infrastructure for open-market innovation. It can set up systems for capturing and circulating ideas inside and outside the company. It can set up the rules for the innovations that are being imported and exported—which technologies will be imported or exported, for instance, and under what time frames will they be released? It can start licensing out and selling its ideas. Most important, a firm can measure and reward its progress with ecosystem or open-market innovation; common metrics might include the contribution of open-market innovations to revenues and profits and the time it takes to reach certain milestones (Rigby and Zook, 2002).

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Strategizing Corporate Social Responsibility

-- Evidence from Guangdong Wen's Foodstuffs Group Co.

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Abstract

Along with the advancement of economic globalization and industrial revolution, scholars and managers have realized the importance of corporate social responsibility (CSR). However, there is still an absence of a knowledge bridge between theories and practices, namely how to apply CSR theories to strategic management practices. This paper adopts a qualitative study method and takes Wen's Foodstuff Group Co., a leading agricultural company, as an example to develop relevant researches. Results show that: the founders' ideas and values serve as the base for its sustainable development strategies. The corporation enhances its social responsibility idea by corporate culture and applies the strategic responsibility thought to daily management. The essence of Wen's strategic CSR is to attach importance to food safety, environment protection, and loyal cooperation with employees and farmers in strategic choice. At the same time, the corporation copies the successful strategic mode in other regions. Its successful strategies depend on paying more attention on food safety and environmental protection, treating competitors, community, media, governments friendly.

Keywords: Corporate social responsibility, Strategy, Wen's Foodstuffs Group Co., Corporate culture

1. Introduction

The study of corporate social responsibility (CSR) has begun in early 20th century in western countries. Along with the advancement of economic globalization and industrial revolution, CSR is becoming a mainstream issue. Entering the new century, the scientific development view, constructing a harmonious society and realizing a human-oriented, comprehensive, coordinative, and sustainable development have already become a consensus in China. Accordingly, the global "CSR movement" has generated profound effects on Chinese companies. In China, more and more companies, entrepreneurs, and scholars have already realized the importance of CSR. However, there is still an absence of a knowledge bridge between theories and practices. At present, lots of CSR researches focus on large-scale enterprises and state-owned companies, paying more attention on the relationship between social performance and financial performance, instead of corporate managers' CSR ideas and how to apply CSR to management process. Besides, practical cases are in an extremely short. As a matter of fact, private economy has already become a backbone for China's economic development. Private enterprises should also shoulder relevant social responsibility in sustainable development. However, most managers in private enterprises do not know how to construct a procedure that affects the corporate management process in order to realize the combination of CSR and strategic management. Theories in this aspect are still undeveloped, which delays management's best practices and more responsible corporate behaviors.

In order to make up this absence and help to fill these theoretical and empirical voids, we focus on an in-depth study of a single case: Wen's Foodstuffs Group, a leading agricultural private enterprise. It is the only private enterprise that has been honored as a national civilization unit by the Central Spiritual Civilization Construction Committee. Besides, it has gained the name of being "a key leading enterprise in national agricultural industrialization" granted

by Ministry of Agriculture of China. It has won more than twenty honors at the provincial level or above. In recent ten years, avian influenza and SARS have heavily hurt China's agriculture. Some breeding companies failed to survive and finally disappeared. In contrast, Wen's Foodstuffs Group shows its strong anti-risks ability and market competence. Evidence from this corporation, we can analyze its dynamic changes by investigations and make further research on how enterprises fulfill their social responsibilities, enriching the present studies.

2. Theoretical background and research questions

As the most direct force in pushing economic development, enterprises hold a special status in constructing a harmonious society. Carroll and Buchholtz (2004) think that after several decades of years' discussion, only few managers and scholars disagree that enterprises should shoulder social responsibility. Most agree that enterprises should protect and enhance the rights and interests of employees, consumers, creditors, communities, environment, government, and other stakeholders except shareholders as much as possible as they pursue and create profits for shareholders. Some scholars begin to study the combination of CSR and corporate strategy recently because it is the most advanced and practical method to apply CSR to corporate operation. Most studies in this field emphasize on the importance of strategic social responsibility.

From a view of strategic management, Freeman (1984) thinks that stakeholders are individuals or groups that can affect or be affected by the implementation of corporate strategic aims. He studies the corporation's strategic management based on the complex relationship between corporate stakeholders. Enterprises do not live in vacuum. They contact with all kinds of sectors in the society all the time. The corporate social responsibility is comprehensive.

Marsden (1996) points out that it is easier for enterprises with social responsibility to recruit new employees who sustain their loyalty to enterprises. Burke and Logsdon (1996) put forward that the CSR can benefit both the enterprise and the stakeholders and the society in the same way. As CSR can generate real interests for enterprises, especially the support for the main business, it can help to improve enterprises' effects, what is helpful to improve corporate social responsibility (policy, progress) to a strategic level.

Archie B. Carroll thinks that the CSR is the society's hope for enterprises fulfilling their obligations. The society hopes enterprises should not only realize their missions in economy but also obey laws, follow ethics, and benefit public interests. Therefore, the complete CSR includes enterprises' economic responsibility, legal responsibility, ethical responsibility and philanthropic responsibility.

Murray (1997) thinks that CSR should be regarded as a key driving factor for corporate performance. Although the carry-out of corporate social responsibility can not generate direct and fast economic effects for enterprises, the CRS can bring about strategic return for enterprises, which can benefit enterprises' long-term return, generating more extensive return for responsible enterprises.

Macleod (2001) thinks that CRS can help to increase employee commitment to the firm and improve the firm's fame. By communicating with stakeholders, it can help to realize the problem management properly. Porter and Kramer (2002) argue that corporate charity should be rooted in enterprises' competence and take the environment into consideration rightly. Besides, once corporate strategy combines with CSR, enterprises should inform all stakeholders (Perrini et al, 2007).

Chinese scholars also agree the importance of strategic social responsibility. Qijun Jiang (2005) thinks that to fulfill corporate social responsibility can benefit enterprises in many ways: fame management, risks management, employees' satisfaction, innovation and leaning, using capitals effectively, economic performance, and improving competitive environment properly. Therefore, enterprises fulfilling the social responsibility can help to improve enterprises' comprehensive competence. In the long run, there is a positive correlation between the fulfillment of corporate social responsibility and the corporate competence.

Generally speaking, most scholars agree that enterprises should shoulder social responsibility and think that to construct CSR from a strategic angle can benefit the development of enterprises. However, many researchers take the enterprise as a "black box". Most researches are merely based on logic conclusions afterwards. As a result, the conditions and intentions for the combination of corporate strategy and CSR are still unclear. As enterprises emphasize on CSR, they seldom pursue the coordination of CSR, corporate policies and procedures, and their strategies. Apparently, experience cases are not sufficient to support theoretical research. Therefore, for researchers, a greater challenge is to analyze the conditions and bases for applying CSR to corporate strategy and organizational operations by case study.

Evidence from an agricultural leading enterprise, Wen's Foodstuffs Group, this paper tends to explore the relationship between enterprises' CSR and corporate strategy, hoping to develop a more specific frame based on

present CSR literature, in order to understand how strategic CSR happens in an agricultural private enterprise.

3. The background of Wen's Foodstuffs Group and the study method

3.1 The background of Wen's Foodstuffs Group

Guangdong Wen's Foodstuffs Group was founded in 1983. Beiying Wen and seven farming families and eight farmers created the predecessor of Wen's Foodstuffs Group ------ Lezhu chicken house. After twenty-five-year's development, it has already developed into a large agricultural and farming corporate group that takes breeding industry as the main business and food process and biopharmaceutical industry as simultaneous businesses, being the largest broiler production and supply base in Guangdong province. It possesses more than eighty son companies, distributing in sixteen provinces, cities, and autonomous regions. It has equipped breeder bird houses, hatching houses, feedstuff houses, and service sectors in branch companies, realizing an integrated operation concerning farmers, trades, sciences and technologies, production, supply, and sales. In 1999, Wen's Foodstuffs Group was honored as "a leading agricultural enterprise" by Guangdong provincial government. In 2000, it was granted as a key leading enterprise in national agricultural industrialization by Ministry of Agriculture of China and other five ministries. Since 2002, Wen's Foodstuffs Group has introduced the ISO9001 quality management standard. Its production management system has already passed ISO certification, non-pollution agricultural product certification, HACCP certification, GMP certification, and many quality-related authorized certifications. Now Wen's Foodstuffs Group has more than sixty integrated chicken-breeding companies, producing more than 600 million chickens annually. It is the largest chicken-supply base in China. Hog products have passed the provincial non-pollution agricultural product certification and have been named as a famous brand product in Guangdong. Guangdong Dahuanong Animal Health Products Co., LTD, an underling company of Wen's Foodstuffs Group, is appointed to produce anti-SARS H9 and H5 vaccines, contributing a lot to the battle against SARS.

In Xinxing County, Guangdong province, there were four agricultural enterprises engaged in chicken- breeding business, namely Wen's Foodstuffs Group, Wenshuhan Group Co., LTD, Wenmuhui Group Co., LTD, and Guzhanghan Wanyi Chicken-Breeding Co., LTD. In short, they are "three-Wen and one- Gu". However, "two-Wen and one-Gu" failed. In contrast, Wen's Foodstuffs Group sustains nice development and achieves marvelous progresses in competence, ecology, and society. What's the reason? Based on researches, the author thinks that it is the CSR that serves as the capital collector in Wen's Foodstuffs Group, which establishes a sound base for sustainable development.

From table 1, we can notice that Wen's Foodstuffs Group has developed in a stably rising trend.

3.2 Research method and data collection and process

It is hard to directly measure the complex and dynamic construction of strategic CSR by quantitative method because the quantitative method is right for large-scale social investigation in a macro aspect. The qualitative method is more suitable for the construction of strategic CSR. By a deep and careful research on the interaction between researchers and research objects, we can get a relatively comprehensive explanative understanding to the nature of thing.

In this paper, the author adopts different method to collect data. After analyzing the history materials, annual reports, internal management files, social reports, other scholars' research reports, and industrial background materials provided by the enterprise, the author interviews some corporate managers by a semi-structural talk. In other words, give direction by asking a series of open questions and focus on enterprise's strategic response and social responsibility in market competition. Interviews ranged from half an hour to two hours. Besides, the author makes practical investigation, visiting the enterprise's factories, offices, and farmers in cooperation in order to comprehensively understand the daily operation of the enterprise. All these materials form powerful evidences in the qualitative research mode.

4. The discoveries in the research

4.1 The construction of CSR strategy: from a history view

4.1.1 The founder's experiences and values serve as the base of today's corporate culture.

The founder of Wen's Foodstuffs Group, Beiying Wen's experiences and creeds exert a vital effect on toady's excellent corporate culture.

Beiying Wen has been influenced greatly by Buddhism and Confucianism. And the thought of "loving homeland, people, science, work, and socialism" has been rooted in his mind. The three thoughts form a kind of "Great Harmony" thought in Beiying Wen's mind. With this thought, Beiying Wen created Wen's Foodstuffs Group that was born with a "Great Harmony" thought. Therefore, this enterprise would like to shoulder social responsibility in nature.

At the very beginning, Beiying Wen's countrymen wanted to buy some chicken to breed from him. Beiying Wen thought: where did they look for feedstuff after buying chicken? Without chicken- breeding knowledge, how would they do when chicken got sickness? How did they sell the grown-up chicks? Therefore, Beiying Wen put forward a suggestion: the enterprise takes certain subscription and provides with chicken, feedstuff, and medicine; keep relevant records; send people to help farmers breed chicken; the enterprise takes back grown-up chicks and settles accounts finally. By this way, his countrymen can gain profits. This suggestion finally becomes an "enterprise + farmers" mode that contributes a lot to the success of Wen's Foodstuffs Group. It thanks for the entrepreneur's "Great Harmony" thought, hoping to achieve a common prosperity with all farmers. Meanwhile, by cooperating with Wen's Foodstuffs Group, farmers learnt the chicken-breeding technology, knowing how to contact with enterprises, obtaining higher incomes. The independent and self-sufficient farmers become workers in workshops of the industrial chain. Wen's Foodstuffs Group's social responsibility includes: improving local people's knowledge levels and living levels, and the overall social environment. Just as what was said by people: "where there is Wen's Foodstuffs Group, there is agricultural progress and prosperous rural economy."

Pengcheng Wen is the second president of Wen's Foodstuffs Group. He has inherited and developed Beiying Wen's "Great Harmony" thought, taking "to help farmers to get rid of poverty and achieve prosperity" as the aim of enterprise. Confronting with avian influenza and SARS, Wen's Foodstuffs Group keeps promise ("obtain 1 Yuan return at least for every grown-up chick) and guarantees farmers' interests. "The enterprise would rather face up with loss than hurt farmers' interests." It is the spirit of an entrepreneur and the practice of the enterprise. Wen's Foodstuffs Group shoulders the social responsibility of stabilizing the society and supporting farmers.

4.1.2 The corporate governance role

Pengcheng Wen has inherited his father's values, taking "to achieve common prosperity, to benefit employees and the society" as the enterprise's tenet and aim. Enhance the social responsibility idea by corporate culture and integrate the responsibility strategy thought into daily management. Change the management center and decision center from top level to lower level. Gradually perfect organizational structure and put different levels in order. Make clear descriptions for different positions. Construct a set of standard culture scientific management system that focuses on Wen's culture, pursuing for corporate effects and social effects, based on four-leveled organizational structure and powerful computer network.

Under the direction of corporate culture that emphasizes on responsibility, all managers and employees build up correct life aims and values. They work hard and create the prosperity for the enterprise. Meanwhile, the idea of "creating wealth and sharing wealth" gives farmers higher enthusiasm. After the foundation of the enterprise, it developed at a double rate of last year before 1995. From 1995 to 2000, the development rate sustained 50%. After 2000, the rate kept 30%.

4.2 The nature of strategic CSR

4.2.1 Emphasize on food safety and environment protection

Wen's Foodstuffs Group always emphasizes on environment protection that is the precondition for the long-term existence of breeding enterprise. Wen's Foodstuffs Group invests more in sewage treatment equipments, trying to construct an ecological circular agriculture. In recent years, it tries to produce firedamp or high-quality organic fertilizer by animal dejection. On one hand, it can help to realize a non-pollution process. On the other hand, it can create a new way for farmers earning new incomes. In a sense, the enterprise shoulders the social responsibility in two aspects: environment protection and food safety.

4.2.2 The loyal cooperation of the enterprise, employees, and farmers

Concerning the aspect of treating employees, Wen's Foodstuffs Group emphasizes on an organic combination of feelings, reasons, and laws according to its cultural management. The enterprise spends lots of capitals in improving employees' working conditions and living conditions. Wen's Foodstuffs Group has already become an overall stock cooperation system from initial partly stock system. Employees are not only workers of the enterprise but also the owners of enterprise assets. The overall incentive mechanism can generate powerful and lasting incentive effects, making employees fulfilling their values physically and spiritually. This mechanism serves as one of impulsion driving the enterprise's development, guaranteeing a twenty-five years' stable and healthy development for Wen's Foodstuffs Group.

Wen's Foodstuffs Group adopts an "enterprise + farmers + sellers" industrialization business mode. Agriculture is a special industry. Considering the different features of enterprises, farmers, and sellers, the enterprise guarantees the returns of farmers and sellers from a strategic aspect. Besides, the returns must be higher than the average of farmers who do not join in the industrial chain. Therefore, the enterprise shoulders the social responsibility for its important

stakeholders. Based on its emergency ability, the enterprise will gain benefits from the industrial system's overall operations, what can achieve a positive interaction among all rings of the industrial chain. Cooperators can buy stocks from the enterprise and becomes its stockholders, who can take dividends in the year-end. To construct a long stable cooperative relationship with all cooperators and turn a pure trade relationship into a partner relationship reflects Wen's Foodstuffs Group's business tenet, common prosperity.

Facing up with crisis, Wen's Foodstuffs Group fulfilled its social responsibility completely. In 2003, China suffered from SARS. The Group was affected severely. In front of the crisis, the Group tried hard to guarantee the products quality, promote products sales, ensure stable cash flow, and make timely capital arrangement. Balance the interests of different cooperators and stabilize business order. Adopt a phase output-reduction plan by decreasing the intensity of breeding. During this period, guarantee all employees' jobs and welfare. Enhance trainings and improve employees' professional technologies. All stockholders, employees, cooperators, and customers hold complete confidence in the Group overcoming the difficulty. At the first half year after the SARS, the enterprise suffered a loss of 182 million Yuan. However, the total gross profits of all cooperative farmers reached 141 million Yuan. These data rightly proved the high credit of the enterprise. This crisis makes the enterprise win farmers' trust again. After the SARS, the enterprise develops fast and gains profits quickly. In recent years, due to the impacts of avian influenza and other crisis, separate farmers quit from the market at a rate of 4%. In contrast, farmers who cooperate with Wen's Foodstuffs Group keep in enlarging their production scale.

Wen's Foodstuffs Group always emphasizes on farmers' training. According to the Group's rules, in order to improve farmers' technological management levels and obtain qualified products, all branch companies must provide with two or three technological training for farmers every year at least. In recent years, there are at least 60 thousand people attending this kind of training every year. Besides, the enterprise also pays attentions to farmers' corporate culture training. By this way, farmers who cooperate with Wen's Foodstuffs Group possess a sharp market consciousness, higher production technologies and management abilities. Some outstanding farmers not only improve their own abilities but also drive many surrounding farmers.

4.2.3 The consistent strategy: copy the successful mode in other regions

The success of Wen's Foodstuffs Group is from the constant copy of the "Wen's Mode". This mode includes: how to build up chicken house, how to develop farmers and customers, how to guide farmers. The enterprise has a set of mature experiences for these issues and right software for farmer management and finance management. Wen's Mode displays its powerful vitality during its copying process.

The growth of Wen's Foodstuffs Group can help thousands of farmers realize well-off life by breeding. Therefore, its expansions in other regions are welcome by local governments. Generally speaking, Wen's Foodstuffs Group's integrated branch companies in other regions can make money in the first year or the second year. The longest term needs three or four years. Based on the "enterprise + farmers" business mode, Wen's Foodstuffs Group achieves fast development. Although industrial crisis appears frequently in recent years, its member companies in other regions still gain relatively fast development. The business exceeds 10 billion Yuan. After twenty-five years' development, its market net covers south China, middle China, east China, and the southwest area. Among the enterprise's member companies, eleven are named as provincial leading companies, and five provincial high-tech companies.

With the "profits sharing and risks sharing" idea, Wen's Foodstuffs Group properly deals with the relationship between the enterprise and farmers. It gains a great success by copying this mode in different regions.

Today, Wen's Foodstuffs Group cooperates with more than ten domestic famous agricultural colleges, such as South China Agricultural University and Sun Yat-sen University, and research centers, realizing a close connection among production, learning, and research, ensuring the enterprise's leading position in technological field. Wen's Foodstuffs Group emphasizes on charity cause. In 1996, it founded a Beiying Fund to help students in poverty. The Fund surpasses 2 million Yuan now. Every year, the enterprise takes out more than one million Yuan to repair bridges and roads, improve medical conditions and education conditions, and build up nursing homes. All these behaviors gains praises from governments and people. As a result, Wen's Foodstuffs Group builds up a better corporate image, winning higher corporate fame.

5. Discussion and conclusion

Because Wen's Foodstuffs Group can shoulder responsibility for farmers in cooperation, the enterprise would rather guarantee the farmers' profits than suffer from losses, though it has faced up with SARS, avian influenza, and other crisis. As a result, the responsible enterprise improves its fame, which further supports the generation of corporate values. The CSR promise greatly enhances the enterprise's credit, what makes its operations become more legal for stakeholders and the society in general. Besides, trust and social capitals make the corporate policies more reliable and believable, which can drive employees to work better. Even if its branch company locates in mountain area, can

it still retain capable and competitive employees. By this way, the enterprise's competitive advantage is improved. Being friendly to other stakeholders can help the enterprise win better living spaces. In the future, the enterprise's social effects and economic effects will be further improved (see figure 1).

Studies show that Wen's Foodstuffs Group is a leading agricultural enterprise with a high sense of social responsibility. The enterprise makes its social responsibility method root in corporate strategy deeply. The corporate founder's creed, values, and experiences form a sound base of corporate responsibility strategy. In corporate governance, the founder's personal values should become corporate ideas, constituting corporate culture. The responsibility strategy thought should apply to daily management, constructing a set of complete regulations and ensuring its effective implementation. Make the "cooperate loyally and pursue for a well-off life" idea influence employees' values and shape their behaviors. Guarantee all corporate activities in order. Realize high products quality and corporate effects. As an agricultural enterprise, the essence of Wen's Foodstuffs Group's strategic CSR is to emphasize on food safety and environment protection, loyal cooperation with employees and farmers, similar business mode in other regions, being friendly to competitors, and caring about communities, media, governments, and social charity in strategy choice.

How CSR evolves in an enterprise is a new study in this paper. Wen's Foodstuffs Group's strategic social responsibility is rooted in its origin. However, people do not notice this point. Besides, CSR does not establish and form relevant files. After the enterprise has developed more than ten years, CSR has become formal and clear. This evolution shows that as the organizational structure becomes larger and more complex, not only does the procedures and control system of management need to be normalized, but also the CSR that affects enterprise's strategies, behaviors, and values should be normalized. Finally, in order to ensure that the enterprise follows the social responsibility road programmed by the entrepreneur, the enterprise needs clear values and moral guidance.

This paper is to focus on a leading agricultural enterprise to make a case study. The study of one case is helpful for deep research on complex phenomenon. Besides, this paper selects a typical enterprise as study object and makes analysis based on data from many aspects. However, whether the conclusions are right for other enterprises and industries or not still waits for further tests by relevant researches on other enterprises and industries in future.

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Table 1. The basic development situation in Wen's Foodstuffs Group from 1984 to 2007.

Year	Broilers in market (10,000)	Hogs in market (10,000)	Farmers in cooperation	Farmers' profits (10,000Yuan)	Number of employees	Total sales of the group (10,000Yuan)
1984	1	——	——	——	10	——
1986	5	——	5	——	39	36
1988	15	——	80	13	42	142
1990	61	——	280	96	69	700
1992	369	——	1500	523	123	4114
1994	1683	——	4600	4100	685	23700
1996	4041	——	6500	9100	1500	65000
1998	8840	1.13	8500	12800	2500	107000
2000	13800	14.3	12000	20500	3256	15900
2001	17800	19.66	15000	24500	5000	220400
2002	22800	35.8	20000	32700	8500	283000
2003	29200	59.78	25000	36900	9000	380400
2004	34600	77.91	29500	47300	11000	550000
2005	40000	95.2	30000	63000	13000	634000
2006	45200	133	30000	71000	15000	760000
2007	53000	181.7	36500	113000	15000	1170000

Source: From Wen's Foodstuffs Group

Decisive factors

Results

Social
Performance

First level   Second level

Owner's
beliefs and
values system

Firm's values, vision
And mission

CRS
integrated in
strategy

Trust

Owner's past
experience
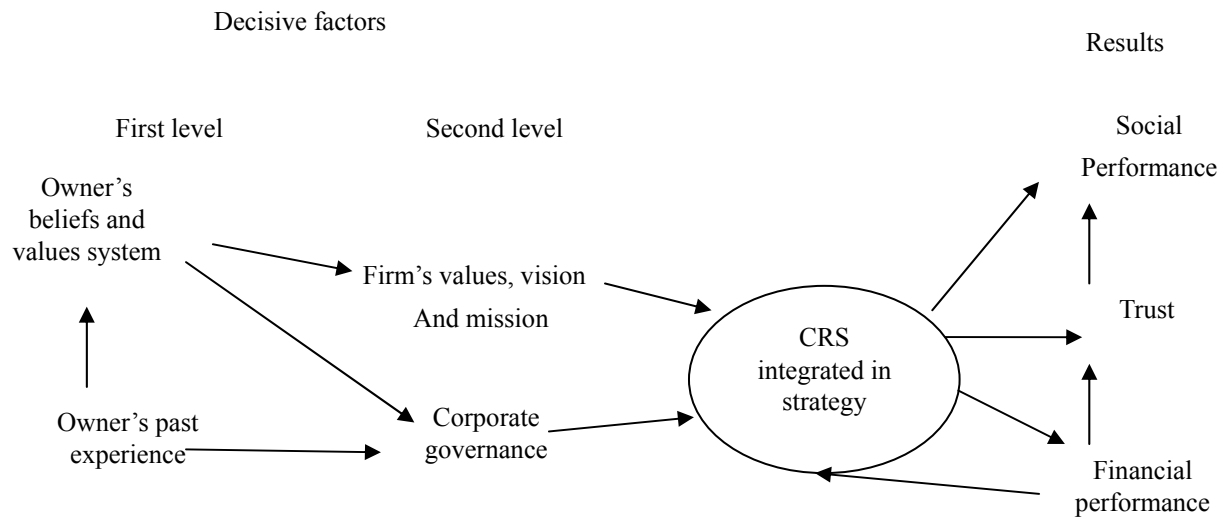
Corporate
governance

Financial
performance

Figure 1. The Frame of Wen's Foodstuffs Group's Social Responsibility Strategy.

Study on the Optimization of Aim-Oriented

Construction Project's Control System

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Abstract

This paper analyzes the Time-Cost, Quality-Cost, Time-Quality aim optimization models of construction project, by studying on the aim system of construction project, and puts up an optimization model of Time-Quality-Cost.

Keywords: Construction project, Aim-oriented, Control system, Optimization

1. Introduction

The aim system of construction project is the description of the final state that will be accomplished in the construction project in essence. Because the project management adopts the aim management methods, construction project has a clear aim system that is the masterstroke during the project process. Project control is a process that includes a series of activities. During the process of accomplishing the project aim, the subjects of project management will examine and collect the information that reflects the project state, based on the prediction for the future and the original action plan, rules, and measures, by the organizational system and any possible way, and compare the information with the original plan. They will find errors and analyze relevant reasons, adopt measures to correct these errors and guarantee the normal execution of project plan, which can help to realize the original aim (Hu Cheng, 2004).

2. A brief introduction for the aim system of construction project

According to the structure of aim, the aim system of construction project is composed of three levels, namely the system aim, the child aim, and the operable aim. According to aim's levels and thinking ways, the aim system of the construction project, especially the large and complex one that has great effects on national economy has three aspects, namely the real thinking aspect (includes quality, cost, time, source, and other basic aims), the logical thinking aspect (refers to the satisfying aims in every aspects), and the philosophical thinking aspect (includes aims of coordinating with environment and sustainable development) (Liping Lan, 2004).

(1) Quality aim. The quality aim during the lifelong period of construction project is the unity of the work quality, the project quality, and the final quality of project functions, products, or services. It emphasizes more on project technology system's integrated functions, technological standards, and safety. Thereof, the design quality includes quality of design work, technological standards, and feasibilities. The construction quality includes quality of materials and equipments, construction quality system, quality of each construction part, and quality of whole construction. The operation quality includes quality of project's employing functions, products, or services, reliability of operations and services, safety of operations, and maintenance.

(2) Cost aim. The cost aim of whole construction project process should take relevant costs and returns during the lifelong period of construction project into consideration, such as total investments, costs of operations (services), and costs of maintenance.

(3) Time aim. For the total process management of modern construction project, the time aim has more contents, including not only construction time, investment-return time, and period of maintenance, update, and reconstruction, but also design life and service life of project.

(4) Satisfaction from every aspect. The success of a project is based on the common efforts of all participators in the project supply chain. Without satisfaction from every aspect, it is impossible for the project winning success. Therefore, the aim system of project should include aims of each participator, reflecting the interest balance of every aspect, and satisfying each participator, which can benefit the cooperation and coordination, and help to cultivate a fair, trust, and cooperative atmosphere. For example, aims of contractors and suppliers usually include expectations for project price, time, corporate image, and relation (credit).

(5) Coordinate with environment and achieve sustainable development. Because of the uniqueness of the whole process of construction projection, the abilities of coordinating with environment and achieving sustainable development include: the project products and service functions are stable and sustainable, what can not only satisfy the present requirements but also meet the future requirements, satisfying the requirements for coordinating with environment; the construction project should update the functions and structure expediently at lower costs; the

construction project can provide with sustainable support for local or national economic development; the construction project should have the capabilities of escaping from disasters, including the capability of supervision and prediction, the capability of defending calamities, and the capability of timely response.

3. The cooperation of aim system of construction project

Construction project's multiple aim system is composed of time child-system, cost child-system, quality child-system, and resource-control child-system. These child systems have relative independence and have special functions and operational aims.

The aim system of construction project should be a stable, balance, and complete aim system. Too- much emphasis on certain aim (child aim) usually kills or hurts other aims. Therefore, the improvement of harmony of project's aim system can be achieved by the cooperation and optimization of multiple aims. The core of construction project's multiple-aim cooperation is to emphasize on the conformity of completeness and integration, aiming at improving the general efficiency and effect of construction project management. In specific:

(1) Consistency. In an aim system, according to the structure of aims, aims at lower levels should obey aims at higher levels. Aims at higher levels have superiorities over aims at lower levels. In other words, the system aim has precedence over child aim, and child aim operable aim.

(2) Completeness. The sum of project's aim factors should wholly reflect the requirements of higher system. Especially, it should ensure the compulsory aim factor. Therefore, the project is usually a complete system composed of many aims. The shortcomings of aim system may cause bugs in project technological system, errors in implementing plans, and difficulties in control. Just as what has been mentioned above, modern complex construction project should adopt the process-oriented procedure management. Therefore, the aim system should reflect the requirements of being process-oriented, including not only aims in construction period, but also aims in construction operation (Xiaolin Cao. & Bing Han, 2002).

(3) Equilibrium. The process-oriented aim of construction project should reach the equilibrium of all participators. Every participator accepts the aim and reaches an agreement. Especially, the aim should notice the equilibrium among time, expenses (costs, investments), and quality (function). During the project's multiple aim coordinative management process, we should notice that the project aims may have different precedence during the lifelong process of the project. For example, the quality aim is the core at the decision stage, the cost at the implement stage, and the time at the later stage. In addition, different kinds of projects have different emphasis on the three basic aims. Under the special condition, it is possible to give up strict requirements for one aim in order to realize certain aim.

(4) Dynamics. Aim system has a dynamic development process. It is a complete aim-guaranteed system formed gradually during the process of aim design, feasibility research, technological design and plan. Because of the changeable environment, higher system may change its requirements for the project. Therefore, the aim system will change more or less during the whole process, such as the increase or decrease of aim factors, and the adjustment of indicator levels. As a result, the design scheme, the contract changes, and the implementation scheme will change.

4. The optimization of aim-oriented construction project's control system

This paper is chiefly to coordinate and optimize the main project aims, such as time, quality, and cost. In implementing the project management, we should take the project scope, costs, time, quality, labors, risks, information communication, biding management, and other project factors into consideration from a view of general optimization.

4.1 The construction of the optimized quality-cost control model

Project quality is determined by the quality of working procedures in the construction process. The quality of each procedure will directly or indirectly affect the project quality at last. Therefore, the procedure quality is the most fundamental part for the project quality. In general, if the project time is shortened, the project quality will become poor. But many spot managers do not think so. In their opinion, even if the time is shortened, the procedure quality does not necessarily become poor.

Any procedure needs time. The procedure quality is formed during the time. Different time contributes to different procedure quality. Here, we make an assumption that if the construction factors do not change, there is a linear function relationship between the procedure quality and its time. In other words, there is positive correlation between them. See to the figure 1 as follow. Use the continuous numbers from 0 to 1 to reflect the strictness of requirements for procedure quality. The shorter the time is, the nearer to 0 the number is, the lower the strictness of requirements for procedure quality is, and the poorer the procedure quality is. Conversely, the nearer to 1 the number is, the higher the strictness of requirements for quality, and the higher the procedure quality is.

With the assumption above, the slope of the curve, namely the Time-Quality function, is:

$$\alpha_i = \frac{nq_i - sq_i}{nt_i - st_i}$$

Then, the real quality of the procedure i is: $Q_i = sq_i + \alpha_i(t_i - st_i)$

If the whole project includes m procedures, the whole project quality is equal to the average of weighted quality of every procedure.

$$Q = \sum_{i=1}^{m} \omega_i Q_i, \qquad \left(\sum_{i=1}^{m} \omega_i = 1\right)$$

The control model of Quality-Time is:

$$\max Q = \max \sum_{i}^{m} \omega_i Q_i = \max \sum_{i}^{m} \omega_i [sq_i + \alpha_i(t_i - st_i)]$$

$$s.t.: \qquad nt_i \geq t_i \geq st_i > 0;$$

$$\omega_k > 0, \sum_{k}^{m} \omega_k = 1$$

Here, nt_i refers to the time consumed by the procedure under the normal condition. st_i refers to the time consumed by the procedure in order to catch up with the plan. t_i refers to the time consumed by the procedure in fact. ω_i refers to the weighed quality of procedure i to the whole project quality.

4.2 The construction of the optimized cost-time control model

The relationship between procedure time and cost is changeable under different conditions. In general, as the procedure time is shortened, the cost will rise. The shorter the time, the fast the cost increases (Xiaolin Cao. & Bing Han, 2002). Of course, some procedures may adjust the operation time by increasing or re-allocating resources. Under this condition, the procedure cost does not change. But for common procedure, the relationship between its time and cost can be reflected by figure 2 as follow.

According to the figure 2 above, the reasonable procedure time should be confined to [D_s, D_L]. Without increasing procedure cost, the shorter the procedure time, the better. Because the project time is determined by the key procedure time, the key procedure time should be confined to [D_s, D_N] in cost optimization. For non-key procedures, the procedure time can be adjusted between [Ds, DL] based on the requirements for resource balance as the cost optimization is over. Besides, because the Time-Cost relationship is a curve, it is complicate to establish all the relationship between every procedure cost and time. In practice, we usually replace the curve with the line from S to N. By this way, the calculated procedure cost is slightly higher than real procedure cost, what is allowable in practice. In addition, considering all uncertain information in construction, such as labors, materials, technologies, and management levels, the conservative calculation is necessary. The slope of this line is the rate of direct cost, namely the average increasing procedure cost as the procedure time is shortened by one unit. It is β_i in the following equation.

$$\beta_i = \frac{nc_i - sc_i}{nt_i - st_i}$$

In this equation, nt_i refers to the time of procedure i under the normal condition. st_i refers to the time of procedure i under the rush-up condition. nc_i refers to the cost of procedure i under the normal condition. sc_i refers to the cost of procedure i under the rush-up condition.

The relationship between the procedure cost and the procedure time is: $c_i = sc_i + \beta_i(t_i - st_i)$.

Here, t_i refers to the time of procedure i. c_i refers to the cost of procedure i as it consumes the time t_i.

The figure 2 can not reflect the indirect cost. In optimization, we can use the rate of indirect cost to deal with the indirect cost. The so-called rate of indirect cost means the decreasing (or increasing) indirect cost as the procedure time is shortened (or prolonged) by one unit. Use γ to represent it. The rate of indirect cost is usually based on real facts.

4.3 The construction of optimized Time-Cost control model

The Time-Cost optimization aims at establishing the time of every procedure in order to realize the lowest reasonable cost with the precondition of meeting the contract time (or planed time). The time aim is one of three main aims in construction project management, which is an important factor for construction enterprises winning

credit. Properly dealing with the relationship between time and cost is an important part in construction project's cost management. However, shorter project time does not necessarily mean excellence. The right way is to seek for the most reasonable cost by adjusting the time properly. In general, the project cost is reflected in two aspects. In the first aspect, it is the cost generated by the construction sector in order to guarantee the project time, such as the increasing cost originated from increasing resources, and updating technologies. In the second aspect, the prolonged project time may cause new cost. If the prolonged project time is caused by construction environment or natural environment, we can gain compensation from owners. But if the loss is caused by internal factors, we have to shoulder it by ourselves. Therefore, it is necessary for us to find out the right time for lowest cost.

To summarize the Time-Cost relationship, we can get the Time-Cost control model as follow:

$$\max C = \max \sum_{i}^{m} \left[sc_i + \beta_i(t_i - st_i) - (p_a + \gamma)d_a + (p_p + \gamma)d_p \right]$$

$$s.t.: \quad st_i \le t_i \le nt_i;$$

$$d_a = \begin{cases} T_p - T_c; T_p > T_c \\ 0, T_p > T_c \end{cases}, d_p = \begin{cases} T_c - T_p; T_c \ge T_p \\ 0, T_c < T_p \end{cases}$$

In the equation above, C refers to the total project cost. t_i refers to the time of procedure i. nt_i refers to the time of procedure i under the normal condition. st_i refers to the time of procedure a under the rush- up condition. nc_i refers to the cost of procedure a under the normal condition. sc_i refers to the cost of procedure i under the rush-up condition. β_i refers to the rate of direct cost of procedure i. Y is the rate of indirect cost. Pa is the prize for shortened one-unit time. Pp is the compensation for owners due to prolonged one-unit time. da is the number of days for shortened one-unit time. dp is the number of days for prolonged one-unit time. Tp is the planed time. Tc is the calculated time. m is the number of procedures.

4.4 The construction of optimized Time-Cost-Quality integrated control model

By integrating every aim control model, we can get a Time-Cost-Quality multiple-aim integrated model.

$$\begin{cases} \min T = TE(m) - TE(0) \\ \min C = \min \sum_{i=1}^{m} \left[sc_i + \beta(t_i - st_i) - (p_a + \gamma)d_a + (p_p + \gamma)d_p \right] \\ \min Q = \min \sum_{i=1}^{m} \omega_i Q_i = \max \sum_{i=1}^{m} \omega_i \left[sq_i + \alpha_i(t_i - st_i) \right] \end{cases}$$

$$s.t.: \quad st_i \le t_i \le nt_i$$

$$TE(j) - TE(i) - t_i \ge 0$$

In this equation, TE(i) and TE(j) respectively refer to the earliest time of i and j in the net.

This model is to realize the multiple-aim optimization of construction project. It pursues the optimization of three aims, namely time, cost, and quality, instead of the optimization of one aim. It respects a systematic idea and requirement.

5. Conclusion

The whole construction project control process is a dynamic optimized management process. The essence of coordination and optimization is to look for the right point that satisfies all restrictions, reaching the integrated optimization of system (or the highest coordination state of system). As thepractical control aim (quality, time, and cost) fails to the planed aim, we should take measures to correct parameters and adjust the original plan. At this moment, the control system should make new decisions. Therefore, during the construction process, we should make proper adjustment according to the changeable relationship of time, cost, and quality in the aim system.

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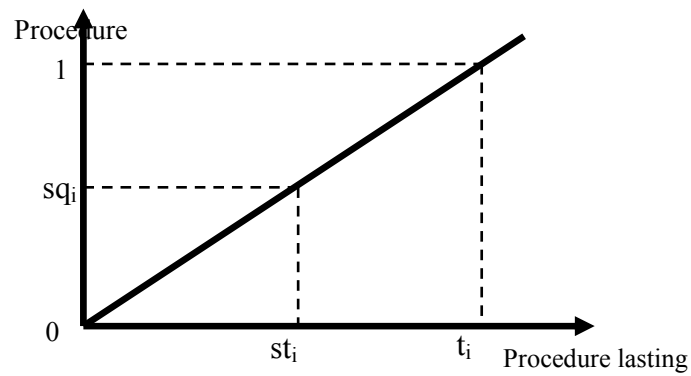
Figure 1. The Relationship between Procedure Time and Procedure Quality.
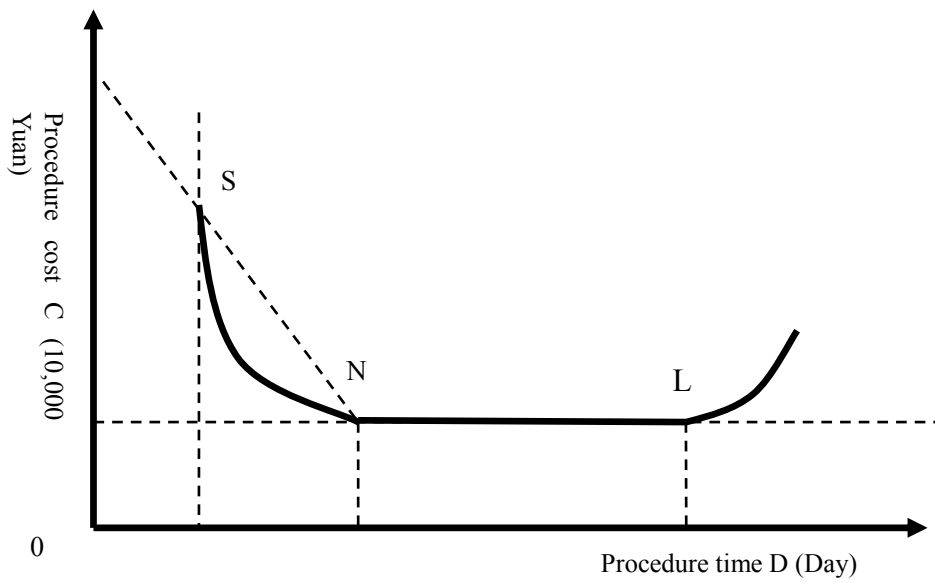
Figure 2. The Time-Cost Curve.

Study of the Problems with Chinese State-owned Listed Enterprise Managers' Equity Incentive and Their Solutions

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Abstract

It has a great influence on Chinese State-owned Listed Enterprises' efficiency and performance to implement effective equity incentives to Chinese State-owned Listed Enterprise Managers. This paper analyses the problems, from the view of five aspects including the internal management structure and external market environment, which are existing in equity incentive for Chinese State-owned Listed Enterprise Managers, and provides the corresponding solutions to the existing problems of Chinese State-owned Listed Enterprise Managers' equity incentives.

Keywords: Equity incentive, Capital markets, Professional managers

Introduction

Chinese State-owned Listed Enterprise is not only the main occupation and users of Chinese State-owned Assets, but also the main impetus that promotes Chinese national economic development.

The managers, as the core enterprise resources, undertake the mission of market development, technological innovation, system innovation and management innovation. So their behaviors directly affect the function of other enterprise resources, and influence the competitiveness of enterprises even the existence of enterprises. Accordingly, it has a positive meaning for improving the current issue of Chinese State-owned Listed Enterprise management, and enhancing economic efficiency to solve the problems of Chinese State-owned Listed Enterprise Managers' equity incentives.

1. The concept of equity incentive and the definition of Chinese State-owned Listed Enterprises Managers

1.1 The basic concept of equity incentive

Equity incentive is the main incentive [enterprises or shareholders) granted incentive target (the managers or employees) shares the reality of interest or potential interest, encouraging the latter to work hard from the perspective of the business owners, so as to maximize the value of enterprise and Shareholders Wealth.

1.2 The definition of Chinese State-owned Listed Enterprises Managers

Chinese State-owned Listed Enterprises Managers is the general manager or factory director (manager), and other senior managers of the wholly-owned enterprises and state-holding enterprises in Chinese State-owned Listed Enterprises, sometimes including the Chairman. Because in Chinese State-owned Listed Enterprises, the Chairman still is an "agent", and greater commits to the manager's role.

2. The problem of Chinese State-owned Listed Enterprises Managers' equity incentives

Good equity incentives can reconcile the interests of managers and enterprises; enhance the managers' sense of responsibility. But because of the special nature of Chinese State-owned Listed Enterprises and the special status of Chinese stock market development, there are many problems in the process of the implementation of equity incentive in Chinese State-owned Listed Enterprises, which have been affecting the equity incentive function, or even undermine the fairness of payment.

2.1 The problems of internal governance structure

2.1.1 The Serious color of executive, and remains "major shareholder control"

Chinese State-owned Listed Enterprises are major from the restructuring of State-owned Enterprises; these enterprises often use the state holding absolutely or relative of the equity holding pattern in the process of restructuring in order to maintain the dominant position of public ownership. It is the unique State-owned controlling shareholder that makes Chinese State-owned Listed Enterprises preferment the major shareholders-led model that under the administration of the Government. This "one greatest shareholder" ownership structure makes it possible that the major shareholders are against the interests of minority shareholders and other stakeholders. Under the circumstances of information asymmetry and the largest shareholder control, the major shareholders will use the information to take advantage of opportunistic behavior as to damage the interests of other shareholders.

2.1.2 Lack of effective internal checks and balances and supervision mechanisms

The "separation of powers" about decision-making, executive, and supervision, and the "three" of shareholders, boards of directors, board of supervisors coexist and mutual supervise, checks and balances become a modern corporate governance structure of the basic structure.

Such separation of powers adapts to the trend to the refining division in the modern society, "the three" carry out their duties that can increase the operating efficiency and save operating costs. Meanwhile, the separation of powers prevents the abuse of power, balance the internal interests and achieve the maximum economic benefits.

However, supervisors keep a higher and lower levels of membership with the highest corporate decision-makers or operators in Chinese State-owned Listed Enterprises, some supervisors can not or dare not daring to exercise supervision, so some independent directors did not become truly "independent directors" .

2.2 External market environment problems.

2.2.1 The weak effectiveness of capital market

Equity incentive should encourage the managers of Listed Enterprises to adopt long-term strategy to create long-term value of the enterprise. As Chinese capital market is imperfect, the stock market is around with strong speculation atmosphere, corporate shares and long-term enterprise value are not necessarily entirely consistent, stock prices can not really reflect the value of the stock itself (Wu & Yuan, 2006, pp.20-23). Because of local protectionism and policy, the profits of some Chinese State-owned Listed Enterprises can not reflect truly of the operating results. In such a strong speculative, value-overestimated market, the manipulators of stock prices has more space to control the market, the equity incentives to executives can easily push up short-term stock price. So the equity incentive may become the corporate executives' impetus to manipulate the stock price.

In addition, the limited duration of senior corporate management staff and the infinite of enterprises, the executives take short-sighted behavior may be substantially increased; it is possible to manipulate accounting deception to raise corporate stock prices using surplus, and the cash will be held by the Shares.

2.2.2 Professional managers market is not perfect

Professional managers market can provide a good choice of the market mechanism, under the mechanism of competition elimination, the manager will be choused by the market, the manager's market value will be determined, there will form a contract contractual relationship. Take repeated transaction into consideration, a manager in the course of business would be more value his reputation and avoid speculation, lazy, etc., managers work hard to artificially increase their value, this is an important constraint conditions, but also the premise of one of the conditions of equity incentive. However, in Chinese State-owned Listed Enterprises, the vast majority of managers are appointed by government departments. Administration appointment has an uncertainty attached to many complex factors, In general, managers in the representation of a certain enterprise are generally no more than five years, stock options and the right to the line usually takes 5 years to 10 years or even longer. In this case, the long-term incentive equity incentive mechanism can easily be conflicted with the envisaged appointment. Once they are conflicted, managers can only be unconditional obedience to organizations' arrangements; the result is that equity incentive mechanism will be difficult to implement.

2.2.3 Unsound laws and regulations

The implementations of equity incentive need a series of laws and regulations to give guidance to the participants, the right of price, the stock buyback, and securities issued. But Chinese current system of laws and regulations has no corresponding norms of what the terms in the equity incentive mechanism, while some of the existing legal provisions are too strict. Equity incentive mechanism must play a role in the secondary market, so there is lack of a reasonable operating space, which makes Chinese State-owned Listed Enterprises can not complete the equity incentive may be due to constraints on the policies and regulations.

3. Measures to improve the Chinese State-owned Listed Enterprises Managers' equity incentive

3.1 Improve the Enterprises governance structure

Whether the equity incentive can smoothly implement achieve the desired effect or not, largely depends on the degree of perfection of the enterprises governance structure. According to the analysis of the problems that are major shareholders-led, the constraints of internal and external supervision in Chinese State-owned Listed Enterprises, this paper provides the following recommendations.

3.1.1 Optimize the ownership structure

If China wants to truly improve the State-owned Listed Enterprises on the management structure, safeguard the interests of small and medium-sized investors, it's essential to adjust the ownership structure, reduce the

concentration of equity, but should not be too dispersion stake. Although dispersion stake is benefiting to balances the shareholders' interests, the supervision of the managers would become a serious problem (Hua, 2007, pp. 31-34)

In the case of managers is relatively representative of the controlling shareholder , the other major shareholders can oversight the managers for possession of a certain number of shares, and they are less like the small shareholders as a "free-rider", the monitoring costs are often less than the benefits by effective supervision. Therefore, for Chinese State-owned Listed Enterprises, while maintaining the control of state assets, finding the best ownership structure through the capital markets have an important role in improving the governance issues,

3.1.2 Improve the structure of the Board

In the process of Chinese State-owned Enterprise Reform, there exists acute conflict between business rules and the established political rules. For a long time, Chinese State-owned Enterprises was dominated by the culture of official position, managers are often too keen on power than the management efficiency and profit considerations. To some extent, Chinese State-owned Assets Management Committee vigorously promote the reform on the Board of State-owned Listed Enterprises, the introduction of external and independent people to the board, it's not only to standardize their internal management structure through the addition of outside directors, so that the board could be more fairly protect the interests of shareholders, particularly, small shareholders, and also to urge the management of cultural change through the introduction of people who is more familiar with the rules of the external market economy. It can be said that it is a direct and effective way to solve the problem and optimize the structure of the Board by increasing the proportion of independent directors (Gao, 2007, pp. 83-84). Including:

(1) Increase the independence of the board; establish the Remuneration Committee or similar bodies.

The proportion of Gray (association) Board should be reduced; the existence of ties between Association Board and companies would undermine its ability of independent judgment, which makes it difficult to give an objective and impartial advice on managers' payment.

(2) Enhance the professionalism of the Board. Directors (in particular the independent directors) should have business and financial knowledge, and sufficient time to participate in corporate affairs, so that they can play a great role of supervision in reward incentives, information disclosure and other issues.

(3) Directors' decisions on the incentive of payments that caused enterprises' damage, he should be liable. In addition, it must increase the independence and professionalism of the Board of supervisors, and the board of supervisors' functions of managers' payment, including the introduction of independent board of supervisors system (LI, 2006, pp. 32-38).

3.2 Improve the external market environment

The implementation of equity incentive in Chinese State-owned Listed Enterprises largely depends on the external environment supporting level. According to the existing problems in Chinese external environment, this paper makes the following specific recommendations.

3.2.1 Speed up the establishment of a sound capital market

To promote the incentive system reform on Chinese State-owned Listed Enterprises, and let equity incentive play a tremendous role in the reform, we must provide relatively complete, mature, rational capital markets, to form effective market evaluation mechanisms in the stock market, and so as to enable the market price of enterprises to objectively reflect the operation of enterprises, the manager's job performance and business prospects for development. Only in this way equity incentive system can take full advantage of the capital market pricing. In information disclosure, we should not only strengthen the accuracy of the annual report or quarter report' information disclosure, but also develop specialized equity incentive information disclosure system. In addition, we should make Regular disclosure the details of the equity incentive scheme' targets, the scope of incentives, and given the price, the implementation of equity (Shui, 2006, 30-31).

We must establish a sound legal system of capital market so that a large number of behaviors are strictly in accordance with the law and regulations.

On the one hand, we should amend the "Enterprise Law" to facilitate the establishment of genuine joint-stock enterprises and joint-stock principles of operation; On the other hand, we should improve the relevant provisions of "Securities Act", streamline regulatory system, and give a clear legal status to the SFC, the Stock Exchange, Securities Industry Association, to ensure that their supervision and self-discipline.

3.2.2 Establish a sound professional managers market

It is a longer process to establish Chinese manager market. At present the focus should be to create a fair environment for competition, and give the fore to the ability of people. In accordance with the principle of open, fair and justify and competition, we must break the barriers to local protectionism to prompt the healthy growth of

manager, so that the employed manager can achieve trans-regional, inter-departmental flows. We can reduce the agent risk through the selection of managers by market means. The perfect of manager market guarantees the State-owned Enterprise Reform Managers to enter.

In the process of the establishment of the managers market, Chinese State-owned Listed Enterprises should reform on the following two be listed aspects:

(1) Establish the files of State-owned Listed Enterprises managers' ability and credit. Chinese State-owned Assets Management Committee should establish the files of the State-owned Listed Enterprises managers' ability and credit. It can take province, city or county as a unit, record the manager's performance, and set up a special channel of communication to a certain extent sharing, and take this as an important basis for selecting one manager.

(2) Establish and improve the probation system of State-owned Listed Enterprises managers. State-owned Listed Enterprises should establish probation system of manager to eliminate the unqualified managers timely (Wu, & Zhou, 2007, pp. 28-29).

3.2.3 Establish a sound supporting legal system

It has made good progress in the implementation of the relevant supporting laws and regulations in equity incentive, but there is no enabling policy in the tax concessions of equity incentive. To encourage the development of equity incentive that is in line with Chinese national policies, and make the interests of managers consistent with enterprises', the developed countries have made requirements of equity incentives in general; all the equity incentive which meets the requirements can be enjoy the tax benefits. And the tax incentives include allowance to individuals' deferred payments; enjoy a concessionary tax rate, and enterprises' pre-tax deductions.

However, China has no preferential policies in tax incentive, which will bring high costs of the implementation of equity incentive plan, and reduce the effectiveness of incentive plans because of tax burden. Therefore, we should learn from preferential tax policies of developed countries, promulgate corresponding policies to promote the implementation of Chinese equity incentive for the further reform on State-owned Enterprises.

4. Conclusion

We can conclude the following views from the study on Chinese State-owned Listed Enterprises' equity incentives:

(1) In the enterprises governance structure, the problems remain in major shareholders control, lack of internal checks and balances, as well as the discipline of external market. It is suggested that we should ease the problem by optimizing the ownership structure and the Board structure.

(2) In the external environment, the focus is of the speculative and weak effectiveness of capital market, as well as unsound supporting laws and regulations. To enhance the effectiveness of the capital market and reduce speculative, we must highlight the establishment of preferential tax policies of equity incentive in supporting laws and regulations. So that it can promote the implementation of equity incentive, and acquire equity incentive effect.

At the end of 2006, China promulgated the "state-holding enterprises listed equity incentive pilot scheme", but there is few State-owned Listed Enterprise implements completely.

Chinese State-owned Assets Management Committee said that "the implementation of equity incentives in State-owned Listed Enterprises have yet to be considered and studied, it's not the right time" in April 2008. It reflects that it's necessary to implement equity incentive for Chinese State-owned Listed Enterprises managers, On the other hand, there are many aspects worthy of exploring and improving in the implementation of equity incentive for Chinese State-owned Listed Enterprises managers.

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Determining the Cost of Adequate Education:

A Critical Review of the Approaches

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Abstract

Education plays a pivotal role in nation building. As such, it is only natural that a large portion of a country's annual budget is allocated to this sector. However, policy and decision makers in the education system often find the task of determining the cost of education a tedious and difficult process. This is, in part, due to the complexity of education systems and the large number of stakeholders involved. Thus, it is the purpose of this paper to provide an overview of the term 'adequate education' and subsequently critically review the various methods that are currently utilized worldwide to determine the cost of adequate education. In doing so, the paper attempts to compare and contrast the various methods in an objective manner by identifying and evaluating the major advantages and disadvantages of each method.

Keywords: Adequacy, Education cost

1. Introduction

Education plays a crucial role in nation building. Thus, it comes as no surprise that many developing countries are allocating more funds to improve the education sector. However, it ought to be noted that an increase in the amount of funding may not necessarily yield the desired outcome. What is more important is how the funding is utilized effectively by the various stakeholders in the system so that the students gain adequately from the system and reap the benefits.

This raises the following question: How much is enough? In the context of education, it is often linked to the concepts *adequate* and *adequacy* which will be used interchangeably in the context of this paper.   Basically, this paper discusses the concepts thoroughly in an attempt to provide a succinct definition of the terms, followed by a review of the methods that are currently used to compute the cost of *adequate education*.

2. Relationship between adequate and cost

2.1 Adequate

There are several definitions for the term *adequacy* that are relevant in the context of this paper, depending on the perspective that one is taking. For example, if adequacy is regarded as "input based" (Myersk and Silverstein, 2002), it refers to the number of teachers required to perform a certain task or tasks using a specific type of resource. On the other hand, Haveman (2004) defines adequacy as the achievement of certain state test scores standards. Adequacy has also been viewed from the constitutional aspect (for example in Kentucky, United States) which focuses on a set of specific skills that a student should obtain during his formal education years while studying in educational institutions. Basically, the skills that a student ought to acquire are reading, writing, and mathematical skills, Apart from these skills, students should gain sufficient knowledge of their culture and heritage and the economic, social and political systems that would enable them to become productive citizens in the future (Reschovsky & Imazeki (1999).

2.2 Cost of education

Cost of education refers to the minimum amount of expenditure or outlay needed to produce students with a projected level of achievement, considered as adequate. In other words, the least amount of money that needs to be spent to achieve the desired level of outcome is what scholars generally regard as the cost of education (see Andrews, Duncombe & Yinger, 2002 and Reschovsky and Imazeki, 1999). Based on the above two views, this paper views cost of education as the value of resources needed to produce any given level of output or the minimum amount of expenditure or outlay needed to   produce a given level of   student achievement.

3. Methods of determining Cost of adequate education

There are several methods which can be used to determine the cost of an adequate education. They are:

3.1 Professional Judgement Approach / Resource Cost Model (Downes, 2004; Odden, 2003; Harris, 2004; and Duncombe and Lukemeyer, 2002).

3.2 Cost Function Approach / Statistical Approach (Downes, 2004; Odden, 2003; Harris, 2004; Duncombe and Lukemeyer, 2002; Augenblick and Myers Inc, 2003; Myers and   Silverstein, 2002; and Reschovsky and Imazeki, 1999)

3.3 Empirical Identification Approach / Evidence Based Approach / Effective School Approach / Successful District Approach (Downes, 2004; Duncombe and Lukemeyer, 2002; Odden, 2003; Harris, 2004; Verstegen, 2003; and Myers and Silverstein, 2002)

3.4 Whole School Design Method / Costing Comprehensive School Reform Models (CSR) / Comprehensive School Reform Research Based Models (Downes, 2004; Verstegen, 2003; Augenblick and Myers Inc, 2003; Myers and Silverstein, 2002; and Chamber, Parrish, Smith and Guthrie, 2004)

3.1 Professional Judgement Approach

In this approach, individuals who are directly involved in teaching (teachers in particular) are called upon to work out the cost of education. In this case, since teachers are the people who are actually responsible to educate the students, Augenblick and Myers (2003) argue that hey would be best placed to realize the resources needed both in terms of quantity and quality.

So, scholars such as Fowler (1998) have indicated that it would be ideal to get teachers to describe in detail the kind of delivery systems that should be made available in educational institutions such as the counseling services or non-personnel resources to cater for students across different areas and institutions. In other words, the teachers would make the final decision on the kind of resources and support services they would need to provide adequate education to the students. Once these resources are identified, they are priced according to the existing market value (Verstegen, 2003), which in turn makes it easier to estimate the cost of education.

Many decision makers involved in education prefer to use this method in determining the cost of education for the following reasons:

(i)It is easier to understand and implement compared to other methods (Myers and Silverstein, 2002)

(ii)It reflects the views of the actual service providers (i.e. the teachers).

However, researchers generally do not favor this method to determine the cost of education for several reasons as indicated below.

i)Duncombe and Lukemeyer (2002) argue that the outcome of cost is dependent on the preferences of a   particular group of professionals, which may not be coherent with the opinion of the other stakeholders in the education

system. For instance, a teacher may feel that the use of white boards will be better than chalk boards because they are easier to use and clean. An administrator, however, might opine that chalk boards are better because they are relatively cheaper to maintain compared to white boards (also see, Verstegen, 2003; Augenblick and Myers, 2003; Myers and Silverstein 2002).

ii) Most of the findings or recommendations made are based on current practices in education rather than anticipated or projected needs for the future scenario (Verstegen, 2003; Augenblick and Myers, 2003; Myers and Silverstein, 2002). Basically, this method tends to ignore the dynamic nature of the education system, thereby either hindering or ignoring any research and development in the area.

iii) The outcome depends on the experience of the professionals i.e. teaching experience is a crucial factor drawn upon by the professionals in their decision making process (Duncombe and Lukemeyer, 2002). Hence, the experience of the decision makers which is usually wide and varied has a direct relation to the outcome. This may cause problems in determining the cost of education on a wider scale. For example, the types of resources needed by rural teachers may differ completely from those teaching in urban areas and result in a mismatch.

(iv) Since experience plays an important role, the panel of decision-makers may rely on the element of guessing in their decision making process (Verstegen, 2003).

(v) The amount of money allocated for education is limited. However in this method, the professionals may be under the 'impression' that the financial allocation is unlimited, thus the aspect of budget constraint may be overlooked.

(vi) Currently, educational strategies and components do not seem to have a clear link with actual students' performance level (Odden, 2003; Duncombe and Lukemeyer, 2002). This view is concurrent with Peyser and Costrell's (2004) claim that concerted attempts have not been made to link observed spending levels to actual student outcomes which undermines the credibility of this approach. Therefore, more research in this area to determine specifically how the money spent on resources has a direct influence on the outcome in terms of students' performance level should be conducted as proposed by Verstegen (2003)

(vii) This method focuses more on the consumption of the resources than the actual expenditure incurred, making the task of estimating the cost of an adequate education difficult (Odden, Archibald, Fermanich and Gross, 2002)

3.2 Cost Function Approach

This approach which focuses on an aspect called cost function allows one to quantify the relationship between per-pupil spending for education, student performance, various student characteristics, and the economic and spatial characteristics of school districts (Imazeki & Reschovsky, 2004). One advantage of this approach is that it takes into consideration the influence of variables such as the setting of the school i.e. rural or urban, etc. (Taylor and Keller, 2002). Similarly, Fowler (1998) stakes a claim that researchers applying this method of analysis would be able to include the differences in input prices across various locations. For example the price of educational resource, such as teaching aids is not the same across a particularly country.

In addition to the above advantage, this method also takes into account the patterns of input substitution that occur in response to differences in relative prices and differences in the technology requirements associated with pupil needs. In relation to this argument, this paper opines that students from the urban areas are likely to be more exposed to sophisticated technological advances than students from rural areas. Hence, it is highly likely that rural students resort to the 3½ floppy disk to save their data compared to students from the urban areas who may own more advanced hardware such as a CD-burner and so on.

Apart from the above, this method is more superior as it not only considers the input, i.e. the cost, but also the outcome of the input or specifically the students' achievement in relation to the expenditure incurred. If a student's achievement in an exam is used as the yardstick, then it would be possible to link these two aspects to determine the cost of the adequacy via this method.

Researchers using this approach generally consider all the following variables in determining the adequate cost of education:

(i)District expenditure

(ii)Educational outcomes

(iii) School Size

(iv)Input prices such as teachers, administrators, auxiliary personnel and computer equipment & instructional equipment

(v)Environmental Factors such as range of students, and family and neighborhood characteristics.

(vi)Capital

(vii)Geography or location of school

(viii)Efficiency of the school   (Gronberg, Jansen, Taylor & Booker ,2004)

The above variables do not ensure validity and reliability of the results, thus, it is equally important to determine the achievement standard and the acceptable (tolerable) level of inefficiency. By using the data, the cost index for each school can be calculated by dividing the predicted spending level for each district to the predicted spending level in a district with average characteristics.

3.3 Empirical Identification Approach

According to Augenblick and Myers (2003), this is a viable approach in situations where the objectives are well laid and specified by the school or other stakeholders such as the district or state educational departments. In relation to this criterion, schools that will serve as good models for research will be schools which have met the specified objectives. Usually, a minimum level of test achievements is used as the yardstick (Duncombe and Lukemeyer 2002).

Augenblick and Myers (2003) suggest a 3-step procedure in this approach. The steps are:

Step 1: A set of schools are selected which have met the state standards. Duncombe and Lukemeyer (2002) have used the weighted average of the 4th and 8th grades in Mathematics and English Test as the state standards. In countries which have national exams such as Malaysia, the passing rate in these exams could be used as the state standard.

Step 2: The total expenditure of the school is utilized to calculate the cost.

Step 3: A base cost figure using the basic expenditure figure is calculated.

According to Harris (2004) and Verstegen (2003), this approach is very concrete and objective as it enables non-school factors like family background to be included in determining the cost. Furthermore, its effectiveness stems from the fact that the outcome of this method is actually based on actual evidence (Myers and Silverstein, 2002) and therefore does not require further testing on its applicability.

The main weakness, however, is that schools which have outcomes or achievement beyond the norm are omitted. Thus, Verstegen (2003) questions the validity of this approach because it does not include these 'outliers' school in the process of computing the cost. In addition, Peyser and Costrell (2004) have questioned the practicality of this approach as they believe that it would be time-consuming to include the data of every student in the education system to compute the cost. In fact, it would be improbable to use this method in countries with a large student population like Indonesia, India or China.

Another weakness of this method is that the exact breakdown on how the selected schools have spent their money is often left out, instead only the average basic expenditure is provided (Augenblick and Myers, 2003).

3.4 Whole School Design Method

In this approach, a few schools are selected randomly to participate in an educational program. At the end of the program, the outcome of the program will be evaluated. The school which performs the best in the program will be selected to become the benchmark for the other schools to follow in the future.

The main criticism of this approach is that the schools selected are selected randomly and thus, may not be a proper representation of the whole nation or a particular sector. In addition, there is also a tendency to eliminate the highest and lowest spending schools from the analysis in this method. This tendency has been noted by Odden, (2003) who claims that schools from large districts and urban schools are often not selected to take part in the program, thus raising questions pertaining to the validity of this approach.

4. Conclusion

There is no doubt that determining adequate education and its cost is an important process that cuts across all nations, both developed and developing. In acknowledging that there are strengths and weaknesses in all the methods reviewed above, this paper believes that the stakeholders involved in the process must take every effort to choose the most practical method, in relation to the situation in their respective countries. If the situation permits, it would be ideal (though not practical) to estimate the cost in a more localized basis such as within particular districts as it is only natural that the cost of adequate education varies from place to place. However, it must also be noted that research acknowledge that more spending alone won't result in greater performance. What is more important is whether the money is spent wisely. In line with this argument, perhaps, what is needed is not more funding for schools which do not provide an adequate education, but a transformation of the system so that there is good governance all around to ensure better quality and greater efficiency in schools.

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Sino-American Textile Trade Balance and Trade Friction

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Abstract

In recent years, there has been severe unbalance in Sino-American trade. China has remained trade surplus of large volume to America, especially in textile products trade, so America has a lot of trade friction with China. This article collects information of unbalanced condition in Sino-American Textile trade, analyzes the reasons for this kind of trade friction, and proposes an opinion that China has to modify the policy of developing country by foreign trade to realize trade balance of textile products.

Keywords: Textile trade, Trade balance, Trade friction

1. Introduction

Since the reform and opening to the outside of the world, Chinese foreign trade has developed very well and has become one of the most important momentum for economic growth. And Sino-American trade is the primary part in Chinese foreign trade. China is the biggest developing country and America is the largest developed country in the world. Sino-American trade has developed quickly in recent 30 years,

Which is good for Chinese, American even the global economy. However, in recent years, there has been continuous trade friction between China and America for the unbalanced Sino-American trade, especially for unbalanced textile trade. Sino-American trade deficit is always the hot topic in American congress and federal government. It is always one important topic for parties to win votes in the congress election or presidential election. However, American congress and government always force Chinese government to keep trade balance, which engenders shadow in Sino-American trade relationship. Therefore, it's necessary to research for unbalanced Sino-American textile trade, propose good policies to solve this issue and promote normal development of Sino-American textile trade.

2. Recent Condition of Sino-American Trade Friction

There are a series of issues between America and China: RMB exchange rate, intellectual property rights and textile products.

In 2006, American trade deficit reached 763.6 billion dollars, among which Sino-American trade deficit was 233 billion dollars.

This data aggravates the relationship between American congress and Bush administration. The congress uttered the voice of punishing China.

On Feb. 2nd of 2007, Bush Administration declared to imp lead the export allowance of Chinese government to WTO.

American manufacturing industry and labor organization rebukes that China decreases the currency value of RMB to earn unbalanced trade advantage and result in unemployment of American workers.

In order to give pressure to Chinese government, the councilors of Democratic Party and Republic Party proposed a bill demanding to withdraw the permanent normal trade relationship given to China. 15 councilors such as Nancy Pelosi, Steny H.Hoyer, Charles B.Rangel, Sander Levin,etc. wrote a letter together to President Bush and urged the government to adopt measures to change the situation of increasing trade deficit. The content about China is listed as following: "… We urged Bush Administration to adopt measures to solve these problems. We welcome the activities Bush Administration carried out recently, including imp leading the export allowance of Chinese government to

WTO. However, that's not enough… We demand that Bush Administration cooperate with the Congress…to dismantle trade barriers and counterattack unfair trade. American trade deficit with three trade partners occupies a large part of general trade deficit, among which 233 billion dollars with China, 117 billion dollars with EU and 88 billion dollars with Japan)… First of all, we demand that within 90 days Bush Administration propose a general plan to reduce American trade deficit with three economic partners, including how to dismantle market entry barriers and cancel unfair trade; second, we have to adopt the following measures to correct the unfair trade of American trade partners: to stop Japan and China controlling currency by using American item No. 301 and WTO's multilateral mechanism; to impaled China's infringing intellectual property rights to WTO and EU's discrimination trade policy; to strengthen implementing American Trade Relief Law and levy anti-allowance tax upon Chinese products which receive allowance."

National Association of Manufactures (NAM) points out that the trade deficit of manufacturing industry is 526 billion dollars, among which 80% of manufacturing industry trade deficit comes from Asian countries and trade deficit with China accounts for 40%, which indicates the importance of fair trade between America and China. It's important for America to imp lead Chinese export allowance to WTO and it's necessary for America to get result as soon as possible.

American Manufacturing Trade Action Coalition (AMTAC) holds the opinion that American trade policy directly results in the increase of American trade deficit and the lose of over 3 million employment positions of manufacturing industry. American government refuses to take the entry into American market as negotiation chip. Giving green light to Chinese products with export allowance damages American company's profit. According to the opinion of AMTAC, the most popular and most harmful protective allowance is foreign VAT export tax return policy. At present 137 countries implement export VAT export tax return policy. In 2005, influenced by foreign VAT export tax return policy, most American manufacturers suffered great loss for 294 billion dollars, among which loss of 48 billion dollars was relevant with China. If American congress and government don't adopt measures to countervail the partners' trade advantage from the export VAT export tax return policy, America cannot reduce its huge trade deficit.

Generally speaking, Sino-American trade friction is more severe than Sino-European trade friction. EU always negotiates with China, but America implements unilateralism. The demand for domestic political battle makes most Americans not willing to listen to Chinese reasonable explanation but understand Sino-American trade unbalance from their own point of view.

3. Unbalance in Sino-American Textile Trade

(1) Comparing Foreign Trade Data of China with that of America

According to Chinese foreign trade export statistics issued by China Customs, in 2006 Chinese foreign trade volume reached 1760 billion dollars, the export volume was 969.08 billion dollars and the import volume was 791.61 billion dollars. America is Chinese second trade partner, and total Sino-American trade volume has reached 262.68 billion dollars.

Bureau of Census of American Department of Commerce issued American foreign trade statistics, which showed that in 2006 American foreign trade volume was 3600 billion dollars, among which the import volume was 1400 billion dollars and the export volumn was 2200 billion dollars. In 2006, American trade deficit was 763.6 billion dollars, among which the trade deficit with China reached 232.5 billion dollars and increased by 15.3%.

(2) Import and export of Sino-American Textile Products

Among export products publicized by China Customs in 2006, textile yarn, textile products, apparel were 143.99 billion dollars.

According to the statistics issued by the OTEXA of American Department of Commerce, in 2006, American imported textile products all over the world for 52.1 billion square meters which amounted to 93.3 billion dollars, among which America imported textile products for 18.6 billion square meters which amounted to 27.1 billion dollars. The share of Chinese products in American total import amount increased from 33% in 2005 to 35.7% in 2006 and the share of Chinese products in American total import sum increased from 25.1% in 2005 to 29% in 2006.

4. Analysis on Sino-American Textile Products Trade

(1) Generally speaking, Sino-American foreign trade develops well with a growing trend. The development speed of Chinese foreign trade has remained over 20% for 5 years. In 2006, Chinese foreign trade increased 338.78 billion dollars than that of 2005 with the growth rate of 23.8%. In 2006, American exported products for 1400 billion dollars, which ranked No. 1 in the world with the growth rate of 13%. Among American 30 trade partners, the American export amount increased in 29 countries and the export growth rate to China was 32%, the highest one in

30 countries. However, American foreign trade deficit reached the highest point in history, among which American-Sino trade deficit was largest and occupied 30% in American total foreign trade deficit.

To outward seeming, Chinese foreign trade profit comes from American foreign trade loss. However, through analyzing Chinese export, in 2006, Chinese common trade import and export was 749.5 billion dollars, which increased by 26% and occupied 42.6% of the general import and export volume. In the same year, processing trade import and export was 831.88 billion dollars, which increased 20.5% and occupied 47.2%. We can conclude that processing trade still occupies a huge part of Chinese import and export volume. The beneficiaries who get the most profit in processing trade are the foreign traders who own the brands and selling channels. Through the research on modern industrial value chain, the profit of industrial value chain appears as "V", which is, "smiling curve". In this curve, one end is research and design, another end is selling, service and the middle part is processing. Some research shows that the industrial profit rate on both ends is from 20% to 25%, but the processing industrial value is only 5%. In the international division of textile industry, a Chinese enterprise is located at the bottom of the "smiling curve" and earns the least processing fee. Therefore, the media and some experts compare Chinese textile industry even other industries to "international labor" in the international industrial chain.

Especially the American multinationals in China enjoy the great profit. Therefore, Chinese export trade surplus should be discounted. Many economic experts say that trade surplus is in China but profit is in America. Sino-American trade surplus is good for America from another side. From the trade structure, processing trade occupies a huge part of the whole foreign trade. Because the two ends of processing trade are in foreign countries, its effect on increasing national treasure and developing economy is limited. According to the international experience, the processing trade by adopting the mode of processing with customers' materials can form increasing value which only occupies 20-30% of the product's general value in the country which engages in processing trade. Therefore, this country can gain very limited profit from processing trade. However, the increasing value in processing trade is foreign trade surplus volume, which has apparent effect on the growth of foreign trade surplus. In the special historical period, processing trade is the source of increasing foreign exchange and good method of solving employment problem. However, since Chinese foreign reserve has become the No. 1 in the world, the environment pollution from processing trade is more severe than before and it's more urgent to adjust trade mode and increase the proportion of common trade.

(2) As for Sino-American textile industry and trade, they occupy small part of foreign trade volume. Chinese textile products occupy 14.9% of the total export volume of that year and only are 8.7% of Sino-American trade.

However, American import textile products occupy 4.2% of the general import volume of that year, but only 1.23% in Sino-American trade. As for America, textile products import is a little problem.

We cannot ignore the Sino-American trade friction just because of the above figures.

For China, the meaning of textile products export is not about money but employment. Americans have said that touching with textile products, Chinese people would jump up. China is the biggest country producing and exporting textile products. The trade surplus from textile products ranks No. 1 among all products. The textile industry is a traditional manufacturing and labor-intensive industry which attracts the most employees. In 2006, the direct employees of the textile industry were 19 million, the indirect employees were close to 100,000,000. The direct employees in American textile industry were only 613,200. Comparing the direct employees of Chinese with American textile industry, Chinese direct employees are 30 times of that of America. Chinese textile industry's actual dependence on foreign countries is 30%, which means that once the textile products export is frustrated, Chinese industrial development and employment will be threatened seriously.

In 2006, the average income of American textile industry is 12.5 dollars per hour, which is 15 times of the average income of Chinese textile industry, 0.80 dollars per hour. As the labor-intensive products, Chinese textile products' competition precedes that of America. Therefore, it is impossible for America to urge the Chinese government to raise the value of RMB, which is an obvious thing for American economists and policy makers. The import volume of textile products is really small and does not relate with large-scale unemployment. The appreciation of RMB cannot balance Sino-American textile trade. So what's the reason for America to compete with China in textile products?

From the recent trade friction, America entangles with China on textile products for American domestic political pressure. American government wants to force Chinese government to make concessions on RMB's exchange rate with the condition of textile products.

American holds the aim for protecting itself and taking care of its neighboring countries by pressing Chinese textile products. As a matter of fact, taking care of its neighboring countries, America also wants to guarantee its own security. Therefore, America would rather decrease Chinese textile products import volume than reduce the textile

products export volume of Latin America and Central America.

5. The method and effect of China to Balance Trade

Since reform and opening up to the outside of China, promoting export has always been a very important national policy. The Chinese government has adopted a series of priority policies, such as export loan, export allowance, and export drawback of tax, which has exerted great influence. However, these methods are used to decrease price to increase export volume, which distorts the resource allocation of domestic economy, aggravates financial burden of the government and puts Chinese foreign export in a very embarrassing situation. By sacrificing environment and workers' welfare to sell many goods at lower price to the foreigners, China gets much trade friction however.

In order to balance trade and decrease friction, China adopts some methods of making standards. China has always been the biggest import country of American beans and cotton. Only in 2004, China imported American beans for 10,200,000 tons, which occupied 43% of American bean export. In 2003, China exported American cotton for 510,000 tons, which is 4.6 times that of 2002. In 2004, China imported cotton for 1.06 million, which increased more than one time of that in 2003. In 2005, in order to decrease trade surplus, China signed a contract with America to buy 70 Boeing planes for 4 billion dollars. Plus imported American telecommunication products, automobile whole and accessory parts, machinery and electrical equipments, China has purchased American goods for 9.5 billion dollars. China has exceeded Britain to become the fourth export market of America and the country which exports goods to America most quickly. According to the chairman of China Textile Industry Association, Mr. Du Yuzhou, China imports an American plane with the foreign exchange, which is at the cost that China should export 800,000,000 textile products.

In addition, since 2005 China stopped textile products export customs, the rumor that the textile products export drawback rate will be cancelled spread. On Sep. 12, 2006, in the Sino-Euro Industry and Business Summit, Premier Wen Jiabao declared that China implemented import-export balance policy and does not pursue trade surplus deliberately, which paved a way for "decreasing export drawback rate". On Sep.15, 2006, China Finance Ministry, National Development and Reform Commission, Ministry of Commerce, General Administration of Customs, and National Tax Bureau issued a notice to reduce the export drawback rate from 13% to 11%.

According to the statistics of China customs, in February of 2007, Chinese textile products export reached 11.24 billion dollars, which increased 71.3% than that of last year. It has created a new record of export increasing rate for a single month since China's entry into WTO. The increasing rate is higher than that of 2005 and 2006, even than the accumulated increasing rate of every month in 2004. One main reason was for a rumor that Chinese government would reduce textile products drawback rate further. All textile export enterprises exported their products before the first quarter of 2007. The policy limiting export promotes a huge amount of export. The policy makers also have not expected the result like this.

6. Conclusion

China's economy has developed at a high speed in recent years. Its foreign trade volume has increased quickly, which strikes the original profit structure of the world and creates trade friction. Chinese abnormal export increase roots in the change of international industry division and the transfer of domestic economic development stage. Even though the export guiding policies dealing with Asian financial crisis need to be adjusted and are now being adjusted, the foreign trade increase which is promoted by international industry division adjustment and domestic development stage transfer has its own necessary trend and should not be restrained by simple currency regulation. If the imbalance of bilateral trade results from bilateral economic structure and other non-currency elements, the resolution for exchange rate may be useless.

As the country with trade surplus, China faces the trade friction with countries with trade deficit and also worries about the increasing foreign exchange reserve. The effect of foreign trade on improving economy is very obvious. Within the short term, foreign trade can actually promote economic increase, but extremely relying on foreign trade may not develop domestic consumption demand situation. Only depending on international market and foreign investment, economic development is comparatively weak and full of disadvantages. Once international market and economy of other countries change, the domestic economy also will be affected and even encounters economic crisis.

Therefore, the policy of "foreign trade establishing China" should be changed, domestic demand should be focused on, and the welfare of Chinese workers in textile industry should be increased through legal form. The development relying on low-level scope expansion, low-cost competition and resource consumption is hard to last for long. In order to become a textile powerful nation with international competition, Chinese textile industry's urgent task is to upgrade the industrial structure instead of staying in the position of "global low-price processing plant". Giving up some textile foreign trade export orders with low additional value, improving technical innovation of textile

products and apparel and promoting upgrade of domestic textile industry are best solution for the above problems.

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An Examination of the Factors Influencing the

Level of Consideration for Activity-based Costing

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Abstract

Prior research into the extent to which operating units have considered activity-based costing (ABC) has either examined the extent to which operating units have considered or not considered ABC. This paper uses logistic ordinal regression analysis to examine the impact of the level of competition, product customization, manufacturing overhead costs and operating unit size on the level of consideration for ABC when measured on a three-point ordinal scale ranging from not considered, considering and considered ABC. The results indicate that operating unit size is related positively to the level of consideration for ABC. This implies that the availability of financial, labour, computing and time resources should mean that it is more likely for operating units to be considering or have considered ABC.

Keywords: Activity-based costing (ABC), Consideration for ABC, Ordinal regression

1. Introduction

In recent years there has been a significant amount of research into the factors which have influenced whether operating units have adopted activity-based costing (ABC). However, this research has been somewhat fragmented because of the different ways in which it has defined the extent to which operating units have or have not adopted ABC (see Brown et al., 2004). This is illustrated below, which shows the different definitions of ABC adoption in research conducted in manufacturing industry. (Note 1)

(1) Using ABC verses not using ABC (Groot, 1999; Joshi, 1998).

(2) Adopted ABC verses not adopted ABC (Malmi, 1996).

(3) Using ABC verses considered and rejected, currently considering and not considered ABC (Schoute, 2004).

(4) Using ABC versus assessed and rejected, currently assessing and not considered ABC (Clarke et al., 1999).

(5) Implemented after having adopted ABC verses not implemented after having adopted ABC (Gosselin, 1997).

(6) Adopted ABC verses rejected ABC after having adopted ABC as an idea (Booth & Giacobbe, 1998).

(7) Using or implementing ABC verses not using or not implementing ABC (Schoute, 2004).

(8) Using ABC or activity-based management (ABM), or currently implementing ABC verses not using ABC or ABM, or not currently implementing ABC (Malmi, 1999).

(9) Using, implementing, approved for implementing, or implemented and abandoned ABC verses considered then rejected, considering or not considered ABC (Krumwiede, 1998).

(10) Using, implementing or intending to implement ABC verses not using, not implementing or not intending to implement ABC (Al-Omiri & Drury, 2007).

(11) Implemented, currently implementing or wanted to implement ABC verses did not want to adopt or have not decided about ABC (Bjørnenak, 1997).

The problem with this research is that it may have adopted a narrow approach to ABC usage by assuming that operating units that have adopted ABC are distinct from operating units that have not adopted it. For example, research that has compared operating units that have adopted or are using ABC with those that have not adopted or are not using ABC, assume that each of these two groups are homogeneous. However, this may not be the case. Krumwiede (1998) points out that firms that reject ABC after having considered it usually have higher quality information systems than other non-adopters who have not considered ABC. In this case, firms that have rejected ABC may have similar characteristics to those that have adopted ABC, rather than those that have not considered it. Similarly, Krumwiede (1998) argues that firms that adopt ABC and subsequently abandon it, tend to have high quality information systems, which again may lead to them having similar characteristics to ABC adopters rather

than non-adopters. Thus, operating units that are categorized as not using ABC may not be a homogeneous group, which may affect any interpretation of the differences between operating units that have adopted and have not adopted ABC. Furthermore, operating units that have adopted ABC may be similar to operating units that have rejected it, because they have both considered it, which may distinguish them from operating units that are currently considering ABC (and, hence, have not made a decision about whether or not to adopt it) and those that have not considered it.

Only Booth & Giacobbe (1998), Brown et al. (2004) and Krumwiede (1998) have examined the issue of consideration for ABC. (Note 2) Booth & Giacobbe (1998) compared operating units with an interest in ABC (or those who were at least willing to consider it) to those that had not considered ABC. Brown et al. (2004) compared operating units that had shown an interest in ABC by either currently considering it or having considered it with those that had not considered it. The problem with this approach, however, is that it assumes that operating units with an interest in ABC are a homogeneous group. This may not be the case, however, because there may be differences between those that are currently considering and those that have considered ABC. Given that operating units' consideration for ABC can be divided between those that have not considered ABC, are considering ABC and have considered ABC, operating units that are considering ABC are in the process of moving from the not considered category to the considered category. These operating units may retain the characteristics of those that have not considered ABC until they have completed their considerations and/or they may have characteristics that are similar to those that have considered ABC.

To the author's knowledge, only Krumwiede (1998) has empirically examined the issue of consideration of ABC by looking at the impact of a variety of factors on operating units that had not considered ABC, were considering ABC and had considered and adopted ABC. From the perspective of consideration, this research is incomplete, however, because it does not examine operating units that had considered and rejected ABC. This is an important omission because not all operating units that have considered ABC will adopt it, and by implication, not all those that are currently considering ABC will adopt it. Hence, research into the consideration of ABC should include operating units that have not considered ABC, are considering ABC and have considered ABC (including those that have adopted and rejected it).

Another issue from prior research into ABC usage relates to the data analysis procedures. Some of the research described above has used univariate statistical methods, such as chi-square tests, Mann Whitney tests or t-tests to compare ABC adopters and non-adopters, however defined, over a variety of constructs (Booth & Giacobbe, 1998; Groot, 1999; Joshi, 1998; Malmi, 1996, 1999). Other researchers have overcome the limitations of using only univariate statistical methods by using more powerful multivariate statistical methods, such as binary logistic regression analysis or discriminant analysis to consider the impact of a variety of factors on the extent to which operating units have adopted ABC relative to those that have not adopted ABC, however defined (Al-Omiri & Drury, 2007; Bjørnenak, 1997; Brown et al., 2004; Booth & Gosselin, 1998; Schoute, 2004)).

One disadvantage with multivariate binary logistic regression is that the dependent variable in the regression runs is binary coded, meaning that it is restricted to two data points, and, consequently, this can limit the depth of the analysis. Furthermore, if ordinally coded constructs are collapsed into a binary coded construct, then important data may be lost in the analysis. This problem can be overcome by using ordinal logistic regression (hereafter ordinal regression), which is a logistic regression method that can be applied when a dependent construct is coded on an ordinal scale consisting of three or more points. Unlike binary logistic regression, which considers the log odds of an individual event occurring, ordinal regression considers the log odds of an event occurring and all other events that can be ordered before it. In addition, ordinal regression overcomes the problem of trying to apply ordinary least squares (OLS) regression analysis to a dependent construct coded on an ordinal scale, because one of the assumptions of OLS regression is that the dependent construct should be coded on at least an interval scale, with equal intervals between the points on the scale. Furthermore, ordinal regression has the advantage of not requiring a constant variance in the residuals.

In relation to ABC, operating units can have three levels of consideration for ABC, which can be coded on an ordinal scale. At the lowest level are operating units that have not considered ABC, at the next level are operating units that are considering ABC and at the highest level are those that have considered ABC, regardless of whether or not they have accepted it. To the author's knowledge, only Krumwiede (1998) has applied ordinal regression to ABC research. However, as mentioned above the latter point on the consideration scale adopted in his research excludes operating units that have considered, but rejected ABC. Given the above, the objective of this paper is to use ordinal regression analysis to develop and test a model of the influences of the level of competition, product customization, manufacturing overhead costs and operating unit size on the level of consideration that operating units give to ABC, including those that have considered and rejected ABC.

The remainder of the paper is organized into four further sections. Section two proposes four hypotheses relating to the influence of the four factors referred to above on the level of consideration for ABC. Section three describes how the research data was obtained from a questionnaire survey of British management accountants working in manufacturing operating units and how it was analysed using ordinal regression. Section four reports the results of the ordinal regression analysis. Section five concludes the research, identifies some of its limitations and the opportunities for future research.

2. Research hypotheses

Based upon the results of prior ABC research, four constructs are examined as possible influences on the level of consideration for ABC and the possible influence of each of these constructs is discussed below and this results in a research hypothesis for each construct.

2.1 Competition

Prior research has identified a positive relationship between the level of competition in the marketplace and the use of management accounting systems (Khandwalla, 1972; Mia & Clarke, 1999). In relation to product costing, it has been suggested that when there is a high level of competition, then firms should implement ABC (Cooper, 1988; Kaplan & Cooper, 1998). If firms do not implement ABC, then a competitor or competitors may take advantage of errors arising from inaccurate product costs (Cooper, 1988). Consequently, it would be expected that an operating unit facing a high level of competition would have considered or at the very least be considering ABC. Booth & Giacobbe (1998) found there was no significant difference between firms who were interested and not interested in ABC as an idea and whether they were price takers or price makers in the market. Given that, in theory, a higher level of competition would be expected to lead to the adoption of ABC, then, by implication, operating units would have considered ABC and others may be considering it. Hence:

H_1: The level of competition is related positively to the extent to which operating units have considered ABC.

2.2 Product customization

Customized products are produced in non-repetitive manufacturing processes, which means that it is not possible to derive standard costs (Drury & Tayles, 2005). Kaplan & Cooper (1998) suggest that ABC systems should be used to enhance the accuracy of customized product costs. Thus, a company producing customized products would be expected to have considered ABC or at least to be considering it. Hence:

H_2: The level of product customization is related positively to the extent to which operating units have considered ABC.

2.3 Manufacturing overhead costs

When higher levels of overhead costs are incurred to produce products, it is argued that there is a greater need to use product costing systems to capture those costs in product costs (Bjørnenak, 1997). When overhead costs (excluding facility-level costs) make up a high proportion of total product costs, Kaplan & Cooper (1998) consider that ABC should be used. In research into the consideration for ABC, Brown et al. (2004) did not observe a significant effect for overhead costs to value added costs on operating units that were considering or had considered ABC verses those that had not considered it. In contrast, Booth & Giacobbe (1998) found that operating units with a higher percentage of overhead costs to value added costs in operating units had shown an interest in ABC. Operating units with a higher percentage of manufacturing overhead costs to total manufacturing overhead costs would be expected to be more likely to have considered or to be considering ABC. Hence:

H_3: The percentage of manufacturing overhead costs to total manufacturing costs is related positively to the extent to which operating units have considered ABC.

2.4 Operating unit size

Krumwiede (1998) pointed out that the reasons for the significant size effect in prior ABC adoption research are unclear. It may be that as larger operating units are likely to have access to more resources, have more contacts and communication channels (Bjørnenak, 1997), and they are able to invest in and, by implication, to have considered ABC. Brown et al. (2004) suggested that larger firms are able to spread the costs of implementation across several products. In empirical research, Brown et al. (2004) found that the number of employees was positively related to whether operating units were considering or had considered ABC. Similarly, Booth & Giacobbe (1998) found that the annual sales revenue of operating units was positively related to whether operating units had an interest in ABC. When using ordinal regression, Krumwiede (1998) found that annual sales revenue had a positive effect on whether operating units had considered and adopted ABC. However, it did not have a significant effect on whether operating units were considering, or had considered and adopted ABC. Given the significant size effects in prior research into

the consideration for ABC, this research assumes that larger operating units are more likely to be considering or to have considered ABC. Hence:

H$_4$: Operating unit size is related positively to the extent to which operating units have considered ABC.

3. Research method

3.1 Research questionnaire

Questionnaire subjects were obtained initially from a list of 854 members of the Chartered Institute of Management Accountants in Great Britain who were working in British manufacturing industry and had the job title of cost, management or manufacturing accountant. An initial letter was posted to all potential subjects outlining the objectives of the research and informing them that they would receive a questionnaire in two weeks time. Accompanying each questionnaire was a covering letter, which assured subjects of the confidentiality of their responses, and a stamped-addressed envelope. Non-respondents to the questionnaire were posted a follow-up letter two weeks later, and a further follow-up letter, questionnaire and stamped-addressed envelope were posted to non-respondents two weeks after that. After identifying potential subjects who worked in the same operating unit, potential subjects who had left their operating unit, operating units that had closed down, and subjects whose work did not involve manufacturing or product costing, the total potential subjects employed in independent operating units declined to 673. A total of 280 usable questionnaires were received (effective response rate = 41.6 percent) and, of these, 274 respondents indicated that they used product costs in decision making. (Note 3)

The existence of non-response bias was tested by Mann-Whitney tests to compare respondents who had returned the questionnaire prior to the first reminder being sent out (n = 116) and those who returned the questionnaire after the second reminder had been sent out (n = 40). This did not reveal any significant differences between these two types of respondent on any of the five research constructs (p > 0.05). (Note 4) Hence, non-response bias may not be a problem.

3.2 The ordinal regression model

The ordinal regression model for a dependent construct defined as the level of consideration of ABC is:

$$\ln(\theta_{j=1,2}) = \alpha_{j=1,2} - \beta_1 COMP - \beta_2 CUST - \beta_3 MANUO/D - \beta_4 SIZE + e$$

Where:

$\ln(\theta_{j=1,2})$	=	The link function that connects the independent constructs of the linear model. In this case, it is the natural logarithm of $\theta_{j=1,2}$, where j is the number of link functions. Here, there are two link functions, that is j = k – 1, where:
		k = number of points on the ordinally coded scale, in this case a three point scale.
$\theta_{j=1,2}$	=	The odds of an event occurring defined as $^{pk}/_{(1-pk)}$ where:
	p_k	= the cumulative probability of an event or events occurring, and
	$1 - p_k$	= the probability of that event or events not occurring.
	In this case:	
	θ_1	= $^{p(\text{not considered ABC})}/_{p(\text{considering or considered ABC})}$
	θ_2	= $^{p(\text{not considered or considering ABC})}/_{p(\text{considered ABC})}$
$\alpha_{j=1,2}$	=	A constant term for each of the link functions.
β_{1-4}	=	The ordinal regression coefficients.
COMP	=	The level of competition.
CUST	=	The level of product customization.
MANUO/D	=	Percentage of manufacturing overhead costs to total manufacturing costs.
SIZE	=	The operating unit size, measured by SALES = Annual sales revenue or EMPLOYEES = Number of employees.
e	=	Residual error term.

Given that there are two size measures, there are two versions of each logit function depending upon whether size is measured by the annual sales revenue or the number of employees.

3.3 Construct measurement

Respondents were asked to answer the questionnaire from the perspective of the operating unit in which they worked. Operating units' experience of ABC was obtained from a single question with responses of currently using ABC; intending to use ABC; currently investigating using ABC; intending to investigate using ABC; rejected ABC, but established a system of activity analysis or cost driver analysis; implemented ABC and subsequently abandoned it; investigated using ABC and rejected it; rejected ABC, but never investigated its possible use; never considered ABC and other. For the purposes of the ordinal regression analysis, respondents were classified as having never considered ABC (code = 1), respondents who were currently investigating or intending to investigate using ABC were regarded

as considering ABC (code = 2), and all other respondents were regarded as having considered ABC (code = 3). The respondents who gave the response of other were omitted from subsequent analysis, because they did not indicate their level of consideration for ABC.

The level of competition was measured by two questions developed by the researcher. The first question covered the current general level of competition for the major products produced by the operating unit with responses on five-point Likert scale ranging from 1 = Very intense to 5 = Very slack. The second question requested information about the expected level of competition over the next two years for the major products produced by the operating unit, with responses ranging from 1 = Very high and 5 = Very low. For the purpose of data analysis the scores on these two questions were reverse scored and initially summed and divided by 2 to provide a measure of the general level of competition on a nine-point scale from a low score of 1 to a high score of 5. Similarly, product customization was measured by two questions developed by the researcher. From these two questions, respondents had to identify the range of products produced by their operating unit on a five-point Likert type scale. For the first question responses ranged from 1 = Virtually all customized products, to 5 = Virtually all standardized products. For the second question responses ranged from 1 = At least 95% of products produced are unique and produced to satisfy individual customer's orders, to 5 = At least 95% of products are identical products produced in large quantities. The responses to both questions were initially reverse scored for data analysis and summed and divided by 2 to give a low score of 1 to a high score of 5.

The percentage share of manufacturing overhead costs to total manufacturing costs was obtained from responses to a question that required details about the operating unit cost structure. From this it was possible to derive the percentage of manufacturing overhead costs to total manufacturing costs (i.e., the sum of direct material costs, direct labour costs and manufacturing overhead costs). Operating unit size was measured in two different ways. Respondents were asked to indicate the approximate annual sales revenue of their operating unit in the last financial year and the approximate number of employees in their operating unit.

4. Results

The ordinal regression analysis was applied using listwise deletion, which gave a usable sample of 200 respondents. The results of ordinal regression equations including all of the independent constructs, and when operating unit size was measured by either annual sales revenue or number of employees showed that 66.7 percent of the cells between the dependent construct and the independent constructs were empty. This meant that the goodness-of-fit statistics for the ordinal regression equations were unreliable (Norusis, 2005). In order to increase the dependability of the goodness-of-fit statistics in the ordinal regression analysis it was necessary to reduce the number of empty cells between different values of the dependent construct and different values of the independent constructs, and the number of cells with small expected values on the points on the scales of each independent construct. This was achieved by rescaling the independent constructs, and, by a process of trail and error, this led to the scales of the independent constructs being reduced to three-point ordinal scales.

For the competition measure, as no operating units had a score of 1 or 1.5 and only one operating unit had a score of 2, the responses were reduced to a three-point scale with scores of 2, 2.5 and 3 being coded 1, scores of 3.5 and 4 being coded 2, and scores of 4.5 and 5 being coded 3. Unlike the responses to the measure of competition, the responses to the product customization measure were spread more evenly. Hence, the scale was reduced to a three-point scale with scores of 1, 1.5 and 2 being coded 1, scores of 2.5, 3 and 3.5 being coded 2, and scores of 4, 4.5 and 5 being coded 3. (Note 5) The manufacturing overhead cost percentage was the reduced to a three-point scale based on up to 12.5 percent = 1, greater than 12.5 percent to 25 percent = 2 and greater than 25 percent = 3. The annual sales revenue measure was coded £0m to £20m = 1, greater than £20m to £100m = 2, and greater than £100m = 3. The number of employees was scored on a similar scale with 0 to 100 employees = 1, 101 to 500 employees = 2 and greater than 500 employees = 3.

The experiences of ABC of these 200 respondents are shown in Table 1. Before testing the research model, a number of preliminary tests were conducted on the data to ensure that the multi-item measures of considering and considered ABC are distinct constructs. Kruskal-Wallis tests examined the differences in responses between the six different responses representing respondents who had considered ABC for each of the independent constructs. The Kruskal-Wallis tests did not reveal any significant differences between the independent constructs. Hence, there were no significant differences between operating units that have adopted ABC and those that have rejected ABC in some way.

Related to the above, Mann-Whitney tests did not reveal any significant differences across the independent measures between operating units that had accepted ABC (that is using and intending to use ABC) (n = 20) and those that had rejected ABC, when defined in the four ways listed in the questionnaire (n = 79). (Note 6). (Note 7) This indicates that operating units that have accepted and those that have rejected ABC were similar for these constructs. The

similarity is that they have both considered ABC. A Mann-Whitney test did not reveal any significant differences across the five independent measures between the two items making up the currently considering ABC construct. This provides evidence that the two measures of currently considering ABC were measuring a single construct. The distribution of responses for the independent constructs in the regression model are shown in Table 2. This shows that operating units faced a high level of competition, had varying levels of product customization and had moderate sizes and manufacturing overhead percentages.

Table 3 shows the Spearman Rank correlation coefficients between the six construct measures, and shows that the only significant correlation with the level of consideration for ABC was for the two size measures ($p < 0.05$). This indicates that these constructs may be related to the level of consideration for ABC in the ordinal regressions. Unsurprisingly, the largest correlation was between the two size measures ($r = 0.679$), but this is of no consequence because these two constructs do not appear in the same ordinal regression equations. The only other significant correlation was between annual sales revenue and manufacturing overhead percentage, and given the low correlations between the independent constructs, multicollinearity is unlikely to be a problem in the ordinal regressions.

The results of the ordinal regressions are shown in Table 4 and reveal that operating unit size, regardless of whether it was measured by annual sales revenue or number of employees was the only construct to significantly influence the level of consideration for ABC. Hence, hypothesis 4 is accepted, but as there were no significant effects for competition, product customization and manufacturing overhead percentage, hypotheses 1, 2 and 3 are rejected. The ordinal regression equations are:

For sales revenue:
$$\ln\left(\frac{\text{p(not considered ABC)}}{\text{p(considering or considered ABC)}}\right)$$
$$= 0.897 - 0.099(\text{COMP}) - 0.061(\text{CUST}) - 0.029(\text{MANUO/D}) - 0.822(\text{SALES})$$

$$\ln\left(\frac{\text{p(not considered or considering ABC)}}{\text{p(considered ABC)}}\right)$$
$$= 1.931 - 0.099(\text{COMP}) - 0.061(\text{CUST}) - 0.029(\text{MANUO/D}) - 0.822(\text{SALES})$$

For number of employees:
$$\ln\left(\frac{\text{p(not considered ABC)}}{\text{p(considering or considered ABC)}}\right)$$
$$= 1.005 - 0.169(\text{COMP}) - 0.055(\text{CUST}) + 0.134(\text{MANUO/D}) - 0.789(\text{EMPLOYEES})$$

$$\ln\left(\frac{\text{p(not considered or considering ABC)}}{\text{p(considered ABC)}}\right)$$
$$= 2.030 - 0.169(\text{COMP}) - 0.055(\text{CUST}) + 0.134(\text{MANUO/D}) - 0.789(\text{EMPLOYEES})$$

This shows that the log odds of an operating unit either having not considered ABC or having not considered or currently considering ABC was negatively related to operating unit size. It is necessary to test that the two regression lines are parallel, that is the relationship between independent constructs and the two link functions is the same for each pair of link functions. The test for parallel lines compares the model assuming that the two lines are parallel with the model assuming that the model consists of separate lines. A non-significant chi-square statistic is indicative of parallel lines and that the relationship between the independent constructs is the same for the different link functions in the dependent construct. If the chi-square statistic is significant then different models are required for the different link functions. The test for parallel lines when the ordinal regression included size measured by annual sales revenue gives chi-square = 0.834, p = 0.934 and when size was measured by the number of employees, chi-square = 2.246, p = 0.691. The non-significant chi-square indicates that the two lines were parallel.

If the model provides a good fit of the data, the observed and expected cell counts are similar, and, hence, there is no significant difference between them. When size was measured by annual sales revenue the goodness-of-fit statistics were:
Pearson: chi-square = 98.936, p = 0.722 and
Deviance: chi-square = 113.467, p = 0.341.

When size was measured by the number of employees, the goodness of fit statistics were:
Pearson: chi-square = 95.212, p = 0.805 and
Deviance: chi-square = 107.793, p = 0.488.

The non-significant goodness-of-fit statistics indicate that the model provided a good fit of the data, and, hence, the observed and expected cell counts were similar. In addition, the model fitting test compares the model with predictors to the model without predictors. A significant chi-square indicates that the model with predictors provided a better fit to the data. When size was measured by the annual sales revenue: chi-square = 17.154, p = 0.002, and when size was measured by the number of employees: chi-square = 14.627, p = 0.006. In both cases the models including predictors provided a better fit to the data than if they were not included.

Although the objective of the research was to develop a model of the factors influencing the level of consideration for ABC, various measures of the strength of the association between the two size measures and the dependent construct are reported for completeness. When size was measured by annual sales revenue the strength of the associations were Cox and Snell pseudo $R^2 = 0.082$, Nagelkerke pseudo $R^2 = 0.094$ and McFadden pseudo $R^2 = 0.041$. Similarly, when size was measured by the number of employees they were Cox and Snell pseudo $R^2 = 0.071$, Nagelkerke pseudo $R^2 = 0.081$ and McFadden pseudo $R^2 = 0.035$. Hence, the explanatory variance was low.

5. Conclusion

This paper has developed and tested a model of the factors influencing operating units' level of consideration for ABC in British manufacturing industry. The model was tested by ordinal regression analysis with the level of consideration for ABC as the dependent construct and the level of competition, the level of product customization, the percentage share of the manufacturing overhead costs to total manufacturing costs and operating unit size as independent constructs. The results indicate that, regardless of how operating unit size is measured, operating unit size has a significant influence on the level of consideration for ABC. Specifically, the log odds of an operating unit having not considered ABC and the log odds of an operating unit having not considered or considering ABC is negatively related to size, or, alternatively, operating unit size is positively related to the level of consideration for ABC when defined as the log odds of an operating unit having considered ABC, or currently considering or considered ABC. Thus, there is no difference between the impact of the independent constructs and the different link functions, however these are defined.

The non-significant effect of the other constructs indicates that the level of competition, product customization, manufacturing overhead percentage do not impact on the decision to consider ABC. This is consistent with Brown et al. (2004) who found that technological factors, such as product customization and cost structure are not related to whether operating units are considering or have considered ABC. Furthermore, the non-significant effect of environmental factors, such as competition is consistent with Booth & Giacobbe (1998). Operating units appear to consider ABC based on their size. They consider ABC when they believe that they are sufficiently large, in terms of, for example, financial, labour, computing and time resources, to consider it. Until this point is reached they do not consider it. Future research needs to consider when this point arises, and when it does arise do operating units immediately start to consider ABC or is there some time gap before they start to consider it. This could be done using longitudinal research to see when and how their considerations have been completed.

Although operating unit size is the only significant construct in the ordinal regressions, the pseudo R^2 measures are low. This indicates that other constructs affect the consideration decision and have been omitted from the model. These omitted constructs could relate to constructs referred to above that influence the consideration decision directly, like the level of financial, labour, computing and time resources. These could be measured in future research using psychometric measures. In addition, future research needs to consider the impact of organizational factors on the level of consideration of ABC. These have been included in ABC consideration research by Brown et al. (2004), where top management support and having an internal champion to support the implementation of ABC had a positive effect on operating units considering or having considered ABC. Krumwiede (1998) observed significant effects on the level of consideration of ABC for not only size, but also the complexity of manufacturing and costing systems, and whether the operating unit used job shop as opposed to non-job shop manufacturing. Further research needs to include these constructs in models of the level of consideration as operationalized in this research. Other research has found that organizational structure influences the likelihood of adopting innovations (Damanpour, 1991). In the context of ABC, Gosselin (1997) found that more centralized and formalized organizations were more likely to implement ABC. This research could be extended to see if this relationship holds for the consideration of ABC.

The main limitation of this research is that the independent constructs are coded on a three-point ordinal scale. This reduces the data that is included in these constructs, and, hence, the discrimination between different levels of intensity of these constructs. Notwithstanding this limitation, the research illustrates the application of a research method that has been used rarely in accounting research, namely ordinal regression. The method has the potential of overcoming the limitation of only having a binary coded dependent construct in binary logistic regression and of applying an ordinally coded dependent construct in OLS regression analysis. It is hoped that the technique described in this paper will encourage other accounting researchers to apply the ordinal regression method in future research.

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Notes

Note 1. Given that this study is confined to operating units in manufacturing industry, the identification of prior research into the adoption of ABC is confined to manufacturing industry.

Note 2. The Brown et al. (2004) sample consists of both manufacturing and non-manufacturing operating units. Although their results may not be strictly comparable to Booth & Giacobbe (1998) and Krumwiede (1998) because of the inclusion of non-manufacturing operating units, their paper is included in the introduction to this research area because, to the author's knowledge, it is the only paper into the consideration for ABC that has defined operating units that have considered ABC, as including those that have both adopted and rejected ABC.

Note 3. A copy of the questionnaire is available on request.

Note 4. The results of the Mann Whitney tests, and other subsequent Mann Whitney tests and Kruskal Wallis tests are available from the author on request. All subsequent statistical significance levels are at the $p = 0.05$ level and all statistical tests are two-tailed tests.

Note 5. A factor analysis with a varimax rotation confirmed that the two, two-item measures of competition and product customization each loaded on to a single factor. In addition, both of these measures displayed satisfactory reliability scores. The Cronbach's alpha for competition and product customization were 0.825 and 0.791 respectively.

Note 6. A Mann Whitney test did not reveal any significant differences across the five independent measures between operating units that were currently using and intending to use ABC. Kruskal-Wallis tests did not reveal any significant differences across the five independent measures between operating units that had rejected ABC in one of four ways listed on the questionnaire.

Note 7. Operating units that had accepted ABC before abandoning it may have different characteristics to those that had rejected it initially. Mann Whitney tests, however, did not reveal any significant differences across the five independent measures between operating units that had accepted ABC and those that had rejected ABC, excluding the two operating units that had implemented and subsequently abandoned ABC. Furthermore, the operating units that have rejected ABC, but established a system of activity analysis or cost driver analysis may also have different characteristics from those that had rejected ABC, because these operating units have embraced activity-based principles. There were no significant differences, however, between those that had accepted ABC and those that had rejected ABC and had never embraced activity-based principles. This reinforces the view that operating units that have accepted and operating units that have rejected ABC are similar on these characteristics because they have both considered ABC.

Table 1. Operating units consideration of ABC

	No.	No.	%
Considered ABC			
Currently using ABC	5[a]		
Intending to use ABC	15		
Rejected ABC, but established a system of activity analysis or cost driver analysis	25		
Implemented ABC and subsequently abandoned it	2		
Investigated using ABC and rejected it	43		
Rejected ABC, but never investigated its possible use	9	99	49.5
Considering ABC			
Currently investigating ABC	14		
Intending to investigate using ABC	31	45	22.5
Not considered ABC			
Never considered ABC	56	<u>56</u>	
			<u>28.0</u>
		<u>200</u>	<u>100.0</u>

[a] The number of respondents shown in Table 1 that were currently using ABC agreed with the number of respondents to another question about the treatment of overhead costs in product costs, which asked respondents to indicate whether they were using ABC.

Table 2. Distribution of responses for the independent constructs[a]

	Score 1		Score 2		Score 3		Total	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Level of competition	13	(6.5)	78	(39.0)	109	(54.5)	200	(100)
Level of product customization	68	(34.0)	64	(32.0)	68	(34.0)	200	(100)
Manufacturing overhead percentage	50	(25.0)	95	(47.5)	55	(27.5)	200	(100)
Annual sales revenue	71	(35.5)	98	(49.0)	31	(15.5)	200	(100)
Number of employees	25	(12.5)	110	(55.0)	65	(32.5)	200	(100)

[a] Scored on a three-point scale with low score = 1 and high score = 3.

Table 3. Spearman rank correlation coefficients[a]

	1	2	3	4	5	6
1. Consideration for ABC	1.000					
2. Level of competition	0.060	1.000				
3. Level of product customization	0.034	0.044	1.000			
4. Manufacturing overhead percentage	−0.053	−0.045	−0.068	1.000		
5. Annual sales revenue	0.282**	0.099	0.027	−0.174*	1.000	
6. Number of employees	0.252**	−0.025	−0.010	0.023	0.679**	1.000

[a] * $p<0.05$, ** $p<0.001$

Table 4. Ordinal regression analysis

	Regression coefficient	Standard error	Wald statistic	df	p
Panel A: Including annual sales revenue as the measure of operating unit size					
Constant (α_1)	0.897	0.858	1.092	1	0.296
Constant (α_2)	1.931	0.867	4.961	1	0.026
Level of competition	0.099	0.223	0.196	1	0.658
Level of product customization	0.061	0.167	0.134	1	0.714
Manufacturing overhead percentage	0.029	0.191	0.023	1	0.880
Annual sales revenue	0.822	0.213	14.913	1	0.000
Panel B: Including number of employees as the measure of operating unit size					
Constant (α_1)	1.005	0.887	1.283	1	0.257
Constant (α_2)	2.030	0.896	5.131	1	0.023
Level of competition	0.169	0.221	0.588	1	0.443
Level of product customization	0.055	0.166	0.112	1	0.738
Manufacturing overhead percentage	−0.134	0.188	0.507	1	0.477
Number of employees	0.789	0.219	12.963	1	0.000

Discussion on the Quantification-Based

Performance Evaluation of Rural County Government

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Abstract

At present the government performance evaluation has already become popular in all fields of government performance management. It contributes a lot to the construction of service-oriented government. However, the quantitative evaluation on government performance is far different from each other in practice. This paper tends to explore the development trend of quantitative evaluation on agricultural county government's performance, hoping to provide with reference for agricultural county government understanding and realizing performance management completely.

Keywords: Public administration, Performance management, Performance evaluation

Presently relevant theories about public organization's performance evaluation have been mature. The quantitative evaluation on government performance has gradually become popular at different administrative levels in China. Considering the special features of agricultural county government, the quantitative evaluation on its performance needs to meet higher requirements. This paper will discuss the necessity of making quantitative evaluation on agricultural county government's performance.

1. The characteristics of agricultural county government

The research object in this paper is the agricultural county government that is appointed by the central government. Its administrative position is between the province, city, and the town. It is a relatively independent and legal administrative organization at a lower level with complete government functions and is in charge of certain region. It belongs to certain administrative level with special functions. The agricultural county government has unique characteristics that will limit its performance evaluation. At present, characteristics of agricultural county government include:

(1) Stay in a lower level in the management system. In the administrative management system from the central to the local in China, the agricultural county (city) government is merely one of management levels. Above there are the central, provincial, and city government. The agricultural county (city) government aims at executing the guidance and policy from higher levels. Below there are the town and other grass-roots units. Therefore, the agricultural county (city) government should make up policies and measures that are right for local development. Considering the administrative modes and features, the local administrative organization adopts a leader-responsibility system. The administrative organization at a lower level should submit to the lead of the one at a higher level. The local administrative organization should submit to the lead of the central government. The special position determines that the agricultural county (city) government should pay attention to its execution function in constructing a service-oriented government. Therefore, a quantitative evaluation on its performance becomes necessary in order to make the evaluation more convincible.

(2) The particularities of management. Because the local resources endowments are different, agricultural counties are under the influences of natural environment and climates, which causes the diversity of agricultural county (city) government's work. In executing the central, provincial, and city government's policies, the agricultural county (city) government has to take local conditions into consideration to make decisions. It means the agricultural county (city) government needs to try its best to meet the requirements in practice. In fact, the official departments have different responsibilities and functions. The agricultural county (city) government holds a great dominance in constructing a service- oriented government. Therefore, it is necessary to set up some parameters for a quantitative evaluation on government performance in order to reflect local conditions more scientifically.

(3) The comprehensiveness of management. The agricultural county (city) government is a typical representative in China's administrative organizations. It has all functional departments that are the same with its upper government. This is for a comprehensive management of all public affairs. However, this organizational mode has poor flexibility and may cause a management dilemma, namely "huge and overstaffed organization". Then, the quantitative evaluation on performance can help to drive the agricultural county government work better.

2. The connotation and concept of agricultural county government's performance evaluation

In western countries, the government performance is also named as "public productivity", "national productivity", "public organization performance", "government achievement", and "government behavior". In the literal meaning, it means the achievement and effect gained by the government. It has rich connotation. On one hand, it includes the government's "output" performance, namely the performance of government in providing with public service and arranging social management. On the other hand, it includes the government's "process" performance, namely the performance of government in exercising its functions. The government performance can be divided into organization performance and individual performance. The former includes the overall performance of government at certain level, the performance of the government's functional department, and the team performance. This paper focuses on the quantitative evaluation on the agricultural county government's overall performance.

For the agricultural county government management, the core is to improve performance. Therefore, the first step is to understand and evaluate present performance. Use scientific method, standards, and procedures and make right evaluations on the agricultural county government and its departments' performances, achievements, and practical work. By this way, we can further improve and perfect the government performance.

The agricultural county government's performance evaluation is based on efficiency, ability, service quality, and the satisfaction degree of the public. Make evaluation and grade the performance by assessing the agricultural county government's input, output, middle achievement, and final achievement in the management process. The government performance evaluation is based on the performance, pursuing the direct control of public responsibility mechanism over government's public departments, and pursuing that the government management will be responsible for legal institutions and customers. According to the evaluation standards, the service quality and public needs are primary, what indicates a management idea of public responsibility and customer priority. The evaluation aims at enhancing and perfecting the public responsibility mechanism, and making the agricultural county government more competitive in managing public businesses, transferring public services, and improving living qualities.

The quantitative evaluation chiefly focuses on the agricultural county government's expenses, operations, and social effects in management activities. By measuring these aspects, the performance can be graded. The agricultural county government's performance evaluation is not a single behavioral process but a behavioral system and a comprehensive process composed of many rings: describe the evaluation's requirements and objects, establish the evaluation's aims and quantitative goals, make up evaluation standards, make performance evaluation according to standards, compare performance results and goals, analyze and report the performance results, and improve the government management based on performance evaluation.

3. The agricultural county government's performance evaluation has profound management ideas.

The management idea existed in the agricultural county government's performance evaluation is reflected by the government performance evaluation's nature, values, and characteristics. In nature, government performance evaluation is a kind of market responsibility mechanism. Cooper concludes this mechanism as: firstly, it is an "economic efficiency assumption"; secondly, it "adopts cost-interest analysis method"; thirdly, it is to "establish performance standards by an input-output mode, emphasizing on the evaluation on the output"; fourthly, it is to "define the market responsibility mechanism based on customer satisfaction. This definition is to regard citizen as consumer." Therefore, the agricultural county government's performance evaluation, the market responsibility mechanism is kind of local residents' direct control and choice over the public services provided by the agricultural county government. The agricultural county government is responsible for the local residents. Without residents' choice, it is hard to form the market mechanism. As a result, it can not inspire a competition among public service suppliers. Therefore, it is impossible to form the public responsibility mechanism in the agricultural county government.

In values, the value orientation of agricultural county government's performance evaluation determines the performance evaluation's standards. Therefore, only when there is reasonable value orientation in government performance evaluation, can we construct scientific performance evaluation standards. For the evaluation on agricultural county government's public service supply, just as what was said by Pennock, the key should focus on the aspects that meet the needs ------ not only the government's needs but also the human needs. Only by meeting the human needs, can the policy proves its values for the human being. And the policy can prove its rationality of existence. With the base of social fairness, contemporary government management emphasizes on public responsibility and democratic participation, making efficiency, orders, social fairness, and democracy become the essential value orientation of agricultural county government's performance evaluation. The value orientation of efficiency reflects the quantitative requirement of the society for government management performance. The value

orientation of orders, social fairness, and democracy is a kind of interactive behavioral mode that can solve all social relationship and interest conflicts, reflecting the qualitative requirement of the society for government management. In the performance evaluation process, these value orientations are embodied by management efficiency, management ability, public responsibility, and satisfaction degree of the public.

In the characteristics aspect, the implementation of agricultural county government's performance evaluation is to meet the requirements of the information and democracy trend for government management. As an important content and method of government management, the evaluation is special because the appraisal of primary tasks and the results have already push managers using a new view to think about the accomplishment of management plan or certain specific projects. The agricultural county government management includes not only the public departments' management of local public business, but also the management of internal business; not only the management of affairs, but also the management of any organization. All these facts contribute to the form of the characteristics of agricultural county government's performance evaluation: complexity, multi-levels, hard to make quantitative evaluation, multi-objects, and objectiveness.

4. The problems in China's agricultural county government's quantitative performance evaluation and the necessity of quantitative evaluation system study

Relevant theories and practices about agricultural county government's performance evaluation are still in a researching stage. Recently, as an important content of agricultural county government's performance evaluation system, although quantitative evaluation research has already made new progresses, it still serves as a bottleneck of performance evaluation. In a sense, this condition blocks the development and progress of administrative management system in China.

(1) Unclear concept

Equalize government performance evaluation with agricultural county government's performance management. Performance management is a set of complete management system. Performance evaluation is the core ring of performance management and also the important tool and method. It reflects performance management's specific operational method. The agricultural county government's performance evaluation is based on efficiency, ability, service quality, and the satisfaction degree of the public. Make evaluation and grade the performance by assessing the agricultural county government's input, output, middle achievement, and final achievement in the management process.

(2) Unclear objects of quantitative research

Different index systems are right for different agricultural county governments and their departments. An index system should guarantee a relatively smaller error in a horizontal comparison and reflect the differences of different departments in agricultural county government. For a vertical comparison among the departments of agricultural county government, the index system should also reflect the characteristics of climates and grains. Many researches adopt certain quantitative methods and index systems and draw relevant conclusions. However, they never report how these index systems are constructed, the construction method, the empirical results, and what kind of governments these index systems are right for. These researches fail to make these issues clear. Their conclusions need to further prove.

(3) The unilateral performance evaluation index

Because most agricultural county areas are undeveloped, there are no scientific performance evaluation index systems. They merely copy what is used in industrial cities, equalizing economic performance with government performance. To evaluate work performance is not based on performance and the contribution to organizational goals and missions, but whether obey rules, and whether meet leaders' intentions. The participation of the public and administrative counterparts needs to be further enhanced. Theoretical direction is poor. The quantitative performance evaluation on agricultural county government needs to be further studied. The aim should be defined clearly. The evaluation standards are too simple and the indexes are too general. The evaluation results are impractical in a sense.

(4) The lagged-behind and simple quantitative research method

Presently, the agricultural county government's performance evaluation is not popular. Relevant quantitative research methods are lagged behind heavily. For using DEA to evaluate agricultural county government and its relevant departments' performance, in 1985, a famous American scholar adopted DEA to study the influences of large city organization on local police service efficiency in America, revealing the different influences of institutional structures on performances. Twenty years later, in 2004, domestic scholars began to make similar studies. Till 2007, some scholars introduced DEA evaluation into agricultural county government's performance evaluation.

(5) Unsystematic government's comprehensive performance evaluation

The contents and goals of agricultural county government's comprehensive performance evaluation are too narrow and the designed evaluation frame is unilateral. Therefore, the performance evaluation is not objective and comprehensive. Presently, the relatively general analysis basically belongs to an effect analysis. In other words, firstly divide the index systems that reflect the government performance results into economic subsystem, political subsystem, and social subsystem. Each subsystem includes many indexes. Then define every subsystem and its main index according to different methods. Finally multiply and add the practical value of every index and relevant weight. Get the comprehensive performance value of the government during certain period. Although this effect analysis realizes the emphasis on government performance results (achievements) in new public management in a sense, it neglects the evaluation on agricultural county government's achievement efficiency and seldom analyzes the input-output efficiency. Besides, few analyses are about the analysis of coordination among agricultural county government's performance subsystems and the analysis of continuous improvement ability in the time sequence. According to systematic opinions, only when the agricultural county government performance's development degree, efficiency degree, coordination degree, and continuousness degree are integrated into the big frame of government comprehensive performance (sustainable development degree), can it reflect the government's comprehensive performance objectively and generally, showing the government's requirement for multi-values orientations.

(6) The separation between evaluation subject and research subject

At present, most researchers who focus on government performance evaluation are "academism" scholars in colleges or related with administrative management. However, the practitioners of government performance evaluation are mostly public functionaries in departments of government. Researchers seldom take part in government's performance evaluation process. They seldom make performance evaluation on agricultural county government's performance. For agricultural county government, because of limits of conditions, evaluators seldom care about theoretical research. Even if researchers make experimental performance evaluation for agricultural county government, some reasons, such as unsuccessful communication with relevant departments of agricultural county government, and weakness of fundamental statistical work, may lead to the absence or distortion of data, causing a decrease of quantitative research's quality and credibility. The separation between evaluation subject and research subject leads to a gap between theories and practices.

(7) The unilateral use of comprehensive quantitative research method

The uniqueness and complexity of agricultural county government determines that its evaluation has to be based on many methods. For the research on complex political system, if there is no coordination of relevant evaluation technologies and statistical technologies, one method is too unilateral, such as the use of DEA evaluation method. A complex political system has many input and output indexes and hard to be established. As there is a significant positive correlation between input indexes, it means the information reflected by them is highly overlapped. It not only makes the DEA mode design and the calculation process more difficult. What's more important, it is hard to find out the obvious logic relationship between performance evaluation results and indexes. Without key points, the evaluation indexes' economic meanings are unclear. Therefore, if DEA analysis combines with certain statistical models, such as factor analysis model, regression model, and time sequence model, it will help to avoid the multi-collinear issue. Identify the key influencing factors and discuss further the external reasons of government and the proportion of government technological improvement. For another instance, the implement of balanced scorecard is also unilateral. Its implementation is based on the causality analysis of indexes in different aspects and internal indexes in every aspect. The internal consistency between the logical analysis method and the analytic network process (ANP) makes the balanced scorecard and the analytic network process can be used at the same time. In the causality analysis process, using the analytic network process to determine the rational weights of indexes in different aspects can enhance the analysis function of the balanced scorecard method. Besides, we should pay more attentions to the comprehensive implementation of the balanced scorecard method, the economic value-added (EVA) method, and the activity-based costing (ABC).

5. Conclusion

Because there are many problems in the quantitative research on the agricultural county government's performance evaluation and the special significance of quantitative performance evaluation, it becomes necessary, important, and urgent to study the government's quantitative performance evaluation system. How we make an overall design for indexes of government's performance evaluation based on the quantitative evaluation's foundations, backgrounds, experiences, and value orientations, construct a set of scientific and rational quantitative evaluation method system, and make objective evaluation on government performance from an angle of government's sustainable development will become the key point of the research on the quantitative evaluation system of government performance.

Perfect the original index system for the agricultural county government further. According to the characteristics of agricultural county government, select scientific and rational indexes for the four evaluation systems and build up evaluation index systems for these departments. Increase the research samples and use BP neutral network complete the prediction for government performance. Or, adopt a more scientific method to study the prediction for small sample data. Integrate the electric government's performance evaluation into government's comprehensive performance evaluation, making the quantitative evaluation process more scientific and the evaluation results more practical.

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Study on Decision Support System of

Employee Turnover Risk Management

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Abstract

Employee turnover risk is becoming an important aspect that influences the stability and development of enterprises in the times of knowledge economy. After analyzing the factors of employee turnover risk which would threaten enterprise production and operation activities, a decision support system in this field will be proposed, and it is realized by message processing mechanism, software combination technology and system integration. Also, the corresponding management strategies were set up to manage the risk effectively in this paper. Data, information and knowledge that the system needed come from both enterprise internal application systems and external systems. The decision support system is proved to be effective in improving employee turnover risk management in enterprises. This paper will present the structure and components of the system based on Web Services, which are provided by Analytic System. Some strategies to deal with employee turnover risk will be given and this will be the last part of this paper.

Keywords: Risk Management, Human Resources Management, Decision Support System

1. Introduction

The employee turnover risk is the probability of loss that led by employee's turnover in an enterprise. In the times of knowledge economy, the significance of people in enterprises becomes more and more outstanding (Bohlander and Snell, 2004, p. 25). Business employees' quality, skill and intelligence are becoming the first essential factors of economy movements (Su and Zhao, 2005, pp.111-116). The competency among enterprises is the competency on human resources in the final analyses.

The employee turnover in enterprises is bound to lead labor cost, serious loss of intangible assets, and at the same time would weaken cohesiveness and personnel moral, it has great influence on enterprises competency power (Li and Yu, 2003, pp.35-37). In fact, the problem of employee turnover is becoming an important cause influencing the stability and development of enterprises (Sexton, McMurtrey and Smith, 2005, pp.2635-2651). It should not be ignored, and if the risk could not be managed effectively, the organization will be in a very passive position.

Enterprises must find the potential employee turnover risk factors that would threaten their production and operation activities, to set up corresponding management strategies and make scientific decisions to manage the risk effectively (Tziner, 1996, pp.113-122). Information system developed from the early Electric Data Process (EDP) into Management Information System (MIS), and now it has become Decision Support System (DSS). With the development of information technology, especially the appearance and development of Data Warehouse (DW), On-Line Analytical Process (OLAP) and Data-Mining (DM), it has set up reliable basis to construct the decision support system of employee turnover risk.

2. Analysis of Employee Turnover Risk Factors

Employee turnover risk factors mainly come from outside enterprise conditions, inside enterprise conditions and employee conditions (Jiang and Zhao, 2001, pp.85-88; Price, 1999, pp.387-395). These factors act on enterprise development and management directly, and have leading effect on employee's idea of choosing jobs and personnel ideal, see Fig. 1.

The influencing factors of employee turnover are as follows:

Enterprise outside conditions mainly includes employee supply & demand, industry and enterprise location; Enterprise inside conditions mainly includes enterprise comprehensive level, salary and incentive systems, corporate culture and employee socialization. Employee conditions mainly include personality characteristics and evaluation of enterprise, such as age, gender, education, job satisfaction, personal ideal etc.

Outside enterprise conditions are the factors related to State economy development, systems construction, policies, laws and regulations. These conditions act on enterprise development and management directly, and have leading

effective on employee idea of choosing jobs, personnel ideal (Huang, 2002, pp.78-80). At the same time, inside enterprise conditions and employee conditions act and affect on each other.

By combing work motive theory and interactive relations of all the influencing factors, analyzing the outside enterprise conditions, inside enterprise conditions and employee conditions comprehensively, a model of employee turnover influencing factors was constructed, see Fig. 2.

3. Structure of decision support system of employee turnover risk management

Decision support system of employee turnover risk is related with many technologies and application systems, i.e., data warehouse, data analysis, data-mining, data display, subscriber mutual system and system interfaces, etc. Trough exchanging with systems that includes human resource information, decision support system of employee turnover risk uses database and Knowledge Warehouse (KW) to provide the traditional inquiry and report function. It can do multi-dimensional data analysis and data-mining based on subject-oriented integrate data which were built by DW. Through all kinds of algorithms and models, decision support system can provide decision-makers analytical reports and settlement plan on employee turnover risk.

3.1 Problems on decision support system of employee turnover risk management

Employee turnover risk factors mainly come from outside enterprise conditions, inside enterprise conditions and employee conditions. Relative data, information and knowledge lies in many information systems both inside enterprise and outside enterprise. i.e., human resource management information system (HRMS), career planning system, office automation (OA), national or department information system, further more ERP, SCM and CRM systems. Thus it requires information communication between decision support system of employee turnover risk and the systems mentioned above.

Because of the development process of information technology itself, many of the enterprises internal information systems were supplied by different factories, circulating independently and using different information technology. These systems like many "solitary islands" inside the enterprise, there were no information communication and sharing between each other. Thus the construction on decision support system of employee turnover risk needs to solve two problems thereinafter.

On one hand, integrate the decision support system of employee turnover risk with other enterprise inside information systems. Data and information may communicate dynamically and automatically through the integrated system, and to make resource sharing into reality on data and functions level. On the other hand, improve the function of exchanging data into information and information into knowledge. Using advanced information technology to solve the problems on data and information collection for human resource management decision.

Decision support system of employee turnover risk needs to make use of all kinds of models and algorithms computing and simulating on test or forecast. Many of the models and algorithms are independent, based on many exploiting tools and different circumstance. It lacked a suitable mechanism to integrate and compare the models and algorithms. This situation make the decision support system of employee turnover risk have the following shortcomings:

(1) Decision makers found it hard to compare the results from each single model or algorithm.

(2) If the restraint conditions of each model and algorithm were the same as the ones transferred from database or data warehouse, it had no way to judge directly.

(3) Some universal methods in models or algorithms could not be transferred to utilizing.

(4) Intermediate results, comprehensive information or algorithm results of other models and algorithms in database or data warehouse were hindered to be shared.

3.2 Methods to solve the problems

The development of information techniques has provided feasible method for the construction on decision support system of employee turnover risk. Internet technology based on Web Services has been integrating information resources into a shared, mutual-operated, framework-unified based, flexible and dynamic expanding system (Chao and Liang, 2003. pp.5-13). Web Services mainly aims at building a universal technique level that has nothing to do with platform and language based on the present heterogeneous platforms. Information techniques based on Web Services provides good mechanism for cross-platform data exchange and share by message passing, service search and collaboration. The application on all the different platforms depends on the technique layer to connect and integrate with each other (Havenstein, 2003, p.48).

The system based on Web Services integrated various information resources, so that all the information can be shared. The development of Web Services provides new method for constructing and improving the decision support system of employee turnover risk theoretically. And it also eliminates the cost of the whole system.

In the protocol stacks of Web Services, definition of data, message, service and registry is included. And so are some specified standard technologies, such as eXtensible Markup Language (XML), Simple Object Access Protocol (SOAP), Web Services Description Language (WSDL), and Universal Description, Discovery and Integration (UDDI). XML is used to describe the data from different layers, so that data and message from different platforms and environments can be communicated. SOAP is used for exchanging messages in XML. WSDL is used to describe services universally. UDDI, working with WSDL and SOAP to manage Web Services, provides a unified architecture and interface for programming, realizing the publication and discovering services (Raghavan, 2003, pp.1080-1383).

In order to improve the performance of decision support system of employee turnover risk, Analytic System (AS) is constructed according to the theory of management based on Web Services. AS provides decision-maker optimized solutions, which are rational, effective and scientific.

3.3 Components of decision support system model of employee turnover risk management

Decision support system of employee turnover risk system, which is platform-free and improves the interoperability of heterogeneous system, is a comprehensive system realized by message processing mechanism, software combination technology and system integration. Data, information and knowledge the system needed come from enterprise internal application systems and external systems. The system model is composed of seven sub-systems. See Fig. 3.

(1) Platforms include hardware platform i.e., internet system, computer, memory system, fire wall, etc. and software platform, i.e., operation system.

(2) Database system is used to deposit enterprise internal and external information, i.e., on-job employee information, off-job employee information, employee dynamic performance information and employee supply & demand information in the same industry.

(3) Data warehouse is used to deposit risk-oriented comprehensive information.

(4) Data-mining system is used to obtain effective and scientific data, information or knowledge though various algorithms for decision making.

(5) Algorithms & models system includes algorithms & models warehouse, system and algorithms & models exploitation tools.

(6) Knowledge warehouse system includes knowledge warehouse and knowledge management system.

(7) Analytic system is directly related with DM, DW, KW and Model Exploitation Tools.

(8) Client interface is used to execute human-computer interaction function, to communicate with the above systems.

Decision support system of employee turnover risk system integrates all the internal and external enterprise information systems into the whole using information techniques. It may obtain considerable stable data, information, knowledge and many functions of information system, thus provides basis for employee turnover risk identification, evaluation and management.

3.4 The requirement of data integration

Because different enterprises are in the different phases of the information construction, they stored their data about production and operation in different formats, so do their data management systems. From simple file to complicated net database, different storage makes the resource of heterogeneous data. The existing data satisfy the current users of separate systems, but doesn't meet the need of corporation users, who want to be aware of all the data located in different format. Thus a distributed application system, built upon the heterogeneous data, is necessary (Wierse, 2001, pp.39-42).

The aim of integrating heterogeneous data is to provide unified, safe, timely information for operation system application to meet the requirements of query, data mining and decision making. Therefore, integrated data has to be of integrity and security in data accessing.

(1) *Integrated:* After the integration of separate information in different isolated operation systems, query can be uniformly executed in data warehouse which integrated various data organically and achieve associated store, without accessing each isolated system. Data are no longer stored simply and separately in each database.

(2) *Integrity:* Integrity refers to the data integrity and restriction integrity. Data integrity refers to extract data totally, while restriction integrity means the relationship between different data, which is the only character of presenting the logic of data. Restriction integrity is the premise of data publication and exchange, and can improve the processing and the efficiency.

(3) *Consistency:* Different information differs semantically, and causes all kinds of incomplete and wrong information. From name to structure, semantic conflicts make integration result redundant and the processing, publication and exchange of data interfered. Integrated data should be transformed following the data structure rules and codes (Malone, 1990, pp.348-421).

(4) *Data Access Security:* Different data resources belong to different companies and each database owns rights control. Therefore access and security management are not centralized. In order to keep the security of accessing the data source without intrusion and shield the original data access control, designing a unified user security management is necessary.

Aiming to meet the requirements of heterogeneous data integration, data warehouse technology and data extraction tools are used to integrate heterogeneous database and heterogeneous types of files, such as text and spreadsheet (Wang, 2005, pp.162-166). Based on the existing systems, independent data transforming code secondary development is executed to collect raw data, clean wrong data, integrate heterogeneous data, transform data structure and refresh data periodically.

Based on the theory of data warehouse, heterogeneous data is integrated to integrated database by exchanging access technology. See Fig. 4.

4. AS in decision support system of employee turnover risk management

Decision support system of employee turnover risk is loose-coupled. The coordination between systems, including coordination of shared resources and problem solutions, are realized by Analytic System (AS). Collaboration of shared resources, including both the coordination caused by diversity of time, space and right and the resources combination, is based on the connection of resources. Coordination of problem solution means the discussion between sub-systems for achieving one optimized solution.

4.1 AS construction

Web Services is used to encapsulate the services of database system, knowledge base, data-mining system, model base and others, with which is AS is integrated. By Web Service, various algorithms and models can be located in different environment, even in different languages and platforms.

AS UDDI, taking the result of query and calculation as services, is used to register the knowledge bases, data bases and models. By WSDL, searching the required Web services and invoking each of their public functions are automatic and new service can be easily integrated to the application (Duftler, 2002, pp.86-93).

In the AS integrated model, see Fig. 5, all the interfaces of knowledge system and models are encapsulated universally by Web Services and registered in AS UDDI register center following the mechanism of UDDI (①). Decision-maker finds out required knowledge and solution in the AS UDDI register center (②, or AS recommends solution to decision-maker, and invokes relative knowledge or model by the message mechanism of SOAP.

4.2 AS self-learning mechanism

Information for Authors, is available at a general IEEE style guide. As a part of knowledge management system, it is necessary to improve the efficiency and accuracy of solutions provided by the system, therefore, feedbacks and refinement algorithm are important during the process of application(Wang, 2005, pp.162-166). New knowledge, models and algorithms are added to the system as the upgrade. The mechanism of self- learning is the key issue of system construction.

Via the statistics, comparison and analysis of the historical results, especially the decisions, knowledge is cumulated, while algorithms and models are adjusted and optimized. Meanwhile, they are evaluated and recommended as follows:

(1) The knowledge, model or algorithm related to the solution are analyzed and compared on their effectiveness.

(2) Apply the mechanisms of award, in which the decision from AS are compared with that from the experts, including the suggestion and knowledge never used in the solution.

(3) Adjust the conditions, scopes and grade of each algorithm and model, according to the result of the cases.

5. Strategies to Deal with Employee Turnover Risk and the Conclusion

In accordance with employee turnover risk, based on the information from decision support system of employee turnover risk, corresponding management strategies should be taken in enterprises.

(1) *Strengthen human resources information management:* Through the inner and outer information, enterprise can know employees situation in time, thus can deal with cases probably happened. At the same time, the information can also bring managers more ways to make personnel employment and retention strategy.

(2) *Make use of advanced incentive ways:* By providing more career development chance, create harmony working environment, develop systematic trainings, etc., can encourage employees bring their function into full play to contribute more to the enterprise (Guo and Shi, 2001, pp.53-56).

(3) *Establish constructive corporate culture:* Based on people-oriented beliefs, setting struggle and contributing values, employees will be willing to strive in the enterprise to fulfill their targets, thus their turnover probability is lower (Liao and Jin, 2003, pp.26-27).

(4) *Other Ways:* Paying attention on personnel reserve, making laws and regulations to enhance management, innovating incentive systems, establishing learning organization, etc., are also functional strategies to deal with employee turnover risk.

The problem of employee turnover is important to enterprises existence and development. The influencing factors may come from enterprise outside, inside conditions and employee conditions. Based on analyzing the influencing factors, this article proposed a decision support system of employee turnover risk. It is a complex and comprehensive system realized by message processing mechanism, software combination technology and system integration. Data, information and knowledge that the system needed come from enterprise internal application systems and external systems. The application of Web Services and AS based on knowledge management changes the pattern of development and eliminates the expense. According to the results of decision support system, enterprises should strengthen human resources information management, make use of advanced incentive ways, and establish constructive upward corporate culture to avoid employee turnover risk. Although the system has been designed, suitable mechanisms for encouraging the contribution to the system should be further studied.

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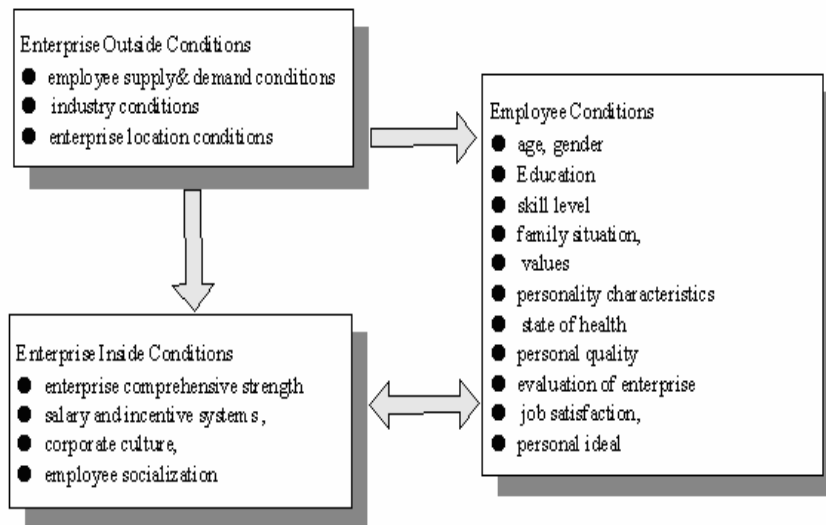Figure 1. Environmental factors of employee turnover risk
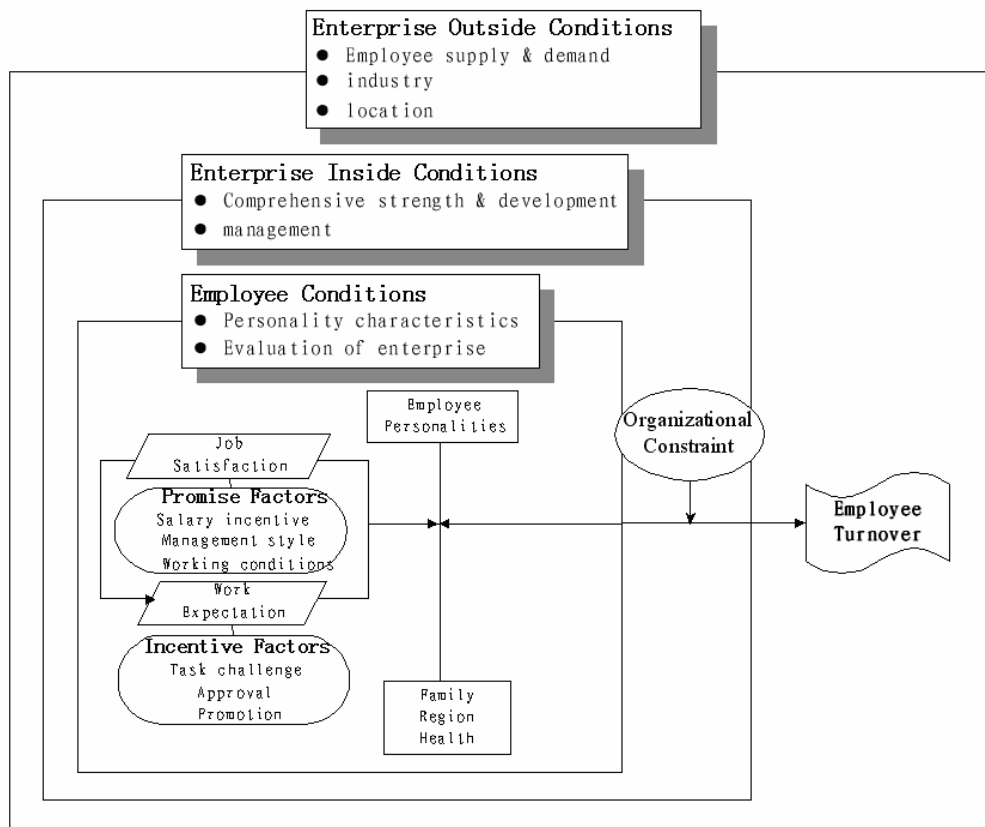
Source: Wang Xin (2006)

Figure 2. Illustration of employee turnover factors
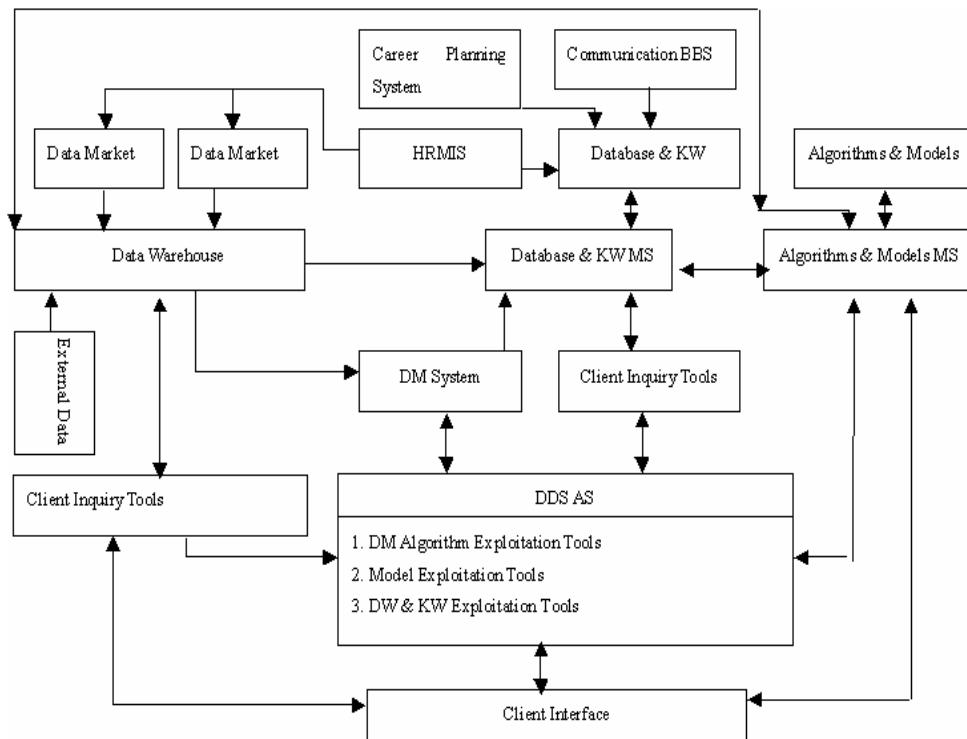
Source: Wang Xin (2006)

Figure 3. Decision support system model of employee turnover risk
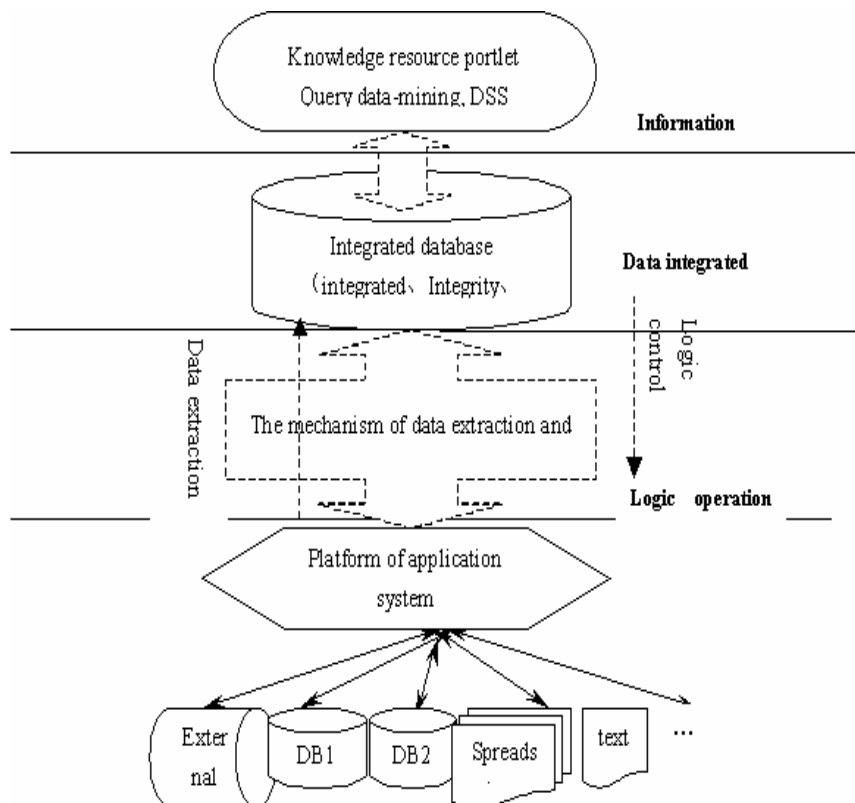
Source: Wang Xin (2006)

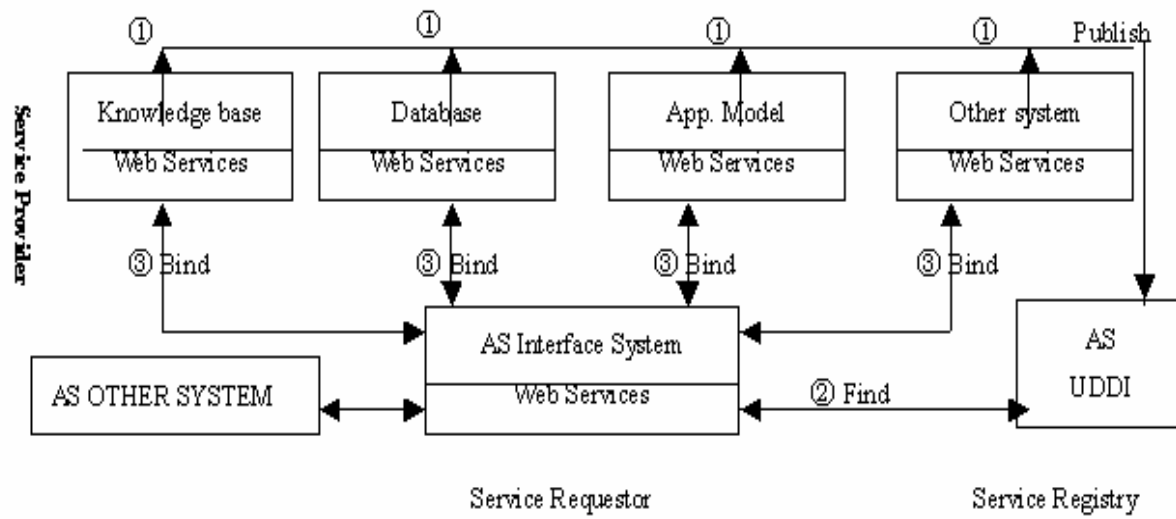Figure 4. Integration of heterogeneous data

Source: Wang Xin(2006)

Figure 5. Integrated AS model based on Web Services

Source: Wang Xin (2006)

Social Support of Elderly Caregivers

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Abstract

In this article, the author reviews the concept "social support" from western and eastern perspective, and the concept of adult child caregiver, finally analysize several cases from social support perspective.

Keywords: Caregiver burden, Elderly caregivers

A wide variety of researchers including anthropologists, physicians, psychologists, and sociologists express interests to study social support and the focus of their studies varies widely. The unit of analysis might be individual, family, community or society. Furthermore, social support has been defined in a variety of ways, but none is unified (Chappell, 1985; Chak, 1996). Yuen-Tsang (1997) summarized the concept of social support and distinguished it into five aspects: functional, structural, subjective, interactional, and the synthetic definition. Several researchers (Oxman & Hull, 1997; Chen & Silverstein, 2000) regarded social support as consisting of structural, functional, and appraisal support, although there are many ways to operationalize this construct: the structural dimension of social support is the composition of the social network and the availability of people to help the individual; the functional dimension represents the amount of instrumental, emotional, and financial backing, the appraisal dimension denotes subjective evaluation of the extent of satisfaction with the support.

Tardy (1985) identified five distinct factors in defining the concept at the operational level including: firstly, direction that means social support can be either given to other people or it can be received; secondly, disposition, that means differentiation between perceived support and received support; thirdly, description/evaluation that means a focus on the characteristics of supportive behaviors. The evaluation of social support concerns people's subjective appraisal of what they have received; fourthly, content, that means different theorists have proposed different categorizations of the content; and fifthly, network. According to Krause (2001), social support is best defined as a measure of "social embeddeness (e.g., indicators assessing the frequency of contact with others), received support (e.g., measures of the amount of tangible help actually provided by social network members), and perceived support (subjective evaluations of supportive exchanges)"(Krause,2001, p.273).

Social support is widely regarded as a valuable resource comprising tangible and intangible forms of assistance that individuals receive from family and friends. Studies of types of social support (House & Kahn, 1985; Cutrona & Russell, 1990; Wellman & Wortley, 1990) suggested one or more of the following forms: informational support, tangible assistance, emotional support, esteem support and social integration. Informational support refers to the guidance and advice received from others which help the family caregiver to understand and manage stressful situations. Tangible assistance is the instrumental behaviors and goods which directly subsidize the primary caregiver's caregiving responsibilities. The emotional support that caregivers receive refers to the behaviors of others that promote the primary caregiver's feelings of comfort, ease, and security. Some researchers (Streeter & Franklin, 1992; Bass & Noelker, 1997) distinguished between informal and formal social support. The former consists of the caregivers' relationships with family members, relatives, friends, neighbors and other associations who interact with the caregivers (Unger & Powell, 1980). Formal social support includes respite services like day-care center, day hospital, old-age center and residential services (Kane & Penrod, 1995).

Family support is composed of emotional support and instrumental support. Thompson et. al., (1993) said family support is the key point of decrease all kinds of negative outcomes. Most people acquire major portion of social support from their family, especially in the aspects of material and care of activities of daily living (Hermalin et.al., 1993). Social support is the attachments among individuals that provide a sense of being assisted and supported by others (Turner, 1981) and is regarded as one of the moderating factors which can potentially reduce caregiver burden and depression. It is essential for maintaining mental health, particularly in chronic stressors. Some studies (Horowitz, 1985; George & Gwyther, 1986; Barber, 1989) found that social support from family, friends, and institutions reduce the negative outcomes of caring. Furthermore, the specific type of support experienced in self-help or mutual help groups has been reported to provide to caregivers (Lazarus, Stafford, Cooper, Cohler, & Dysken, 1981). Others point out that social support can prevent stress, increase problem solving abilities, improve healthy actions, and increase wellbeing (Wright, Clipp, & George, 1993; Bass, Noelker, & Rechlin, 1996). Several researchers found that social support can reduce caregiver burden, but Lawton, Brody and Saperstein (1991) found

that social support has not obvious impacts on caregiver burden. Some studies (Zarit, Reever, & Bach-Peterson, 1980; George & Gwyther, 1986) showed that informal social support is related to reduction in the negative outcomes of caring, and if without informal social support, the negative outcomes of caring increase (Vitalinano, Russo, Young, Teri, & Maiuro, 1991). Other studies (Scharlach & Frezel, 1986; Whiltlach, Zarit, & Eye, 1991; Frakin & Heath, 1992) found formal social support, such as home help services, respite care, adult daily care, family counseling or psychotherapy, and caregiver support groups, can also reduce caregiver burden.

Although there are some positive aspects to caring for frail elderly people, most researchers focus on the negative outcomes and have developed *burden-coping* models to explore how to adjust burden of caregivers. Bass and Noelker (1997) developed *social support* models for caregivers. Social support has been found to be beneficial to caregivers, as those who have access to the support of others have a lower level of depressive symptoms than those without social support. Specifically, caregivers who have more frequent contact with family and friends tend to have higher psychological wellbeing (Fengler & Goodrich, 1979) and lower levels of burden (Zarit, Reeves, & Bach-Peterson, 1980) than caregivers with less frequent contact with their social support network. Research in past decades began to validate the importance of social support for individual wellbeing (Caplan, 1974) by demonstrating the role that support networks play in "buffering" individuals from the harmful effects of stress (Cohen & Syme, 1985). In order to elaborate the buffering hypotheses, Cohen and Mckay (1984) proposed a stressor-support specificity model based on the assumption that various stressors pose various coping requirements.

Studies of caregiver burden and well-being have shown that social support is important to their well-being. Evidence suggested that caring for a frail elderly is an arduous task what may cause financial difficulties, emotional strain, or physical health problem (Brody, 1981; Cantor, 1983; Zarit et al., 1986), but the burden are less severe for those having a strong social support network (Zarit, Reever, and Bach-Perterson, 1980). Informal support networks alleviate negative aspects of caregiving as emotional distress, health concerns, and economic strain (Clip & George, 1990).

The author uses two categories of social support in the current study: perceived and received social support. Tardy (1985) viewed social support as either perceived social support that the focus is on the recipient's subjective appraisal of the acts performed by others that are either helpful or intended to be helpful, or received social support that others intend to assist a particular person. Kahn and Antonucci (1980) defined perceived social support as the perception of the individual of the amount and quality of support received from his/her social network. Hermalin et al. (1993) defined received social support as objective quantification of the help and aid people receive from their social network. Antonucci (1990) demonstrated perceived social support has stronger predicting power for the effects of social support on adaptation than the measure of received social support, but Hermalin (1993) claimed the measure of received social support provides good information for assessment of policy implications. Theorists (Dunkel-Schetter & Bennett, 1990; Thoits, 1995) have argued that perceived social support is conceptually distinct from received social support. Perceived social support generally represents moderately stable cognitive appraisals that support from others will be available when needed or that connections to others are secure (Sarason et.al., 1990). In contrast to perceived social support, received social support generally refers to actual administered aid or the behavior of engaging in positive interpersonal social exchanges (Dunkel-Schetter & Bennett, 1990). Research investigating both perceived and received social support in relation to well-being has generally followed the stress-buffering model (Cohen & Wills, 1985). The stress-buffering model posits that social support benefits wellbeing by protecting individuals from the detrimental effects of stress.

Family Support

Subjects experienced a lot of difficulties in caring for elderly parents. In order to lessen the burden, they would seek social support to mitigate the difficulties and negative feelings.

My husband is a very filial person. Not only is he filial to his parents but also to my parents. He always brings food and clothes to my mother. Everyone in our community says that he is very filial. (F1)

When I am unhappy for my mother's misunderstanding, I will talk with my husband. My husband will comfort me that I should understand my aged mother, although she sometimes misunderstands me. (F2)

My daughter comes often. She will wash clothes and cook for my aged mother. (F2)

Extra Family Support

Adult child caregivers would ask for support from friends, neighbors, or other community members as a source of extra-familial support. This provided subjects with some comfort to lessen the burden. For most subjects, the family played a major role. Extra-familial support only served as a supplement to it. Subjects would turn outside the family if they could not receive available support from within it.

Sometimes, I will talk with some good friends and colleagues. My colleagues say it is not easy to care for my aged mother, although my physical conditions are not good. After talking with them, I feel better. (F3)

From her words, it is obvious that this subject did not receive enough support from family members, and so then turned to her friends and colleagues.

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Managing the American Tourist

Experience in Ireland: An Emotional Context

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Abstract

The special relationship that exists between the United States of America and the island of Ireland has its origins predominantly in emigration. Through several centuries, the interaction generated by familial ties has steadily developed into a strong and lasting bond irrevocably linking both nations. The relationship between the United States of America and Ireland has provided the impetus for a continual flow of traffic across the Atlantic. This movement of people and vessels to and fro, engaged in the varied tasks of commerce, family interaction, and leisure, created a new energy for the tourism industry sector in Ireland which continues to flourish into modern times. This paper presents new findings on the Irish tourism industry, with particular reference to the American tourist's emotional relationship. The paper seeks to outline the historical framework governing the development of the relationship between the United States and Ireland, and identifies the emotional and connectional factors that bind the two nations.

Keywords: American Tourist, Irish Tourism Industry, Motivating Factors to Travel

1. The Contribution of American Tourist to Ireland

The American tourist is of particular importance to Irish tourism as they contribute €731 million to the industry. This accounts for approximately 22% of Ireland's tourism revenue (Fáilte Ireland, 2006). According to tourism industry managers, American tourists love the Irish product, predominantly visit Ireland during the high season, and are the most likely of all tourists to Ireland to disperse into the regions. In relation to the latter finding, Fáilte Ireland (2005a) states that support of the regions is essential to the sustainability of the broader tourism product. American visitors to Ireland stay longer (approximately seven to fourteen nights), spend more money per capita (approximately 70% more), have larger overall budgets than other travellers to Ireland, stay in high-end accommodation, travel into the regions, and engage in more activities than the average tourist (Fáilte Ireland, 2005b, 2006). The American tourist represents almost a quarter of tourism spending in Ireland each year; American golfers, for example, will spend €915 on average in comparison to €720 spent by the general visitor (Tourism Ireland, 2006). Traditionally, the unique attraction of Ireland for the American tourist market has been the level and depth of contact with the Irish people in a relaxed and clean environment, characterized by an unhurried pace of life and beautiful landscape (Wright, Linehan, 2004). From past experience in the market, the absence of Americans has had a devastating impact on the Irish tourism industry. This was evident from the terrorist attacks in the US on 9/11.

2. The Nostalgic Relationship between Ireland and the United States

The relationship between the United States and Ireland developed through the centuries because of the continuous stream of emigration, immigration, and migration, particularly from Ireland to the United States. According to O'Sullivan (1997), the bonds between both nations have reached the status of a relationship so intertwined that to unravel it would involve the rewriting of the histories of both countries. O'Sullivan (1997) and Akenson (2000) believe that, when one deals with the story of the migration of the Irish to America, the only accurate way to acquire a history of the events is to pass through historiography — that is to gain an understanding of the mechanism of the historical story of migrants. This is particularly important in relation to the Irish migrants to the United States who make up the numerically largest portion of American migration.

Dowling Almeida (2004) states that the Irish have been leaving their homeland for America, without interruption, since the 1600s. Late nineteenth-century emigration, however, was the most dramatic population movement and the most significant in terms of the Irish presence in the United States. Walter (2002) states that, in each census between 1850 and 1910, over 60 per cent of all Irish-born people living outside of Ireland were recorded in the United States of America. In 1890, 3.5 million people lived in Ireland, and a further 1.9 million Irish-born lived in the United

States, more than half the total number of Irish citizens. In 1990, 22.7 million claimed Irish ancestry, which is a far higher ratio between birthplace and descent than in any other country (Walter, 2002). In terms of overall emigration to the United States in the twentieth century, the 1950s marked one of the three major surges of migration. The other two occurred in the 1920s and the 1980s. The significance of the 1950s surge is that it ensured a continuity of Irish emigration over three centuries and the perpetuation of Irish and ethnic community life in the United States (Dowling Almeida, 2004). These past bonds and connections between Ireland and the United States are important today in terms of the relationship that exists between the two countries. Lowenthal (1986) states that the past is a very important component of people's lives.

According to Lowenthal, past connections act as significant motivators and incentives to travel. Lowenthal believes that all around us lay features which, like ourselves and our thoughts, have more or less recognizable antecedents. Relics, histories, memories suffuse human experience. Each particular trace of the past ultimately perishes, but collectively they are immortal: "whether it is celebrated or rejected, attended to or ignored, the past is omnipresent" (1986: 123). Lowenthal suggests that, in present times, the past is also pervasive in its abundance of deliberate, tangible evocations. Americans, in particular, are devoted to the past and this has a particular impact on the Irish tourism product, as Americans with connections to Ireland are more inclined to choose it as a holiday destination, "We are at home in the past because it is our home — the past is where we come from", (Lowenthal, 1986: 130).

3. Research Methodology

In this research, the answers provided to the chosen research questions are from thirty-three interviewees. The thirty-three interviewees that were chosen for inclusion in this study range from senior tourism managers both in Ireland and in the United States, the current Minister for Tourism in Ireland, academics and researchers, and ten American tourists holidaying in Ireland. Reflecting Sheldon (1992), the selection of these individuals was intended to be representative but by no means inclusive. The choice of the interviewees was influenced by factors such as (i) their relatively high profile, as reflected by their career experience, seniority, organizational role, (ii) availability and willingness of American tourists at Dublin airport, and (iii) availability and co-operation. The thirty-three interviews were conducted within a fifteen-month time span. A total of twenty-two males and eleven females agreed to be interviewed — coincidentally, a ratio of two to one. By nationality, the thirty-three participants comprised: twelve males and four females from Ireland; ten males and seven females from the United States. In this research the long interview was used. According to McCracken (1988), the long interview is one of the most powerful methods in the qualitative armoury. A semi-structured research instrument was used in the current study. In this study, all interviews were transcribed verbatim immediately or shortly after each interview by the author. A model of data analysis, developed by Easterby-Smith *et al.* (1991) and based on the grounded theory method, was chosen for the analysis of data in this study. A codified procedure for analysing the data was used. The coding procedure assisted the author to think creatively when using the data and generated theories and frameworks.

4. Why American Tourists are Motivated to Travel to Ireland

According to Solomon *et al* (2002), motivation is the process that causes people to respond as they do. This research has found that one of the main aims and objectives of the Irish tourism industry is to encourage Americans to behave favourably towards Ireland as a destination. Ten professional participants in this research suggest that the American tourist's needs are satisfied by a journey to Ireland. All professional participants in this research believe that Americans are primarily motivated to travel to Ireland because of the Irish way of life; often referred to as "people, pace, and place", (see Figure 1.1). According to Fáilte Ireland (2006), 89% of all visitors to the island of Ireland come because of the beautiful scenery, 86% because of the friendly people, and 84% because of the natural, unspoilt environment. O'Connor (1993) and Wright and Linehan (2004) previously noted that the warmth and friendliness of the Irish people is consistently high on the list of attractions to visitors.

One professional participant believes that "Americans are looking for a simpler, happier way of life; the ideal that is presented by the Irish, and Tourism Ireland". Reflecting the findings of this research, Quinn states that these qualities are found in "abundance" in the towns and rural areas of Ireland (in Fáilte Ireland, 2005c). Another motivator for Americans, according to nine professional participants in this current study, is that Americans perceive Ireland to be a "safe" destination: "The fact that Ireland is perceived as a safe destination, with good food entertainment and great 'craic' is also a major motivator".

Reflecting the importance of the contribution of Irish people to the tourism industry, participants in this research suggest that major exponents of Irish cultural excellence constitute important 'quasi- ambassadors' for Irish tourism, in that, as an adjunct to their own profiles, they draw a high degree of attention to the brand. Ambassadors such as Irish musicians, playwrights, novelists, and poets, all act to draw positive attention to Ireland. One participant relays

"That whole lineage, beginning with Riverdance, contributed to drawing attention to Ireland worldwide. Ireland is considered to be trendy. Irish-Americans, in particular, identified with Ireland again and decided that they need to visit". According to another contributor, the suggestion that "The Irish themselves are great ambassadors for Ireland and should be encouraged to promote Ireland to Americans while in America" is insightful. According to one contributor, the Irish nation should be encouraged to promote Ireland and Irish culture when encountering Americans in their travels. This reflects Vincent Vanderpool Wallace, CEO of the Caribbean tourism industry, when he stated that: "tourism is the only industry in the world where every person in the country is involved" (in Grennan, 2005). Two professional respondents in this current study believe that the role of informal ambassadors is a great bonus for Ireland as they add many positive elements to the brand (see Figure 1.1).

5. Ancestry: A Key Motivator

An important finding arising from this research is that the majority of the participants cite ancestry, visiting the land of one's forefathers, finding one's Irish roots, and Irish culture, as significant motivators for Irish-American visitors (see Figure 1.1). This reflects Winston (2002) and Lynch (2005), who believe that emotional bonds and connections to the homeland are strong enticements to travel. Fifteen of the professional participants in this current study affirm that there is an opportunity to expand and develop "ancestry tourism". According to this research, there is a need to find "one's roots", and to visit the land of "one's people": "One of the biggest motivators in my opinion for Americans to travel to Ireland is to visit the homeland of their forefathers". Participants believe that connections are so very important to Americans; they can be used as a motivating tool and a tangible reason to travel to Ireland. One American tourist states that "Americans travel to Ireland to satisfy their souls". Many Americans believe that "all will be revealed", if they can just put their feet on Irish soil. According to the findings of this study, much of the market is driven by some form of connection to Ireland, with many Americans citing strong links to Ireland acting as a huge motivator for the ethnic market in America. This research reflects Lynch (2005), who reveals that the desire to travel to Ireland in order to visit the land of his ancestors was all embracing: "Ireland happened to me as a whole-body-experience, blood-borne, core experience; an echo thumping in the cardiovascular pulse of things. The case is chronic, acute, and terminal", (2005:4).

Further analysis of this research reveals that Ireland has a distinct sustainable competitive advantage, in that many Americans claim, or believe, that, through some "far out" connection, they are of Irish origin. One respondent suggests that, in some way, it is often seen as a status symbol to say that you are Irish. All managerial and professional participants in this study believe that this link could be used as a motivating tool to encourage Americans to visit Ireland; for example, according to one contributor, there is a "middle ground for the kind of Irish-American who has a vague sense of affinity to Ireland; that sort of identification needs to be made more concrete in terms of their desire to visit and travel to Ireland". "How often do you meet people in the States; who claim to be Irish?". David Boyce, Tourism Ireland, mirroring Staunton (2006), states that many Americans have a notion that they are Irish, or are "wannabe Irish". Goodfriend (2006) concurs and states that one does not have to be Irish to "feel 'Irish soul', a deep sense of culture that the Irish brought with them to American when they emigrated" (2006:3D). According to the Governor of Maryland, Martin O'Malley, responding in this research, many Americans are motivated by the fact that most of them have a personal connection through family history and ancestry, or, through extended family connections. Minister O'Donoghue concurs and states that the 'homing bird attraction' is an important element of Irish tourism that can be used to motivate potential tourists. According to the CSO (2005), one million, eight hundred and seven thousand overseas visitors travelled to Ireland to visit friends and relatives. Fáilte Ireland (2006) states that 20% of all American visitors cite visiting friends and relatives as their reason for traveling to Ireland.

American tourists, who travelled to Ireland and contributed to this research, state that they were primarily motivated to travel to Ireland because of their Irish roots, Irish culture, and Irish heritage. Interestingly, Irish stories, Irish music and song were also included in responses as motivators. One tourist muses: "As a little girl, I listened to Irish music, and I remember how the music of Ireland moved me and stayed with me forever"; "Hearing all the recent revival of Irish music and all the beautiful songs awakened my love for Ireland". Another tourist was motivated because of the Irish friends that their family made: "I have been motivated to visit Ireland since I was a child. "It is the land and the people, the fresh air, and the water. You breathe it and you touch it, and it touches you back. The smell of the turf fires, the taste of the whiskey, and a nice plate of bacon and cabbage".

According to the findings of this research, Irish-Americans who have some connection with Ireland, even a distant connection through ancestry, are already predisposed to thinking about Ireland. American tourists contributing in this research describe how they were enticed to "see" Ireland for themselves. "The history of such an ancient country is fascinating"; "There is an aura and soul in Ireland that is hard to describe which affects you very deeply". Fáilte Ireland (2005a) states that, in order to enhance the product offering in relation to culture and heritage, they intend to offer consumers a more broadly defined product that fits more closely with their understanding of culture and heritage.

6. Longing and Belonging: American Ancestry and Connections

According to McCartney, "Belonging has always been part of our Irish-ness", (1997:17). Reflecting Surlis (2003) and Bly (2006), participants in this study believe that bonds and connections with Ireland are lasting and enduring. Mirroring Harrison McBride (2002), the results from this study affirm that Irish-Americans long to walk the land of their forefathers and experience Irish traditions. According to the findings of this research, genealogy is one of the top ten leisure activities of Americans, and they invest considerable time, effort, and money on same. According to Bly (2006), Irish-Americans, particularly around St. Patrick's Day, dream of returning to Ireland. According to Minister O'Donoghue, 40 million Irish descendants in the United States are very interested in rediscovering their Irish roots. The Governor of Maryland concurs and states that he continually encounters people who feel that "special connection" with Ireland and long to visit the land of their ancestors. The Governor states that he was also compelled to travel to Ireland by a natural curiosity to find his own heritage: "Finding my roots was an important part of my identity". Another contributor states that "it is a very important link with the past to see the church where your grandparents were married, or the house where they were born. "It can fill in some blanks for folks and make them feel more complete".

The interviewed managers in this study state that Tourism Ireland (2004) found that 50% of all visitors to the island of Ireland claimed Irish ancestry and further state that heredity and ancestry have traditionally been at the top of the list of motivations spurring "non-Irish born" United States' holidaymakers to visit Ireland. This indicates a market with a strong roots and heritage preoccupation (see Figure 1.1). Participants affirm that there is an opportunity for management of the tourist product to expand on this market in order to awaken some of these latent nostalgic longings that exist among this demographic because "as Americans grow older they tend to look to their roots". Contributing in this study, professionals who aid Americans in the search for their Irish roots relay that they are constantly contacted by Americans trying to find their Irish ancestry. This research has found that the interest in genealogy amongst those Americans who actively seek ancestral information seems to be increasing. Referring to the convenience of the Internet, respondents relay that "If Americans do not come in person, then, they e-mail us through our web-site, or send letters looking for any information that we can give them". According to these professionals, if relevant information is found enabling some definite line of enquiry, these Americans will usually travel to Ireland and visit in person. This research can affirm that the process of finding one's Irish ancestors can be difficult, and much depends on the amount of information known in each individual case; for example, if the information needed is pre-1840s, then it is very difficult as very few records exist, especially for Roman Catholics. Overall, the success rate, according to these professionals, is about 80%. Obstacles predominately consist of a lack of information, or wrong names, leading to a "wild goose chase". According to Grenham (1999), when researching ancestry, what will be uncovered is dependant on the quality of surviving records for the area in question. Interestingly, contributors in this research state that Americans, in particular, believe that, when they find someone with the same surname as themselves, there must be some connection. Generally, this is not the case, and it is difficult to convince them otherwise, reflecting Grenham (1999). According to O'Donoghue (2005), the number of Irish names in the United States is endless and, referring to a book on Irish gangs in New York, O'Donoghue states that "the index of Irish names reads like a phone book, with lots of McCarthys, O'Briens and Walshes" (2005:08). Some of the American tourists participating in this research relay the difficulties that they encountered in trying to research their ancestry: "It has been difficult because there were fires in Newfoundland, and vital records for Catholics prior to 1800 are sketchy".

According to one librarian interviewed, if census, PRONI (Public Record Office of Northern Ireland), births, deaths, and marriage data were available online, ancestry could be made much more accessible. This research has found that, although there is a wealth of information already available through the Internet, the progressive filtering of the data is very time consuming; also, many of the search sites charge fees. Notwithstanding this detail, the majority of participants in this study believe that ancestry researchers are satisfied to pay a fee, if required. Participants believe that usage of the Internet will increase as more genealogical information becomes digitally available in the future. The establishment of Internet hubs linked to the main and subsidiary repositories would greatly facilitate searches. Genealogical organizations can be accessed online, but the data available is limited and payment is required.

Affirming the substantial interest by Americans in Irish ancestry, this research, reflecting Tourism Ireland (2005), has found that, when Tourism Ireland was inaugurated, a programme called 'The Scots-Irish Programme' was initiated in order to encourage Americans with ancestral links with Ireland to return to the land of their ancestors. According to two professionals, the programme was a joint venture between the Ulster Scots Agency and the University of Ulster. Since its initiation in 2004, it has received many genuine genealogical queries. Ten professional participants in this research confirm that there is an opportunity for the Irish tourism industry throughout Ireland to capitalize on genealogy as an area of interest, as it is believed that it can contribute

significantly to the tourist trade. Hearne (2004), for example, believes that genealogy is a thriving industry. The tourism managers and professionals associated with genealogy responding in this research, state however, that there have been many unsuccessful attempts to get 'roots tourism' established as a product offering, even though it is believed that it is a segment that should be exploited and developed: "I sincerely believe that there is an enormous opportunity to develop this ancestry product, as does our CEO, Jim McGuigan, but, there have been too many failed attempts to get this together in my mind". According to the findings of this research, the problems lie in Ireland. Tourism managers relay that the delivery of the product is not available there, but if the package was available it would prosper and be an added value for Irish tourism.

According to one tourism manager, there was a brochure called 'Tracing Your Ulster Roots' launched in the United States market; this brochure was produced by the Northern Ireland Tourist Board and there was a press release in Los Angeles to coincide with its launch. The results were phenomenal: "We had 1,600 phone calls into our offices in the space of about a week, all from California". Interestingly, according to the findings of this study, the tourism industry was not ready to deliver the product at the time and, therefore, it was decided to cancel the whole project. This research found that the main problems with the development of this kind of product are the costs of implementation, logistics, and the overall coordination of the operation.

7. An Opportunity for "Light-Touch Ancestry"

Although there is an existing market for in-depth genealogy (those who go to extraordinary lengths to trace ancestors), participants in this research believe that there is an opportunity for a more general approach to ancestry and that tourists would be satisfied if they could engage in what this research terms — "light-touch ancestry": "One might find a name on a gravestone, a common surname, or a local guide who might take the tourists around to the local areas of interest etc.". One interesting suggestion for the implementation of "light-touch ancestry" is to coordinate a programme that could be operated in conjunction with the regional tourism authorities. According to one participant, the Irish tourism industry is constantly searching for new ideas to develop the product range and "light-touch ancestry", if approached with creativity, has the potential to offer added value to the product range. Fáilte Ireland (2006) proposes that the provision of activities and attractions, things to do and see, are central to increasing spend per visitor, therefore, this research affirms that an opportunity to develop "light-touch ancestry" presents itself.

Tour operators responding in this research claim that they are asked many times about finding Irish lineage. American tourists, for example, would tell how "their ancestors, grandfather, great-grandfather etc. came from Co. Longford, and they would like to include a visit in their itinerary. These tourists then generally like to remain in the area for a night or two". Other respondents state that they are frequently asked about tracing Irish roots and Irish ancestors and therefore believe that there is an opportunity to bring Americans into the regions to see where their ancestors came from: "Americans absolutely love to walk the roads that their ancestors walked"; "We can tailor the trip so that they can visit whatever part of Ireland that their relations came from". Correspondingly, the dispersal of American tourists into the regions reflects Fáilte Ireland (2005a), who previously stated that there is a need for a more balanced regional spread of tourism. Roots tourism offers this opportunity.

Four professional participants in this research believe that tourism industry managers have not taken ancestry seriously enough and that there is no proper infrastructure, or policy, to implement the service properly. Two professional contributors further suggest that there has been a dearth of investment in the human capital side of the tourism industry for far too long and that there has been a poor quality of human resources investment in ancestry projects. Four professional contributors believe that, if Americans are to be encouraged to research their ancestry, there needs to be constructive advertising of the methods available to them, should they wish to progress with genealogy research. The tourism industry needs to be more cohesive and advertise the resources and facilities that are available in venues such as The National Library. Minister O'Donoghue believes that there is a future in roots tourism, and states that "the reality of genealogy is that anything is possible and workable".

The importance of Irish ancestry is further compounded by the American tourists who participated in this research. An analysis of the ten American tourists participating in this study reveals that 70% of those interviewed acknowledged that they would "love the opportunity to find their Irish roots". Some of the supporting quotations include: "I would love the opportunity to trace my father's people"; "I always wanted to find and visit my grandparent's graves and to find out if any of my relatives were still alive". Reflecting Solomon *et al* (2002), Americans are motivated and behave in a certain manner towards Ireland because of the established bonds that exist through emigration in the past.

This research has ascertained that the Irish in America in 2006 are "proud" and "privileged", and regard being Irish to be a "status symbol": "Being Irish is the bond with the country and the heritage. This bond gives one a status, a

bit of class". MacCannell (1975) affirms that such travel represents a journey to the sacred sites of our culture. Participants in this research believe that a sense of belonging to the homeland is deeply rooted in the American psyche, and stating ones "Irish-ness" is like referring to a "prestigious strong brand". Bly (2006) concurs and states that Irish-Americans nostalgically refer to Ireland as the "old country" (2006:1). Interestingly, participants in this research believe that Americans consider Ireland to be the 51st State of the United States of America and that President Bill Clinton re-kindled the spirit of those links. This research affirms that the future management of the Irish tourism industry is dependent on proactive development of the product range. The affirmed bonds that exist between Ireland and the United States as outlined in this paper presents a window of opportunity for the development and management of a new product such as "light-touch ancestry" in the future, thus adding variety, and enhancing the 'things to do and see' aspect of destination Ireland.

8. Discussion

Model 1.1, presents the broad thematic areas from the empirical data.   The model provides a diagrammatic and synoptic overview of this research. An analysis of the perceptions gathered from participants allowed for these thematic approaches to emerge, representing issues intrinsic to the practice and theory of the Irish tourism industry as identified in this current study. The model provides an overview of the current study's original contribution to the dearth of literature on the Irish tourism industry particularly in relation to the American tourist. The findings of this study suggest that the connections and bonds that exist between Ireland and the United States directly translate into tourist numbers from America and there is an opportunity to further capitalize on this. From a detailed examination of the American tourist market into Ireland, other issues emerged from the data and these are also reflected in the model.

Reflecting the historical emigration experience from the ancestral home, coupled with the anguish of separation, this research reveals that a significant motivator for Americans is the concept of ancestry: they longed to fulfil a lifelong destiny by travelling to the land of their forefathers and actualise the tales that nurtured their youth. While many Americans have some documented bond or connection with Ireland, respondents in this research believe that others, who have no identifiable link, still try to create a connection; this grouping is referred to as the "wannabe Irish". Many Americans desire a retrospective experience, gazing to Ireland for their past history. Americans yearn to belong and many return to Ireland to define and inform their lineage, explore their heritage, connect with the past and find their personal antecedent history. Genealogy has emerged in this research as one of the top ten leisure activities of Americans and many Americans travelling to Ireland inquire of their hosts how to obtain information on ancestry. Today, the tourism industry is presented with an opportunity to structure the development of 'Roots Tourism'. Participants believe that tourism organisations have not taken ancestry seriously in the past and could offer superior assistance by providing opportunities for the regional tourism authorities to become involved at a local level. Participants suggest that there would be high demand for such a product, especially what this research has termed 'light-touch' roots tourism where interested parties could visit a locality, church, or graveyard. As the tourism industry is constantly seeking new ideas, 'light-touch' roots tourism offers an opportunity for capitalisation. Ancestral tourism affords the added prospect of attracting visitors into the regions.

9. Conclusions

The predominant focus of this paper is on the ancestral relationship between the American tourist and Ireland. Clearly, participants realize that the Irish tourism industry cannot become complacent and must endeavour to satisfy this vital segment of the market. Significantly, contributors in this research place a substantial emphasis on the need for continued product development by industry managers. 'Light-touch' roots tourism is a window of opportunity for such development. The strong bonds between the United States and Ireland found in the literature were substantiated in this current research, where it has been suggested that both countries enjoy a "big brother, small brother" affiliation. Professionals and industry stakeholders in this research believe that specialist interest activities have a very important role to play in the sustainability of Irish tourism in delivering the correct product in the future.

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**The American
Tourist Experience
in Ireland**

Restricted Access
International
+ Regional

People

Traditional Image
Welcoming/Friendly
Emotional
Bonds/Family/Lineage/
Heritage/Culture
~~~~~~~~~~~~~~~~
Modern Image
Service   Delivery/Foreign
Nationals/Busy Society
Informal Ambassadors

Pace

Traditional Image
Easy/Rural/Traditions/
Cultural Events/Festivals
Leisure Pursuits/Escape
~~~~~~~~~~~~~~~~
Modern Image
Lively/Urban/Modern
Cosmopolitan Style
Music

Place

Traditional Image
Safe Destination
Emotional bonds/Religion
Landscape/Heritage   Historical
Sites ~~~~~~~~~~~~~~~~
Modern Image
Sporting Activities/golf
Luxury Hotels/Spas
City Attractions/Fun

Managerial opportunities for New Product Development
The Desires of American Tourists
Ease of Access into Ireland and Rural Areas
'Light-Touch Roots' Tourism
More Access to Historical Sites
More Things to 'Do and See'/ Religious Tours
More Pursuits for Older-Actives
More Innovative Tour Packages

Model 1.1The American Tourist Experience in Ireland

SWOT Analysis on Development of the

City Cluster in Hebei Coastal Area

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Abstract

Hebei Province wants to become a strong economy among all the coastal provinces. And this needs Hebei Province to develop its city cluster in coastal area. SWOT method used here to analyze the strengths, weaknesses, opportunities and threats of the city cluster in Hebei costal area means a lot for Hebei Province to find measures to improve its coastal economy.

Keywords: Hebei Province, Coastal area, City cluster, Analysis

The development of coastal city cluster is the foundation for the improvement of coastal economy. Also it's an important measure for Hebei Province to become the strong economy among all the coastal provinces. Hebei Province has 487-kilometer-long coast line as well as many harbors which are the foundation and power to develop the coastal city cluster. The development of city cluster in the Yangtze delta and the Zhujiang delta provide good lessons for Hebei Province. SWOT method was created by Andrews who was the professor of Harvard Business School—S for Strengths, W for Weaknesses, O for Opportunities, T for Threats. SWOT is used here to analyze the strengths, weaknesses, opportunities and threats of the city cluster in Hebei costal area to find good measures to improve its costal economy. The measures are: develop the three big cities (Qinhuangdao City, Tangshan City and Cangzhou City)as a foundation and optimize their economic structure so that their economy can get powerful; support the development of some counties and county-class cities to become the middle-scaled cites; push some well-developed towns to become the small scaled cities.

1. SWOT Analysis on Development of the City Cluster in Hebei Coastal Area

The city cluster in Hebei coastal area are concerned with Qinhuangdao City, Tangshan City and Cangzhou City as well as 6 county-class cities and 120 towns. And Qinhuangdao City, Tangshan City and Cangzhou City will be the center of this city cluster. While the county-class cities and towns will be the foundation. This city cluster covering 35317 square meters includes 3 big cities, 6 county-class cities, 19 counties and 220 towns with the population of 17,120,000 totally. (Note 1)

1.1 Strengths of the city cluster in Hebei coastal area

1.1.1 Good location

Hebei coastal city cluster is located in Bohai Wan with many excellent harbors and fishery resources. East is the city cluster Of Western liaoning Province with Jinzhou Harbor and Dalian Harbo. The harbors provide convenient access on the sea for Hebei coastal city cluster. And the development of the city cluster in Western liaoning Province is good for Hebei coastal city cluster. North is Chengde City of Hebei Province and Neimenggu Autonomous Region with wide area and abundant natural resources, human resource and tourism resources which are also the good resources for the development of Hebei costal city cluster. West is Beijing City and Tianjin City which are the most important cities in North China. The two cities are with many material resources, financial resources, science and technology resources and human resources which are the foundation stone providing talents and materials for Hebei coastal city cluster. Thereby the key for the development of Hebei coastal city cluster is the full use of the resources of Beijing City and Tianjin City. While the development of Chengde City, Baoding City, Langfang City, Hengshui City and Shijiazhuang City in Hebei Province will provide the engine for the economy of Hebei coastal city cluster.

1.1.2 Excellent Harbors

Hebei Province is a large-scaled coastal province with 487- kilometer coast line and excellent

harbors—Qinhuangdao Harbor, Caofeidian Harbor, Jingtang Harbor and Huanghua Harbor. And these harbors play a very important role in the transfer of China's coal from China's North to South as well as the transportation on the sea in China's North. Among these harbors Caofeidian Harbor is the best which can accommodate ships with 300,000 ton goods because it has very deep water.

1.1.3 Convenient transportation

Hebei Coastal City Cluster lies in the center of Bohai Sea Rim. Also it links the North and the Northeast of China. So its transportation is very convenient. And there are 7 railways including Beijing- Haerbin, Beijing—Qinhuangdao, Dalian—Qinhuangdao, Beijing—Shanghai, Beijing— Jiulong, Shuozhou—Huanghua. Also there are many highways and express ways, for example, Tangshan—Qinhuangdao Highway, Beijing—Tangshan Highway and Beijing—Shenyang Express way, Beijing—Shanghai Express way, Shijiazhuang—Huanghua Express way, Tangshan—Tianjin Express way, Tangshan—Chengde Express way. These railways, highways and express ways are linked together and make the transportation very convenient. With further development of transportation, Hebei Coastal City Cluster will arrive in Beijing and Tianjin in one hour—thereby called Within-one-hour Economic Rim.

1.1.4 Industry strength

The industrial structure of Hebei Coastal City Cluster are including steel, building material, energy, manufacturing and chemical industry. These five industries with good prospects are the cornerstone for the development strategy of Hebei Coastal City Cluster. For example the value that the steel industry makes is above 30% of total industrial added value. Also the harbors in Hebei Coastal City Cluster can house as many goods as 355,410,000 tons, for example, 338,050,000 tons in 2006. The value of these five industries is above 80% of total GDP in Hebei Coastal City Cluster. (Note 2)

The GDP of Hebei Coastal City Cluster in 2006 is RMB419, 600,000,000 which is 35.99% of Hebei Province. Among them Primary Industry makes value of RMB46,200,000,000 which is 11% of the total GDP of Hebei Coastal City Cluster and 28.75% of total value of Hebei's Primary Industry in 2006. Secondary Industry makes value of RMB226, 300,000,000 which is 54% of the total GDP of Hebei Coastal City Cluster and 37.01% of total value of Hebei's Secondary Industry in 2006. Tertiary Industry makes value of RMB147,100,000,000 which is 35% of the total GDP of Hebei Coastal City Cluster and 37.05% of total value of Hebei's Tertiary Industry in 2006. (Note 3)

1.2 Weaknesses of the city cluster in Hebei coastal area

1.2.1 Smaller city scale

The city cluster in Hebei coastal area are concerned with Qinhuangdao City ,Tangshan City and Cangzhou City as well as 6 county-class cities, 19 counties and 220 towns. And Qinhuangdao City ,Tangshan City and Cangzhou City are the center and the county-class cities are the second level while the counties and towns are the foundation for this city cluster system. These cities cover the key area in Hebei Coastal City Cluster. But their scale is very small. The county-class cities' ability to absorb population is very limited. And the urbanization rate is only 35% which is a little higher than the average level of 34% in Hebei Province. Also this urbanization rate is far behind Tianjin City, Liaoning Province and Shandong Province which share the same Bohai Wan. Tianjin's urbanization rate is 80%; Liaoning's is 46% and Shandong's is 46%. The population of Tangshan City is over 2,000,000 which is the largest city in Hebei Coastal city Cluster. The population of Qinhuangdao city is near to 800000 and Cangzhou City is over 500000 which are the larger cities there. As for the population of the six county-class cities, Renqiu City is the only one whose population is above 100000. The other five county-class cities 's population is 50000-100000. And the amount of towns in Hebei Coastal city cluster is as many as 220, but their scale is very small with average population of 6000. There is a strong relationship between the population scale and the industrial structure, government's revenue, land development as well as economic development. If the city scale is small, their economy development is influenced. And these cities will have difficulties to develop the industry and absorb the population. (Note 4)

1.2.2 The weakness of infrastructure

Beijing City and Tianjin City are housed by Hebei Province. While Sanhe County, Xianghe County and Dachang County of Langfang City in Hebei Province are housed by Beijing and Tianjin City. So the geographic location of Beijing City, Tianjin City and Hebei Province is integrated together. But their infrastructures are not integrated which quite affect the transportations network between these cities. While the transportation network in Yangtze River delta and Zhujiang delta is very successful. Because the convenient transportation links the cities and towns of all level within their region. As a result, the city cluster in Yangtze River delta and Zhujiang delta provide good

examples. But for Hebei Coastal City Cluster, the transfer of goods and population must go through Beijing City or Tianjin City which not only increase the transportation cost but also is not good to these cities themselves. The transportation network between cities in Hebei Coastal City Cluster is not convenient and can not get a direct access to each other. So the population and goods can not be freely transferred which is not good to the economy of Hebei Coastal City Cluster.

1.2.3 Development of the cities with harbor falls behind

The development of the cities with harbor falls behind. Qinhuangdao Harbor is ranked 6th concerning its ability to transfer goods but only 20th concerning the population and 18th concerning the economy. Jingtang Harbor and Caofeidian Harbor in Tangshan City can transfer as many goods as 50,000,000 tons in 2006. But both their population are not beyond 100,000. The goal of Huanghua Harbor is to improve its ability to transfer coals of 100,000,000 tons and other goods of 50,000,000 tons. But its population is only 480,000 in 2006. As a result these harbors have enough ability to transfer goods, but the city is too small to agglomerate industries. (Note 5)

1.3 Opportunities

1.3.1 Globalization

With globalization, the economy in the world becomes more and more close-related. And this provides opportunities for the development of Hebei Coastal City Cluster. Because the globalization will push all kinds of resources to flow in the world. And shipping is the most economic way to transfer goods. The transfer and move of the resources and goods in the world will be good to the development of harbors, then push the development of the cities with harbor, as a result the city cluster in Hebei Coastal Area will be well-developed.

1.3.2 Influence of Yangtze River Delta and Zhujiang Delta

The economy in Yangtze River Delta and Zhujiang Delta has been greatly improved because of the reform and opening policy. The development of the economy pushes the construction of cities with harbor. Thereby forms city cluster which provides talents and materials for the development of cities with harbor. Then the development of cities with harbor pushes the development of the city cluster. The city clusters in Yangtze River Delta and Zhujiang Delta are a good example for the development of Hebei Coastal City Cluster and will have a big effect on the construction of city cluster in Hebei Coastal Area.

1.3.3 Hebei government makes strategy on economy development

Hebei Government makes the strategy on the economy development. That is to push Hebei to become a strong economy among coastal provinces. And this strategy provides opportunities for the development of the cities with harbor in Hebei Coastal area. If Hebei wants to become a strong economy among coastal provinces, it is essential for the coastal cities to absorb industries, talents and capitals. At the same time the construction of coastal city cluster and cities with harbor provides a foundation for the agglomeration of industries, talents and capitals. In order to realize its aim, Hebei government makes many favorable measures to push the development of its coastal city cluster.

Also the central government makes very favorable policies for the coastal cities which will push the development of Hebei Coastal City Cluster.

1.4 Threats that Hebei Coastal City Cluster faces

1.4.1 The influence of the environmental policy

The central government makes many environmental policies to ask the enterprises to save energy, protect the environment and adjust their industrial structure. The policies bring much pressure to Hebei Coastal City Cluster.

1.4.2 Sharp competition between different areas

Beijing City and Tianjin City share the same Bohai Wan Rim with Hebei Coastal City Cluster. Their development will bring pressure for Hebei Coastal City Cluster. At the same time Liaoning coastal city cluster and Shandong coastal city cluster make a quick development. All of them have a sharp competition with Hebei Coastal City Cluster.

1.4.3 Their own position during development

Hebei Coastal City Cluster, Beijing City and Tianjin City are in the same economy rim. But Beijing and Tianjin are bigger. And they are the centered city with the advantage in talents, capitals and hi-tech industries. Also they play a key role in this region. The cities in Hebei coastal area is smaller. Among these cities, only the population of Tangshan City is above 2,000,000. While the population of Qinhuangdao City is not beyond 1,000,000 and Cangzhou not beyond 600,000. (Note 6) And these cities in Hebei coastal area are facing the threats to be

marginalized.

2. Suggestions on the development of Hebei Coastal City Cluster

The key for Hebei's aim to become a strong economy among all the coastal provinces is to make full use of the strengths, avoid the weaknesses, hold the opportunities and challenge the threats of Hebei Coastal area.

2.1 Proper programming and arrangements on the development of Hebei Coastal City Cluster

The key for the development of Hebei Coastal City Cluster is to make a proper program on the economic structure and find suitable position for harbors.

2.1.1 Proper plan and arrangements on the economic structure

The proper plan and arrangements should be made to develop Hebei Coastal City

Cluster. For one thing, the strength of harbors in Hebei Coastal City Cluster should be made full use of. And the industries concerning harbors should be developed. Also the harbor cities should be well developed. For another, take Qinhuangdao city, Tangshan City and Cangzhou City as the center; upgrade 6 county-class cities such Renqiu City, Qianan City and Huanghua City to the regional center; At the same time, develop 19 counties as the center of counties' economy; Take 220 towns as the foundation of this city cluster.

2.1.2 Find the development focus

Firstly focus on the on the development of three large cities---Qinhuangdao City, Tangshan City and Cangzhou City. They are as the center. And Qinhuangdao Harbor, Jingtang Harbor, Caofeidian Harbor, Huanghua Harbor will be the cornerstone; make a proper plan and suitable arrangements on their industry and infrastructure according to their position and division. Secondly focus on the on the development of 6 county class cities including Renqiu City, QiananCity and Huanghua City; Make them the medium level cities. Thirdly develop 19 counties as the center of counties' economy. Fourthly focus on the development of 50 towns.

2.1.3 High quality construction on harbor cities

Firstly is to build the harbor cities to a comprehensive international junction and strengthen their function and ties with other harbors, regions and countries. Secondly is developing the industries concerning harbors. Thirdly is to make the harbors, harbor area and harbor cities in one and depend on the harbors to develop industries.

2.1.4 Strengthen the coordination

There are 5 harbors in Hebei Coastal area—Qinhuangdao Harbor, Caofeidian Harbor, Jingtang Harbor, Tianjin Harbor and Huanghua Harbor. These harbors are belonging to different cities which have their own interests. So it's hard to make a good coordination between them. Thereby a good and proper plan and arrangements based on market should be made in order to make full use of their strength, avoid their weakness. Firstly is to make a good coordination on transportation net work, construction of infrastructure and of harbors not only between coastal cities but also between coastal cities and hinterland city. Secondly is to make coordination between provinces, especially Hebei Province, Beijing and Tianjin.

2.2 Improve infrastructure in Hebei Coastal City Cluster

2.2.1 Quicken the construction of transportation net in Hebei Coastal Area

The construction of transportation net in Hebei Coastal Area will improve the ability to transfer people and goods between cities and benefit to the development of Hebei Coastal Area. Express railways and express roads should be built to provide securities for the export and import of goods, and meet the demands of transferring in harbors.

2.2.2 Quicken the construction of modern logistics

The modern logistics in Hebei Coastal City Cluster is that Beijing City, Tianjin City, Tangshan City ,Qinhuangdao City, Cangzhou City and etc will be the center and the neighboring cities will be the branch, while the transportation net work will be the stem. And the international logistics park whose center is Beijing City ,Tianjin City, Tangshan City, Qinhuangdao City, Cangzhou City should be built.

The proper plan and arrangements should be made on the structure of Hebei Coastal City Cluster, then find the focus of development and set the suitable position of harbors. The key for the development of Hebei coastal cities is to make full use of their coastal strength, held the opportunities and challenging the threats. It also means a lot for Hebei Province since its aim is to become a strong economy among all the coastal provinces.

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Hedging Effectiveness of Hong Kong

Stock Index Futures Contracts

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Abstract

This paper investigates the hedging performance of both the HSIF and HHIF contracts using daily data for the period January 2004-June 2005. The hedged portfolios consist of market indices and unit funds. The dynamic OLS-modeled strategies and EWMA-modeled hedging strategies for both 63-day and 126-day estimation windows are compared. The results show that (1) compared to the HSIF contract, the HHIF contract is an important additional hedging instrument; (2) the EWMA model is slightly superior to the dynamic OLS model generally; (3) the cross-hedging effectiveness for actual spot portfolios to be hedged appears to be much lower than that for market indices.

Keywords: Stock index futures, Dynamic hedging, Actual spot portfolios

1. Introduction

As derivative instruments, stock index futures contracts provide people in the stock market with additional risk management opportunities. To reduce the inherent risk in holding stocks, investors can protect the value of his portfolio by selling stock index futures in the market. If the price movements of the spot and futures positions offset roughly each other, a successful hedging will be achieved. However, due to the existence of basic risk, futures could not completely eliminate the risk associated with the spot position (see Figlewski, 1984; Holmes, 1996). Therefore, it is important for market participants to have an understanding of how effective the stock index futures are in hedging. For this reason, the hedging effectiveness of stock index futures has been widely examined over the past twenty-five years.

Hedging effectiveness of stock index futures have been mainly investigated by a variety of hedging strategies in US and UK. However, there are very few studies done in the Pacific Basin region markets, especially in the Hong Kong market. Hong Kong futures market represents one of the largest markets in the Pacific Basin region. According to Choudhry (2004), the average percentage of trading volumes in numbers of shares in the Hong Kong futures market relative to the US futures market between 1990 and 2000 is 45.8% while those in Australian and Japanese futures markets are only 6.6% and 21.6%, respectively. As a result, it is worthwhile to investigate the hedging effectiveness of stock index futures in the Hong Kong market.

Since the traditional one-to-one and beta hedges could not minimize the risk associated with the spot portfolios, numerous studies use Johnson's(1960) minimum variance hedge ratio(MVHR) which measures hedging effectiveness as the reduction in variance of the hedged positions to investigate hedging performance. The MVHR, h^*, is calculated by Johnson as follows:

$$h^* = -\frac{Cov(R_s, R_f)}{Var(R_f)} \tag{1.1}$$

where R_s is the return on the spot portfolios and R_f is the return on the futures contract. These studies report the existence of considerable risk reduction of the hedged positions (see Feglewski (1984), Junkus and Lee (1985), Graham and Jennings (1987), Lindahl (1992)). However, most previous studies have been seriously challenged. Firstly, there are plenty of disagreements regarding the genuineness of such risk reduction and the procedures used for estimating the hedge ratios. Some researchers argue that previous studies concentrate on *ex post* hedging effectiveness that may exaggerate hedging effectiveness (Holmes, 1995; Butterworth & Holmes, 2000). Holmes (1995) also interprets that ex post hedging assumes that hedgers have perfect foresight for spot and futures prices and can thus estimate the optimal hedge ratio for the subsequent period. But, it is unrealistic because in real world,

hedgers do not have perfect foresight and optimal hedge ratios are time-varying (Malliaris and Urrutia, 1991). Alternatively, Malliaris and Urrutia (1991), Holmes (1995) and Butterworth & Holmes (2000) investigate ex-ante hedging effectives in US and UK market respectively. Secondly, Butterworth and Holmes (2000) claim that majority of previous studies have failed to obtain true hedging effectiveness by examining performance for actual stock portfolios that investors may hold in real world. Most using market index as portfolios to be hedged, this may make the empirical results of hedging effectiveness questionable more or less.

The main purpose of this paper is to examine and compare the hedging effectiveness of two contracts-Hang Seng Index Futures (HSIF) and Hang Seng H-shares Index Futures (HHIF) contracts for a range of spot portfolios in the Hong Kong stock market with static and dynamic strategies. The organization of this paper is as follows. Section 2 presents the data. Section 3 presents methodology. Empirical results and evaluation of hedging effectiveness of different hedging techniques are presented in Section 4. Section 5 concludes.

2. Data

Hedging performance is examined for Hang Seng index futures(HSIF) and Hang Seng H-shares index futures contracts(HHIF) traded on HKSE. The data used in the analysis covered the period of one and a half year, from 5th January 2004 to 29th June 2005 (Note 1). For purpose of comparisons, we hedge four cash market indices and two investment funds. The 4 market indices are Hang Seng Index(HSI), Hang Seng China Enterprises Index(HKHCHIE), Hang Seng 50(HKHF50I) and Hang Seng Composite Index(HKHCOMP). The two unit funds include Track Fund of Hong Kong(TFHK) and IShares MSCI China Tracker(MSCI). Unit funds are used in this study because they represent diversified portfolios which are well managed by professional investment companies. Moreover, they have similar composition to those held by individual investors and have growing trading volumes in recent years. Only two unit funds are chosen because of a lack of available funds with sufficiently long trading history. Therefore, it is of more interest to examine hedging effectiveness for these two actual spot portfolios.

Daily closing prices are used and collected for all futures contracts and spot portfolios from Datastream. This results in a time series consisting of 388 price observations for both spot and futures positions.

Table 2.1 shows descriptive statistics of the returns of all futures and spot portfolios. According to Jarque-Bera (JB) test, all 9 series show excess kurtosis, signifying fatter tails than a normal distribution. The unit roots of the series is tested by using Augmented Dickey-Fuller test (ADF). Appropriate DF critical value (Harris & Sollis, 2003) is used. Results show null hypothesis of unit roots are all significantly rejected at 1% level of significance, which means all series are stationary.

Table 2.1   Descriptive statistics (Jan 2004-Jun 2005)

	Mean	SD	Skewness	Kurtosis	JB	ADF
HSI	0.00024111	0.008986	-0.14229	1.7477	36.524**	-18.73**
HKHCHIE	-0.000256	0.017076	-0.33807	2.7194	64.976**	-14.94**
HKHF50I	0.00019983	0.0097598	-0.25094	2.5652	62.907**	-18.63**
HKHCOMP	0.00023075	0.0093885	-0.25881	2.5761	63.028**	-18.41**
TFHK	0.00026237	0.0098068	-0.15126	1.379	25.032**	-20.64**
MSCI	-3.828E-05	0.017121	-0.79241	3.6318	64.102**	-15.22**
HSIF	0.00031112	0.01015	-0.30131	1.9355	39.300**	-20.17**
HHIF	6.51E-05	0.022042	1.1429	21.574	788.07**	-16.46**

**significant at the 1% level

3. Methodology

The paper employs a log-return formulation to calculate continuously compounded returns from each cash portfolio and each futures contract as follows:

$$r_t = \ln(P_t / P_{t-1}) \qquad (2.1)$$

where: r_t denotes the weekly return on either the cash or futures position at time t;

P_t denotes the price at time t;

Ln denotes the natural logarithm.

Both *ex post* and *ex ante* hedging effectiveness of Hong Kong stock index futures contracts are examined. *Ex post* hedging strategies are implemented for the purpose of providing comparable benchmarks. We investigate the direct-

and cross-hedging performance of HSIF and HHIF contracts by using the Johnson(1960) minimum variance hedge ratio method.

A variety of approaches could be adopted to estimate the MVHR by different hedgers. Here we first employ OLS method to calculate MVHR by regressing the following equation:

$$RS_t = \alpha + \beta RF_t + \varepsilon_t \tag{2.2}$$

where : *RS* is the return on the cash portfolios;

RF is the return of the futures contracts;

ε is a residual term;

α, β are regression parameters, where β is the minimum variance hedge ratio, h^*.

To make the analysis more reasonable, we assume that the hedgers use historical information in one period to calculate the hedge ratio, and use it to estimate hedge ratio in the subsequent period. This ex ante approach of hedging effectiveness is first introduced by Holmes (1995) in UK market. Like Butterworth and Holmes (2000), we also apply a dynamic strategy to ex ante hedging approach, where hedge ratios are estimated using rolling regression procedures. Two window sizes, 63-day (3 months) rolling window and 126-day (6 month) rolling window, are used respectively. For comparison purposes, hedging effectiveness is investigated from 127-387 observations in post-sample period. Therefore, 261 *ex ante* hedge ratios for each hedged spot portfolio will be generated in line with 63-day and 126-day rolling windows. Laws and Thompson (2005) point out an argument that latest observations may have stronger effects and another counter argument that using fewer observations may introduce instability into estimates. By using different rolling windows, we could examine whether the window sizes influence the stability of hedged ratio and hedging performance also.

Moreover, like Laws and Thompson (2005), we use the exponential weighted moving average model (EWMA) for estimating dynamic hedge ratios, in which the conditional variance-covariance matrix of futures and spot portfolio returns are estimated. The EWMA covariance and variance equations (Note 2) are given by:

$$\sigma(x, y) = (1 - \lambda) \sum_{i=1}^{T} \lambda^i x_{t-i} y_{t-i} \tag{2.3}$$

$$\sigma^2(y) = (1 - \lambda) \sum_{i=1}^{T} \lambda^i y^2_{t-i} \tag{2.4}$$

where *T* is the lag horizon and $\lambda \, (0 < \lambda < 1)$ is the decay factors and also called "smoothing" parameter. The larger the value of λ is, the more weight is placed on early data and the more influence of early data on future data. Therefore, the series becomes smoother (Alexander, 1997). Since JP Morgan RiskMetrics uses an infinite EWMA with $\lambda = 0.94$ for all markets and suggests that it is the most optimal weighting for daily data, we take λ as 0.94. Both 63-day and 126-day estimation window sizes are also used here.

Once the hedge ratio is estimated, each return of hedged spot portfolio could be estimated as the following equation:

$$R_h = R_s - hR_f \tag{2.5}$$

where: R_h is the return of each hedged spot portfolio;

R_s is the return of each unhedged spot portfolio;

R_f is the return of futures contracts;

h is the hedge ratio.

Meanwhile, mean and standard deviation of returns of the unhedged and hedged portfolios will be calculated. Finally, the hedging effectiveness of minimum-variance hedge can be determined by examining the percentage of risk reduction by the hedge which is suggested by Butterworth and Holmes (2000) as following equation:

$$Risk \; reduction = \frac{\sigma_u - \sigma_h}{\sigma_u} \times 100\% \tag{7}$$

where: σ_u refers to standard deviation of returns of the unhedged positions; σ_h refers to standard deviation of returns of the hedged positions.

4. Empirical results

4.1 The OLS results

Out-of-sample summary details of the empirical results with respect to the *ex post* and *ex ante* hedging performance

of both HSIF and HHIF contracts are recorded in Table 4.1 and 4.2. Each table composes four panels of results. For each panel, there are seven spot portfolios: the first four are market indices, the middle two are unit funds and the last one is the randomly created portfolio (see Appendix for abbreviations and details).

A.   Stock market indices

To begin, we examine hedging performance where the underlying spot portfolios are broadly diversified market indices. Table 4.1 reports the results of the HSIF contracts. Overall, hedging for stock market indices show a better performance than hedging for investment funds or created portfolio in terms of risk reduction. We can see that HSIF contracts produce considerable risk reduction in both ex post and ex ante hedging. Specially, it results in 0.6693 of risk reduction on HSI which is the direct underlying market index in ex post hedging; for other cross hedged positions- HKHCHIE, HKHF50I and HKHCOMP, the level of risk reduction is reduced by 0.3017, 0.6312 and 0.6575 respectively, which are relatively lower than the level of risk reduction on HSI. We notice that the level of risk reduction of HKHCHIE is particularly low (0.3017). It shows the relatively weak covariance relationships that links HSIF contract and HKHCHIE due to the special nature of the HKHCHIE which consists of only Chinese enterprises traded on Hong Kong stock market. Unfortunately, we find that the average mean returns of all hedged market indexes are extremely low, some even negative. The results confirm findings reported by Butterworth and Holmes(2000) who indicate that in order to achieve risk reduction, the mean returns have to be sacrificed.

Panel (C) and (D) in Table 4.1 show the results when the rolling *ex ante* hedging strategies are used. Note that slightly lower levels of risk reduction could be obtained by using such *ex ante* hedging strategy compared to *ex post* hedging strategy. Moreover, with the expansion of rolling window from 63 days to 126 days, the degrees of risk reduction are, apart from one exception, close to the ex-post benchmarks. The result is expected and consistent with Holmes (1995), Butterworth and Holmes (2000). As Butterworth and Holmes(2000) point out that, ex ante hedging performance would be improved by enlarging the rolling window size used for estimating hedge ratios.

In addition, the last column in Table 4.1 shows that, with the enlarging window size from 63 days to 126 days, the standard deviations of ex ante hedge ratios tend to decrease, except HKHCHIE. These findings agree with Butterworth & Holmes (2000) who find the problem of the degree of ex ante hedge ratio instability could be alleviated when larger window sizes are employed. However, it should be noticed that the standard deviation of ex ante hedge ratio for HKHCHIE reaches 0.1811 for 126-day rolling window size, significantly higher than 0.0205, 0.0311 and 0.0275 for other three market indices-HSI, HKHF50I and HKHCOMP, respectively. The possible reason is that HSIF contract and the cross-hedged spot portfolio- HKHCHIE has weak economic relationship.

Table 4.2 reports the ex post and ex ante hedging effectiveness of the HHIF contract. To begin, we can see clearly that, for ex post hedging strategy, the HHIF contract could reduce 0.5199 of the risk associated with its underlying market index-HKHCHIE, not great as the level(0.6693) of risk reduction of HSIF contract direct hedge, but still acceptable. For the cross hedges with HSI, HKHCHIE and HKHCOMP, the level of risk reduction is reduced only by 0.3159, 0.3927 and 0.3773 respectively. More importantly, the results also show that the overall degree of both direct- and cross-hedged risk reduction of HHIF contract is weaker that that of HSIF. It is not surprising. This may be attributable to the large return variability of the HHIF contract, since it is just introduced at the end of 2003 and has relatively shorter trading history, lower trading volume and lower liquidity compared to HSIF contract. It should be also mentioned here that the mean returns on direct and cross-hedges are substantially greater than those associated with the HSIF contract. For example, the results show that by *ex post* cross hedging strategy, the level of sacrificed mean returns of HHIF for hedging HKHF50I and HKHCOMP is 0.6319 and 0.5804, lower to figures for the HSIF of 0.9167 and 0.8753 respectively. It indicates that, the hedgers, by hedging their spot positions with HHIF contracts, do not have to sacrifice substantial mean returns to pursue relatively higher risk reduction. Once again, these findings confirm Butterworth & Holmes (2000). From this point of view, the HHIF contract appears to be an important hedging instrument.

Panel(C) and (D) in Table 4.2 also report the ex ante hedging effectiveness of HHIF contract. In all cases, the mean returns on *ex ante* hedges for the HHIF contract is examined to be relatively higher than those on *ex post* hedges. Furthermore, with the enlarged rolling window from 63 days to 126 days, mean returns of hedged spot portfolios on *ex ante* hedges tend to slightly increase. Additionally, it is worthwhile noting that, the levels of risk reduction for hedged the four market indices drop from 0.2827, 0.4634, 0.3442 and 0.3372, to 0.2491, 0.4140, 0.3229 and 0.3015 respectively, when the estimation window size is enlarged from 63 days to 126 days. These figures are the opposite of conclusions reached by Holmes (1995) and Butterworth & Holmes (2000) which suggest that effectiveness of the hedge improves with the length of estimation window. Two possible reasons are: (1) the relatively lower stability of daily data may have some negative impact on the accuracy of hedging effectiveness (Laws & Thompson, 2005); (2) Great return variability of the HHIF contract may lead to these seemingly contradictory findings since HHIF is a

new contract. It may take some time for the investors to be familiar with the new contract and also for the trading volume to reach a stable and sufficient level.

Table 4.1   OLS-modeled hedging effectiveness of the HSIF contract:*(Annually)

	Average hedge ratio	mean return	S.D. of returns	Decrease in S.D.	S.D.of hedge ratios
(a) Unhedged					
HSI*		0.158459	0.114772		
HKHCHIE		0.136947	0.175754		
HKHF50I		0.165677	0.117036		
HKHCOMP		0.169182	0.113423		
TFHK		0.158875	0.127318		
MSCI		0.164574	0.201959		
(b) Ex post hedging					
HSI*	0.843221	0.007912	0.037950	0.669346	
HKHCHIE	0.979344	-0.037903	0.122733	0.301680	
HKHF50I	0.850932	0.013754	0.041827	0.631235	
HKHCOMP	0.829571	0.021072	0.038847	0.657500	
TFHK	0.859129	0.005489	0.063487	0.501350	
MSCI	0.813243	0.019380	0.172842	0.144173	
(c)Ex-ante hedging-63 day window					
HSI*	0.845724	0.005506	0.038186	0.667286	0.037808
HKHCHIE	1.082466	-0.072033	0.131563	0.251439	0.174074
HKHF50I	0.870738	0.006294	0.043380	0.617534	0.047745
HKHCOMP	0.846223	0.014523	0.040225	0.645353	0.044322
TFHK	0.874555	-0.002943	0.064294	0.495012	0.061076
MSCI	0.905401	-0.005864	0.182002	0.098817	0.212414
(d)Ex-ante hedging-126 day window					
HSI*	0.845731	0.009471	0.038242	0.666804	0.020530
HKHCHIE	1.149676	-0.085502	0.129120	0.265340	0.181147
HKHF50I	0.884155	0.006264	0.042423	0.637523	0.031102
HKHCOMP	0.858198	0.015060	0.039328	0.653266	0.027536
TFHK	0.881027	0.002062	0.063805	0.498858	0.030718
MSCI	0.956329	-0.012832	0.176801	0.124568	0.125973

represents the spot portfolio directly underlying the HSIF contract

The results in the last column in Table 4.2 show the great instability in hedge ratios of the HHIF contract. Interestingly, observe that the standard deviations of ex ante hedge ratio adversely increase with the enlarging rolling window expect for its underlying index-HKHCHIE. More importantly, the stability of *ex ante* hedge ratio of HHIF contract is much weaker than that of HSIF contract for all market indices, reflecting HHIF's inherent liquidity nature and less hedging effectiveness for Hong Kong market-based indices.

Table 4.2   OLS-modeled hedging effectiveness of the HHIF contract:*(Annually)

	Average hedge ratio	mean return	S.D. of returns	Decrease in S.D.	S.D. of hedge ratios
(a) Unhedged					
HSI		0.158459	0.114772		
HKHCHIE*		0.136947	0.175754		
HKHF50I		0.165677	0.117036		
HKHCOMP		0.169182	0.113423		
TFHK		0.158875	0.127318		
MSCI		0.164574	0.201959		
(b) Ex post hedging					
HSI	0.438371	0.065806	0.078517	0.315891	
HKHCHIE*	0.807357	-0.033693	0.084377	0.519913	
HKHF50I	0.495477	0.060955	0.068884	0.392682	
HKHCOMP	0.464733	0.070958	0.070632	0.377273	
TFHK	0.459887	0.061676	0.092181	0.275978	
MSCI	0.607978	0.036075	0.165251	0.181759	
(c)Ex-ante hedging-63 day window					
HSI	0.393723	0.099769	0.082326	0.282699	0.131340
HKHCHIE*	0.711978	0.031857	0.094313	0.463379	0.225180
HKHF50I	0.442506	0.100359	0.074387	0.344167	0.144119
HKHCOMP	0.417947	0.106103	0.075177	0.337201	0.133345
TFHK	0.409804	0.096036	0.096055	0.245550	0.142115
MSCI	0.544861	0.078204	0.167027	0.172965	0.153100
(d)Ex-ante hedging-126 day window					
HSI	0.343217	0.119763	0.086183	0.249091	0.140297
HKHCHIE*	0.624410	0.060597	0.102997	0.413970	0.222668
HKHF50I	0.386104	0.121278	0.079240	0.322943	0.152879
HKHCOMP	0.366925	0.125792	0.079227	0.301495	0.141237
TFHK	0.355816	0.120732	0.100378	0.211601	0.153078
MSCI	0.497521	0.089049	0.169368	0.161372	0.147633

*represents the spot portfolio directly underlying the HHIF contract

B. Unit trust funds

Compared to evaluation of *ex ante* hedging effectiveness of market indices, it is more realistic to study the *ex post* and *ex ante* hedging performance on actual portfolios. Table 4.1 and 4.2 report the relevant results for the HSIF and HHIF contract for the two hedged unit funds. It can be easily found that HSIF contract is superior to HHIF contract in terms of risk reduction for hedging TFHK based on both *ex post* and *ex ante* hedging strategies. For example, HSIF contract gets 0.4950 of risk reduction for *ex ante* hedged TFHK based on the 63-day rolling window, whereas HHIF contract only gets the figure of 0.2456. It is not hard to offer an explanation that TFHK is designed to track Hang Seng Index and therefore, has a similar portfolio composition to the market index. Dismally, both HHIF and HSIF contract only achieve extremely poor level of risk reduction on hedged MSCI, for example, 0.1730 and 0.0988 respectively for 63-day estimation window. The results show that weak economic relationship between the MSCI

and the two futures contracts. Nevertheless, the HHIF contract is slightly superior to the HSIF contract in terms of risk reduction since the MSCI holds a part of H-shares which are the spot portfolios directly underlying the HHIF. However, MSCI seems to be little related to the HSIF due to the nature of the unit fund. As a result, we can see that HHIF are slightly more effective for hedging the unit fund—MSCI compared to the HSIF. Thus, the HHIF contract could be regarded as an important hedging instrument.

As anticipated, with the enlarging window size, the level of risk reduction continues to improve with respect to the two hedged unit funds. However, compared to the hedging effectiveness on hedged market indices, the degrees of risk reduction for unit funds are significantly lower. It demonstrates that the levels of cross-hedging effectiveness appear to be overstated using the market indices. The actual hedging effectiveness could be only achieved for hedging true spot portfolios.

Table 4.1 and 4.2 also display the standard deviations of ex ante hedge ratio with the two investment funds. The results show that the larger the rolling window size, the more stable the ex ante hedge ratios are. The opposite is observed for the hedged TFHK with the HHIF. The standard deviation of ex ante hedge ratio increases from 0.1421 to 0.1531 with the length of the estimation window. This finding suggests the instability of hedge ratios of the HHIF. It also may be attributable to the inherently instability of the daily data. Nevertheless, notice that the standard deviation of the HSIF for MSCI for 63-day estimation window is 0.2124, higher than the figure for the HHIF of 0.1531, indicating again that the HHIF is more effective for hedging MSCI than the HSIF.

Considering the stability of *ex ante* hedge ratio, the results show that HSIF contract has great hedge ratio instability than HHIF contract. For instance, the standard deviation of *ex ante* hedge ratio based on 26-week rolling window procedure for HSIF contract reaches 0.1205 while that for HHIF is only 0.0919. Additionally, we find that the mean returns of the hedged portfolio associated with HHIF contract is higher than that associated with the HSIF contract. Overall, the results demonstrate that the hedging performance of HSIF contract is effective than the HHIF contract in risk reduction, but only slightly. Given the higher mean return and more stable hedge ratios generated from the HHIF compared to the HSIF, one can conclude that HHIF contract has a relatively higher hedging ability for "actual" portfolios in financial industry compared to HSIF contract.

4.2 The EWMA results

The out-of-sample EWMA empirical results with respect to the hedging performance of both HSIF and HHIF contracts are recorded in Table 4.3 and 4.4. The two tables have the same organization as Table 4.1 and 4.2 but only compose three panels. Because the main results are unchanged, we only briefly discuss the main results and highlight particular findings as follows.

As can be seen from Table 4.3 and 4.4, similar to the results from OLS method, overall hedging effectiveness in risk reduction for stock market indices based on EWMA model is better than hedging for "actual" spot portfolios for both HSIF and HHIF(for HSIF, HKHCHIE is the exception). Note that direct hedge of the HSIF with the 63-day estimation window results in 0.6652 of risk reduction which is greatly higher than the figure of 0.4819 for the HHIF. It indicates again that the new HHIF is not as effective as the HSIF for hedging its underlying index. Besides, cross hedging effectiveness of 126-day estimation window of HSIF for other market indices- HKHF50I and HKHCOMP is 0.6361 and 0.6517 respectively, greater than 0.3811 and 0.3445 of the HHIF. These figures suggest two features: First, the HSIF is a better hedge instrument for market indices than the HHIF; Second, cross hedge is unlikely to be as effectiveness as a direct hedge. Additionally, we notice that, like the OLS estimation, level of risk reduction of the HSIF for hedging HKHCHIE is particularly low (0.2740 with 63-day estimation window). It shows the relatively weak covariance relationships that link the HSIF contract and HKHCHIE since HKHCHIE only consists of the Chinese enterprises traded on Hong Kong stock market. When considering the risk reduction for the hedged investment funds, the results reveal that the with 63-day estimation window, HSIF could obtain 0.4966 and 0.1326 of risk reduction level for hedged TFHK and MSCI respectively while the HHIF could obtain 0.2565 and 0.1803 for same spot portfolios. According to these figures, one can conclude that the HHIF is more effective for hedging the unit fund-MSCI than the HSIF since MSCI contains some H-shares, and in turn, is more related to the HHIF. Apart from one or two exceptions, the levels of risk reduction for both HSIF and HHIF contract rise as the estimation window size is enlarged from 63 days to 126 days. Note that these findings for the HHIF are a little different from those obtained using OLS in this paper which show that with the enlarged estimation period, levels of risk reduction for some hedged portfolios with the HHIF even decrease. In general, the above findings suggest that the HSIF are more effective in risk reduction than the HHIF, especially for hedging market indices. However, compared to the HSIF, the HHIF achieves a better performance when the hedged cash portfolios is the underlying market index—HKHCHIE or true unit fund—MSCI. Thus, for portfolios related to H-shares, the HHIF is a significant additional hedging instrument.

Table 4.3   EWMA-modeled hedging effectiveness of the HSIF contract:*(Annually)

	Average hedge ratio	Average mean return	S.D.of returns	Decrease in S.D.	S.D. of hedge ratio
(a) Unhedged					
HSI*		0.158459	0.114772		
HKHCHIE		0.136947	0.175754		
HKHF50I		0.165677	0.117036		
HKHCOMP		0.169182	0.113423		
TFHK		0.158875	0.127318		
MSCI		0.164574	0.201959		
(b) hedging with 63-day estimation window					
HSI*	0.847506	-0.000049	0.038427	0.665186	0.052744
HKHCHIE	1.046793	-0.052420	0.127590	0.274041	0.152921
HKHF50I	0.864560	0.004584	0.042644	0.624026	0.056068
HKHCOMP	0.841715	0.011022	0.039553	0.651284	0.054803
TFHK	0.871799	-0.013052	0.064098	0.496551	0.077274
MSCI	0.893527	0.005014	0.175178	0.132608	0.263540
(c)Ex-ante hedging-126 day window					
HSI*	0.847074	0.000285	0.038407	0.665362	0.050798
HKHCHIE	1.052542	-0.054740	0.127397	0.275144	0.144117
HKHF50I	0.865314	0.004347	0.042579	0.636191	0.053312
HKHCOMP	0.841481	0.011807	0.039501	0.651737	0.052151
TFHK	0.871776	-0.012585	0.064046	0.496964	0.074733
MSCI	0.897485	0.002904	0.174844	0.134257	0.245200

*represents the spot portfolio directly underlying the HSIF contract

Table 4.4   EWMA-modeled hedging effectiveness of the HHIF contract:*(Annually)

	Average hedge ratio	Average mean return	S.D.of returns	Decrease in S.D.	S.D. of hedge ratio
(a) Unhedged					
HIS		0.158459	0.114772		
HKHCHIE*		0.136947	0.175754		
HKHF50I		0.165677	0.117036		
HKHCOMP		0.169182	0.113423		
TFHK		0.158875	0.127318		
MSCI		0.164574	0.201959		

(b) hedging with 63-day estimation window

HIS	0.403561	0.080415	0.081937	0.286090	0.122704
HKHCHIE*	0.731271	0.007489	0.091062	0.481880	0.205565
HKHF50I	0.449329	0.068017	0.072538	0.360465	0.131844
HKHCOMP	0.427644	0.085525	0.074514	0.343049	0.123493
TFHK	0.421438	0.057425	0.094657	0.256535	0.136668
MSCI	0.565283	0.047669	0.165545	0.180301	0.186306

(c) hedging with 126-day estimation window

HIS	0.395507	0.086621	0.081786	0.287404	0.120657
HKHCHIE*	0.716124	0.017532	0.091710	0.478194	0.195467
HKHF50I	0.440130	0.075082	0.072432	0.381120	0.128473
HKHCOMP	0.419250	0.091838	0.074345	0.344533	0.120458
TFHK	0.412703	0.073396	0.095579	0.249288	0.134743
MSCI	0.558348	0.047669	0.167070	0.172753	0.180961

*represents the spot portfolio directly underlying the HHIF contract

Another concern is about the mean returns of the hedged spot portfolios. We find that in most circumstances, the average mean returns of hedged spot portfolios with the HSIF are greatly lower than those with the HHIF. For example, with the 63-day estimation window, the HSIF remains mean return of -0.0131 for hedged TFHK, compared to figures of 0.0574 for the HHIF.

As for the stability of hedge ratios, we notice that, without exception, the hedge ratios for both HSIF and HHIF contracts show more stability with the length of the estimation window. More importantly, the standard deviations of the hedge ratios of the HHIF contract (except MSCI) are greater than those of the HSIF. Such findings are similar to those obtained from ex ante OLS model which indicate that the majority of the hedge ratios of the HSIF is more stable compared to the HHIF and also confirm again great instability in hedge ratios of the HHIF contract.

4.3 Overall comparison of results obtained from OLS and EWMA

A comparison of the hedging performance in terms of risk reduction and stability of the hedge ratios using dynamic OLS and EWMA model is shown in Table 4.5 for both the HSIF and HHIF estimates. Both 63- and 126-day estimation windows are used.

Table 4.5 shows that the overall levels of risk reduction obtained by EWMA model are higher than those obtained by ex ante OLS model. Particularly, for the HHIF estimates, the EWMA model provides better hedging performance than the OLS model in all cases. For example, the HHIF achieves superior risk reduction of 0.2861, 0.4819, 0.3605 and 0.3430 for HSI, HKHCHIE, HKHF50I and HKHCOMP respectively by EWMA model with 63-day estimation window, compared to 0.2827, 0.4634, 0.3442 and 0.3372 by dynamic OLS model. In contrast, for the HHIF contract, we find that the EWMA is superior to OLS model with 63-day estimation window (expect HSI). However, when the estimation window is enlarged to 126 days, the superiority of the EWMA disappears. In other words, the improvement of risk reduction level with the enlarged estimation window using the EWMA model is less significant than that of the dynamic OLS model. Generally, the EWMA model is slightly better than the dynamic OLS model.

As for the results of the stability of hedge ratios, interestingly, the evidence is mixed. For the HHIF contract, apart from one exception, the hedge ratios obtained by EWMA are more stable than those obtained by the OLS model. However, for the HSIF contract, we see that the standard deviations of hedge ratios estimated by the EWMA are lower than the OLS only for HKHCHIE.

Generally speaking, the EWMA model could provide better hedging performance than the dynamic OLS model in terms of risk reduction, particularly for the HHIF contract, but only slightly. This results are consistent with some previous researchers' findings, such as Brooks and Chong(2001) and Laws & Thompson(2005) who suggest that EWMA hedging strategy performs best given the criteria of risk reduction, but also in line with Tong(1996) who indicates that using more complex hedging model seems not improve the performance much.

Table 4.5   Comparison in hedging effectiveness between dynamic OLS and EWMA

	63-day estimation window				126-day estimation window			
	Risk reduction		S.D. of hedge ratio		Risk reduction		S.D. of hedge ratio	
	OLS	EWMA	*OLS*	EWMA	*OLS*	EWMA	*OLS*	EWMA
Panel(A) Using the HSIF contract								
HSI*	0.6673	0.6652	0.0378	0.0527	0.6668	0.6654	0.0205	0.0508
HKHCHIE*	0.2514	0.2740	0.1741	0.1529	0.2653	0.2751	0.1811	0.1441
HKHF50I	0.6175	0.6240	0.0477	0.0561	0.6375	0.6362	0.0311	0.0533
HKHCOMP	0.6454	0.6513	0.0443	0.0548	0.6533	0.6517	0.0275	0.0522
TFHK	0.4950	0.4966	0.0611	0.0773	0.4989	0.4970	0.0307	0.0747
MSCI	0.0988	0.1326	0.2124	0.2635	0.1246	0.1343	0.1260	0.2452
Panel (B) Using the HHIF contract								
HSI*	0.2827	0.2861	0.1313	0.1227	0.2491	0.2874	0.1403	0.1207
HKHCHIE*	0.4634	0.4819	0.2252	0.2056	0.4140	0.4782	0.2227	0.1955
HKHF50I	0.3442	0.3605	0.1441	0.1318	0.3229	0.3811	0.1529	0.1285
HKHCOMP	0.3372	0.3430	0.1333	0.1235	0.3015	0.3445	0.1412	0.1205
TFHK	0.2456	0.2565	0.1421	0.1367	0.2116	0.2493	0.1531	0.1347
MSCI	0.1730	0.1803	0.1531	0.1863	0.1614	0.1728	0.1476	0.1810

*represents two spot portfolios directly underlying HSIF and HHIF contract respectively

5. Conclusions

In this paper the hedging performance of both HSIF and HHIF contracts is investigated using daily data for the period since the first trading of the HHIF in January 2004. Several hedging models including the static and dynamic OLS model and the EWMA model are used. Among them, ex post hedging performance estimated by static OLS model is used as benchmarks and EWMA-modeled hedging strategies and the dynamic OLS-modeled strategies for both 63-day and 126-day rolling estimation windows are compared to determine which perform better. The results show that generally, the EWMA model is superior to the dynamic OLS model in terms of risk reduction, particularly for the HHIF contract. Interestingly, we find that for the HSIF contract, the superiority of the EWMA disappears as the estimation window is enlarged from 63-day to 126-day. This may suggest that the improvement of risk reduction level with the enlarged estimation window using the EWMA model is less than that of the dynamic OLS model.

More importantly, the HSIF contract is more effective than the HHIF contract in most cases, especially for hedging market indices. However, when hedging its underlying index-HKHCHIE and some actual spot portfolio, like unit fund-MSCI, the HHIF provides a better hedge than the HSIF, indicating that the HHIF is an important additional instrument, and particularly effective for hedging Chinese-enterprise stocks. The results also show that, for the HSIF, the risk reduction level and stability of the hedge ratios will improve with the length of estimation period. However, these are not the cases for the HHIF due to the inherently great instability and variability of the new contract.

Finally, the results show the magnitude of risk reduction with both futures contracts for cross hedging unit funds is significantly lower than that for market indices, suggesting the level of cross-hedging effectiveness appears to be overstated when market indices are to be hedged. It also demonstrates that actual hedging effectiveness could only be achieved by using "true" spot portfolios that does not mimic the broad market indices.

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Notes

Note 1. H-shares index futures contract was traded on 5th Jan. 2004, although it is introduced on 8 Dec. 2003.

Note 2. Note x and y refer to deviations from the means. When dealing with daily returns, a common assumption is the mean return is zero (See Harris and Shen (2002). Here we assume that the mean returns are zero.

The Changing Role of Management Accountants; Evidence

From the Implementation of ERP Systems in Large Organisations

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Abstract

Enterprise Resource Planning (ERP) Systems are among the most topical subjects in the current business environment. Organisations implement these systems to become more efficient as well as integrate and modernise the whole business. This study examines the impact of ERP systems on the changing role of the management accountant. The main objective of this research is to investigate the role of ERP in an organisation and examine the impact that ERP has on the role of the management accountant as it evolves from a traditional role to a more dynamic involvement in the business.

Keywords: Enterprise resource planning systems, Organisations, Change management, Management accountant

1. Introduction

It is clear in today's competitive business environment that advances in technology are having a significant effect on how business is operated. Businesses are benefiting from the automation of many processes. The emergence of ERP systems offer businesses a set of integrated application modules which span most business functions (Scapens and Jazayeri, 2003).

The objective of this study was to assess the effect of ERP systems on the management accountant in a number of departments in a particular organization (Company X). The study reviews the current relevant management accounting and ERP literature. A number of semi-structured interviews were also conducted with five management accountants each working in a different department in Company X.

Company X Profile: The organisation is a multinational subsidiary with a large workforce and a significant role for accountants. Company X has invested heavily in Information Systems.

Interviewees - average of five years experience with Company X

(1) Senior Budget Analyst

(2) Senior Financial Analyst

(3) Senior Manufacturing Analyst

(4) Budget Analyst

(5) Accounting Analyst

2. ERP Systems and the effect of ERP on the Management Accountant

ERP is a broad term for any software application that integrates all business processes and data into a single system (Waxer, 2006). ERP systems can be described as integrated software packages that control all personnel, material, monetary and information flows of a company. They are composed of several modules, such as human resources, sales, finance and production which provide cross-organization integration of data through embedded business processes. As these ERP systems are integrated, all data are available to all personnel throughout the organisation at any time. These software packages can be customised to cater for the specific needs of an organisation (Esteves and Pastor, 2001; Granlund and Malmi, 2002).

ERP systems have become the system of choice for the majority of companies. These systems have changed the way accounting information is processed, evaluated and reported throughout the business. ERP systems are comprehensive systems as they operate throughout the entire company maintaining large amounts of data. They are also modular systems which are based on a client/server technology.   Data are stored in a single database, which

eliminates the need to update data in several different subsystems (Davenport, 1998; Rosemann, 1999). ERP can help companies to arrange data flows and provides management with direct access to a wealth of real-time operating information. This can help companies to achieve productivity gains and time savings. By providing universal, real-time access to operating and financial data, the systems allow companies to streamline their management structures, creating flatter, more flexible, and more democratic organisations (Davenport, 1998; Ross, 2000; Jackling and Spraakman, 2006). The ability of ERP systems to simplify business processing and provide time savings for the company while simultaneously improving customer service are among the main reasons for the success of these systems.

The Institute of Certified Management Accountants (ICMA, Australia) describes the management accountant as someone who applies his or her professional knowledge and skill in the preparation and presentation of financial and other decision oriented information in such a way as to assist management in the formulation of policies and in the planning and control of the operation. The changes which are affecting the core role of the management accountant are in large part due to the popularity of ERP systems such as SAP and Baan, particularly in large companies (Foote, 2006; Jackling and Spraakman, 2006; Bae et al. 2004; Booth et al. 2000; Burns et al., 1999; Davenport 1998).

In this new environment the management accountant must acquire a broad knowledge of the business, and add value to the organisation by bringing financial expertise to the management process and participating as team players. The management accountant must now move into the spotlight and become an integral part of the management team by using a broader range of skills, utilising both financial and non-financial indicators; taking decision-making roles in cross functional teams; and integrating operational and strategic control. The management accountant must broaden the nature of their role and become a strategic manager (Collins, 2000; Murphy, 2004; Parker, 2002; Pierce, 2001).

In a survey conducted by Doran and Walsh (2004) on the effects of ERP implementation on accounting techniques and practices in Ireland, 73% of respondents believed that the implementation of ERP systems had an impact on accounting techniques and practices within their organisations. The survey also concluded that more than 75% of respondents believed that the implementation of ERP systems had an effect on the role of the management accountant (p.11-12). This was reflected in Company X where a senior manufacturing analyst stated;

"Our core activities now involve monthly close and pre-close reporting. During this time we are looking at the overall figures but during the month we are looking at strategic ways to cut back costs. We are now meeting with and partnering with operations on a regular basis rather than giving them month end results. As a result we are getting to know the business better and understand their processes. We have also seen a change in the way that operations work. In the past they have wanted to spend as much as possible but they now have factory targets and have become more responsible in their spending. We are both working together."

3. Findings

Previously Company X operated on a less integrated system which involved a number of inter-related subsystems developed internally. The company now uses ERP applications to manage and control many of its core business processes including production and materials management, sales and distribution, and a variety of financial and accounting functions. Under ERP the flow of information from one area to another is seamless. Interviewees commented;

"Suppliers can see through ERP when they needs parts, materials etc. Data on all goods in/out are accessible via the ERP system so the whole transaction from start to finish is completed via ERP". (Senior Accounting Analyst)

"Our ERP system is understandably complex considering there are thousands of suppliers worldwide both direct and indirect. The traditional ERP system was essentially a manual process. It involved a number of different systems where each process linked with a different system which achieved the same results…eventually". (Budget Analyst)

Interviewees estimated that management accountants were spending up to 30% of their time using ERP.

"ERP has integrated the whole business. It does not just look at finance/purchasing. The whole business is operating on one tool. Everything is done online. We can see where a payment is, how long it will take and where the payment is at a certain time. Our finance department is heavily reliant on the ERP system". (Senior Manufacturing Analyst)

New techniques have integrated new roles and responsibilities into the management accountant role. Management accountants have had to move into the spotlight and become recognised as agents of change in the organisation.

"The days of the management accountant being a number-cruncher is over……The accountant now looks at the way we do business and looks for process/productivity improvements. In the past we may have spent 50% of our time number-crunching but now with the help of ERP we can do the same quality of work in 25% of the time. This time

saving allows us to spend more time on value-added projects." (Budget Analyst)

4. Benefits of ERP

The main benefits of using ERP systems identified could be summarised as follows.

4.1 Improved Efficiency

The introduction of ERP has seen the reduction in the amount of communication between operation partners and finance personnel. This is important to both parties as most queries can now be answered with the use of ERP. This allows time for staff to work on more beneficial/value-add tasks.

"Meetings with operation partners have decreased with the introduction of ERP. Meetings now involve initiatives to cut back spending. We are now partnering with operations rather than dealing with their queries and giving them month-end figures. We have learned to understand their processes." (Senior Manufacturing Analyst)

4.2 Real Time Advantage

The facility that ERP offers for "Real-Time" processing is crucial at month end considering the tight time lines available.

"At month end ERP is essential as you are working with time lines and within tight deadlines." (Budget Analyst)

"We can see the use of the real-time advantage when we are booking accruals. We cannot release an accrual until the invoice hits the spending report. Our ERP system enables us to see exactly when the invoice is going to hit the spending report." (Senior Budget Analyst)

4.3 World-wide Integrated System

The fact that ERP is a world-wide system allows both budget owners and the finance function to see any world-wide transaction at any time. Therefore the information on purchase orders, invoices and payments is available perpetually.

"The integrated corporate wide system is crucial in the day to day running of the business. It is important because we work in sync. With Malaysia. As a result we could not survive in the current environment with the current structure if we were relying on Excel calculations, etc. We simply couldn't function." (Senior Financial Analyst)

Scapens and Jazayeri (2003) reinforce this statement by claiming that one of the major attractions of ERP systems is that they are 'enterprise-wide' and consequently offer corporate management the opportunity of managing their business through a single integrated information system.

4.4 Speed / Time Saving

All interviewees outlined the importance of the speed and time saving element that ERP brings to the organisation.

"Our ERP system allows us to be quicker. All the information is now at our finger-tips. Before we were chasing numbers but ERP allows us to look at the information we want within one user-friendly report." (Senior Manufacturing Analyst)

"The time element means we do not spend our time calculating figures. The information is now at hand so we interpret the information and work with it." (Budget Analyst)

4.5 Functionality

Functionality is possibly the most appealing benefit for the finance users of the application. ERP allows management accountants to book journals, reverse journals, run reports and review in multiple currencies. Conducting month close using the traditional system was a slow and prolonged process. Each aspect of month close involved a different system and the traditional processes ensured that all elements could not be executed and amended simultaneously.

"The added functionality that ERP allows us is an advantage. We can view documents, book and reverse journals, generate reports and review currencies in just one application." (Senior Financial Analyst)

5. Limitations

5.1 Customisation

One of the main drawbacks identified with the current ERP system implementation was the amount of customization that was applied. Most ERP packages are bought "off the shelf" and implemented into a business. The business is then shaped around the ERP application. This was not the case in Company X.

"We have a major problem. We have not bought our ERP system off the shelf. We have bought and customised to such an extent that our ERP vendor will not support us. As a result the experts in our vendor will not support us."

(Accounting Analyst)

"We have tailored the ERP application towards our business. It hasn't worked. For an ERP system to be successful you must tailor your business to the needs of the ERP system, not tailor your ERP system around the needs of your business." (Senior Budget Analyst)

"The tailor made ERP application, made towards the business has not worked. All the initial customisation we made is currently being taken out." (Senior Financial Analyst)

The experience of Company X reflects prior experience in the literature. Agyemang Dual et al. (2006) report difficulties including enormous cost overruns, inadequate experts and customisation problems contributing to a high failure rate in implementing ERP systems. Koch (2002) argues that the customisation of the core ERP software is very costly and should be avoided if at all possible.

5.2 Utilising the Full Capability of ERP?

A recent PMP (Project Management Professional) survey found that just 5% of those polled showed that they were using ERP to its full extent (Note 1) the survey also found that most companies were not getting ERP systems to perform as expected. A number of personnel acknowledged that Company X had not utilised its system to its full capability.

"As a whole the ERP system was an extensive system to implement. It is virtually impossible to get the whole understanding and the full capability out of ERP." (Senior Financial Analyst)

"You are never going to get the best use of ERP as it is so vast. It is difficult to get the full capability due to world-wide issues, legal issues and fraud issues. Although it would be beneficial to know how other departments utilise ERP, it is still difficult due to access problems, fraud problems and segregation of duties." (Senior Budget Analyst)

5.3 Manipulation of Information

Despite the user-friendliness and flexibility of ERP it cannot provide a completed set of final accounts from the system.

"Once a number of reports are run the data must be exported to Excel and the information must be manipulated into the different categories for both the income statement and the balance sheet. A global template is used where the data is inputted but the ERP system does not provide you with a completed set of accounts." (Accounting Analyst)

Despite these limitations it was noted that all interviewees believed that the advantages of ERP systems outweighed its limitations

6. Change in the Role of the Management Accountant

The suggestions in the literature that the role of the management accountant has changed and that one of the main reasons is the implementation of ERP systems is supported by the interviewees. In particular interviewees emphasised a shift from processing information to analysis.

"The role is certainly different with ERP. We now have more time as ERP is so efficient for us. We spend more time analysing the information now rather than just getting the bottom final figures." (Budget Analyst)

"As part of our expanding scope, our responsibilities have now changed. We are no longer allowed to get away with generating month end results. We now have to look into operations and influence them. Our communication with operations helps and we have to be engaged with them on a constant basis." (Senior Budget Accountant)

"If you implement a whole new ERP system, it can fundamentally change your job. With the help of ERP there is less focus on generating information. The emphasis is now to analyse the information and use this information to make decisions for the business." (Senior Financial Analyst)

"There is now more time to analyse the information in our ERP system. Before, it could have taken a week to complete close but with the new systems now in place the information is available straight away and it allows us to complete our core activities quickly. We can now spend better time on the higher level activities such as variance analysis, cost savings and productivity improvements. Close must still be completed, ERP just makes it easier." (Senior Manufacturing Analyst)

This gives the management accountant the opportunity to influence the business as there is the opportunity to identify the main drivers of spending. As a result the accountant can attempt to influence the business and delve deeper into the main drivers of spending. However the expectation of customers for information within the organisation may not have shifted as quickly. Core accounting responsibilities still remain.

"Although we link in with operations on a more regular basis, ERP has not changed the main responsibilities of an accounting analyst. ERP has made it quicker and more efficient but it has not changed the core responsibilities. There is more scope to get involved now but the ultimate responsibility is the financial numbers." (Accounting Analyst)

"Although ERP does help during month close, our activities have not changed. Our main aim is still to provide the correct financials at month end. ERP is beneficial to us in this respect but our responsibilities remain the same." (Senior Budget Analyst)

This is in line with similar literature where research shows that ERP systems have only a limited impact on management accounting practices (Fahy and Lynch, 1999; Granlund and Malmi, 2002; Scapens and Jazayeri, 2003). However there are conflicting views as some literature state that the adoption of an ERP system can bring around a redefinition in the tasks and responsibilities of the management accountant (Brazil and Li, 2005; Carruth, 2004; Gabriels, 2002). It is clear that ERP is influencing the management accountant and is a valuable tool which assists the management accountant in fulfilling their core activities. However the core responsibilities remain and there is still a high priority to provide the financials on a monthly basis.

7. Has the Implementation of ERP systems made it easier for non-accountants to take an accounting role?

A question that arises is whether ERP systems can help to make management accountants redundant? It is well publicised that although ERP systems are highly complex systems, personnel from varied backgrounds can be trained on the main functions of ERP.

"The system is set up in such a way that you don't have to be an accountant to run a report. The theory behind it is that it gives accountants more time as operations can run reports themselves." (Senior Financial Analyst)

"Non-finance personnel can come in and perform accounting activities. People from operations have rotated into finance and have used ERP and have booked journals. You do not have to be qualified to do this. Management accounting involves more with the business than dealing with the figures. The figures are there to support decisions and help to make better decisions. The days of the number cruncher are over; you are now part of a team whose aim is to improve business productivity." (Senior Budget Analyst)

These systems are easy to use and easy to understand and this facilitates running reports or booking journals. However the role of the management accountant is not just as "book-keeper". Interviewees felt that the management accountant has enough training and background knowledge to make important business decisions, plan strategies and analyse the market.

"Management accountants are fully trained and have a high level of understanding. Operations understand the specific accounts at month end. Management accountants understand how things fit into the overall picture i.e. the Profit and Loss Account and the Balance Sheet. Operations are only looking at the cost centre level but don't have the overall picture. Management accountants are still the experts." (Budget Analyst)

"Yes this is possible once the correct training is provided. The system is there to enable you to conduct the core activities such as reporting and journal bookings. However you do need accounting knowledge to understand the accounting terminology. The correct training can help but you need to understand accounting." (Accounting Analyst)

8. Conclusion

In conclusion the findings suggest that the ERP system has had a positive effect on the role of the management accountant, however the rise of these ERP systems has not changed the ultimate responsibility of accountants which is the end of month figures. The findings suggest found that ERP will not be responsible for the redundancy of management accountants. In the view of interviewees who were predominantly accountants, management accountants are still essential to the organisation. Views of non-accounting partners in operations are not considered in this paper.

The interviewees viewed ERP as vital for the future of their businesses. They recognise its importance to such an extent that it was currently transforming all of its business processes to accommodate ERP in the business. What is perhaps most interesting is the specific type of ERP system being implemented.

There were also a number of limitations of the ERP systems currently used. These include not getting the full capability of the ERP system and the manipulation of information that is needed to generate a final set of accounts. One of the most interesting findings highlighted in the study relates to the problems that can arise where an ERP system becomes too customised towards a company's needs. This is partly due to the fact that an ERP vendor may not support an over-customised system.

It is well documented that there has been a shift in the role of the management accountant. ERP is one of the major contributors to the change in the role of the management accountant. Accounting personnel feel that ERP allows them to expand their roles and instead of producing figures allows time for further analysis and value adding activities in areas such as cost control.

An interesting finding in this study is in relation to the idea of non-management accountants becoming accountants. Prior to the introduction of ERP systems accounting was exclusively completed by personnel in the finance area. The introduction of ERP systems has allowed tasks such as reporting and journal bookings to be completed by non management accountants. But despite this, core accounting activities related to finalising accountants are still completed by the finance personnel.

From these findings the authors would argue that ERP is having a positive effect on management accountants. Although there are negatives the overall view is that the positives of ERP far outweigh the negatives.

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Notes

Note1.http://www.logisticsit.com/absolutenm/templates/articlemanufacturing.aspx?articleid=2092&zoneid=2

A Discussion about Solutions to the

Employment Problem of China

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Abstract

Employment is one of the bread-and –butter issues requiring urgent attention and careful handling. With the accelerating of the urbanization, a large number of surplus labors have appeared in rural areas of China. At the same time, in the course of the deepening reform of state-owned enterprises,   there are more and more laid-off workers, so the problem of unemployment sticks out. In this paper, the authors first analyze the industrial and the employment structures of China, and then propose a facile solution to the problem of employment.

Keywords: Employment, Industrial Structure, Employment Structure, The tertiary industry

1. Introduction

Since the 1990s, with the deepening of the reform of state-owned enterprises, the unemployment has grown substantially in cities and towns. According to the State Statistical Bureau of China, in 2005, the urban registered unemployment rate rose from 2.3 percent in 1991 to 4.2 percent, the urban registered unemployed grew from 3.522 billion in 1991 to 8.39 billion (see Figure 1). And at the same time, with the development of production and the improvement of productivity, more surplus laborers appear in rural areas. According to the research of Wu (2005), there are about 490 million laborers in rural areas, of which 180 million had moved to non-agricultural industries, 310 million labors remain in the agricultural industry. But it is usually believed that, 180 million laborers are enough to work in the agricultural industry, so, there are still 130 million surplus laborers in rural areas. Because of the pressures of the transfer of rural work force, the re-employment of laid-off workers in urban areas and the new growing employees, it is unprecedentedly difficult to tackle the problem of employment. Because of the rigidity of the supply of the labor force, the key to resolving the problem of employment lies in expanding the demand for work force. Li (2005) maintains that, the factors affecting the elasticity of employment are complicated. In addition to the laws governing economic development, the government's economic policy and the industrial structure are also factors affecting the elasticity of employment. In this paper, the authors first analyze the industrial and employment structures of China, then work out specific measures to solve the problem of employment.

2. The analysis of industrial and employment structures of China

British economist William Petty (1691) finds out that the profit of manufacturing industry is far more than that of agriculture, and the profit of commercial industry is far more than that of manufacturing industry. With the economic development, the labor force will move to manufacturing industry from agriculture gradually, and then move to commercial industry from manufacturing industry. The industrial and employment of China will be analyzed below.

2.1 The industrial structure of China

The industrial structure of China has been steadily optimized over the past years since the reform and opening up policy in 1978. Related data is presented in Figure 2. The proportion of the primary industry in GDP dropped from 27.9% in 1978 to 11.7% in 2006, a decrease of 16.2 percentage points; that of the secondary industry grew up by 15.2 percentage points between 1978 and 2006, with an average annual growth of 0.54 percent; that of the tertiary industry had a increase of 15.2 percentage points, and which peaked at 41.5% in 2002. But, as compared with the world, the industrial structure of China needs a further optimization. Table 1 shows the difference of the industrial structures between China and other countries in the world. The proportion of the primary industry in the GDP of China was 12.6 percent in 2005, which was higher 9.1 percent than the world's average level, higher 11 percent than

that of the developed countries, higher 0.9 percent than that of the developing countries. So, it is clear that the percentage of the primary industry in GDP of China is rather high. In striking contrast to the primary industry's proportion far higher than the world, that of the tertiary industry is far lower than that of the world. In 2005, the tertiary industry accounted for 38.2% of the GDP in China, with 30.3 percentage points lower than that of the world's average in 2003, with 12.4 percentage points lower than the developing countries' average in 2003, and with 32.3 percentage points lower than the developed countries' average. By contrast with the world, it is evident that the tertiary industry of China is urgent to be improved.

2.2 The employment structure of China

Along with the readjustment of the industrial structure, the employment structure of China has also been optimized gradually as shown in Figure 3. In 2006, employees in the primary, secondary, tertiary industries accounted for 42.6 percent, 25.2 percent and 32.2 percent, respectively. Compared with 1978, the employment proportion of the primary industry dropped by 27.9 percentage points, that of the secondary industry rose by 7.9 percentage points, and that of the tertiary industry rose by 13 percentage points. Compared with the world, the employment proportion of the primary industry is still rather high, on the contrary, that of the tertiary industry is too low (see Table 2).

Table 2 shows that in 2005 the employment percentage of the primary of China was 44.8%, which was 40 percentage points higher than the average of the developed countries listed in the table, 7.8 percentage points higher than that of Philippines, 44.5 percentage points higher than that of Singapore, even 23.8 percentage points higher than that of Brazil in the same period. It is evident that the employment structure of China still should be improved.

2.3 The comparison of employment elasticity of the three industries

Employment elasticity refers to the corresponding growth rate of employment when the economy increases one percentage point. Here, we calculate the employment elasticity of the primary, secondary, and tertiary industries with the formula of (i), (ii), and (iii) respectively as below

$$E_1 = GY_1/GL_1 \qquad\qquad\qquad (i)$$

$$E_2 = GY_2/GL_2 \qquad\qquad\qquad (ii)$$

$$E_3 = GY_3/GL_3 \qquad\qquad\qquad (iii)$$

Where E_1, E_2, and E_3 represent the coefficient of the employment elasticity of the primary, secondary, and tertiary industry respectively; GY_1, GY_2, and GY_3 represent the economic growth rate of the three industries respectively; GL_1, GL_2, and GL_3 represent the growth rate of the employment of the three industries respectively. The calculation results of the related data are shown in Table 3. We can see that the average employment elasticity duringthe period 1991-2006 was 0.112, and that of the primary, secondary and tertiary industry were -0.169, 0.192 and 0.525, respectively. Since 2003, the coefficient of the employment elasticity of the primary industry had been negative and kept going down, which indicates that with the economic growth the primary industry's contributions to employment had been decreasing, and more and more work force in the primary industry should be transferred to the other two industries. The employment elasticity of the tertiary industry is the highest in the three industries, which is 3.7 times of that of the secondary industry. So, it is clear that the tertiary industry has greater potentials to absorb labor than the other two industries. As the economic development of the secondary industry relying more on the technological progress, the employment of the secondary industry will decline slowly; at the same time, the employment space has long been saturated, therefore, it is necessary for China to develop the tertiary industry vigorously to solve the problem of employment.

3. Ways to Solve the Problem of Employment of the Surplus Labor Force

Because there are lots of laid-off workers in the cities, it is unrealistic for the surplus labor force in rural areas to be transferred to the city areas completely all at once. It should be proceed on two aspects to solve the employment problem of China better. Firstly, to develop tertiary industry especially the new service industries in cities so as to increase more employment opportunities; Secondly, to develop rural economy and adjust the industrial structure of rural areas to absorb more surplus labor.

3.1 Rreducing the cost of institution and developing the tertiary industry vigorously in urban areas

It is well known that, in a country's output structure, the greater the proportion of labor-intensive products, the higher the employment elasticity; on the contrary, the greater the proportion of the capital- and technology- intensive products, the less the employment opportunities. Compared to the secondary industry, the tertiary industry has a higher capacity to absorb labors. It is benefit to raise the employment elasticity to develop the tertiary industry for China.

The raise of the income stimulates peoples' demand for service. And with the expanding of the market of 'service'

products, it becomes inevitable for labor force to enter the tertiary industry. At the same time, the low entry barriers of capital and technology of the tertiary industry makes it possible for the large number of laborers to work in this industry. Analysis on employment elasticity presents that the tertiary industry is the largest industry to absorb labor force. The experience of many countries in the world also shows that the tertiary industry is the strongest field to absorb labors. Therefore, it is urgent for China to develop the tertiary industry to alleviate the contradictions caused by the difficulties of employment.

In the internal structure of China's tertiary industry, the proportion of modern service industries such as financing, insurance, and the information industries is still low, which lags far behind that of the developed countries. To develop the modern services, it is required to establish a reliable legal protection of the rights and interests of investors, to set up the corresponding judicial system and legal proceedings, to found the contractual rights protection system to reduce transaction costs. As the transactions of the tertiary industry are products as 'services' or 'promises', which are impalpable or intangible, the probability of risk of moral hazard or adverse selection of the tertiary industry is much higher than that of other industries. So, if the capital of institution does not to be enhanced, the service industry will stagnate or even shut down in China (Chen, 2004), which makes it an urgent request to reform the corresponding system of China.

3.2 Developing the rural enterprises further

Since the reform and opening up of China, the development of the rural enterprises has been alleviating the pressure of employment in rural areas, and has been making important contributions to the increase of farmers' income. Figure 4 shows that since 1978, although with some ups and downs, the number of rural labor force absorbed by the rural enterprises has been rising. In 1978, the proportion of the employees in the rural enterprises to the total rural employed persons was 9.23 percentage points, the proportion rose to 30.53 percentage points in 2006. The number of employees worked in rural enterprises rose from 28.23 million in 1978 to 146.80 million in 2006, an increase of 118.57 million in 28 years. Currently, rural enterprises are still main channels to solve the problem of the rural surplus labor force (Qu & Zhang, 2007). In future, it is important to speed up the reform of the rural enterprises. Only in this way can the rural enterprises play to the full their roles of driving the economic growth and absorbing labors.

Though China's rural enterprises have been flourishing over the past years, their overall level of development is still backward: such as their scales of are always small; their management system remains to be perfected; their layout is irrational (Guo, 2007); the environmental pollutions they bring are serious (Liu, 2001); the costs of their products are high; the equipment, capital, raw materials and energy are still severe short form them, and so on.

To improve competitiveness, rural enterprises should actively bring in specialized technical talents and advanced management experience, focus on human resources' development and management to improve the capability of technological innovation and technological development. The government should create a relaxed policy environment and offer facilities for the development of the rural enterprises. The government should keep guiding the rural enterprises to develop in a healthy way, and alleviating environmental pollution through reinforcing environmental management. In view of the uneven development of the rural enterprises in different regions of China, it is suggested that the rural enterprises in the less-developed areas first develop some labor-intensive industries; and those in developed regions quick their pace of upgrading their industries and energetically develop capital-and technology-intensive industries. At the same time, scattered rural enterprises should be joined together to form industrial districts to promote the development of the tertiary industry.

3.3 Improving farmers' general quality and optimizing the agricultural structure

In order to optimize the structure of agriculture, it is important for the government to guide farmers to develop agricultural projects of high quality, high efficiency and high-yield; to guide farmers to expand the industrial management of agriculture, to better organize farmers' access to the market and raise the overall efficiency of agriculture. Farmers should develop the deep processing of agricultural products, extend the processing industry chain of the competitive agricultural products, gradually integrate the production, processing and marketing of agricultural products so as to enhance the added value of agricultural products.

At present, the average educational level of the rural labor force of China is still very low, above 80 percent of them are only with junior middle school or even lower education. Coupled with a lower lever of skills, farmers can not meet the needs the request of agricultural modernization and industrialization. This requires the government to develop education in rural areas and improve farmers' overall quality of the culture, to offer professional skills training to farmers to make them know how to use technology and market information to increase agricultural efficiency and effectiveness. Only in this way can farmers become new farmers who understand technology and know business and management.

3.4 Accelerating the development of tertiary industry in rural area

At present, the economic structure in most rural areas is single. The agriculture system is mainly made up of farming and animal husbandry, the development of secondary and tertiary industries is very slow. According to the National Bureau of Statistics of China, in 2007, the rural employed persons numbered 47.852 million, of which, people employed in the primary industry, the secondary industry and the tertiary industry accounted for 70.8, 15.6, and 13.6 percentage points respectively. In the western rural areas of China, the proportion of the people employed in the tertiary industry to the total rural employed persons was only 8.5 percent in 2007. Yet early in 1980, the rural labors engaged in the tertiary industry accounted for 42% of the total rural employed persons, 18 percentage points higher than that engaged in agriculture (Wang, 2005). In view of the tertiary industry's strong ability to absorb labor, the tertiary industry must be gradually developed in rural areas of China.

The development of the tertiary industry in the rural areas can be carried out through the following aspects: Firstly, in the western regions, traditional services as transport, hotels and catering, wholesale and retail trade, repair service, and so on can be given priority to be developed; Secondly, in the more developed eastern regions, industries as science and technology education, information and consultant services and so on should be expanded vigorously, so as to provide the following services for farmers: production technology, adequate market information of production and circulation of agricultural products, the guidance and services on investment decision-making , and so on; Thirdly, with the prosperity of rural economy, knowledge-intensive services as posts and telecommunications, financing, insurance, commodity circulation, culture and sports will be encouraged to develop.

4. Concluding Remarks

The existence of the mass surplus labors in rural areas and the large laid-off and unemployed personnel in cities makes the employment problem of China become increasingly prominent. To settle the difficulties of employment, the following aspects should be given enough consideration: the first one is to spread the development of the tertiary industry in urban areas, for the employment elasticity of the tertiary industry is the highest in the three industries; the second one is to adjust the rural industrial structure and to promote the development of the secondary and tertiary industries in rural areas, so as to improve the quality and level of rural economic development and offer more job opportunities for rural surplus labors.

To accelerate the development of the modern service sector, the government should attach importance to the building of institutional environment, because in the tertiary industry, the asymmetry of information possessed by the both sides of transaction is much higher than that in the primary and secondary industries. On the one hand, it is necessary to enhance the protection of consumers' rights and interests; on the other hand, it is important to ensure the disclosure of information of both sides of trade adequately and reliably. Only in this way can the tertiary industry develop soundly.

To settle the employment problem better, China should work hard to develop job training with a view to enhancing workers' job skills and quality and improving their capabilities of finding employment and adapting to job changes. Solving the employment issue is a long and arduous process, the Government and individuals need to make more efforts.

Note: The national data of China in this paper do not include that of Hong Kong Special Administrative Region, Macao Special Administrative Region and TaiwanProvince.

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Table 1. A Comparison of Indicators of Composition of GDP among China and other Countries

Country or Area	The Primary Industry (%)	The Secondary Industry (%)	The Tertiary Industry (%)
World(2003)	3.5	28.0	68.5
Developed Countries(2003)	1.6	26.2	72.2
Developing Countries(2004)	11.7	36	52.3
China(2005)	12.6	47.5	39.9
United States(2003)	1.2	22.3	76.5
Japan(2003)	1.3	30.5	68.2
Canada(2001)	2.2	32.4	65.4
Germany(2004)	1.1	29.1	69.8
United Kingdom(2004)	1.0	26.3	72.7
France(2004)	2.5	21.7	75.5
Singapore(2005)	0.1	33.8	66.1
Korea, Rep.(2004)	3.7	40.8	55.5
India(2005)	18.6	27.6	53.8
Brazil(2005)	9.8	37.9	52.3
Russian Federation(2005)	5.6	38.0	56.4

Source: National Bureau of Statistics of China, http://www.stats.gov.cn

Table 2. A Comparison of Indicators of Employment Structure among China and other countries

Country	Year	Employment Structure(%)		
		The primary industry (%)	The secondary industry (%)	The tertiary industry (%)
United States	2005	1.5	20.7	77.8
Japan	2005	3.3	30	67.7
United Kingdom	2005	1.4	22	76.6
France	2005	3.8	24.4	71.8
Canada	2005	2.7	22	75.3
Philippines	2005	37	14.9	48.1
Singapore	2004	0.3	23.3	76.4
Korea, Rep.	2005	7.9	26.9	65.2
Brazil	2004	21	21	58
China	2005	44.8	23.8	31.4

Note: The data is worked out based on related data in *Year Book of Labor Statistics-2005*. Compiled by International Labor Organization.

Table 3.The Employment Elasticity of the Three Industries of China 1991-2006

Year	GY (%)	GL (%)	E	GY1 (%)	GL1 (%)	E1	GY2 (%)	GL2 (%)	E2	GY3 (%)	GL3 (%)	E3
1991	9.2	1.15	0.125	2.4	0.47	0.196	13.9	1.15	0.083	8.8	3.33	0.378
1992	14.2	1.00	0.070	4.7	-1.02	-0.217	21.2	2.43	0.115	12.4	5.82	0.469
1993	13.5	0.99	0.073	4.7	-2.63	-0.560	19.9	4.25	0.214	10.7	8.13	0.760
1994	12.6	0.97	0.077	4.0	-2.79	-0.698	18.4	2.32	0.126	9.6	9.55	0.995
1995	10.5	0.90	0.086	5.0	-3.0	-0.600	13.9	2.24	0.161	8.4	8.80	1.048
1996	9.6	1.30	0.135	5.1	-2.0	-0.392	12.1	3.50	0.289	7.9	6.20	0.785
1997	8.8	1.26	0.143	3.5	0.06	0.017	10.5	2.12	0.202	9.1	2.82	0.310
1998	7.8	1.17	0.150	3.5	0.97	0.277	8.9	0.32	0.036	8.3	2.32	0.280
1999	7.1	1.07	0.151	2.8	1.68	0.600	8.1	-1.08	-0.133	7.5	1.83	0.244
2000	8.0	0.97	0.121	2.4	0.77	0.321	9.6	-1.23	-0.128	7.4	3.22	0.435
2001	7.3	1.30	0.178	2.8	1.30	0.464	8.7	0.40	0.046	7.8	2.04	0.262
2002	8.0	0.98	0.122	2.9	0.98	0.338	9.9	-3.10	0.313	7.3	4.26	0.584
2003	9.1	0.94	0.103	2.5	-0.88	-0.352	12.5	1.88	0.150	6.7	3.41	0.509
2004	9.5	1.03	0.108	6.3	-3.49	-0.554	11.1	5.24	0.472	8.3	5.51	0.664
2005	9.9	0.83	0.084	5.2	-3.68	-0.708	11.4	6.88	0.604	9.6	3.30	0.344
2006	10.7	0.76	0.071	5.0	-4.19	-0.838	12.5	6.46	0.517	10.3	3.49	0.339
Average			0.112			-0.169			0.192			0.525

Note: GY indicates China's total economic growth rate, GL indicates China's total labor force growth rate, E indicates China's total employment elasticity; the data of GDP is calculated based on 1980 constant price.

Source: China Statistical Yearbook-2006; China Labor Statistical Yearbook-2006; Statistics communiqué of national economic and social development of People's Republic of China during 2006.
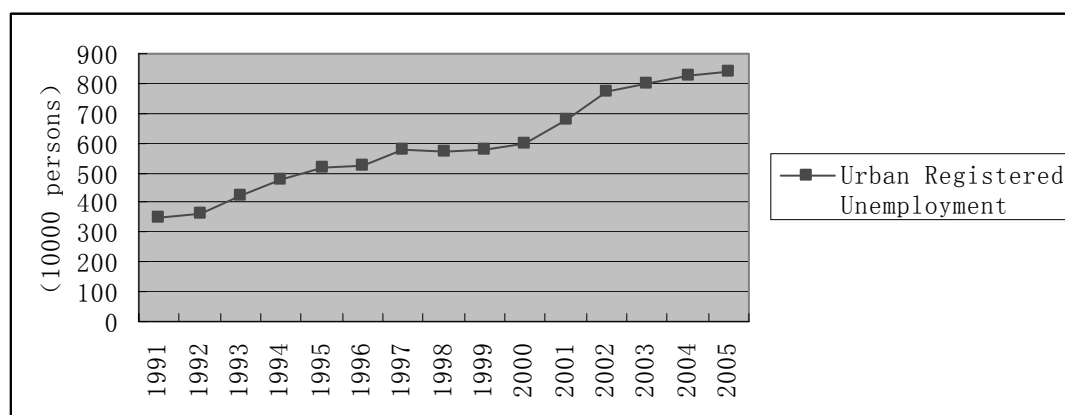

Figure 1. Urban Registered Uunemployment 1991-2005

Source: China Labor Statistical Yearbook 2006. Compiled by Department of Population and Employment Statistics National Bureau of Statistics, P. R. C & Department of Planning and Finance, Ministry of Labor and Social Security, P. R. C. Beijing: China Statistics Press. November, 2006.
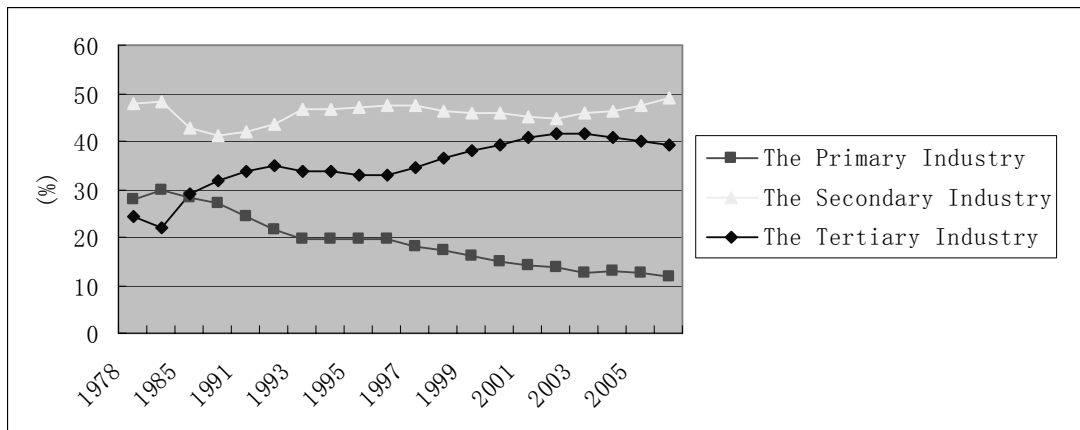
Figure 2. The Industrial Structure of China 1978-2006

Source: The Statistical Yearbook of China-2006. Compiled by National Bureau of Statistics of China. Beijing: China Statistics Press. November, 2006.
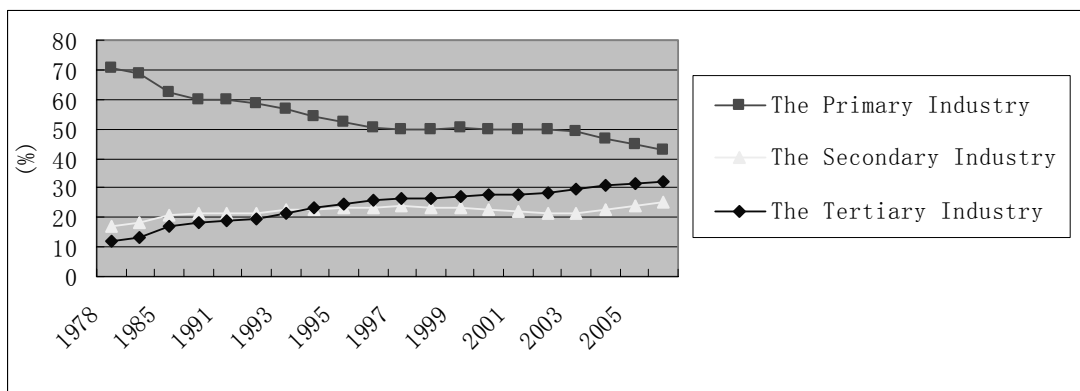

Figure 3. The Employment Structure of China 1978-2006

Source: China Labor Statistical Yearbook-2006, Beijing: China statistics press, 2006; Statistics communiqué of national economic and social development of People's Republic of China during 2006.
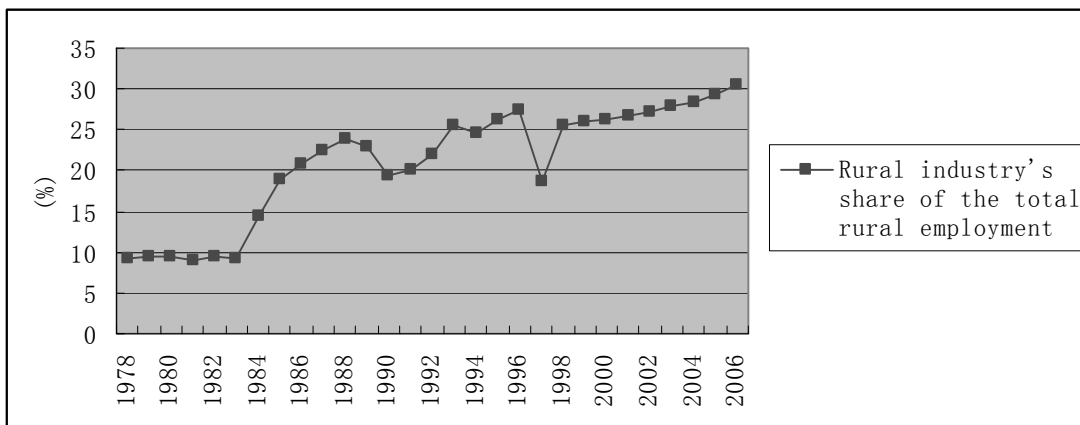

Figure 4. Rural Industry's Share of the Total Rural Employment in China 1978-2006

Source: China Labor Statistical Yearbook-2006, Beijing: China statistics press, 2006; Statistics communiqué of national economic and social development of People's Republic of China during 2006.

Foreign Present Condition of the Science and Technology

Project Evaluation and Development Trend Research

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Abstract

The science and technology project evaluation is science and technology evaluation of importance constitute part, push national science and technology business to develop continuously and healthily, promote science and technology resources excellent turn to install, suggest a high-tech management important means and guarantee of the level. This text carried on for the abroad in advance national way of doing with evaluation of the science and technology project analytical, put forward evaluating to our country science and technology project according to its evaluation characteristics and the development trend of apocalypse.

Keywords: Science and technology project, Item evaluation, Developing trend, Evaluate system

The science and technology project evaluation is science and technology evaluation of importance constitute part, push national science and technology business to develop continuously and healthily, promote science and technology resources excellent turn to install, suggest a high-tech management important means and guarantee of the level. Reasonable valid evaluation system of the science and technology project for stir up science and technology personnel's creative potential betterly, construct science and technology to create new surrounding, promote our country science technique research development and nations be in line with, establishment and development which push forward national science and technology creative system have important meaning.

1. In advance national evaluation present condition of the science and technology item

1.1 Sign a choice standard

The abroad signs science and technology project a choice to mostly adopt go along discussing method, each the national science and technology project sign a contents of choice and standard each not same:

EU the third evaluation standard that science and technology develops a total programming to win election to choose science and technology project is: ①Match a programming target, be suitable for a multinational cooperation a research; ②science technique level is high, having unique and having a creative potential; ③has important industry value and competition ability; ④The realization of item has a possibility.

Germany's evaluating standard to the science and technology programming item is: ①Owe may that the project studies prevision: Whether involve science blank, The application of research result, market foreground, economic meaning etc.; ②Whether studying direction pursues merit and fame too or not; ③Whether study direction and development foreground are consistent or not; ④Whether study a direction to the society relation graveness, moderate consistently or not.

Korea concerning nation's studying contents of an project evaluation over a long period of time is: ①Settles sex of the item research target; ②Founds sex the item; ③The applicability of project research result; ④Possibility of the study method etc..

American evaluation standard of the science and technology project is: ①Apply for science value and quality of project. The main contents includes: How the application may be greatly enhanced the disciplines and other subjects of new knowledge. Whether organization and management plan of project is careful and attentive or not cans believe, whether has an enough research condition; ②What Applying for the project can produce a wider impact on society. The main contents includes: In the promotion of scientific discoveries, the increase in the accumulation of knowledge at the same time, the extent to which the project will promote education, training and research; Can build up studying equipments, information, database, network, cooperative-relationship and other infrastructure with increment; The extent to which the increased participation of the extensive personnel; Whether can expend the knowledge of science and technique to popularize; It is what towards satisfying a social demanding function.

1.2 Process management style

In the United States, Europe and other developed countries and regions, to manage and control science and technology project, regardless and theoretically still on the fulfillment and all already very mature. Especially after

80's in 20 centuries, with the rapid development of information technology, accelerating the process of economic globalization, urge it from science and technology project sign to evaluate the whole processeses more standardized and internationalized.

The science and technology project of the United States adopts the management style of diverse dispersion type, government research institutes, universities and industrial research institutions this three research systems forming a unique technology management. The United States government manages to the foundation research item is firstly povide guarantee of funds, and the second is to provide laboratory facilities and create a favorable working environment. The scientist who is engaged in a foundation research can be free to use national laboratory, areas of research projects, research projects and the method of using funds research projects are responsible for their own decisions. For application development, it is divided into large-scale commercial projects and technology development projects. Large IT projects are usually related to the functions of government and national defense, public health and the cause of science and technology activities, it's specific programme of activities put forward by the Government research centre, reporting to the authorities concerned in Washington headquarters, the Office of Management and Budget and Appropriations Committee approved the examination and approval, then establish a homologous committee, at the same time responsible for the project management system design, makes, reliability etc. carry on an investigation, and tracking and manage the whole distanceses; the most typical of business technique development aspect is Advanced Technology Program, this program is managed by national standard and technique hospital, its executive body is divided into headquarters, carry out office and information resources department three partses, primarily responsible for daily administration, the intelligence-gathering work.

Japan's science and technology projects mostly commit to the project management units based on its own; the stage result report which subsidizes a square with the item is the main basis of evaluation. Japan's choice to science and technology project is very strict, in the project selection process exist three main options: the government section which is responsible for puting forward mission; be responsible for the academic organization section which organizes an item choice an activity; be responsible for an investigation and put forward the specialized research group who studies a project. On the management of funds, Japanese government attaches great importance to the budget management and supervision. Government has drawn up a "Science and Technology Basic Law," "Science and Technology Basic Plan" and other big country policies on science and technology, Provides for the future direction of the science and technology research for several years and its budget target amount. Government budget implementation process have a comprehensive set of technology project management evaluation system and budget supervision mechanism, once technology projects identified, one of its expenditure has to press plan performance, if need adjustment, subject to the consent of the competent government departments. Project progress need to periodically check, if discovering the problem should be put a forward adjusting opinion in time, preparation of the budget for the next fiscal year reference. The management of budget is carried out according to the plan by the project which responsible for to carry out, apart from the process of implementing the unit and higher-level departments in charge of strict management,and evaluation, the nation still establishes specialized national auditor's system, for the purpose of science and technology budget take charge of. Japan is changing the early way of equally assign doing of research budget, funds focus on financing research institutions and universities outstanding scientific research centre.

The science and technology project management style of Germany belongs to federal power system for cent, that is, through various channels to support science and technology, the government section is responsible for a macroscopic control, Through adoption of the control-oriented investment, pass the work that the index sign system evaluates academic section. The German Government have set up a complete system of examination and approval of projects: The government puts forward a research framework→The item unit declares →Medium lie consultation organization to provide a service and help to plan and prepare to declare a project →Evaluating organization carries on a reviewing and evaluate, put forward to a grant project →The government organizes an expert committee to research examination and approval. A lot of work during the period are responsible for intermediary organizations, these intermediary organizations are mostly nonprofit public-spirited organization, and they are responsible for the government and the public. Internal intermediary organizations according to their professional categories setup corresponding committees or departments, keep the authority position of professional realm, control the latest Dynamic research in the field, managing reported items of counterparts in the field. The project appraisal and management persist in publicly, fair and just principles, Government departments have small influence in it, let intermediary organizations, experts in various fields to be responsible for, to ensure that the most competitive strength to the scientists or scientific research units funded through a competition. At the same time, pay attention to guarantee the management of the project, units which can not complet the research projects will be subject to heavy penalties, this control means guarantee the finished quality and the success rate.

Science and technology research project evaluation of France is unified managed by the Department of skills, project is generally drafted and put forward by experts and scholars who are invited by the Scientific Committee, then adopt the way decision of public invitation to bid. To the topic which has already signed an item, Executive Secretary with relevant experts carry out an annual assessment every year, checking on progress, and evaluating the results achieved. If necessary, re-examine the original goal and orientation issues of state plan, this kind of circumstance generally assured by the science committee organization convenes bigger scope expert meeting. Budget which the government is used to support a national science and technology research and develops planned is issued in the name of the research and the technique fund annually. The project of foundation science research, even be included in a national plan, greatly parts of budgets provided by the each cooperation unit which attends the project. Since 1988, funds allocated to the National Plan of 3/4 use to support with a clear goal of industrialization of science and technology projects, and asked to participate in the projects of enterprises take out development budget of an equal funds complement project in the meantime. The French government still built up a set of direct system of integrity: Congress to the evaluation of science and technology-based option, congress assessment level assess the overall direction of the development of science and technology evaluation and review, provide argument for the government to choose a science and technology development direction; with the national research evaluate committee for lord, assessment level to government policy of the policy valuation, science and technology programming, evaluating major projects of government-owned science and technology organizations and agencies, providing a suggestion for the president and each section of government.

1.3 Performance Evaluation of the late

The science and technology project results evaluation is a key job of the management and science and technology management of the government public finance expenditure, and is to push science researches progressive powerful measure. Abroad have successful experiences in science and technology projects:

The United States is the nation which came into force a science and technology evaluation work at the earliest stage in the world, as early as 1993 January of U.S. Congress passed <Government Performance and Results Act>, that bill is the important law basis of American science and technology item and the government section performance evaluation. GPRA provision, each section has to draw up while making a budget, putting forward expenditure request 5 years strategic item, the enactment item year target, draw up a set of results index sign that can reflect a section accomplishment, easy to evaluation, and periodically provide long-term strategy a programming, year results programming and year performent result report etc. three kinds of reports. For the research and development agencies, GPRA performance situation can be divided into organization fixed position and performance measurement. In the meantime, basis the provision of that bill, the American government established National Performance Evaluation Committee in March, 1993, being responsible for the direct and the implement of bill. United States National Science Foundation (NSF) was founded in the 20th century early 1950s, is a section which is exclusively responsible for pushing forward American science and engineering business. NSF funded projects of its performance evaluation models and methods, can be used as performance evaluation of a prominent example. NSF divid science and technology project performance evaluation indicators into three categories: financing a result, internal management and investment process. Grants reflect on the results of the performance evaluation use of qualitative indicators, which reflects the internal management of the investment process and performance evaluations as much as possible use of quantitative indicators. In order to better carry out scientific and technological project performance evaluation, NSF special attention and performance objectives related data collection, verification and certification for IT projects to provide detailed statement that the contents of the report, and entered by the NSF maintenance network systems, for the efficient and enquiries.

The Australia is more and early one of the nations which carries out science and technology performance evaluation. Australia federal government comes into force the implementation of scientific and technological performance evaluation of the pilot project from 1985, starting promoting science and technology performance evaluation completely in 1993. The science and technology performance evaluation project of the Australia mainly includes three aspect contentses: the appropriate evaluation, efficiency evaluates and the usefulness evaluate, evaluate a point to decide the development stage of the place according to item target and item life cycle. Australia's evaluation of the performance of technology projects throughout the project implementation, its main step is: carry on project analysis, make sure an evaluation point; finding out the evaluation key problem that need to be resolved, make sure evaluation item and strategy; collections, analyze evaluate data; draft, release an evaluation report; look back a results evaluation; make use of an evaluation conclusion well. The management of nation to science and technology performance evaluation of technology projects mainly includes organization, implement, control and check, as well as toward the application of the evaluation findings. Some sections built up taking charge of committee, while taking charge of the direct of committee, evaluation team procedure by rule, to ensure the evaluation of managers

and team members perform their responsibilities. Australia on the project performance evaluation process control is based on the evaluation of the size and complexity of the set, such as the evaluation team meet regularly, analytical evaluation make progress circumstance, establishment a periodically check mechanism for evaluate a work. In order to promise the quality of science and technology performance evaluation, the government established the quality standard system of evaluation. Australia federal government drew up the principles of performance management information for better guiding their subordinate departments and agencies to report on the performance of drafting, requesting a results information shoulded have clear in meaning and concentrated public.

Japan reduced to establish a policy evaluation study in the economic industry in March, 1998, draw up *Science and Technology Basic Law*, *basic science and technology projects* etc. great government policy, provision aftertime some year science and technology of research direction and it budget target limit. On this foundation, each province hall drew up a year <science and technology point indicators>, formulate the annual budgeting strictly. There is a complete set of project management evaluation system and budget oversight mechanisms in Japan government budget implementation process. Once the projects identified, every expenditure must be on budget implementation, if need adjustment, beard through the consent of the competent government departments. November 2001, the Japanese government also announced a <National R & D evaluation of the implementation of guidelines>, require the project progress regularly checked, the issue which foundede should be promptly adjustment, proposed for the next fiscal year to budget for reference. The project implementation unit responsible for managing fund, in addition to a higher level of the units and departments in charge of the strict management and evaluation in the process of implementing, the State also has a special system of national auditors to supervise science and technology funding.

1.4 Choiceing evaluation methods

Technology evaluation methods which foreign are commonly used can be divided into two kinds of qualitative and quantitative, among them, qualitative Evaluation Methods mainly includs Peer Review Act, the Delphi method, indicators and evaluation questionnaire and interview; quantitative evaluation mainly includes economic evaluation of the level of analysis, multi-attribute and multi-objective decision-making methods and fuzzy comprehensive evaluation method. Countries have each special features on the method choice of science and technology evaluation project:

Every year, Australia's scientific research institutions according to the science and technology planning cycle, periodically organize evaluates committee to carry on an evaluation to the in progress science and technology project exclusively, the basis for the evaluation of the project are the project identified by the research goals, objectives, the actual results and the actual impact on the social aspects of such evaluations; study on the basis of the United States, mainly in the institutes which are supported by universities and government departments; British Government in the major scientific and technological projects Alwi Most of the evaluation plan mostly adopt to hire an independent professional evaluation of the assessment unit.

Totally speaking, to the evaluation of projects in science and technology, all countries in accordance with the characteristics of various evaluation methods and the scope of application (see table 1.below), and choose the right combination of the actual project evaluation methods. (See Table 1)

1.5 Evaluation of operational mechanism

On the part of the National Science and Technology project evaluation mechanism mainly from the operation of the evaluation system and organizational structure set up to analyse two aspects:

1.5.1 Evaluation system

In 1993 the United States Congress enacted the *Government Performance and Results Act* (GPRA), the concept and technology evaluation system, the United States Congress an evaluation of the role of science and technology, functions, powers and responsibilities are clear legal provisions identified, the bill requires all agencies, including those that support research institutions, establishment of quantifiable goals and report to Congress the annual progress. In addition, Japan, <Science and Technology Basic Law>(1995) and <Guide to the implementation of research and development>(1997) has proposed the establishment of an open study on the basic framework of evaluation, ruling Japanese technology assessment agencies can not be established or revoked. The French government does a provision in 1985, before having no process evaluation, any national science and technology plan the items all can't start. In France, the evaluation mainly concentrated in the two independent agencies: Evaluation Board and the National Council on the Evaluation Commission, the former through the creation of laws, the latter by issuing a decree by the Council of Ministers appointed, the term of office of evaluation, the evaluation target identification, evaluation report of announce, all have corresponding laws and regulations. South Korea, Australia and other countries where the evaluation activities in science and technology is required in accordance with the relevant laws of the institutions, in accordance with the statutory procedure, issued by the evaluation findings and

results of feedback to the relevant units.

1.5.2 Organizational structure

As the history of the world from different backgrounds, setup of the evaluation of projects of science and technology organization which countries engaged in is different. From the setting up of organizations can be divided into two properties: governmental and non-governmental in nature. In the organizational structure level can be divided into: national, local or state level, research institutes level.

The United States, France, England, Germany, Japanese etc. country science and technology evaluates system integrity; organization structure is very sound, having above two kinds of attributes and three layers keep both of situations. But different countries have different dependings, the German national technology assessment agencies was commissioned by the Government, anchored in a particular technology under management. Japan different from the United States, France, Britain, Germany is it have many high-level scientific and technological evaluation organizations, important of have already been close to 20, and only a few countries in Europe and America in general. The content of Japan Technology Evaluation mostly is the application of technological innovation, the content of Europe and the United States evaluation mostly is scientific research innovation. There are more entrepreneurs in Japan's technology assessment agencies, but science and technology assessment agencies in Europe and the United States have more scholars.

2. The characteristics and the development trend of the Evaluation of foreign technology

The science and technology evaluation project is one of the main type in science and technology evaluation, it has a direct relationship with the implementation of the National Science and Technology Plan and the efficient allocation of resources. IT project's planned, the research process and the resulting scientific and social values will have a direct impact on science and technology and social development. Science and technology project evaluations as a matter of policy to introduce science and technology management tools, the decision-making process more scientific level, has become the international trend. The United States, France, Germany, Japan and other developed countries through the development of science and technology and the implementation of the relevant laws and regulations, establish and perfect the technological project evaluation agencies, research standardize technology evaluation procedures and methods, has established a relatively complete scientific and technological project evaluation system. Integrated Technology developed the basic system of project evaluation, the following are the main features:

2.1 Project evaluation system for science and technology to give legislative protection

Technology evaluation is highly professional, highly technical content research activities, is institutionalized and standardized work behavior. Therefore, is to ensure that science and technology project evaluation work to the institutionalization, standardization and normal operation, need for the state to give legislative protection. The United States, France, Japan and other countries have established a comprehensive legislative protection technology project evaluation system, through the improvement of legislation, improve the scientific and technological evaluation of the legal status of the project so that the technology evaluation of projects achieve rapid institutionalization, scientific, systematic and standardized.

2.2 To ensure the independence of IT project evaluation institutions

Independence is an important principle of project evaluation activities. Foreign rating agencies and evaluation of practical experience shows that the higher the degree of self-evaluation, the greater the credibility of the outcome of the evaluation. Therefore, in order to ensure the objective, true, valid of evaluation results, we must ensure that science and technology evaluation of the high degree of independence, making the rating agencies to become the third party which independent of the rating agencies and evaluation.

2.3 Have perfect evaluation system of the science and technology project

The project evaluation systems of the part of the Technology the technology developed countries are more perfect, there are relevant laws and regulations system for the technology evaluation, complete evaluation institutions, explicit evaluation target and evaluation methods more mature.

The successful foreign technology project experience shows that, establish the perfect scientific and technological project evaluation system, can improve the quality of evaluations, standardized evaluation activities, and contributes to reflect the scientific technology and social values.

2.4 Science and Technology evaluation process standardization

France, the United States and Japan places great emphasis on the normative evaluation procedures, each of the sessions have detailed descriptions and detailed arrangements, and ready to accept public supervision at any time. in 1993, the United States Congress passed the<Government Performance and results>, the first time in the form of

state law, including the provisions of the Government Performance management technology evaluation. Develop science and technology project evaluation procedures to avoid project evaluation activities arbitrary changes in the procedures, so as to ensure a fair evaluation of the project, just so that the evaluation of the activities of all the participants from the evaluation activities are beginning to the end of law can be.

3. The enlightenment of foreign technology project evaluation experience to China

At present, the science and technology project evaluation has already been subjected tooped abroad off to an early start, and practice experience fulfill, its improved evaluation theory, evaluation system, and evaluation mechanisms for improving China's scientific and technological project evaluation, and strengthen scientific and technological research project evaluation has an important reference:

3.1 Strengthen the institutionalization of science and technology building project evaluation

Institutionalization is the current international trend of the assessment activities, in accordance with national conditions, China should establish their own technology for project evaluation system, the establishment of technology choices, the mid-term evaluation, and later finished all aspects of performance evaluation be expressly provided, thus ensuring science and technology, health, and orderly conduct.

3.2 Insist independence, objective and fair evaluation principle

In order to provide decision makers with the results of the useful analysis and reliable information, our country's scientific and technological project evaluations should ensure that the choice of evaluation methods, evaluation of the design and implementation of activities, as well as the completion of the evaluation report and other links are independent, objective and impartial, avoid in the re-evaluation process out, and the phenomenon of Latin America, and correctly handle the relationship between the assessment and decision-making in practice.

3.3 Value a science and technology project evaluation quality and evaluation an ability construction

In order to enhance the quality of evaluations and evaluation capacity building, our country's scientific and technological project evaluation agencies should develop professional appraisal standards and pay attention to evaluation experts and scientists, management experts communication, attention to the field of evaluation of the international exchange, through exploration and evaluation methods, training evaluation , the rating agencies as a learning organization, and constantly practice and continue to innovate.

3.4 Promote the innocation of the theory and method of evaluation

National rating agencies have attached much importance to the theory and method of evaluation research, such as the United Kingdom Alwi plan, Western Europe Eureka plans and national organizations to finance large-scale projects, have a set of effective evaluation methods. Our country should draw lessons from successful experience of foreign science and technology project evaluation, and combine to investigate to suit evaluation object physically and be advantageous to realization to evaluate the new mode of target.

3.5 Fully understand the technology project evaluation role in society

Technology evaluation as a modern society emerging professional work, have already been subjected to the widespread value of governments in all countries. China should fully understand the technology evaluation and immediate significance. Play its technology to enhance decision-making process of science, and raise the scientific and technological ability to regulate and control management, and promote science and technology management system, to enhance national development and implementation of science and technology projects to the seriousness of the major areas role.

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Table 1. The project evaluation methods

Evaluation Method	Characteristics	Apply scope
Peer Review Act	The operation is simple, the conclusion is easy to an usage, but the subjective is stronger,and is difficult to evaluate the conclusions of convergence	Strategic target level of decision-making analysis
Economic evaluation method	The meaning is explicit, comparability strong, but the establishment model is more difficult, the data hard estimate, the conclusion may lose really	Large and medium-sized investment projects, enterprise equipment update and the development of new products benefit evaluation
Analytic Hierarchy Process	The credibility is higher, the error margin is small, evaluate the factor of object limited(generally and not much in 9), otherwise the conclusion isn't accurate	Cost-effective decision-making, resource allocation, conflict analysis etc.
Multi-attribute and multi-objective decision-making method	Object Description more precise, can be dealt with more decision-makers, many indicators, dynamic targets, but it is rigid evaluation, not involving the object of fuzzy factors	Optimization of the evaluation and decision-making system the applied realm is extensive
Fuzzy comprehensive evaluation method	According to different possibilities can be reached various levels of the problem, match the thought of gentle management, but can not evaluate the correlation between indicators of information duplication	Consumer preferences identification, the expert decision-making system

Real Exchange Rate and Trade Balance

Relationship: An Empirical Study on Malaysia

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Abstract

This paper attempts to identify the relationship between the real exchange rate and trade balance in Malaysia from year 1955 to 2006. This study uses Unit Root Tests, Cointegration techniques, Engle-Granger test, Vector Error Correction Model (VECM), and impulse response analyses. The main findings of this paper are: (i) long run relationship exists between trade balance and exchange rate. Other important variables that determine trade balance such as domestic income shows a long run positive relationship between trade balances, and foreign income shows a long run negative relationship (ii) the real exchange rate is an important variable to the trade balance, and devaluation will improve trade balance in the long run, thus consistent with Marshall-Lerner condition (iii) the results indicate no J-curve effect in Malaysia case.

Keywords: Exchange rate, Trade balance, Devaluation, Cointegration, Malaysian economy

1. Introduction

Depreciation of the currency has great impacts to trade balance but the impact may vary, probably due to different level of economic development. One of the prominent impacts is the Marshall-Lerner condition, which represents that real depreciation leads to increases the trade balance in the long run if sum up value of import and export demand elasticity exceed one. Real depreciation improves the trade balance through two different channels. Firstly, increase quantity of export. Depreciation of the currency reveals the domestic goods cheaper as compared to the foreign goods, thus making export more competitive. Secondly, quantity of imports decreases, as import is relatively more expensive. Alternatively, amount of export and import may not responsive at initial period of depreciation. Thus, trade balance may be worsening first due to decrease in value of export and increase in value of import but improves after some time. This make scenario knows as J-curve.

2. Objective of Study

The main objectives of this paper, therefore aims (i) to study the relationship between exchange rate and trade balance in Malaysia, and (ii) to investigate whether Marshall-Lerner condition and J-curve exist, both for the period 1955-2006. The rest of the paper is structured as follow: Section 3, there will have review on literatures. Section 4 will be the theoretical framework and methodology. Section 5 will be the result and interpretation and finally is Section 6 will be the conclusion from this study.

3. Literature Review

Hernan Rincon (1999) examined the relationship between trade balance and exchange rate test for Marshall-Lerner condition in Colombia using Johansen-Juselius method. His empirical results provided significant evident for the Marshall-Lerner condition. Shirvani and Wilbratte (1997), Akbostanci's (2002) and Liu, Fan and Shek (2006) also found Marshall-Lerner condition hold in their respective studies. Shirvani and Wilbratte (1997) examined the relationship between trade balance and real exchange rate in United States and the G7 countries of Canada, France, Germany, Italy, Japan, United Kingdom and United States, Akbostanci's (2002) in Turkey while Liu, Fan and Shek

(2006) in Hong Kong. Besides, Onafowora (2003) reported significant relationship exist for three ASEAN countries of Thailand, Malaysia, and Indonesia in their bilateral trade to United States and Japan. In contrast, Rose (1991) reported the Marshall-Lerner condition does not exist in five major OECD countries (United Kingdom, Canada, Germany, Japan, and the United States). Her results also showed insignificant relationship between trade balance and exchange rate, thus implying that devaluation could not improve trade balance in the long run. Rose (1991) predicted it would reveal significant through trade balance treated as exogenous with respect to the exchange rate. Using cointegration test, Hatemi and Irandoust's (2005) study showed Sweden did not satisfy Marshall-Lerner condition. This might be due to the trade balance in Sweden is not sensitive in real exchange rate but only sensitive in changes in income. Wilson and Kua (2001) examined the relationship case between Singapore and United States. Their result indicated exchange rate does not have significant impact on the bilateral trade balance. Liew, Lim, and Hussain (2003) studied the relationship between real exchange rate and balance of trade based in ASEAN countries. They suggested that trade balance is affected by a real money rather than the exchange rate. Thorbecke (2006) indicated that the change in the exchange rate could affect trade within Asia. His empirical studies demonstrated an appreciation in Indonesia, Malaysia, and Thailand would decline export.

As for literatures on the J-curve effect, Ahmad and Yang (2004) examined the hypothesis of J-curve on China's bilateral trade with the G-7 countries by using and found no evidence characterize of J-curve effect. Moffett (1989) examined empirical evidence for the trade price (price of the export and import) and the quantities (quantities of export and import) of the United States to determine whether J-curve exists or not from the period of 1967 to 1987. Reported result indicated that, dollar depreciation leads to import quantities decrease, but it simultaneous decrease in the quantities of export. Based on the J-curve theory, depreciation leads imports to decrease and exports increase. Exports decrease in this case, so, it resembles of sine wave rather than a J-shape. Rose and Yellen (1989), using ordinary least square (OLS) and cointegration test reported no response of the trade balance to the real exchange rate in the United States. Meanwhile, Bahmani-Oskooee and Ratha (2007) examined the bilateral trade between Sweden and her 17 trading partners and analyzed the real depreciation of short run effect and the long run effect. Their long run result concluded that real depreciation of the currency only sufficient in five cases, which is in the trade balance between Sweden and Austria, Denmark, Italy, Netherlands, and the United Kingdom. Short run result has effects on the trade balance in 14 out of the 17 cases. Nevertheless, Sugema (2005), examining the determinate of the trade balance and crisis adjustment in Indonesia through exchange rate make a caution point on the issue of effectiveness of exchange rate depreciation in improving trade balance in the long run. Sugema (2005) claimed that exchange rate might overshoot if the trade balance is not sensitive with the depreciation.

4. Theoretical Framework and Methodology

The modeling the trade balance in this paper follows similar equation chosen from Shirvani and Wilbratte (1997), Baharumshah (2001), Gomez and Alvarez-Ude (2006), which emphasized in exchange rate on bilateral trade balance evidence.

Equilibrium goods market in an open economy can be described by the following equations:

$$Y = C(\underset{+}{Y-T}) + I(\underset{+}{Y}, \underset{-}{r}) + G - IM(\underset{+}{Y}, \underset{-}{\varepsilon}) + X(\underset{+}{Y^*}, \underset{+}{\varepsilon})$$

which Y represents total domestic income, C represents consumer spending, and T represents income tax, I, represents investment, r known as interest rate, G represents government spending, ε represents real exchange rate, IM represents import, X represents export, and Y^* represents foreign income.

Signs in bracket (below the equation) indicate relationships for respective factors. Consumers spending *(C)* which function as total income subtract income tax, which it knows as disposal income *(Y-T)*. Higher disposal income lead to higher consumer spending besides to increase total domestic income, therefore, positive relationship incurs between total domestic income and consumer spending. Investment *(I)* is a function of total income and interest rate. Nations would investment more if increase in the total personal income. Thus, it shows positive relationship between investment and total income. Besides that, interest rate might effect investment decision. Lower interest rate reduces cost for capital, thus attracts more investor come and invests. For that reason it shows negative relationship between investment and interest rate. In other word, higher interest rate would decrease total domestic investment. For the real exchange rate equal the nominal exchange rate (*E*) multiple the foreign price level (*P**) and divided by the domestic price level. Nominal exchange rate (*E*) is defined as the number of unit domestic currency exchange for one unit of foreign currency, giving:

$$\varepsilon = (EP^*) / P \tag{1}$$

Import *(IM)* is influenced by domestic income or output (*Y*). Higher domestic income leads to high imports. So, it shows positive relationship. In additional, import has negative relationship with total domestic income; quantity of import also depends on the real exchange rate *(ε)*. Higher *(ε)* leads to lower quantity of imports because of the foreign goods relatively more expensive. Export (*X*) depends on the foreign income *(Y*)* and real exchange rate *(ε)*. High the foreign income leads to increase in foreign demand for all goods and services as a result increase exports. On the other hands, increase in real exchange rate, the relative price of foreign goods in terms of domestic goods also leads to increase in export. It is showing positive relationship between trade balance and foreign income, real exchange rate. As the objective is to examine trade balance (net export, NX) and exchange rate, other variables are assumed constant. The net export is:

$$NX \equiv X - IM \tag{2}$$

By substituting the function of export and import into equation *(2)*, it shows

$$NX \equiv X(Y^*, \varepsilon) - IM(Y, \varepsilon) \tag{3}$$

After that, substitute equation *(1)* into equation *(3)*

$$NX = X(Y^*, \frac{EP^*}{P}) - IM(Y, \frac{EP^*}{P}) \tag{4}$$

Assume EP*/P is stationary, we can rewrite the equation *(4)* as

$$NX = NX(Y, Y^*, \varepsilon) \tag{5}$$

Therefore, equation (6) expresses the balance of trade as a function of the levels of domestic and foreign income and the real exchange rate.

$$\ln TB_t = \beta_0 + \beta_1 \ln Y_t + \beta_2 \ln Y_t^* + \beta_3 \ln RER_t + u_t \tag{6}$$

where *ln* represents natural logarithm, u_t is assumed to be a white-noise process, and trade balance, TB_t, represents as the ratio of exports to imports allows all variables to be explained in logarithm form and removes the need for appropriate price index to explain the trade balance in real term. In this research, real exchange rate, RER_t, expresses by Ringgit Malaysia (RM) against United States Dollar (US\$) and Y^*_t expresses as gross domestic product of United States.

Following classical theory, the sign of β_1 could be either positive or negative. If the estimate of β_1 would be expected to be negative which means that an increase in Malaysian real income, Y_t, increases imports volume. However, if the estimate of β_1 would be expected to be positive which means that an increase in Y_t the is due to an increase in the production of import-substituted goods. Similarly the estimate of β_2 could be either positive or negative. It the sign of β_2 would be depended on whether the supply side factors dominate demand side factors. Marshall-Lerner theory holds when β_3 is positive indicating that depreciation leads to improve the trade balance for Malaysia.

The annual data used to model this equation from year 1955 to 2006 obtained from International Monetary Fund (IMF). During that period, Malaysia has some dramatic change in real exchange rate and trade imbalance. Hence this provides an excellent research condition to examine whether the changes in real exchange rate affect the volume of trade. The trade balance, domestic and foreign incomes are in real terms; the consumer price index (CPI) acts as the price deflator.

Unit root test is used to test of stationary. Following the work of Baharumshah (2001) and Sugema (2005), Augmented Dickey-Fuller (ADF) test and Philips-Perron (PP) test is applied for testing stationarity in economic data. If ADF test and PP test show different results, the Kwiatkowski-Philips-Schmidt-Shin (KPSS) test is used as decisive results. In order to solve the spurious regression problem and violation assumptions of the Classical Regression Model, cointegration analysis used to examine the long-run relationship between TB_t, RER_t, Y_t and Y^*_t. To test for cointegration, three methods are used. There are Engle-Granger Test, Error Correction Model, and Johansen-Juselius Test. In order to know the disequilibrium error, we rewrite equation (6) as:

$$u_t = \ln TB_t - \beta_0 - \beta_1 \ln Y_t - \beta_2 \ln Y_t^* - \beta_3 \ln RER_t \tag{7}$$

In order to perform Engle-Granger Test, the order of integration of the estimated residual, u_t, should be tested. If there is a cointegrating regression, then disequilibrium errors in equation (7) should form a stationary time series, and have a zero mean, the u_t should be stationary, I(0) with E(u_t) = 0.

The long run equilibrium may be rarely observed, but there is a tendency to move towards equilibrium. Thus, Error Correction Model is used to represent the long-run (static) and short-run (dynamic) relationships between trade balance, real exchange rate, domestic and foreign income. According to Baharumshah (2001), Onafowora (2003),

Ahmad and Yang (2004) and Sugema (2005), Vector Error Correction Model is suitable to estimate the effect of exchange rate on trade balance. The equation (8) represents Error Correction Model as:

$$\Delta \ln TB_t = lagged\,(\Delta TB_t, \Delta RER_t, \Delta Y_t, \Delta Y_t^*) - \lambda u_{t-1} + v_t \tag{8}$$

where u_{t-1} represents the residual term at *t-1* in long term.

Both, Engle-Granger Test and Vector Error Correction Model (VECM), are test for whether the long-run relationship exists in equation only. Following the work of Shirvani and Wilbratte (1997), Baharumshah (2001), Onafowora (2003), Gomez and Alvarez-Ude (2006), Johansen-Juselius test is used to perform hypothesis tests about the number of the long-run relationship exists in equation. To use Johansen-Juselius's method, the Vector Autoregressive (VAR) of the form needed to turn first,

$$Z_t = \beta_1 Z_{t-1} + \beta_2 Z_{t-2} + K + \beta_k Z_{t-k} + v_t, \qquad t = 1, K, T \tag{9}$$

into a Vector Error Correction Model (VECM), which can be written as

$$\Delta Z_t = \Pi Z_{t-k} + \Gamma_1 \Delta Z_{t-1} + \Gamma_2 \Delta Z_{t-2} + \ldots + \Gamma_{k-1} \Delta Z_{t-(k-1)} + v_t \tag{10}$$

The test for cointegration between the *Z* is calculated by looking at the rank of the *Π* matrix via its eigenvalues. The rank of a matrix is equal to the number of its characteristic roots (eigenvalues) that are different from zero. *Π* represents how many linear combinations of Z_t are stationary. The vector Z_t included of trade balance (*TB*), real exchange rate (*RER*), domestic income (*Y*) and foreign income (*Y**). Thus, $Z_t = [TB\ RER\ Y\ Y^*]$. We have chosen the number of lags based on Akaike Information Criterion (AIC) and Schwarz Criterion (SIC). Next, following Johansen-Juselius's approach, the number of cointegrating equilibrium relationship between the logarithms of trade balance, domestic and foreign national income and real exchange rate should be tested. Two statistics for cointegration used: the trace statistic, λ_{trace}, and the maximal-eigenvalue statistic, λ_{max}. Both test statistics are the estimated value for the *i*th ordered eigenvalue from the *Π* matrix. The *r* set from zero to $k-1$, where $k = 4$ (*k* represents the number of endogenous variables in this research).

For trace statistic, the test statistic for cointegration is formulated as

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^{g} \ln(1 - \hat{\lambda}_i)$$

where *T* represents the sample size, *r* represents number of long run relationship exist, and $\hat{\lambda}$ represents the eigunvalue. For trace statistic, the null hypothesis is the number of cointegrating vectors is less than equal to *r* against an unspecified alternative. If λ_{trace} equal to zero, all the λ_i equal to zero, so it is a joint test.

For maximal-eigenvalue statistic, the test statistic for cointegration is formulated as

$$\lambda_{max}(r, r+1) = -T \ln(1 - \hat{\lambda}_{r+1})$$

The null hypothesis for maximal-eigenvalue statistic is the number of cointegrating vectors is *r* against an alternative of $r + 1$.

Before forecasting with the final model, it is necessary to perform various diagnostic tests to verify the adequacy of representation of the model. To test the parameter, the t-test is used. In order to test the direction of causality between two variables, the Pairwise Granger Causality Test is used. For analyzing the residual, Portmanteau Autocorrelations (Q) test, Autocorrelation LM (LM) test, White heteroskedasticity (White), and Jarque-Bera residual normality test via Cholesky (JB_{CHOL}) and Urzua (JB_{URZ}) factorizations are applied. Impulse response analysis provides the information about interaction among the variables in the system, therefore used for forecast purpose. Impulse response functions seek the effects of a shock to endogenous variable on the other variables in the system. According to Gomez and Alvarez-Ude (2006), the impulse response function map out the dynamic response of trade balance to Cholesky one standard deviation real exchange rate innovation. Following works of Baharumshah (2001), Akbostanci (2002), Onafowora (2003), Sugema (2005) and Gomez and Alvarez-Ude (2006), Impulse Response Function used to determine whether J-curve theory exists in Malaysia.

5. Research result

Table 1 reports the results of the ADF tests and PP tests for unit root on both the level and the first difference of the variables (for all tables, refer Appendix). The null hypothesis in ADF tests and PP tests are that the variables follow a difference stationary process is tested. Both ADF tests and PP tests show that *ln RER* and *ln Y* are integrated of order one in levels, I (1), and *ln TB* is stationary in level form, I (0). The result of ADF test shows that *ln Y** is integrated of order two in levels, I (2), in intercept without trend model; however, the result of PP test shows that *ln Y** is integrated of order one in levels, I (1), in intercept without trend model. In order to confirm the number of order integration for *ln Y**, the Kwiatkowski-Philips-Schmidt-Shin (KPSS) test was used. The null hypothesis in

KPSS tests is that the variables follow a stationary process is tested. The KPSS result shows that *ln Y** is integrated of order one in levels, I (1) in intercept without trend model (see Table 2). In conclusion, the test statistics indicate that *ln RER*, *ln Y*, and *ln Y** are integrated of order one in levels, I (1), while *ln TB* is stationary in level form, I (0).

The Engle-Granger long-run cointegration test the multivariate system to see whether there exist any linear combinations of the four variables that have common trend. In result, the error term in long run, u_t, is stationary in level form, I (0) (See Table 3). This means that has linear combinations between *ln TB*, *ln RER*, *ln Y* and *ln Y**. Thus, we conclude that long-run relationship exists between the variables in the model. The long term effect of trade balance on the normalizing variable is explained by the coefficient of variable in the cointegrating vector after normalizing for trade balance (see Table 4). The positive sign on the real exchange rate (*RER*) variable represents a devaluation of currency causes an improvement in trade balance in long run. Based on classical theory, the sign on domestic income (*Y*) to domestic trade balance is uncertain, it's depending upon whether it represents the level of economic activity or it may also be seen as a supply variable measuring the supply of exportable**.** The positive sign on the domestic income represents an increase in domestic income leads to an improvement in trade balance in the long run. Usually, the sign on the foreign income (*Y**) to domestic trade balance should be positive. Theory suggests that the volume of exports (imports) to a foreign country (domestic country) ought to increase as the real income and purchasing power of the trading partner (domestic economy) rises, and vice versa. However, the result shows that the negative sign on the foreign income (United States) implies that a rise in foreign income leads to a decrease domestic trade balance. This maybe because the rise in foreign real income is due to an increase in the foreign production of import-substitute goods, thus, their imports may decline as income increases.

After estimated the long run relationship between trade balance, real exchange rate, domestic income, and foreign income, the error correction model (ECM) used for estimation. Based on result, lag one is chosen based on Akaike Information Criterion (AIC) and Schwarz criterion (SIC). All variables (excluded constant term) is statistically significant at 95% confidence level. The result of error correction model (ECM) shown as:

$$\Delta \ln TB_t = -0.0295 + 0.2411 \Delta \ln TB_{t-1} + 0.2572 \Delta \ln RER_{t-1} - 0.6481 \ln Y_{t-1} + 1.2616 \Delta \ln Y^*_{t-1} - 0.5237 u_{t-1}$$
$$t = (-0.8631)\ (2.0837)^*\qquad (1.7934)^*\qquad (-3.5955)^{**}\qquad (2.3071)^*\quad (-4.9323)^{**}$$

where *, ** denote significance at the 5% and 1% level of significance respectively.

The result of diagnostic checking shown that well-behaved residuals in all period (see Table 5). The result of Pairwise Granger Causality shown that there is evidence statistically Granger causal effect running from the real exchange rate to the trade balance at 10 percent level. There has unidirectional causality from the real exchange rate to the trade balance exists. These result also suggest that the direction of causality is from the domestic income to the trade balance is significant at 1 percent level. There also shown that unidirectional causality from the domestic income to the trade balance exists. These results also shown that there is evidence statistically Granger causal effect running from the foreign income (United States) to the trade balance at 5 percent level and unidirectional causality from foreign income (United States) to trade balance. Since the Johansen-Juselius test is quite sensitive to the lag length selected, the most commonly used criterions such as AIC and SIC are utilized to determine the proper lag length, all of which suggest that one lag be included. The results of the Johansen-Juselius test are reported in Table 6. In Trace test, it indicates one cointegrating equation at the 5% and 1% level. In Max-eigenvalue test, it indicates one cointegrating equation at the 5% and no cointegration at 1% level.

Impulse response function used to provide information about the short-term responses for trade balances. To test whether J-curve effects exist in Malaysia, we examine the response of trade balance to innovation in real exchange rate. If the response of trade balance to depreciation has shown a J-shape indicating that J-curve effects exist in Malaysia. This means that depreciation would worsen the trade balance first and then having improvements in trade balance after several periods. The impulse response function of trade balance to shock in the real exchange rate is shown in Figure 1. From Figure 1, we know that trade balance increases quickly to respond the innovation due to depreciation in next two year. After that, trade balance has improved slowly down from year 2 to year 7. And then, the shock has continuing effect permanently. From Figure 1, the impact does not follow the classical J-curve pattern. Thus, J-curve hypothesis is invalid for Malaysia case.

6. Conclusion

In order to test whether Marshall-Lerner condition and J-curve effects exist, this research studied the short run and long run effect of the real exchange rate on the Malaysian trade balance in a dynamic model. In this research, the results support the empirical validity of the Marshall-Lerner condition through VECM, indicating that depreciation has improved the trade balance. This result has further confirms through the empirical work reported by Baharumshah (2001). The empirical work for different set of countries that reported by Shirvani and Wilbratte

(1997), Sugema (2005), Akbostanci (2002) and Thorbecke (2006) are also suggested Marshall-Lerner condition exists.

However, VECM analysis does not find the evidence of the short term worsening of trade balance suggested by the J-curve effects. Thus, by using impulse response functions, the result show that Malaysian trade balance has not followed the J-curve pattern of adjustment or in another words, the result show no evidence for the J-curve hypothesis. This result is consistent with Baharumshah (2001). The empirical work for different set of countries that reported by Rose and Yellen (1989), Akbostanci (2002), Ahmad and Yang (2004), Gomez and Alvarez-Ude (2006), also suggested that no evidence of J-curve effects.

As implication, in order to achieve the desired effects on trade balance, the countries should depend on policy that focusing on the variable of real exchange rate, which is the nominal exchange rate to aggregate price level. At the same time, the devaluation-based policies (affected through changes in nominal exchange rate) must cooperate with stabilization policies (to ensure domestic price level stability) to achieve the desired level of trade balance. However, devaluation-based policies had caused some problem. Devaluation-based policies would cause increases in the cost of import. This might lead to import inflation that would damage the domestic firms that use imported inputs. Besides that, the devaluation-based policies may not effective in improving trade balance if other countries also apply the devaluation-based policies at the same time. On the other hand, the countries should implement the policy that focuses on the production of imported-substituted goods. Import-substitution policy may work well in improving domestic income and trade balance.

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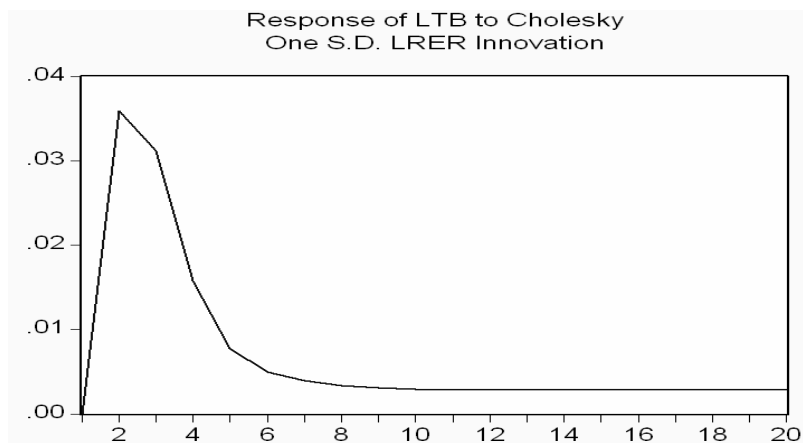

Figure 1. Response of LTB to Cholesky One S.D. LRER Innovation

Appendix

Table 1. Testing for Unit Root (ADF & PP test)

	ADF stat.		PP stat.	
	Intercept	Intercept	Intercept	Intercept
Variables	& no trend	& trend	& no trend	& trend
ln TB	-4.0302**	-3.9965*	-4.0030**	-3.9081*
	(0.0027)	(0.0151)	(0.0029)	(0.0187)
ln RER	-0.8049	-2.2823	-0.6402	-2.2851
	(0.8091)	(0.4355)	(0.8520)	(0.4341)
ln Y	0.6961	-2.7771	0.5595	-2.8662
	(0.9910)	(0.2122)	(0.9872)	(0.1818)
ln Y*	-1.0674	-0.4965	-0.8322	-0.7387
	(0.7215)	(0.9806)	(0.8012)	(0.9644)
Δ*ln TB*	-4.8441**	-4.8861**	-8.9251**	-8.8943**
	(0.0003)	(0.0014)	(0.0000)	(0.0000)
Δ*ln RER*	-7.3252**	-7.2673**	-7.5435**	-7.6354**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Δ*ln Y*	-5.7823**	-5.7587**	-5.7317**	-5.7092**
	(0.0000)	(0.0001)	(0.0000)	(0.0001)
Δ*ln Y**	-2.0718	-4.2251**	-4.2324**	-4.3117**
	(0.2566)	(0.0082)	(0.0015)	(0.0065)

Note: *, ** denote significance at the 5% and 1% level of significance respectively.

   ( ) denotes the p-value.

Table 2. Kwiatkowski-Philips-Schmidt-Shin (KPSS) test (Intercept without trend)

Variable	KPSS Stat.	1%CV	5%CV	10%CV
Δ*ln Y**	0.2514	0.7390	0.4630	0.3470

Note: 1%CV, 5%CV, and 10%CV   stand for 1% critical values, 5% critical values, and 10% critical values.

Table 3. Result of Engle-Granger Test

Variable	ADF stat.	
	t-statistic	Prob.
u	-3.9711	0.0002

Table 4. Estimated Cointegrated Vectors in Johansen

	ln TB	*ln RER*	*ln Y*	*lnY**	*Constant*
Msia/US	-1.0000	0.0851	0.0992	-0.1324	0.0401

Note: The estimated coefficients were obtained by normalizing the trade balance variable.

Table 5.Diagnostic Checking

A. Residuals-Diagnostic Views

H_0: non autocorrelation		H_0: normality		H_0: homoscedasticity
Q	LM	$JB_{Chol.}$	$JB_{Urz.}$	White
18.95	13.70	184.68	323.46	230.56

B. Pairwise Granger Causality Result Based on VECM [Msia/US(lag 1)]

x^2-statistics (p-value)

	$\Delta ln\ TB$	$\Delta ln\ RER$	$\Delta ln\ Y$	$\Delta ln\ Y^*$
Dependent Variable				
$\Delta ln\ TB$	-	3.21(0.07)[*]	12.92(0.00)[***]	5.32(0.02)[**]
$\Delta ln\ RER$	0.11(0.73)	-	0.00(0.99)	0.07(0.78)
$\Delta ln\ Y$	0.20(0.64)	0.75(0.38)	-	1.95(0.16)
$\Delta ln\ Y^*$	0.30(0.58)	0.10(0.91)	0.04(0.82)	-

Note: The x^2 (Wald) statistics for the joint significance of each of the other lagged endogenous variables in that equation. ( ) denotes the p-value. *, **, *** denote significance at the 10%, 5% and 1% level of significance respectively.

Table 6. Testing for Cointegration (Full Sample) lag 1

H_0	H_1	5%CV	1%CV	**Trace stat.**
r≤0	*r*>0	47.21	54.46	57.4729**
r≤1	*r*>2	29.68	35.65	26.4101
				λ Max
r=0	*r*=1	27.07	32.24	31.0627*
r=1	*r*=2	20.97	25.52	16.4820

Note: * (**) denotes rejection of the hypothesis at 5 %(1%) level. 5%CV and 1%CV   stand for 5% critical values and 1% critical values. Chosen r to denote number of cointegrating equation under both tests.

A Research on Problems and Countermeasures of

Logistics Outsourcing for Enterprises in China

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Abstract

Logistics outsourcing, as a form of outsourcing, not only adapt to the requirements of the economic situation but also can bring the economic benefits for enterprise, however, it is not a common phenomenon in China. The aim of this paper is to put forward several suggestions for Chinese enterprises by analyzing the problems existing in the development of logistics outsourcing.

Keywords: Logistics outsourcing, Problems, Countermeasures

1. Introduction

Logistics outsourcing originated in the 1980s. After more than 20 years of development, it has become a certain number of industries in developed countries. According to the data surveying on 500 large enterprises of manufacturing business from a body in the United States, 65 percent of the domestic logistics businesses had done by the third-party Logistics Company in the United States in 2002, it would be 77 percent if international logistics outsourcing is included. At present, the proportion of the third-party logistics in the whole logistics market is nearly as high as 76 percent in Europe and is nearly 80 percent in Japan. However, there is still a big gap compared with developed countries because of many reasons such as imperfect management system and so on although the logistics industry has had a relatively rapid development in recent years in China.

2. The problems of logistics outsourcing for enterprises in China

Chinese enterprises have to face many troubles and risks in the course of logistics outsourcing, they are as follows:

2.1 Logistics management system is not perfect

The logistics management system was ignored. The majority of the Chinese enterprises think it is not important to establish their own logistics management system after they outsourced their logistics to a professional logistics company, in fact, it is wrong. Enterprises should establish a set of internal logistics management systems regardless of whether they had outsourced their logistics to the logistics provider or not. Logistics outsourcing is only a form of enterprise logistics, therefore, enterprises should put the activity of the third party below their own management model, so that they can manage and control logistics businesses effectively.

The logistics information management lags behind. At present, many enterprises still remain in the era of pens and paper in the course of logistics management, the management level is far beyond information and networking although some companies equipped with computers, which hindered the further development of Chinese logistics outsourcing seriously.

2.2 A lack of understanding for logistics outsourcing and decision-making mistakes

Many Chinese enterprises lack the concept of modern logistics, in addition to some of the emerging private enterprises, most of state-owned enterprises still adopt the previous mode of operation of logistics management to meet their demands by the way of   self-sufficient. Up to now, about 70 percent of Chinese enterprises actualize self-logistics. Among these enterprises, most of them have their own transport, warehousing and other departments or companies, they usually spend large amounts of money to establish their own logistics subsidiaries regardless of whether they are capable of logistics management, thus competitiveness for these enterprises is reduced greatly.

In addition, the leadership of the enterprise which outsourced their logistics to the logistics provider defined the scope of outsourcing by the report of the relative sectors. However, they don't consider whether the decision of logistics outsourcing they made are fit for the overall development strategy of the enterprise, it turns out to be that the decision-making is often far from reality.

2.3 Uncertain risks of logistics provider

On the one hand, the enterprise may loss their information resources, core technologies, even the commercial secrets may be let out, because of poor credit of the third party and their "disloyalty" to the corporate; On the other hand, logistics provider may abuse their power to damage the benefits of the enterprise, especially there are many obstacles of exchange of information between them. In addition, it is quite possible that logistics providers raise the price but provide poor services relatively for their own interest under the situation of weakened control for them.

3. How to solve the problems of logistics outsourcing for enterprises in China

According to the problems of logistics outsourcing existing in the enterprises in China, several coutermeasures should be taken as soon as possible, they are as follows:

3.1Make strategic objectives of the enterprise and make relative logistics outsourcing decision-makings

The enterprise should understand that it is important and necessary to outsource their logistics to the third party, they should analyze the situations of their own logistics before they do that, and discuss whether the logistics are their core competencies and whether they could bring external strategic interests to them. In fact, logistics outsourcing is not a strategy to the enterprises itself but the way to achieve the strategy. If they decide to outsource their logistics they should analyze which kind of business can be outsourced to the professional logistic company and which kind of business should be reserved for internal management. Meanwhile, they should determine whether they can find several capable providers so that they can choose among them flexible, otherwise, the strategy of outsourcing will bring many tough problems instead of cutting the cost. In the end, the enterprise should estimate the total cost of logistics before outsourcing. Only after a detail audit of the total cost carried out, they then could estimate the cost of logistics reduced.

3.2 Establish a set of effective management systems of logistics

The enterprise should strengthen the structures of management and organization and the design process so that they can establish a set of effective management system of logistics. The idea that all the business about logistics should only be done by the third party is mistaken. In fact, it is vital that enterprises and the third party formulate the relevant processes, make many operational standards which provide the standard for testing whether the third party can meet their requirements, and identify the channels for information communication together.

3.3 Communicate and manage effectively for forming a win-win strategic cooperative relationship

Firstly, it doesn't mean that enterprises can enjoy good services absolutely from the third party they chosen, on the contrary, they should manage and communicate with the third party effectively. But generally speaking, enterprises should take appropriate logistics management strategies so that they can control the third party flexible to some extent.

Secondly, many problems can be generated in the process of cooperation daily between the enterprise and the third party, most of them can be attributed to the miscommunication. Therefore, the two sides should establish an open-exchange mechanism in order that they can communicate frankly under a kind of institutional and relax circumstances, and solve all the problems appeared in cooperation effectively as soon as possible.

At last, the enterprise should take a long-term view if they want to choose fit model of logistical operation to meet their management strategy. The role of outsourcing for enterprises is not only to achieve the lower costs but also to get value-added benefits. In fact, only think about logistics outsourcing with a spirit of greater motivation and adventure, can the enterprise find its real value. Therefore, to get value-added benefits, it is necessary to improve the competitiveness and profitability of the whole enterprise by the way of innovation of the supply chain. In the end, strategic partnership of co-ordination having common goals, sharing common interests and risks should be established by two sides as soon as possible.

4. Conclusions

With the rapid economic development and increasing competition in the logistics market, it is an inevitable trend of logistics outsourcing, however, the road of outsourcing is a long-term and tortuous process. In general, 3PL is a kind of superior logistics pattern, because it is favorable not only to concentrate on developing business for enterprises and enhance their core competitiveness, but also to reduce the cost and improve the efficiency. We can say, to some extent, it has a kind of integrated advantages. However, the process of adopting the decision-making of logistics outsourcing for enterprises is complex because enterprises have to consider and analyze the whole business development strategy and internal overall strength so that the decision-making they made can adapt to the development of the company. Therefore, enterprises should make a reasonable and prudential decision-making of logistics rather than outsourcing their logistics to third-party logistics blindly. At the same time, enterprises once selected a third-party logistics company, the cooperation with them is also a long-term and run-in process, and

therefore, enterprises should manage and control the third party effectively so that 3PL can truly play a good "third-party source of profits".

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The Model of Expansion from Local

Enterprises to Multinational Enterprises

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Abstract

Multinational enterprises (MNEs) are playing more and more important roles in the development of world economic. A relative small set of multinational enterprises account for most of the world's trade and investment (Rugman and Verbeke, 2004). Indeed, the largest 500 MNEs account for over 90% of the world's stock of foreign direct investment (FDI) and they, themselves, conduct about half the world's trade(Rugman, 2000).

The empirical evidence, however, shows that MNEs are more regional than national versus global. "Data on the activities of the 500 largest MNEs reveal that very few are successful globally. For 320 of the 380 firms for which geographic sales data are available, an average of 80.3% of total sales are their home region of the triad, this means that many of the world's largest firms are not global but regionally based, in terms of a balanced geographic distribution of sales across the triad." (Rugman and Verbeke, 2004).

Therefore, it is very significant to study where the regional impact is on multinational management. In this paper, I will discuss the model of expansion from local enterprises to multinational enterprises and how the regional factors affect enterprises operations.

Keywords: Multinational enterprises (MNEs), the triad region, Globalization, regional factors, Expansion Model

1. Fundamental Definitions

Before we go further, we should, first, make a clear definition of MNEs (Multinational Enterprises), globalization, and regional triad.

1.1 MNEs (Multinational Enterprises)

The MNEs is defined as a firm with value-added activities in at least two countries.(Rugman and Verbeke, 2001)

1.2 The triad region

In 1985 Kenichi Ohmae, a Mchinsey consultant in Japan, firstly defined the triad as "a geographic space consisting of the United States, the EU and Japan. However, in this paper, we use a broad triad." (Rugman and Verbeke, 2004)the broad triad consists of NAFTA, the expanded EU and Asia.

NAFTA: North American Free Trade Agreement.

EU: consisted of 25 countries in 2004.

Asia: "in November 2002, China agree to a free trade agreement with the ten members of the association of south east Asian nations (ASEAN), signaling a wide trade ans investment agreement for Asia. In September 2003, India and the ASEAN members agree to forge a free trade area by 2012, while Japan and ASEAN agreed to begin negotiations on far-reaching trade and investment liberalization by 2005." (Rugman and Verbeke, 2004)

1.3 Globalization

The definition of globalization is very critical in this paper. It is a blurred word. There are many definitions for globalization. Such as economic and business school professor defines globalization as "the activities of multinational enterprises engaged in foreign direct investment and the development of business networks to create value across national borders". While other scholar such as Giddens gave a very different definition: "globalization is political, technical and cultural, as well as economic" (Giddens 1999, p.10). Obviously, we can not distinguish regional enterprises from global enterprises based on these definitions. Because the first is too narrow but the latter is too broad. In this paper, we adopt Rugman and Verbeke's (2004) definition of globalization: having sales of 20% or more in each of the three parts of the triad, but less than 50% in any region of the triad.

2. The Empirical evidence of region

Rugman and Verbeke's (2004) have classified the top 500 MNEs into global, bi-regional, host region oriented, and host region oriented. They concluded that only nine of the MNEs are global. Other MNEs are regional. It means that most MNEs do not have a balanced distribution of sales across the three triads. They either focus on one reign or two reigns.

Table 1. Classification of the top 500 MNEs

Type of MNEs	No. of MNES	Percentage of 500	Percentage of 380	Percentage intra-regional sales
Global	9	1.8	2.4	38.3
Bi-regional	25	5	6.6	42
Host reign oriented	11	2.2	2.9	30.9
Home region oriented	320	64.0	84.2	80.3
Insurfficient data	15	3.0	3.9	40.9
No data	120	24		NA
Total	500	100	100	71.9

Data are for 2001.

Source: Braintrust Research Group, the regional nature of global Multinational Activity, 2003 (www.braintruststreseach.com) NA: not available

The data in table 1 told us that MNEs do not easily penetrate the three triads evenly, and intra-regional sales are easier than inter-regional sales. Obviously, there are some regional factors affecting a MNE to become global.

3. The evidence of conflicts among triad regions

The regional focus partly resulted from MNEs regional strategies because some of them merely want to establish a dominant position in their home regional market, but also from the conflicts among triad regions that prohibit MNEs entering these three regions equally.

The success of regional and bilateral agreement and the failure of multilateral agreements, such as the Organization for Economic Cooperation and Development's (OECD) multilateral agreement on investment (MAI) and the lack of progress at the World Trade Organization (WTO) in setting new agendas for trade and investment liberalization, are signal of the problems of globalization and the power of closed regional/triad blocs. (Rugman 2001,P3)

Triad regions are attempting to stimulate intra-trade and investment and be against "outsiders" by setting up regional policies and regulations. They adopted nontariff barriers to trade and investment to limited access to their internal markets and/or give preferential access to certain partners I return for reciprocal advantages. Examples of nontariff barriers include rules origin, discriminatory health and safety code used to keep out argricultural products, new environmental regulations in European Union and the North American Free Trade Agreement, exempted sectors from the principle of national treatment (such as culture, education, health, etc), poorly administrated anti-dumping and countervailing duty laws, and so on. Many U.S. restrictions are aimed at Japanese and European competitors, and vice versa.

Exports in the broad triad
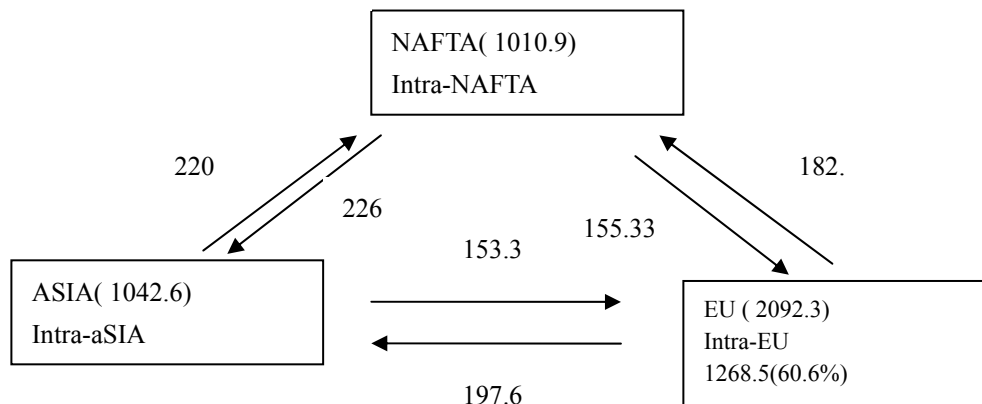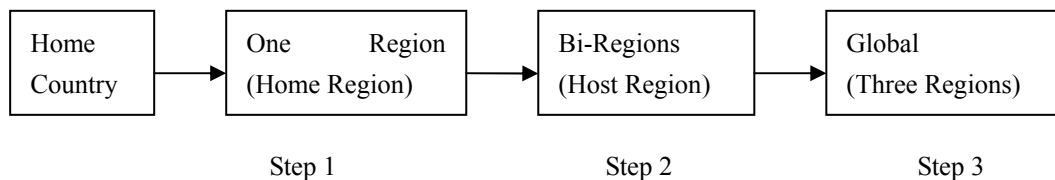

Note: Data are for 1997, in US$ billion.
Source: International Monetary Fund, Direction of Trade Statistics

For example, according to data for 1997, the triad's export total was US$ 4,145.8 billion, with 60.6 per cent of the EU exports of US$ 2,092.3 being internal, at US$ 1,268.5 billion. The EU exports only 8.7 per cent to NAFTA (US$ 182.1 billion) and 9.4 per cent to Asia (US$ 197.6 billion). NAFTA exports 15.4% per cent of its total to the EU (US$ 155.3 billion) and 22.4 per cent to Asian (US$ 226.0 billion). Asia exports 21.1 per cent of its total to NAFTA (US$ 220.0 billion) and 14.7 percent to the EU (US$153.3 billion).

4. Expansion Models of MNEs

When a company decides to become a multinational company, how will it expand abroad in terms of region? Totally there are four models it can adopt.
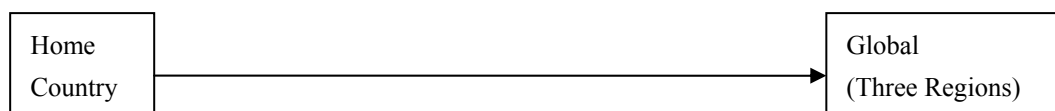
Model 1

| Home Country | → | One Region (Home Region) | → | Bi-Regions (Host Region) | → | Global (Three Regions) |

Step 1   Step 2   Step 3

Model 2

| Home Country | → | One Region (Host Region) | → | Bi-Regions (Other Host Region or Home Region) | → | Global (Three Regions) |

Model 3

| Home Country | → | Bi- Regions | → | Global (Three Regions) |

Model 4

| Home Country | → | Global (Three Regions) |
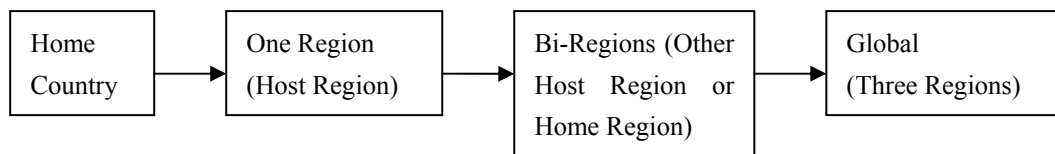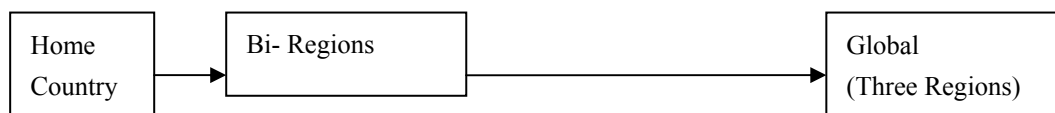
Many MNEs adopted Model1. It will need three steps to become a global company from a local one. MNEs will build upon the strong home base diamond characteristics of the Unite States, the European Union, or Japan and use the appropriate triad market as a staging ground for activities in other markets.(Rugman, 2001) But the great majority of MNEs sales are from its home traid. The home triad region sales weighted averages are as follows: (Rugman and Verbeke, 2004)

(1) home region oriented (320 firms) :80.3%

(2) bi-regional (25 firms): 42%

(3) host region oriented(11 firms): 30.9% ;and

(4) global (9 firms) :38.3%

In this process, they carefully analyze costs, revenues, factor conditions, growth potential, political risk, cultural factors, and environmental issues.

The problem is that why most MNEs adopted Model 1 instead of other Models. This is also told us that there is some regional factors rather than global factors affecting MNEs's operation. Up to now, there are only nine global companies. The study shows that only consumer electronics and high-value-added goods with low transport costs can approach being global. (Rugman 2001, P2)

5. Regional Factors affecting MNEs operations

The analysis above has showed that a MNEs's manager should not think merely in terms of the nation-state-global market dichotomy, he should think about triad regions and regional factors. Here I will divide regional factors into internal factors and external factors.

Internal factors are the factors that MNEs can control, such as MNEs strategy and structures.

5.1 Strategy

The MNEs need different competitive strategies if they are in the different markets position in the various regions. "a leadership role in one market may require different patterns of decisions and actions than the role of a (perhaps ambitious) junior player in other market. These differential roles should then be reflected in the deployment of specific combinations of non-location-bound and location-bound FSAs in each region."(Rugman and Verbeke's, 2004)

5.2 Structure

MNEs strategy, intra-regional or inter-regional sales, and upstream or downstream activities will determine MNEs's structure. A good MNEs structure should serve MNEs regional strategy, and maximize FSAs in that region.

Regional headquarters are an important regional component in MNEs organizational structure. The other elements are organizational physiology and psychology. These regional elements "may increase the difficult of managing multidivisional (M-form) companies, as performance evaluation should be differentiated for units operating in the various regions, even within similar businesses, given the enormous differences in environmental circumstanced faced by the affiliates in each region". (Rugman and Verbeke's, 2004)

External factors is the factors that MNEs can not control but will affect MNEs's operation and management, such as social , political and economic factors.

When MNEs decide to venture into other regions from home triad region, they may face a liability of regional foreignness, including several additional risks that were absent in the host region and may be of an economic, cultural, administrative or geographic nature.

5.3 Regulations and policies

Government regulations and policies differences are major factors affecting MNEs's operation. Inter-triad business is likely to be restricted by government-imposed entry barriers. The EU and the US are likely to fight trade wars and respond to domestic business lobbies seeking shelter in the form of subsidies and/or protection. Moreover, there are significant health care and political differences between Triad regions, but far fewer within them. therefore, most of the advantages of standardization that can often be achieved within the home triad region may be lost or transferred into disadvantages in host triad regions.

5.4 NGOs

The nongovernmental organizations also challenged the MNEs. The NGOs are new and powerful actors on the stage of international business. (Rugman, 2001). NGOs have defeated the OECD's multilateral agreement on investment (MAI).

5.5 Environmental protection

Over the past decade the number of trade disputes arising from such environmental regulations and coalitions has increase sharply. Environment disputes are a global problem but are resolved regionally (Rugman, 2001). For example, in NAFTA triad region, they signed North American Agreement on Enviromental Cooperation(NAAEC), which created three surveillance and enforcement mechanisms to constrain national environmental regulatory activity that affects trade.

5.6 Culture

Culture differences have a great influence on MNEs operations. Culture differences lead to different demand conditions. A commodity that is best seller in home region may be rejected in other triad region. For example, the car designs that are popular in one area of the world are often rejected by customers in other geographic areas

5.7 Rivalry

Competitions vary in three triad regions. A MNE which is the biggest company in its home region may be a very small one in the host region. Obviously, this needs the MNEs's subsidiary to adopt different strategy and structure

from its parent company. Another disadvantage for newcomers is that they will cost much time and money to satisfy local regulations and policies.

6. The implications of studying regional factors

The purpose of MNEs going abroad is to pursue low cost or differentiation competitive advantages. In order to achieve their targets, MNEs must carefully deal with:

How they transfer country NLB and LB FSAs (firm-specific advantage) to regional NLB and LB FSA.

How they take advantage of regional-specific advantages

What entry model they should adopt when they decide to touch triad region.

6.1 How they transfer country NLB and LB FSAs (firm-specific advantage) to regional NLB and LB FSA.

MNEs should design strategies on a regional basis. They are responsive to local consumers, rather than global and uniform. Therefore, they also should analyze their location-bound and Non-location-bound FSAs in term of region. It means MNEs should extend the concept of NLB and LB FSAs across national borders to geographic region, namely regional bound. While new regional-bound FSAs need regional integration. "Hence regional integration creates both a threat and an opportunity for MNEs as they need to complement the conventional bundles of non-location-bound FSAs and location-bound FSAs with a set of region-bound FSAs." (Rugman and Verbeke's, 2004)

FSAs (firm-specific advantage): there are two types of FSAs: non-location-bound (NLB-FSAs) and location-bound ones(LB-FSAs). The former are defined as FSAs that can be exploited globally and lead to benefits of scale, scope or exploitation of national differences.   While location-bound FSAs can be defined as FSAs that benefit a company only in a particular location (or set of locations), and lead to benefits of national responsiveness. (Rugman and Verbeke, 1992)

Obviously, NLB-FSAs can be transferred abroad at low marginal costs and used effectively in foreign operations without substantial adaptation in view of firm. But whether NLB-FSAs can be transferred abroad successfully also depends on the permission of host country or region. So we should find what factors the host country or region will consider when they permit a foreign company to operate in it.

location-bound FSAs are effective in one location but will be ineffective in other locations. But Location-bound FSAs depends on the definition of location. Location can be referred as a sub nation, a nation, a triad region or two triad regions. Therefore we should detect what factors affecting LB-FSAs's effectiveness.

MNEs should redefine their location-bound and non-location bound FSAs in terms of region. Some location-bound FSAs in their home country may still be LB FSAs in region (such as Process 1 in table 2) or may not (such as Process 2). While some NLB FSAs in their home country may turn into LB FSAs in region (such as Process 3) or may still be NLB FSAs (such as Process 4).


Table 2.

Table 2 also can interpret why many MNEs adopt Expansion Model 1: home country---home region—other region. Obviously, more location-bound and non-location-bound FSAs in home country are effective in home region than host region due to external factors.

6.2 How can MNEs take advantage of regional-specific advantages?

When MNEs are in home country, they have Country-specific (or locational) advantages (CSAs), "which state that some benefits are associated with locating certain activities in particular countries. These benefit may arise from (a) structural market imperfections such as government regulation(Rugman et al, 1985) and (b) the potential to economize on

transaction costs by reducing risks and to benefit from local opportunities(Rugman 1990)" (Rugman and Verbeke, 1992).

when MNEs operate in a region, MNEs' managers set up strategy or business structure based on regional-specific advantages not Country-specific advantages. So they should think regional regulations rather than country's regulations. And they should think regional transaction cost, risks and benefits from regional opportunities. Home region commonly have similar regulations with home country. So MNEs can have more regional-specific advantages in home region than host region. Certainly, they not only reduce transaction costs but also reduce risk because they are more familiar with home regional market than host region.

6.3 What entry model should they adopt when they decide to touch triad region.

MNEs have relative benefits associated with different entry models (e.g., exports, licensing, joint venture, FDI and other forms of investment) when serving foreign markets. (Rugman and Verbeke, 1992). But some time what MNEs think is how they can enter a region rather than how efficiently they enter. A related point is that inter-block business is likely to be restricted relative to intra-regional sales by government imposed barriers to entry. For example, the E.U. and the United States are likely to fight trade wars and be responsive to domestic business lobbies seeking shelter in the form of subsidies and/or protection. Cultural and political differences among members of a single triad region may remain, but these will mostly be less significant than across triad regions, Rugman (2000). Value added through aggregation, in the sense of exploiting similarities across coutries (Ghemawat, 2003), can be achieved in the home region but appears difficult across regions. **(**Rugman and Verbeke's, 2004**)**

7. Case studies

We have tested that many MNEs are more regional than global. Next, I will analyze the strategy and structure of a specific MNE, Wal-Mart, and how the regional factors affecting Wal-Mart's strategy and structure.

7.1 Background of Wal-Mart

Wal-Mart is the world's largest retailer. Sam Walton found the first Wal-Mart store in Rogers, Arkansas in 1962. Wal-Mart's international expansion began in 1992, when it entered into a joint venture with Cifra S.A., a successful Mexican retailer. In 1998, it acquired a controlling interest in Cifra and officially changed the company'sname to Wal-Mart of Mexico. Since 1992, it has also expanded into eight other international markets: Argentina, Brazil, Canada, China, Germany, South Korea, Puerto Rico, and the UK. In the year ending of 2002, its revenue was almost $218 billion.

7.2 Regional-based Wal-Mart

Wal-Mart is a regional, not a global business. There are two arguments to back up this conclusion.

First, most its stores located in NAFTA triad region. For example, at the beginning of 2002, Wal-Mart had a total of 3,989 stores. A total of 3,609 of its stores are in the NAFTA region, with 2985 in the domestic US market, 458 in Mexico and another 166 in Canada. Only 380 are truly "international"—outside Wal-Mart's home triad region, only about 10 percent of its stores.

7.3 Distribution of Wal-Mart Stores

Locations		No. of stores	Percentage of Total
NAFTA 3609 (90.47%)	U.S.	2985	74.9%
	Mexico	458	11.48%
	Canada	166	4.09%
Other regions		380	9.53%
Total		3989	100%

Second, although Wal-Mart became the largest company in term of sales revenues in 2001, its most revenue came from NAFTA. For example, Wal-Mart's revenue was almost $218 billion for the year ending in 2002, ahead of General Motors and Exxon Mobil. But about 83.7percent is from United Stated and only16.3 percent is from international sales. The NAFTA market stands at an estimated 94.1 percent, and only 5.9 percent was from EU and Asia regions.

The revenue of Wal-Mart in 2002

500 Rank	Company	Region	Revenues (US$ bn)	F/T Sales	Percentage Intra-regional	North American Percentage of total sales	Europe Percentage of total sales	Asia-Pacific Percentage of total sales
1	Wal-Mart	North America	219.8	16.3	94.1	94.1	4.8	0.4

Data are for 2001

Source: Braintrust Research Group, the Regional Nature of Global Multinational Activity,2003(www.braintrustreseach. com)

7.4 How do Regional Factors affect Wal-Mart strategy and structure?

Wal-Mart is NAFTA-base business. The locus of its business model strategy and structure is regional and home-based. Its success can be attributed to a scale strategy based on cost reduction, steadily generating its "always low prices" formula and increased physical growth of market share(Alan M Rugman,The regional solution: Triad strategies for multinationals, Executive briefing/international business)

One of Wal-Mart's NLB FSAs is its brands. Wal-Mart is "the world's strongest brands". Each week, about 100 million customers visited a Wal-Mart store somewhere in the world. The company employed more than 1.3 million associates.

But Public outcry against the company is growing stronger. Recently the store has faced censure for paying its employees substandard wages and for hiring illegal aliens(Bob Batchelor , Will Wal-Mart Last Forever (http://www.nybooks.com/articles/17647)) Wal-Mart has to adopt a better strategy to "use its power to become a corporate revolutionary, utilizing its influence to set new merchandising standards as the country continues its shift to a service economy"(Bob Batchelor, Will Wal-Mart Last Forever (http://www.nybooks.com/articles/17647)). It should pay employees better,

One of its LB FSAs is innovation in purchasing and distributing goods, cross-docking. In this logistic system, goods trucked to a distribution center from suppliers are immediately transferred to trucks bound for stores—without ever being placed into storage Cross docking and companion innovations led to lower inventory levels and lower operating costs, which Wal-Mart translated into lower prices(Michael Hammer, Deep Change How Operational Innovation Can Transform Your Company, Harvard Business Review, April 2004, online version.)

But in host region, if the transportation industry are not so developed that cant not back up the cross-docking system, Wal-Mart will can not transfer this LN FSAs into host region.

7.5 Strategy

"Wal-Mart used a "saturation" strategy for store expansion. The standard was to be able to drive from a distribution center to a store within a day. A distribution center was strategically placed so that it could eventually serve 150-200 Wal-Mart stores within a day. Stores were built as far away as possible but still within a day's drive of the distribution center; the area then was filled back (or saturated back) to the distribution center. Each distribution center operated 24 hours a day using laser-guided conveyer belts and cross-docking techniques that received goods on one side while simultaneously filling orders on the other."(Wal-Mart stores, http://mba.tuck.dartmouth.edu/pdf/2002-2-0013.pdf)

Wal-Mart was also aware of the power of customers. Wal-Mart defined its core customers and catering to their needs. One of Sam Walton's wisest decisions was to locate many of his earliest stores in towns with populations of fewer than five thousand people, communities largely ignored by his competitors. This strategy gave Wal-Mart a near monopoly in its local markets and enabled the company to ride out the recessions of the 1970s and 1980s more successfully than its then larger competitors such as K-Mart and Sears.Wal-Mart has also been skillful in providing products that appeal to women with low incomes(Bob Batchelor , Will Wal-Mart Last Forever (http://www.nybooks.com/articles/17647)).

7.6 Structure

Wal-Mart's structure and management system is based on region. Each store constituted an investment center and was evaluated on its profits relative to its inventory investments. Store-level data on sales, expenses, and profit and loss were collected, analyzed, and transmitted electronically on a real-time basis. The data could be analyzed by region,

district, store, department within a store, or even at the level of an item within a department(Wal-Mart stores, http://mba.tuck.dartmouth.edu/pdf/2002-2-0013.pdf)

Conclusion

Most of MNEs are home regional -based companies rather than global companies. One of important reason is influence of regional factors. Home regional factors can bring more advantages than host region's. And MNEs can easily transfer FSAs into regional FSAs. Therefore, MNEs should follow home country—home region—host region model. MNEs's manager must "think regional and act local", and design regional strategy and organization structure that develop triad-based internal know-how capabilities and organizational competences.

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The Implementation of a Computerised

Integrated System in a Public Service Organisation

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Abstract

To survive in a customer focused environment, organisations have had to become more effective and efficient. The promised benefits of integrated systems made their implementation a popular attempt at such success in the private sector. The implementation of integrated systems in the private sector is well documented. However, integrated systems are still a relatively new phenomenon in the public sector. One of the researchers of this paper was working as an accountant, in Cork County Council in Ireland, when it deciding to, and then tendering for, a new computerised integrated system. Recognising the gap in the literature in this regard, and having the opportunity to act as participant observers, the researchers decided this would be a worthy area of research. This study is a descriptive case study examining the decision to implement, and the tendering process for, an integrated system in Cork County Council.

Keywords: Integrated System, Centralisation, Debtor Management, Needs Assessment

1. Introduction

Cork County Council is a local government authority in Ireland. It has three divisions: North Cork, South Cork and West Cork. It is responsible for providing services such as water, refuse, housing and roads to the people of County Cork. It is managed by the County Manager, who is supported by the heads of the various departments. Each of the divisions was responsible for its own billing and receipting. This resulted in diverse billing and receipting procedures. The Head of Finance and the County Manager suggested setting-up of centralised Debtors unit with an integrated Corporate Debtors System. While the centralised debtors unit could deal with the billing, receipting and customer account enquiries, each of the divisions could then focus on service delivery.

In the period from November 2005 to September 2006 the Council decided the type of system it required and tendered for such a system. By May 2007 a new centralised integrated Corporate Debtors System was successfully implemented. The first service to be rolled out on the new Corporate Debtors System was Water, the integrated system will later assume responsibility for other income streams such as Rates, Refuse, Rents, Annuities, Roads and Development Contributions.

One of the researchers was employed by Cork County Council, as an accountant, when the decision was made to implement a new integrated system for the new debtors unit. She was involved in the project throughout the processes of tendering, implementation and training. Having recognised that the implementation of an integrated system in a local government authority was such a major gap in the literature, the researchers decided this would be a worthy area of participatory research.

This paper will first take a look at the literature available on integrated systems and compare and contrast single-vender enterprise resource planning (EPP) systems and Best-of-Breed (BoB) systems. It will also look at the limited literature on integrated systems in the public sector. The next section describes the research methodology chosen. The third section describes the decision to implement an integrated system in Cork County Council and the tendering process for such a system. Finally in the conclusion further areas of research are suggested.

2. Literature Review

Integrated information systems are defined as "the extent to which different operational functions are tied together in the overall system" (Miranda 1999, p11). Integration can be achieved by developing system interfaces which links the software of the separated functions of the organisation (Moriarty, 1999; Chester, 2006). The ultimate in

integrated systems is the single vendor Enterprise Resource Planning (ERP) system. ERP systems are standard consolidated software packages that comprise many, if not all, of the functions of the entire organisation. It is because of this integration of the different business processes of the organisation that ERP systems can provide up-to-date, real-time information to their users (Davenport, 1998; Miranda, 1999; Scapens and Jazayeri, 2003; Newman and Westrup, 2005). The term ERP is therefore a misnomer. ERP systems do connect the divisions of an enterprise and certainly do focus on resources, however they go way beyond planning, they also facilitate financial and operational decision-making and refine reporting (Davenport, 1998, Miranda, 1999; Klaus et al, 2000; Botta-Genoulaz and Millet, 2006; Rikhardsson and Kraemmergaard, 2006). In fact, Davenport (1998) and Rikhardsson and Kraemmergaard (2006) refer to integrated systems as ES (Enterprise Systems) rather than ERP systems (Enterprise Resource Planning).

Replacing all of the existing, separate legacy systems and databases within the business with an ERP system, is not the only way to solve integration problems (Moriarty, 1999; Hyvonen, 2003; Global Supply Chain Conference, 2006; Chester, 2006), a best-of-breed (BoB) strategy can also be implemented. A BoB strategy involves interfacing the 'best' available softwares for each function and therefore they do not automatically share a common database (Miranda, 1999; Moriarty, 1999; Hyvonen, 2003). The functionality required from the system, the ability of your own IT department, the resulting relationship with the vendors and of course the cost, are the major issues you have to examine when deciding between an ERP system and a BoB system. An organisation's integrated systems strategy should be based on its own unique business environment (Griffith, 2000).

2.1 ERP versus BoB

What if the functionality offered by an ERP system does not fulfil the requirements of your organisation?   The options open to you are to either customise the ERP system or look for a BoB package (Hyvonen, 2003; Millman, 2004). Customisation is often frowned upon (Holland and Light, 1999; Nah et al, 2003; Nah and Delgado, 2006) this can be an expensive process and therefore if a company takes this route it is stuck with it. Whereas a BoB package can be amended, deleted or enhanced when and if required.   BoBs tend to focus on a particular business requirement which usually results in greater functionality (Moriarty, 1999; Griffith, 2000; Chester; 2006). However Langnau (2004) writes that while ERP systems may not focus on the particular business requirements "that loss is now viewed as better than trying to tie multiple disparate systems together" (p48).

Therefore another issue is to determine the complexity of the interfacing required by your organisation.   If the interfacing is very complex then ERP systems may take the lead (Geishecker, 1999) as they are promoted for reducing interfaces as the package covers most corporate business applications (Griffith, 2000). However BoBs are a viable option if the "anticipated interfaces consist of passing information back and forth with little or no translation and programming required" (Geishecker 1999, p66). Therefore, in making the decision as to whether to adopt an integrated system or a BoB system, you need to look at the complexity of the interfaces and the corresponding skills and facilities of your own IT department for working with these interfaces (Griffith, 2000; Chester, 2006).

Another important question to ask is do you want to lock yourself into a relationship with a single vendor ERP supplier? If so you have to be aware of the viability and financial status of their potential vendors. Some companies have implemented BoB systems to avoid being tied into one supplier (Botta-Genoulas and Millet, 2006). However, this route results in the maintenance of a greater number of vendor management and sales relationships (Chester, 2006). This may impact on the speed at which technical issues are resolved as vendors cannot be expected to be experts on another firm's products (Chester, 2006).

It is very difficult to compare the cost of an ERP system and a BoB system if they are delivering different functionality. It is important, that you are costing and buying only the features that you need (Chester, 2006). There is a lot of evidence in the literature examined of ERP implementation processes going way over budget. Integration costs such as integrating your new product to your legacy systems and integrating the pieces of BoB set to each other can also be very expensive (Geishecker, 1999; Chester, 2006). Often, training costs for a BoB can be more expensive than for an ERP system (Chester, 2006) due to the intricacies of the individual pieces of software. These life-cycle costs are difficult to estimate but must be included in the comparison of ERP and BoB costs.

Integrated systems adoption is a complex exercise involving not only technology but also fundamental organisational change (Markus and Tanis, 2000; Kumar et al, 2002). In the literature, these systems were initially viewed as a computer topic when in fact it is "very much a people related business subject" (Botta-Genoulas and Millet 2006, p205). Research has revealed that if companies adopt the attitude that "once data is integrated, people will follow" the result can be a failed integrated systems implementation (Botta-Genoulaz and Millet 2006, p218).

2.2 Public Sector

In public sector organisations adoption of new information technology (IT) innovations are affected by government

influence, and political and legal factors (Miranda, 2002; Kumar et al, 2002; Lapsley and Wright, 2004; Ramon Gil-Garcia and Pardo, 2005; Botta-Genoulaz and Millet, 2006). Public sector organisations want to be viewed as service providers that meet the needs of their customers (Miranda, 1999; Lapsley and Pallot, 2000, Ramon Gil-Garcia and Pardo, 2005). Integrated systems promise better quality of service to customers. But as well as improved customer service, the improved functionality of integrated systems also helps to eliminate multiple data entries that were present in stand alone legacy systems, improve working procedures and aid in cost reductions (Miranda, 1999; Kumar et al, 2002; Miranda, 2003; Lapsley and Wright, 2004; Miranda and Kavanagh, 2005; Ramon Gil-Garcia and Pardo, 2005; Botta-Genoulaz and Millet, 2006).

Governments cannot be seen to be spending public money on failed systems implementations (Miranda, 2002). The Irish government spent millions on a PPARS health payroll and personnel system only to have it halted due to systems errors and huge escalating costs (Hunter, 2005). An external examination of the PPARS system claimed that part of the reason for the failed systems implementation was due to not properly defining the business needs of the health sector organisation prior to the system going live (Hunter, 2005).

In order to prevent failed systems implementation the existing legacy systems must be reviewed by looking at their major deficiencies, deciding whether the technology is obsolete, asking is there poor management and poor staff training (Miranda, 2002). Alternatives should then be identified, researched and documented. For public sector organisations, the procurement of an integrated system is not only a huge capital investment, but also a highly political process. In Europe, local authorities must invite tenders for purchases greater than €50,000. The tender document must display details of the organisations requirements and terms of the contract.

The local authority then needs to select a supplier based on the selection criteria (Botta-Genoulaz and Millet, 2006). Once the procurement team selects two vendors from the applications submitted, each vendor should be invited to the government site to meet with the team and have a 'discovery' discussion which allows the "vendors to ask questions and find answers (e.g., number and type of interfaces required and data file dimensions)" (Madden and Miranda 1998, p37). The purpose of this session is to allow the vendors the opportunity to refine the scope/cost of their proposals (Madden and Miranda, 1998). Upon selection of the single vendor the government team must then finalise the terms and conditions of the contract. It is clear that the contract must not be seen as a strait-jacket. It must be sufficiently adaptable to deal with the modern, ever-changing environment of the public sector organisation.

3. Research Methodology

As a result of reviewing the literature available, the researcher recognised a gap which has not yet been adequately covered. Much has been written on successful integrated systems implementation in the private sector, but very little had been written about such an implementation in the public sector. The objective of this paper is to examine, in a Local Authority environment, the decision to implement, and the tendering for, an integrated system.

3.1 Research method

The researchers chose the qualitative single case-study method of research. By concentrating on one Local Authority, an in-depth view of the organisation is provided. Cork County Council was chosen for two reasons. First it represents an excellent example of a typical public sector organisation implementing an integrated system. Second as one of the researchers was employed by Cork County Council it was a unique opportunity for her in relation to access to information and of course access to time. The issue of bias by the researcher had to be examined. This was overcome in two ways. The second researcher was an employee of Cork County Council and thus viewed the research as an external agent and triangulation by use of multiple methods for data collection was used throughout to confirm the findings.

3.2 Research tools

The researchers used both structured and unstructured interviews. The unstructured interviews involved meetings with various people on the project throughout the organisation. The researchers then conducted structured interviews with those directly involved in the project. These interviewees were sent a copy of the proposed interview questions shortly before the interview. Throughout the interviews open-ended questions were used, allowing the interviewees to expand beyond the issues already identified and explore new issues in greater detail.

In this study, one of the researchers, due to her role as a participant observer, had access to internal documents. The documentation types used were tender documents, emails, minutes of meetings, proposals, progress reports, presentations, CD-Roms, and training manuals. These provided confirmation of information obtained from the interviews and they provided more rounded information. The researcher in this study acknowledges the fact that the documents were prepared for a specific purpose rather than for the case study. By bearing this in mind during the

analysis of the case study the researchers were not mislead by the contents of the documents.

4. Decision to Implementing and Tendering Process

Prior to the centralisation of Cork County Council's debtors, it used to operate the Water Debtors Legacy application that was written in-house for each division by Cork County Council's IT staff. This Water Debtors Legacy System was the system which held all the information relating to the customers, such as the billing address and customers' water location address. It also held the invoice charge, receipts figure, refunds and any amendments made to the customers' accounts.

Cork County Council used JD Edwards (JDE) World to produce the Annual Financial Statements. Despite JDE being an ERP system, Cork County Council did not transfer its major services such as Water, Rates, Rents, Annuities and Roads from their respective legacy systems to the JDE AR module due to limited JDE AR functionality. The legacy systems had much more appropriate functionality and movement to JDE AR would have been seen as a backward step.

"The financial information that the AR module provided was too limited in its structure and it was agreed by both the finance department and IT department that a move to the JDE AR module would not be a good management decision". (Note 1)

"Much work was done in investigating whether the JDE AR module could be used to incorporate all of the Councils debtors legacy systems, however it was decided it could not, therefore all the legacy systems were retained until a better solution was found". (Note 2)

Therefore, for these services the General Ledger (GL) module of JDE remained independent of the main Debtors Legacy applications.

As well as the complexity of the billing and receipting processes in multiple division, new pricing policy issues were introduced, pushing Cork County Council towards implementing a new integrated Corporate Debtors System.

4.1 Define the problem

A needs assessment was initiated by the Finance Department in November 2005. It revealed that the existing Water Debtors Legacy Systems were becoming dated and no longer provided enough information such as Debtors Aged Analysis for management purposes. However it did confirm that existing Water Debtors Legacy System had more functionality than JDE could offer. So even though the Water Debtors Legacy Systems had more functionality than JDE, they still could have been improved upon.

The Finance Department expressed a need to have all three divisions of Cork County Council operating in a similar fashion. The three divisions should bill customers in a similar way, amend customers' accounts in a standardised fashion and collect monies from debtors in an equitable manner. These issues drove the need for a solution that would implement consistent and accurate methods for the billing and receipting of water services within Cork County Council.

4.2 Identify and Research alternatives

After examining the existing Legacy Systems, Cork County Council had a clearer vision of what it required from a new system. The next step was to identify and evaluate possible options. Four options were identified and evaluated:

The first possible option identified was to outsource the billing and receipting of Water to an external contractor. This was rejected at tender stage as the cost was so high it was rendered prohibitive.   Also Cork County Council was anxious to modernise its debtors systems for all streams of income, and by doing it in-house for one stream of income, would make it easier to later include the other streams.

The next option was to transfer the Water Debtors Legacy Systems over to the Accounts Receivable (AR) module of JDE. The main advantage of this option would be that it would eliminate the need for creating interfaces as JDE is a fully integrated Enterprise Resource Planning (ERP) system. After discussion and tests carried out on the JDE AR module, it was confirmed that the functionality offered by the existing Debtors Legacy Systems could not be provided by the existing or even upgraded JDE AR module in Cork County Council. The Senior Executive Officer (SEO) of ICT said:

"The functionality of JDE AR was not sufficient or robust enough to support an Irish Local Authority without considerable and costly modifications". (Note 3)

The Head of Finance supported this view stating;

"It is suffice to say that generally AR modules in ERP systems are developed for production companies and don't necessarily sit well for Service companies".   (Note 4)

This option although initially preferred by the Finance Department was rejected for these reasons. There would have been huge costs involved in upgrading the JDE AR module to provide the billing and receipting functionality required by Cork County Council.

The third option identified was to continue with the existing Debtors Legacy Systems and interface them into the JDE GL. These Debtors Legacy Systems would need to be upgraded for new water pricing rules and other new issues in financial accounting in the public sector. Interfaces would also have to be built into the JDE GL. According to the SEO (ICT):

"it was thought that the investment that would have been needed to achieve this would be wasted, and not inline with Cork County Councils long term plan to have all income streams operating off the same system".

(Note 5)

This option was rejected because the investment may not have been worth it and other options had better functionality.

The fourth option, and the option which was decided upon, was to implement a centralised billing and receipting system known as the Corporate Debtors System. This would replace the numerous existing legacy systems and would be interfaced into the JDE Financial Management System. This would also be seen to support a modernisation agenda for Cork County Council.

The main reason why Cork County Council opted to interface the Corporate Debtors System into JDE, as opposed to purchasing a new ERP system was because it wanted to retain its existing JDE asset management, procurement and general ledger modules. Both ICT and the Finance personnel were in agreement on this.

"We did not go to tender for a new ERP system. We already had one in the case of JDE" (Note 6)

"The JDE GL suite at present is satisfying all other financial requirements" (Note 7)

Once the needs assessment was completed and the best possible option (that is Option D) was agreed, the next step was the tendering process. As stated earlier, EU law states that local authorities must invite tenders for purchases greater than €50,000.

4.3 Tender Documents

Due to the complexity of the system required, the Cork County Council decided on a restricted rather than an open-tender competition which is in accordance with EU procurement procedures. In a restricted competition, vendors must submit answers to a pre-qualification questionnaire. The applicants had thirty days to reply to the questionnaire. This questionnaire focuses on the three areas of vendors' economic standing, staff resources and track record with similar projects. As stated by the SEO of Finance:

"The questionnaire allowed Cork County Council to gain an understanding of the bidder's financial standing, its capability for the project, how many employees it has, what type of back-up and support it can provide and what type of work it has carried out before" (Note 8)

Therefore only vendors with a realistic chance of winning the contract make it through the pre-qualification stage. This resulted in a much smaller, and therefore manageable, number of tender documents being submitted. Cork County Council received four replies to the pre-qualification questionnaire within the time period. The SEO (Finance) and the SEO (ICT) assessed the pre-qualification questionnaires to reveal that two of the four vendors did not meet the pre-qualification standards and were eliminated from the tender competition.   The two remaining vendors met the standards required at this stage and the formal full tender documents were forwarded to both of them on 3 April 2006. They were given forty days to respond.   Both vendors in the competition submitted tenders and these were opened at the Council meeting on 22 May 2006.

4.4 Assessment of Tenders

Once the procurement team selects two vendors from the applications submitted, each vendor should be invited to the government site to meet with the team and have a 'discovery' discussion which allows the "vendors to ask questions and find answers (e.g., number and type of interfaces required and data file dimensions)" (Madden and Miranda 1998, p37). The purpose of this session is to allow the vendors the opportunity to refine the scope/cost of their proposals (Madden and Miranda, 1998). In Cork County Council a Tender Assessment Team consisting of the SEO (Finance), Head of Finance, two Accountants and two IT specialists was put in place to assess the tenders. The remit of this team was to recommend the most appropriate solution for Cork County Council. Both vendors were invited to meet the Tender Assessment Team and discuss their solutions as set out in the formal tender documents. The meetings took place on 7 June 2006 and on 12 June 2006 respectively.

Discussions focussed on the assessment criteria set out in the tender document. Each vendor was given three hours to clarify the tender under the following headings; functionality, costs, deployment, maintenance support, vendor capacity and case studies. Both vendors were asked to provide written confirmation of areas that needed clarification during the interviews. The Tender Assessment Team was satisfied that both vendors could provide a viable Corporate Debtors solution for Cork County Council. As a result of the tender assessment the next stage was focussed on one Vendor. In particular the Team wished to verify the functionality, support and vendor capability.

4.5 Demonstration

The successful vendor was requested to provide a demonstration of its Corporate Debtors System. The Tender Assessment Team provided a list of twenty nine specific areas to be covered in the demonstration, under the following headings:

Raising and Managing Charges

Receipting

Reporting

Transaction Processing

Inquiry Options

The demonstration was held at the vendor's office in Dublin on 6 July 2006. This demonstration, combined with future clarification in writing, satisfied the Tender Assessment Team as to the functionality set out by the vendor in its formal tender document.

4.6 Site Visit

Cork County Councils team assessment members then visited another Local Authority, where the vendor already had a similar Corporate Debtors System in operation. The site visit took place on 26 July 2006 and focussed on the following areas:

How the individual modules integrate with the Corporate Debtors System

How the on-line payments module is performing (live)

The Local Authorities working relationship with the vendor

The Tender Assessment Team found that much of the system's functionality demonstrated was specifically geared to providing a solution in an Irish Local Authority environment. While there are differences in scale between the two organisations, the team was satisfied that what was demonstrated could be implemented successfully in Cork County Council. More importantly, the site visit established that Vendor capability and support arrangements were of the standard required by Cork County Council. The Local Authority had a good working relationship with the vendor and was happy with the calibre of people provided to work on the various debtors projects. The Local Authority was satisfied that the vendor was honouring all maintenance/support agreements. The Tender Assessment Team was now satisfied that the vendor capability and maintenance/support information could be confirmed.

4.7 Awarding the Contract

The decision was made to award the contract to this vendor. The other vendor was notified, by letter, of its unsuccessful tender application. The contract with the vendor was signed Thursday 21 September 2006. The Corporate Debtors System was up and running by mid May 2007.

5. Conclusion

The new Corporate Debtors System for Cork County Council was a major project. Firstly, the problem was defined. Several debtors' legacy systems were being used and these were not directly linked to the General Ledger system. This resulted in inadequate collection levels and major financial accounting difficulties at month- and year-end. Secondly, the management team identified and researched four viable alternatives. The solution they identified was one of centralising the debtors system and interfacing it with the existing General Ledger system. Thirdly, a Tender Assessment Team called tenders from potential supplier. These tenders were reviewed through a system of pre-qualification tenders, full tender documents, demonstrations and site visits.   Finally, the team agreed and signed a contract with the successful vendor. These step outlined would be a good template for other public sector organisations throughout the world.

The future vision of Cork County Council is to continue this process by consolidating the multiple Debtors Legacy Systems that exist for its other services into the single Corporate Debtors System. The Corporate Debtors System described in this paper will be able to facilitate this. It is also the Council's future intention to allow the public to

view their accounts and pay their Debtors bills online.

This descriptive nature of this research opens many new areas of further research, for example the implementation of integrated systems in other public sector organisations. Also, the role of the accountant in the implementation of integrated systems in the public sector still requires a lot more research. Future research could also be carried out on how integrated systems cope with service expansion, for example when the Corporate Debtors System in Cork County Council expands to include Rates and the Fire Service. All of these areas are worthy of further research work.

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Notes

Note 1. Interview with Financial Accountant 26/04/2007

Note 2. Interview with SEO (Finance) 30/03/2007

Note 3. Interview with SEO (ICT) 29/03/2007
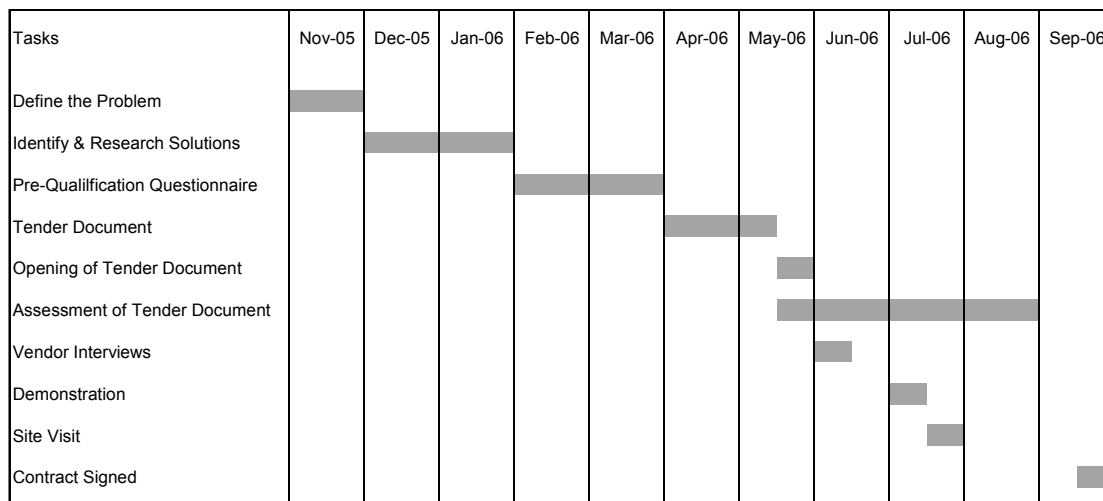
Note 4. Interview with Head of Finance 30/03/2007

Note 5. Interview with SEO (ICT) 29/03/2007

Note 6. Interview with SEO (ICT) 29/03/2007

Note 7. Interview with Financial Accountant 26/04/2007

Note 8. Interview with SEO (Finance) 6/06/2006

Appendix 1: Cork County Council – Needs Assessment Time Line Chart

Tasks	Nov-05	Dec-05	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06
Define the Problem	▬										
Identify & Research Solutions		▬	▬								
Pre-Qualilfication Questionnaire				▬	▬						
Tender Document						▬	▬				
Opening of Tender Document							▬				
Assessment of Tender Document								▬	▬	▬	
Vendor Interviews								▬			
Demonstration									▬		
Site Visit									▬		
Contract Signed											▬

Marketing Channel Sustainable Development on Self-organization

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Abstract

Marketing channel plays a key role for the success of an enterprise in gaining competitive edge, markets demanding agility and quick market responsiveness which represent complex phenomena in global competition. To discover the behavior and mechanism of organization, nowadays, more and more people have paid attention to the complexity theory such as self-organization, dissipative structure theory, synergetic theory, etc. The paper introduces the concept of self-organization theories and marketing channel firstly. Then enlightened by the systematical methodology, the paper puts forward the concept of sustainable development of organization on the basis of analyzing the characteristics of self-organization marketing channel. A thorough analysis of the mechanism of marketing channel sustainable development has been made accordingly. Finally, the paper adopts the marketing channel of TCL Group as an example, indicating that the success of TCL Group is mostly due to its effective and efficient self-organized marketing channel.

Keywords: Complexity phenomenon, Marketing channel, Self-organization, Sustainable development

1. Introduction

The globalization of economy with more diversified and frequent communion and an increase in customer expectations make a chaotic and complex environment for enterprises. Success or failure for most enterprises is determined by how effectively and efficiently their products are sold through their marketing channel in economic environment described "Complexity phenomena". But influences of complex factors, problems such as instability and conflict between channel members existed in marketing channel, have become shackles of many enterprises. Given this situation, considerable marketing channel research has focused on interrelationships among an enterprise and its channel members can be managed better. The study points out that agility, reactivity, flexibility and autonomous marketing channel play a key role for the success of an enterprise in gaining competitive edge, markets demanding agility and quick market response in global competition. These are all in accordance with theoretic foundation of self-organization mechanism. There are many articles about self-organization, but most of them focus on supply chain management and application of intra-organization system. To the best of our knowledge, past research has paid little attention to self-organization marketing channel, and empirical studies remain scarce.

Indeed, self-organization mechanism may be more prevalent in highly complex and uncertain environment such as marketing channel than in simple intra-organizational system. In other words, marketing channel may produce greater benefits and effectiveness by using self-organization mechanism.

The objective of this study is to propose a self-organization framework for marketing channel on the basis of the existing theories, and bring forward the concept of marketing channel sustainable development. Firstly, the theoretical rationale and concept will be presented, the characteristics of self-organization marketing channel will be explained next, followed by the methods and mechanism of marketing channel sustainable development, Finally, a case of marketing channel of TCL group is specialized for empirical research.

2. Concept model of SOMC (Self-organizational Marketing Channel)

2.1 Marketing Channel

Marketing channel can be defined as the set of external organizations that a firm uses to achieve its distribution objectives. Essentially, a channel is the route, a path, or a conduit, through which products or the value of products flow from the manufacturer to the ultimate user. During the process, the channel members compete and cooperate with the external circumstance constantly. Management and marketing researchers alike contend that the environment is in a constant process of change, so the adaptation behavior of marketing channels is very important, which has been well proved in many relevant articles. Specifically, the structural adaptation and strategies of marketing channels to environmental conditions have been shown to be positively related to organizational performance.

In another aspect, there has been a growing interest in the issue of marketing channel focused on the coordination of business activities, which brings the essential of structure of marketing channel and also is concerned with the trust and cooperation relationship among channel members. The objective of this study is to improve the efficiency of

marketing channel in complex distribution channel environment.

2.2 Concept of Self-Organization

Self-organization is a key concept in complexity theory. According to Tharumarajah, self-organization is defined as the ability of an entity (or a system as an entity incorporating a collection of sub-entities) to adapt itself to prevailing conditions of its environment. Self-organization is also known as the relative agility of an entity, which ensures its optimal function through minimum help or intervention from external (e.g. human operator) or internal (e.g. other entity) components of the system. The Intelligent Manufacturing Systems World Project defines self-organized system as a system that is not coordinated by the exterior. Entities are autonomous and execute the tasks together. Through interaction and mutual comprehension, the sum or the combination of individual tasks allows to manage an order, a good or a service which is more global.

Self-organization system must have two aspects. One is spontaneity of internal diversity, the other is instability of internal selectivity in mutual commuting with external environment, maintaining the open state of organization inside or outside. Then the diversified subsystem of organization will compete and cooperate with each other and as a result, a sequence parameter, which coincident with the sequence parameter produced by environment of organization, is produced. The development of self-organization system keeps consistent with the change of environment, which means self-organization has acclimatization.

From the above points, we can view that the associated characteristics of self-organization are (1) autonomous, (2) cooperative, (3) transformative. Term of "autonomous" refers to the possible capability to remain its quality or state without outside control; "cooperative" means to maintain stability relationship among subsystem of inter-organization and with the external environment; "transformative" means the existing independent capability.

2.3 Conceptual Model of Self-Organization Marketing Channel (SOMC)

I.Prigogine, the founder of dissipative structures theory and K.J.Arrow, the Nobel economics prize winner put forward that economic activity is a continuous evolutive complexity system. Subsystems in organization check each other as the external strength to promote each function to be carried out: Design function and framework of organization according to business procedure, every link puts forward the requirements to the upper region and is appraised by lower member at the same time, forming a "self-organized system" characterizing "function coupling" with internal key motivity at last.

2.3.1 The Structure and the Mechanism of Marketing Channel.

The channel member of traditional marketing channel system have different objectives, which causes the cooperation and scheduling problem in an overwhelming complexity which is often difficult to solve. Even more, flexibility is difficult to achieve in the traditional hierarchical system because of the rigid structure. For this reason, a dynamic approach based on autonomous and explicitly independent systems and is able to evolve in a changing environment is required, and a self-organization and its manner of behavior are emerged in the process of interactions between autonomous entities. This approach gives more flexibility and is more suitable for the modeling and control of complex system. To learn from environment and evolve together with it is the key reason to the survival of the systems in changing environment.

The composition principle of the traditional marketing channel and operation process can be simply summarized and shown as a pursuing structure in figure 1. Real line means the connections of members. The output of channel is determined by whole organization, and the performance of each member is determined by plan in advance. The connections among members are single and the relationship is stiff. Therefore, CM (channel member) individual is lack of the right of autonomy and the behaviors of member depend on control management of the manufacturer instead of the relationships with other members and external environment condition.

Self-organization requires changing the relationships among channel members and external marketing circumstance. It regards each member as an independent decision-maker, which has the nature of autonomy and can make decision according to one's own interests and environmental change. On the other hand, due to the inseparability of working cost and transaction cost, it is necessary to keep all units as one integrative organization, so as to form an organic whole connected with each other. Dotted line means to set up market relationships, which meets the flexible structure and adaptability to change in the channel organization.

2.3.2 The Characteristics of Self-Organization Marketing Channel

This study introduces the concept of self-organization marketing channel so as to make the sustainable development of channel of distribution become reality. The characteristics of the self-organization marketing channel are concluded as follows.

(1) Self-adaptability to the environment. Self-organization system has the ability to reorganize its structure and interactive mode automatically, so as to firm new hierarchical structure and function to adapt to the changing of

environment. There's no fixed system structure and equations but only the advanced learning capacity remained inside the channel of distribution system.

(2) Key order-parameter slaved system evolution – In Haken's synergetic theory, there's a famous conception called "slaving principle", which means there always have some key parameters in the complex system, which are called "order-parameter" and change relatively slowly and manage the whole system evolution. The marketing channel system is open, in the process, inside mechanism arose entropy changing ($d_i s$) and the relationship between system and external circumstance produces system entropy changing ($d_e s$), so $ds = d_i s + d_e s$, $d_e s < 0$ in the open channel system and $d_e s > d_i s$, the result is $d_s = d_i s + d_e s < 0$, the system becomes orderly from out of order.

(3) Cooperation - Self-organization normally means the existence of both emergence of individual behavior of entity and upward flow of behavior and information. The marketing channel system is an organic syntheses. Minimal degree of cooperation must exist among distributed system's entities to avoid total disorder, which can be provided by different mechanisms like communication, negotiation… The concept of marketing channel self-organization refers to a variety of distinct systemic attributes, such as: self-creation, self-configuration, self-regulation, self-steering, self-maintenance, self-(re-)production, and at the same time, synergic mechanism make the activity of subsystems consistent with the objective of the marketing channel and the integer behavior will be much better.

(4) Environment consonancy -There is much difference among subsystems of marketing channel intra-organization, which is away from equilibrium. But the effectiveness among them are quite strong, which gather adequate favorable factors for self-renewing in the process of exchanging substance, energy and information with environment, which is away from equilibrium, to enable the development of self-organization marketing channel, which is supposed to be impossible, becomes possible. Many facts prove that objective of sustainable development of the enterprises becomes true when mutual benefits are achieved and friendly relationships with the correlated marketing circumstances are established.

3. The mechanism of marketing channel sustainable development

3.1 Concept of Sustainable Development

The concept of sustainable development is put forward based on the requirements of adaptability to environment for an organization in cruel competition. It refers to that organization should understand and master the characters of developing and changing environment, so as to make it have acclimatization and forecast the developing tendency of environment accordingly. Organization is required to have ability of self-learning and autonomy. The theory foundation is the synergetic theory of Haken, which has two values: masterdom principle and order-parameter. The mathematic formula is:

$$\xi_s(t) = f_s[\xi_u(t); t] \tag{1}$$

Thereinto, $\xi_s(t)$ means stable pattern, $\xi_u(t)$ means unstable pattern. The formula indicates that unstable pattern dominates stable pattern. $\xi_s(t)$ changes with $\xi_u(t)$ quickly, so the formula of movement process of system is:

$$X(s,t) = X_0(s) + \sum_u \xi_u(t) v_u(s) + \sum_s \xi_s(t) v_s(s) \tag{2}$$

$\sum_s \xi_s(t) v_s(s)$ is a gather of stable factors, which have a large number but normally disappear in short time, in the movement process of system. $\sum_u \xi_u(t) v_u(s)$ is a gather of unstable factors, which are few and change slowly, in the movement process of system. It keeps system away from equilibrium point, break up the old equilibrium point and establish a new one, pass the unstable point and form another new ordered state. ξ_u is called order-parameter. In this process, the system is restructured by itself, which makes the organization harmonize with the changing environment further. Harmonized relationship formed between organization and environment has mutual benefits, which makes the circumstance become reliable and stable for sustainable development of organization.

3.2 The Sustainable Development of Marketing Channel—Mechanism of Self-Organization

According to I. Prigogine, It is fluctuation that makes the system away from instable state in the area near equation where system has the ability to anti-jamming. Departure deduced by fluctuation will disappear through self-attenuation and the stability of system will be recurred after interference. The negative feedback mechanism attenuates the fluctuation, as a result, the system remains in the original ordered stable structure and structure-function is optimized accordingly.

Away from equilibrium, in Nonlinear Dynamical Systems, the system is in a unstable stationary state. Some little stochastic fluctuation may be magnified through interactional activities and bring gigantic fluctuation of macrocosm. So the system will get new ordered state from instable state. When environment change strongly, the positive feedback mechanism will magnify the fluctuation and realize the transformation of different macro-stability states, so as to improve the adaptability of system to environment.

The relationship between channel members is solid reticulate relationship. Each member forms its own ordered structure in the process of competition, cooperation and self-organization showed in figure 2.

4. The empirical study——Marketing channel of TCL GROUP

TCL Group is one of the famous corporations in our country specialized in manufacturing and distribution of home electric appliances for over 20 styles and 1,000 varieties. At present, TCL Group has more than 32 sales branch companies, more than 200 business departments and 400 selling centers all over the country. The group starts to implement its global strategy through merging a foreign company successfully. Recent years, it is also succeeded in IT industry such as mobile phone. The above successes are all due to the efficient marketing channel. And more and more people have paid attention to the reforms on marketing channel in TCL frequently.

The high-efficient marketing channel is the key factor for the TCL group to achieve leading position in many areas. And also the channel has reflected the requirements of 3C, which are management centralization, data concentration and apply composition. Different organizations and departments can exchange information rapidly. Besides all the channel members have same objective, the typical characteristic of those members is localization and unanimity.

Because TCL has integrative order management, visual physical data and intelligent management of supplementary goods, information is transferred effectively among channel members by organizing orders, stock, transportation and plans orderly. The characteristics of the marketing channel of TCL can be concluded in the structure showed in figure 3.

1) Integrative order flow: In the process of order flow from end user to manufacturer, each channel member, including sales department, region delivery center and 3PL, can manage the order on the same administration platform. So the relationship between subsystems in channel is harmonious and the cost of the channel is reduced accordingly.

2) Logistic information is visual: Through integrated organizing system of logistics, manufacturer and administration department will know the logistic state in each phase, including the present state of the goods and the node products is processed, so the operation of logistics will be improved greatly.

3) Intelligent management for supplementary of goods: integrative logistic information platform with effective cooperation between channel members make supplementary of goods is executed intelligently. Each member can estimate and forecast the quantity and frequency of demands for the goods through relevant model. This mechanism reduces the stock in the forepart of the marketing channel without lowering the quality of services and controls the OOS (Out of stocks) effectively at the same time.

The effective mechanism of marketing channel in TCL achieves a series of distinct effects: Terminal stock is reduced 40% and the cost of stock is greatly decreased. The quality of the services is improved greatly, especially in delivery. Figures point that, 85% clients receive the goods within 24 hours, 10% clients within 36 hours, and 5% clients within 48 hours. Quick and accurate delivery brings good social image to TCL, therefore, the finance and business situation of TCL Group is improved greatly. So, in a word, the efficient marketing channel is the key important factor to the success of TCL Group.

5. Conclusions

The marketing channel plays a key role in the development of enterprises, but the disorder, complex environment, and diversified objects in traditional channel members make the channel inefficient. Lots of studies analyze cooperation and trust between channel members in order to improve the efficiency. The complexity theory includes self-organization and dissipative structure theory, which are applied to the management and economic science so as to bring new method for solving the problem existed in marketing channel, such as conflict. Through the interaction of the entities, self-organization behavior is firmed and enterprise becomes prosperous in disorder. Self-organization of marketing channel provides flexibility and agility in responding to customer demand shifts. The fundamental premise of this theory is the synchronization represented in multiple autonomous business entities. The paper introduces the self-organization theory into the marketing channel, setting up the concept model of self-organization of marketing channel and concept of marketing channel sustainable development. Its mechanism is developed in the process of simulating the self-organization behavior of marketing channel. It puts forward a new methodology for the management of marketing channel. A paradigm is illustrated to show a successful change from the traditional

manufacturing control and planning to a new self-organization. Finally, an empirical study is given to prove the concept model of self-organization of marketing channel sustainable development.

Se1f-organization principle is one of important theories in system theory domain, which will become a main methodology in the study of management science, whereas it is always thought to be a little far from the view of application. The paper introduces the new concept model of self-organization of marketing channel, which has both theoretical and practical meaning and is tested by the example of TCL group, therefore, develops a new mechanism of marketing channel sustainable development. In addition, more application research will be done after this to test the concept model further, so as to use it in a wider area.

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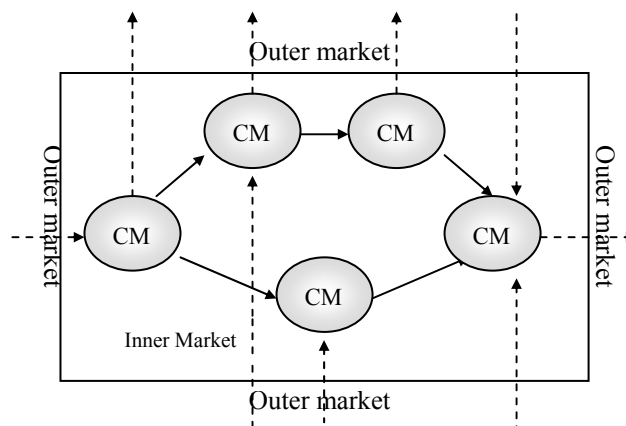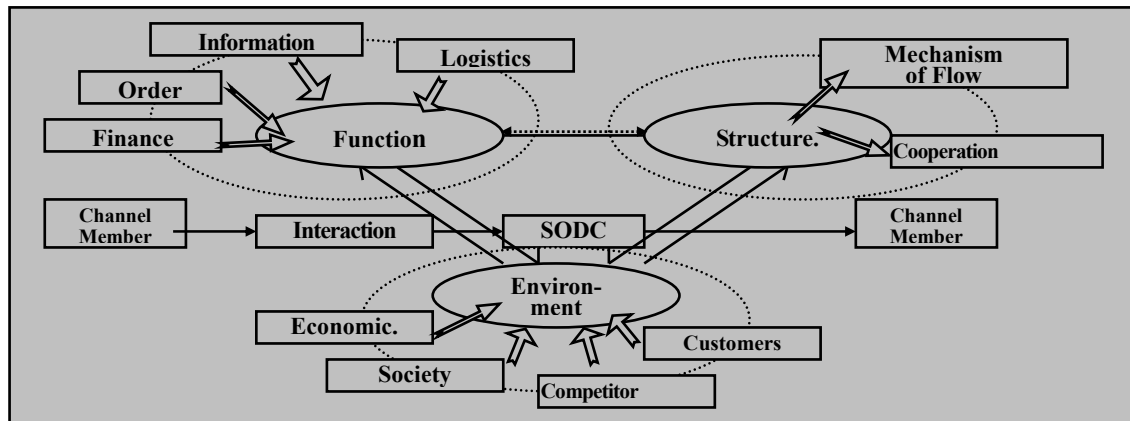

Figure 1. Concept Model of Marketing Channel

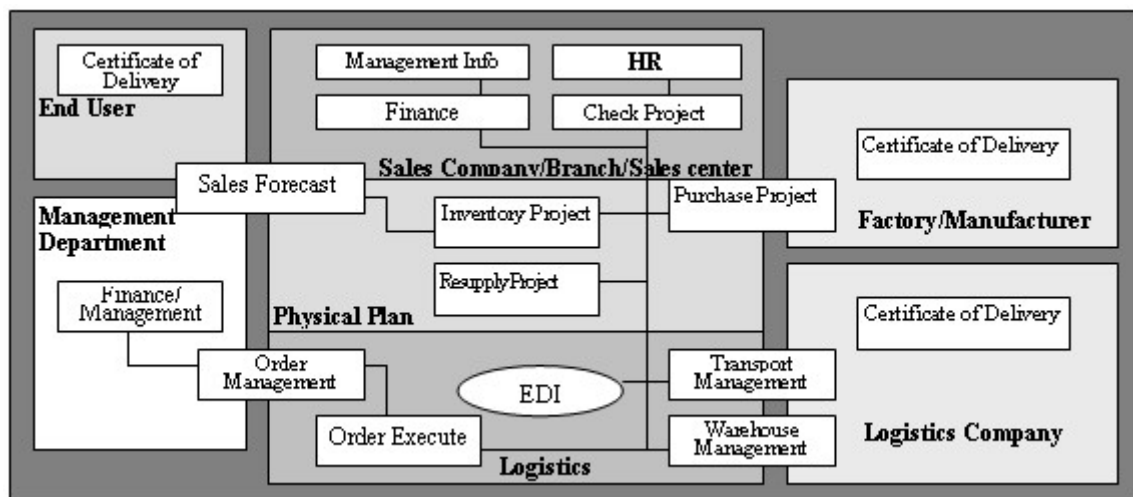Figure 2. The Mechanism of Self-Organization of Marketing Channel

Figure 3. Marketing Channel of TCL Group

Research of High-Tech Enterprises

Evaluation and Decision Support System

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Abstract

Applying to the system engineering, software engineering theory and methods, a system is designed with subjective and objective, qualitative and quantitative evaluation and intelligent decision support. Analytic Hierarchy Process (AHP) makes the weight setting more reasonable. Meanwhile enterprise's comprehensive evaluation model has been constructed by the efficiency coefficient method with multi-objective decision-making. In the system, the expandable decision-making knowledge database was designed in the form of single-tree inference, which can give feasible decision-making suggestions based on different evaluation result.

Keywords: Enterprise Evaluation, DSS, Analytic Hierarchy Process, Multi-Objective Decision-Making, Decision-Making Suggestion

The evaluation system and model aimed to the high-tech enterprise has been established, which can measure and reflect its development. It's useful for decision-makers to realize their situation, advantages, characteristics, shortage comprehensively and practically in a scientific way, and make correct decisions. At the same time, it also explored a new decision approach for high-tech enterprises evaluation and decision-making in the market economy environment.

1. System Analysis and Design

1.1 System Frame Structure

The system is designed based on the following consideration: how high-tech enterprises face to the market problem. And its primacy yardstick is making a correct, reasonable appraise and giving a good improvement suggestion; its starting point is solving practical problems and user-friendly. It's not only using the 'dialogue, model, data' three structural components as framework, but also assimilating the advantages of 'Language System (LS), problem Processing System (PPS), Knowledge Systems (KS)'three components structural from the perspective of practicality. Then a system frame structure has been formed based on six compartments which include human-machine interface, data interface, problem processing system (PPS), database, model base, knowledge base. The system framework is following: Figure 1:

The data that high-tech enterprises needed are sample from the National Science Commission Statistical Databases and Financial Databases, as well as from the enterprise itself.

The relational model applied in terms of database designing, E-R Approach (Entity-Relationship Approach) is used for designing.

1.2 System Workflow

First, users sample some external data as the data source of evaluation system. In the same time, they can input evaluation index date which various enterprises need, then evaluate the enterprises and high-tech, and provide better suggestion and decision-making for decision-makers based on the evaluation results through strategic management base. The sketch of system workflow is following: Figure 2.

2. Confirmation of high-tech enterprises evaluation index

2.1 Layered structure of high-tech enterprises evaluation index

After analyzing the market factor, high-tech standards, economic index and other aspects, as well as selecting in a scientific way, evaluation index can be divided into three categories, which are called the first rank index: high-tech evaluation criterion, marketing, economic efficiency composite index. Corresponding respectively they are followed with the second, third rank index. Based on those, the layered structural evaluation index has been constructed. The entire index parameters are showing in Figure 3.

2.2 Comprehensive evaluation model of the high-tech enterprises

The whole comprehensive evaluation is based on multi-objective decision-making and Analytic Hierarchy Process[1]–[3]. Every second rank index can be seen as a multi-objective decision-making problem.

On the assumption that, including the number of p indexes $f_1(x)$, ..., $f_p(x)$, effectiveness coefficient of the objective function $f_i(x)$ is: $d_j = d_j(f_j(x))$, j=1,2...p; Then account the total efficiency coefficient: $\overline{D} = \left[\sum_{j=1}^{p} a_j d_j \right]$ (weighted); If considering the relative importance between the sub-goal f_j and the overall goal, then give the weight coefficients corresponding with the sub-goal

$$\lambda = \left\{ (\lambda_1, \lambda_2, \Lambda, \lambda_p) \mid j > 0, j = 1, \Lambda, \sum_{j=1}^{p} \lambda_j = 1 \right\}$$

Steps of comprehensive evaluation for enterprise:

1) Make a single contrast analysis for the second rank index; list them according to their priorities.

2) Make an order analysis for the major category of criteria:

High-tech evaluation criteria:

$$W_{1(i)} = \beta_1 \overline{d_{1(i)}} + \beta_2 \overline{d_{2(i)}} + \beta_3 \overline{d_{3(i)}} + \beta_4 \overline{d_{4(i)}} + \beta_5 \overline{d_{5(i)}}$$

$$\beta_1 + \beta_2 + \beta_3 + \beta_4 + \beta_5 = 1$$

Marketing:

$$W_{2(i)} = \beta_6 \overline{d_{6(i)}} + \beta_7 \overline{d_{7(i)}} + \beta_8 \overline{d_{8(i)}} + \beta_9 \overline{d_{9(i)}}$$

$$\beta_6 + \beta_7 + \beta_8 + \beta_9 = 1$$

Economic efficiency composite index:

$$W_{3(i)} = \beta_{10} \overline{d_{10(i)}} + \beta_{11} \overline{d_{11(i)}} + \beta_{12} \overline{d_{12(i)}} + \beta_{13} \overline{d_{13(i)}} + \beta_{14} \overline{d_{14(i)}} + \beta_{15} \overline{d_{15(i)}} + \beta_{16} \overline{d_{164(i)}}$$

$$\beta_{10} + \beta_{11} + \beta_{12} + \beta_{13} + \beta_{14} + \beta_{15} + \beta_{16} = 1$$

Expressions mentioned before, the β_j are the corresponding weight coefficients, identified by the Analytic Hierarchy Process (AHP).

3) Comprehensive evaluation of enterprise

First, make a contrast analysis for the $A_{(i)} = \{ W_{1(i)} \ W_{2(i)} \ W_{3(i)} \}$

If $A_{(i)} \geq A_{(j)}$ i ≠ j; i, j = 1, 2, …m. It's represented that each first rank index of I business were greater or equal than that of the second index of J business ,this means that the I business is better than J business in all aspects.

In case inexistence of $A_{(i)} \geq A_{(j)}$,then need to carry on the comprehensive evaluation and analysis , comprehensive evaluation model is:

$$A_{(i)} = \lambda_1 W_{1(i)} + \lambda_2 W_{2(i)} + \lambda_3 W_{3(i)}$$

$$\lambda_1 + \lambda_2 + \lambda_3 = 1$$

The comprehensive evaluation function:

$$A_{(i)} = \beta_1 \lambda_1 \overline{d_{1(i)}} + \beta_2 \lambda_1 \overline{d_{2(i)}} + \beta_3 \lambda_1 \overline{d_{3(i)}} + \beta_4 \lambda_1 \overline{d_{4(i)}} + \beta_5 \lambda_1 \overline{d_{5(i)}}$$
$$+ \beta_6 \lambda_2 \overline{d_{6(i)}} + \beta_7 \lambda_2 \overline{d_{7(i)}} + \beta_8 \lambda_2 \overline{d_{8(i)}} + \beta_9 \lambda_2 \overline{d_{9(i)}}$$
$$+ \beta_{10} \lambda_3 \overline{d_{10(i)}} + \beta_{11} \lambda_3 \overline{d_{11(i)}} + \beta_{12} \lambda_3 \overline{d_{12(i)}} + \beta_{13} \lambda_3 \overline{d_{13(i)}} + \beta_{14} \lambda_3 \overline{d_{14(i)}} + \beta_{15} \lambda_3 \overline{d_{15(i)}} + \beta_{16} \lambda_3 \overline{d_{16(i)}}$$

$$\beta_1 \lambda_1 + \beta_2 \lambda_1 + \beta_3 \lambda_1 + \beta_4 \lambda_1 + \beta_5 \lambda_1 + \beta_6 \lambda_2 + \beta_7 \lambda_2 + \beta_8 \lambda_2$$
$$+ \beta_9 \lambda_2 + \beta_{10} \lambda_3 + \beta_{11} \lambda_3 + \beta_{12} \lambda_3 + \beta_{13} \lambda_3 + \beta_{14} \lambda_3 + \beta_{15} \lambda_3 + \beta_{16} \lambda_3 = 1$$

3. Research cases: The high-tech enterprises in Zibo

3.1 Conformation of enterprises evaluation weight

First, take economic efficiency composite index for example, it has seven indexes, so the judgment matrix structured as following:

C	C1	C2	C3	C4	C5	C6	C7
C1	1	1	1	2	3	2	2
C2	1	1	1	1	3	1	1
C3	1	1	1	1	2	1	2
C4	1/2	1	1	1/2	1	1	1
C5	1/3	1/3	1/2	1/2	1	1	1
C6	1/2	1	1	1	1	1	1

Account the product of each row element of M matrix: F=(24,3,4,1,0.0278,0.5,0.25)

Account the number of n power root of F :

$$\overline{W} = (1.575,1.170,1.219,1.00,0.599,0.906,0.820)$$

Vector normalization, get the eigenvector as following:

$$W = (0.216,0.167,0.137,0.082,0.124,0.113)$$

Largest eigenvector of the judgement matrix is : $\lambda_{max} = 7.177$

Carrying on the consistency check, then obtains: CI=0.0295, check the form according to module RI=1.32,

Because of the random consistency ratio R=0.0224<0.1 ,so the weight of calculation is satisfied.

3.2 Enterprises Comprehensive Evaluation

Take the YuMin fire-resistant material corporation for example :

1) Constructed weight designing value with AHP method; And the following results are gained by adopting the Efficacy coefficient method to construct the evaluative model:

(1) Calculation results of the high-tech evaluation standard:

   Weight: $\beta = (0.18,0.27,0.16,0.24,0.15)$

   Efficacy coefficient: $W_1 = (0.359,0,0,0.415,1)$

(2) calculation results of the marketing:

   Weight : $\beta = (0.254,0.302,0.162,0.281)$

   Efficacy coefficient: $W_2 = (0.569,0.54,0.473,0.282)$

(3) Calculation results of the economic efficiency composite index:

   Weight : $\beta = (0.216,0.161,0.167,0.137,0.082,0.124,0.113)$

   Efficacy coefficient: $W_3 = (1,1,0.851,1,0.834,1,0.908)$

2) Carrying on the comprehensive evaluation of the enterprise:

Using AHP mathod to set the Weight of composite index : $\lambda = (0.149,0.474,0.377)$

According to the efficiency coefficient method of multi-objective decision-making, the comprehensive evaluation result of Yumin fire-resistant material corporation is gained: A=0.65.It means that this company pertains to power-oriented enterprises, various indexes in the evaluation system are well-qualified, and the evaluation results consist with the actual situation.

4. Determination of the strategic decision

According to the comprehensive evaluation results, the system can get the relevant business strategic decision-making from knowledge database for reference.

If business is operating badly according to the results, decision-makers need to adopt the jointly competitive strategy. The enterprises should cooperate not only in division labor, but also in financial and marketing. For

example,establishing unification sales group, jointed efforts in developing market, thus helping enhance the competitiveness;

If you can make sure that the enterprise is not in bad operating, but with poor strength and small-scale, then use 'small and fine' strategy. Through centralized power to improve product quality and the degree of specialization, thereby on the way to big and specialization; On the contrary, larger scale enterprises can use diversification operation strategy. On the one hand, the enterprises expand to other areas in the form of sideline businesses to decentralized operation risks; On the other hand, in order to make full use of operation resources, the enterprises can develop to the correlative area in technology, market;

If the enterprise is power-oriented, it may take unique strategy in the technical product itself and its function or in product sales of delivery systems and marketing strategy, which can reduce the cost as much as possible without influencing the other factors.

For the better profit enterprises, it's better to adopt leadership strategic, pursuit constantly innovation, take themselves as the center, and gain stability in the market, in this way to make sure that there is no intense competition in the entire industry in terms of price, market share, technology, sales and other areas, which can create conditions for maintenance of leadership position [4]-[5].

5. Conclusions

(1) From the evaluation tests of 12 high-tech enterprises, it's proved that the comprehensive enterprise evaluation model which is constructed by Analytic Hierarchy Process (AHP) and multi-objective decision-making efficiency coefficient method having higher precision and better accuracy evaluation for high-tech enterprises.

(2)The method combined evaluate system with the intelligent decision support system can give feasible decision-making suggestions based on various evaluation results and give good guidance to enterprises.

(3) This system is an open system which can adapt to the changing through the consistent increase of the decision-making knowledge database.

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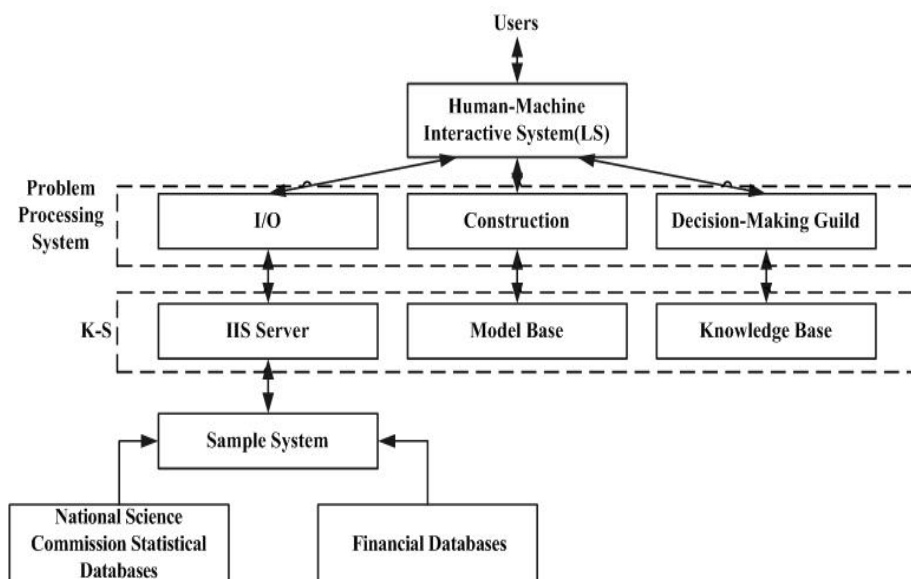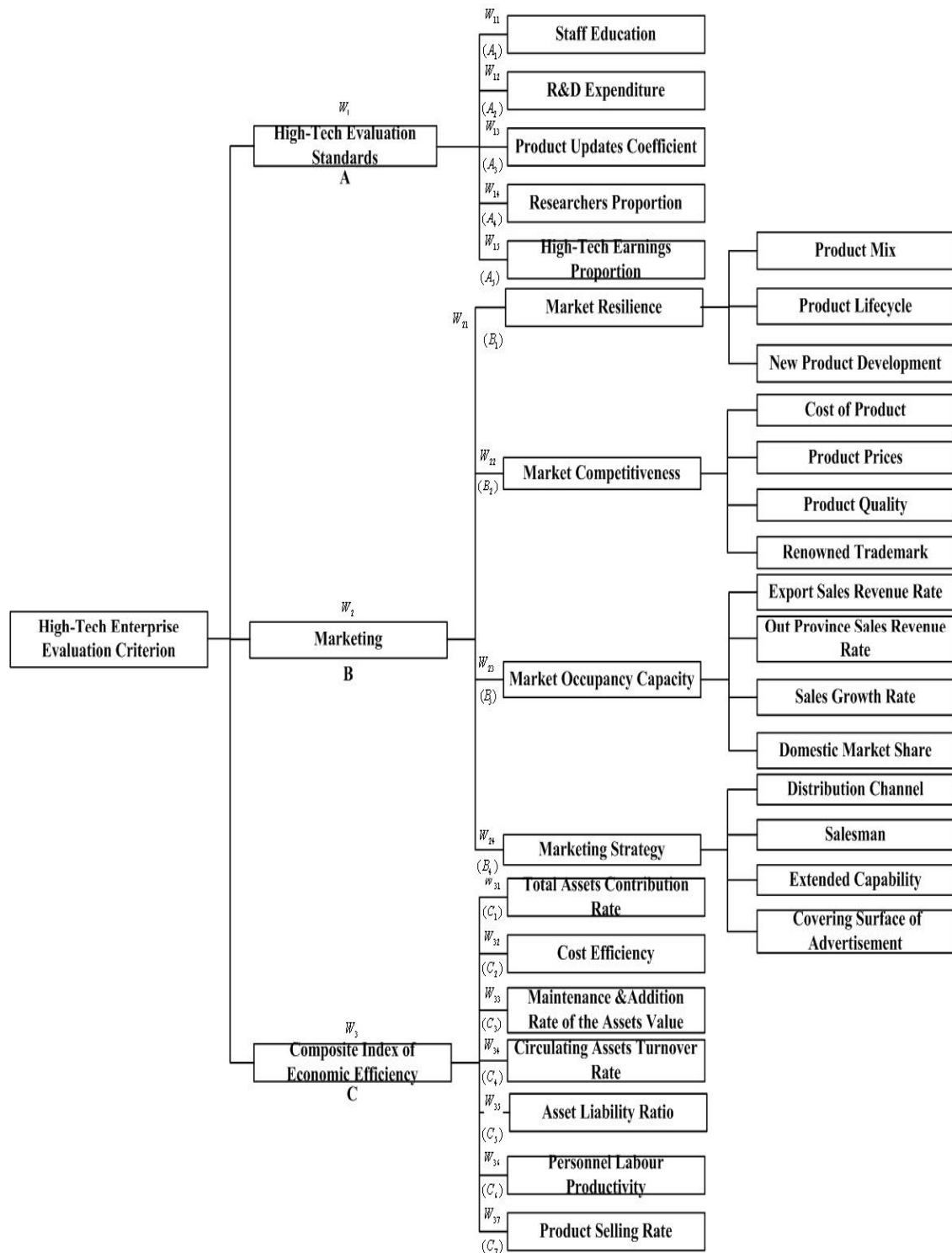
Figure 1. Sketch of System Framework

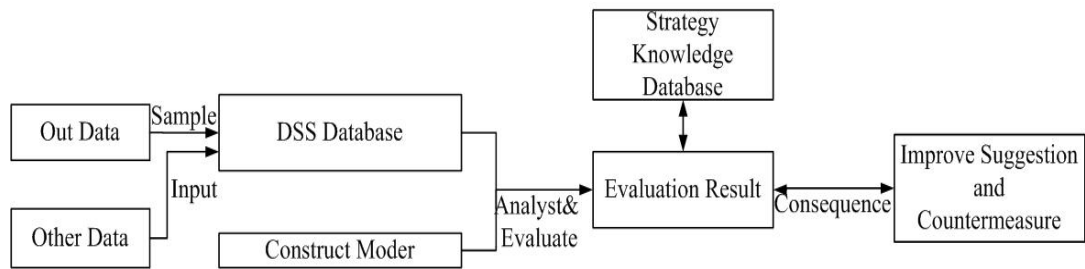Figure 2. Hierarchical Chart of Evaluation Criterion

Figure 3. Hierarchical Chart of System Workflow

A Multivariate Model of Micro Credit and Rural Women

Entrepreneurship Development in Bangladesh

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Abstract

In Bangladesh, micro credit programs have positive socioeconomic impact on the rural women borrowers. However, it is perceived that the micro credit programs help the rural women borrowers to survive only and do not help them to develop entrepreneurial capabilities. Hence, this paper aims at identifying the factors related to the development of entrepreneurship among the rural women borrowers through micro credit programs. A multivariate analysis technique like Factor Analysis was conducted to identify the entrepreneurship development related factors. Structural equation modeling was used to develop a model of micro credit program and the development of rural women entrepreneurship in Bangladesh. Results show that the financial management skills and the group identity of the women borrowers have significant relationship with the development of rural women entrepreneurship in Bangladesh. The experience from the parent's family of the borrowers and the option limit may also lead to the rural women borrowers to be entrepreneurial.

Keywords: Micro credit programs, Rural women borrowers, Entrepreneurship development, Financial management skills, and Group identity

1. Background

About 84% of 140 million people of Bangladesh live in rural areas and half of this population is women.

Men at the rural areas are directly or indirectly engaged in agricultural activities. But female members are used to remain idle in their houses due to a number of social and other barriers. They are discouraged to work outside their houses because of patriarchy and religious norms (Purdah) of Bangladesh (Ahmed, et. al., 1997; Cain and Khanam, 1979). Along with religious bar, barriers can be attributed by the lack of access to fund, lack of knowledge of agro-based technology, lack of market knowledge and lack of support from the family members.

In last two decades, micro credit programs have been operated by the government (GOs) and non-government organizations (NGOs) in Bangladesh. The prime objective of these programs is to enhance income-earning potentials of female members of the rural families and empower them socially and economically. Rural women can work in paddy husking, poultry farming, petty trading (e.g., grocery), pond aquaculture, animal husbandry, weaving, mini-garments, handicrafts, dairy farming, plant nursery etc. which are primarily home based. These programs are contributing a lot to the socioeconomic development of the rural women in Bangladesh. Research

shows that the micro credit programs sponsored have created significant positive differences in the socioeconomic lives of the rural women (Hashemi, 1996). Micro credit programs helped them to be involved in home-based economic activities, which have created enormous opportunity for them to be more independent and self-sufficient. Various studies show that the involvements of the rural women in home-based economic activities through micro credit programs have positive socioeconomic impact on their lives and their families. However, it is also unclear to different corners whether they are becoming entrepreneurial by the credit or not (Hashemi, 1996). The impacts of micro credit programs might be discussed by two ways. *Firstly*, micro credit programs create employment opportunity, increase productivity, provide economic security, give nutritional and health status, and improve housing condition of the rural women. The positive impact on income has increased their asset position and has created wealth for the family (Hulme and Mosely, 1998). *Secondly*, micro credit program creates a significant influence on social empowerment, awareness and education, self-esteem, sense of dignity, organizational and management skills, mobilization of collective strengths, etc. (Pitt and Khandaker, 1996). This positive socioeconomic change subsequently helps the rural women to be more independent and more financially solvent in their families.

Although, it is claimed by the micro credit borrowers that the important impact of micro credit programs is the sustainable development of the socioeconomic lives of rural women. But the reality is that the developments are hardly prolonged. Observation shows that the rural women are unstable to be self-reliant even they are involved in micro credit programs for a long period of time such as, 10 to 15 years. This indicates that the credit programs are making the women more dependent on the credit provider rather than making them independent. It is not making them self-independent and self-sufficient. Therefore, concerns have been raised by the researchers about the sustainability of socioeconomic developments of the rural women by micro credit programs. These concerns are very much relevant to the development of rural women entrepreneurship in Bangladesh.

The development of rural entrepreneurship depends on socioeconomic development of the people. Experts opined that the essentials to develop rural entrepreneurship are the development of capabilities of the borrowers. Once the rural women are self-sufficient, they will be able to initiate their own projects and consequently it will help them to stand on their own feet. To develop rural entrepreneurship in a developing country like Bangladesh, three main activities could be performed such as, stimulatory activities, supporting activities, and sustaining activities (Rahman, 1979; Rahman 1999, Katz, 1991a). These activities are partially performed by the micro credit providers in Bangladesh. The programs are only helping them to survive not to grow and sustain in future. In addition to that, the magnitude of the differences and their sustainability is diverse in government and non-government programs (Amin, 1994). For the development of rural women entrepreneurship, stimulatory supports are essential as the women are unaware of their capabilities. Interaction with the borrowers, with the people of micro credit provider, direct observation, education and training in selecting product, project, and other techno-economic information stimulate rural women to be entrepreneurial. The second step is to support the entrepreneurs for their different necessities. Once women's are stimulated to engage in homestead economic activities they require further support to start and run their own projects. These supports are related to the supply of scarce raw materials, access to the different facilities such as, fund, technology, production methods and procedures, marketing of products, reinvestment etc. The question of sustainability comes at the third stage of the entrepreneurship development activities. Once the business is run, rural women entrepreneurs require supports for sustaining their projects and continuous growth in future. These sustaining activities are related to the help in modernization, diversification, additional financing for full capacity utilization, deferring repayment/interest, diagnostic industrial extension, product reservation, new adventures for marketing, quality testing and improving services etc. Rural women can be benefited from the credit providers for obtaining these support facilities, which are helpful for them to increase the level of sustainability of their economic activities. Therefore, the research questions of this study are as follows. (i) Are the rural women borrowers becoming independent by the involvement in micro credit programs? (ii) Are they gaining any knowledge from the income-generating projects initiated by the credit? (iii) If not, how the women borrowers could be made entrepreneurial in operating home-based economic activities? (iv) Is there any difference in the rural women entrepreneurship development between government and non-government programs?

This study will primarily focus on to identify the factors related to development of entrepreneurship among the rural women borrowers. The present research will also analyze the sustainability of the socioeconomic impact on rural women, which is termed in this study as rural entrepreneurship development. The specific objectives of the study are as follows:

(1) To identify and explain the factors related to entrepreneurship development through micro credit programs;

(2) To test the appropriateness of the factors;

(3) To recommend a policy framework for the credit providers to develop rural women entrepreneurship in Bangladesh.

2. Micro credit program and the entrepreneurship development

Over last two decades, micro credit became an important tool for alleviating poverty in Bangladesh (Khandkar and Chowdhury 1996). The overall success of micro credit program depends not only on immediate alleviation of poverty but also on long-term sustainability and long-term sustainability depends on accumulation assets (Chowdhury 2004). In Bangladesh, Grameen Bank first started micro credit program in 1976 as a pilot project. Now, more than 3000 non-government organizations (NGOs), national commercial banks and specialized financial institutions operate micro credit program in Bangladesh. It is proved as a strong mean to alleviate poverty through social and economic empowerment of the rural poor women (Puhazhendhi and Badatya 2002). It is a group savings program, which helps the rural poor women to bring economic security in their lives (Secretary General, UN, 1998).

Micro credit is a structured program under which micro level loans are given to poor people especially to the poor rural women without collateral security. It is a group-based and intensively supervised loan program. The uniqueness of this loan program is that there is no requirement of collateral security. Anybody can apply for this credit and is eligible to receive credit. It is a small-sized supervised loan varies from Tk.1,000.00 to Tk. 10,000.00 per borrower. The purpose of the micro credit program is to give the loans to the poor people for self-employment that generate income, allow them to care for themselves and their family members (Sankaran 2005).

There are three C's of micro credit program such as, character, capacity and capital (Yunus 2003). *Character* is explained as the historical records of the borrowers such as, how a borrower has handled his past debt obligations, what about his or her background, honesty and reliability to pay the credit etc. *Capacity* is termed as how much debt a borrower can handle easily, what about his or her income streams etc. Capital means current available assets of the borrower, e.g., borrower's real estate, savings and investment that would help him or her to repay the loan in time.

Micro credit program has significant impact on income and economic security on the socioeconomic lives of rural women. It increases income and helps the women to spend more for the development of their lives and families. It helps to increase household income that improves the consumption patterns and lifestyles of the rural families (Hossain, et. al., 1992; Navajas, et. al., 2000). The access to the micro credit program of rural women helps to improve lifestyle through economic self-sufficiency (Apte, 1988). It is the single most important need of destitute women in Bangladesh (Apte 1988). Micro credit encourages women borrowers to save from the profits of their projects for the future, which is an important source of capital accumulation for the economy as well. Increased income indirectly improves the level of education of the borrowers and the awareness about consumption and sanitation needs. The improvement of education among the rural borrowers helps to be more conscious about the health and the future of their next generation. Credit programs increase productive resources of rural families and their housing conditions, which provide economic security for the borrowers.

The main objective of micro credit providers is to create self-employment opportunities for the rural unemployed and underemployed people especially for rural women. This self-employment is largely in non-farm self employment. Before joining the credit program, many of the borrowers were wage labor sellers. Now, they are more self-sufficient and can work in their own businesses. The rural women had a very little opportunity to participate in economic activities. Micro credit programs have created opportunity for them to participate in economic activities and reduced their dependency on others. The immediate effect is to reduce the labor supply and consequently raise wage rate, given the local demand for labor. Wages remain at the high level if the credit program induces a large demand for food and other local products. Thus, the increase of placement in the rural areas is the result of micro credit programs (Ghai, 1984).

Rural wage is the reflection of rural economic condition. Growth of self-employment has been achieved at the expense of wage employment, which implies in rural wage (Shahidur, 1998). Self-employment of borrowers was much higher than the reduction in wage employment in rural areas. The immediate impact of micro-credit is on labor force participation rate and total hours worked. A survey on Grameen Bank shows that micro credit programs had generated new employment for about one third of its members (Hossain, 1986). Most of the new employment was created for the female members of the borrowers. Micro credit programs also reduced the dependency ratio in the village. Micro credit programs increase the use of potentials of the rural poor. Rural development is based on the investments that promote economic growth in rural areas. Increase farm, productivity (Note 1) is the main emphasis for this purpose. Micro credit programs for the rural women can enhance rural productivity (Jha, 1991). Micro credit programs have increased agricultural productivity of small and marginal farm households. The use of high yielding variety is higher among the borrowers, which helps them producing more products (Alam, 1988).

The impact of rural credit programs is more visible in the non-farming sector of Bangladesh. The non-farming activities are livestock, poultry, fisheries, trading, shop keeping etc. Micro credit in rural people increased shop-keeping activities, which has increased volume of trade in the rural areas. It is reported in Grameen Bank report that 46% of total trade loans given to the trade sector by Grameen bank went to crop trading in 1985 and 22% went to livestock and fisheries. Trading and shop-keeping activities have positive impact on the development of local market by boosting local production and creating new market opportunities for selling those products locally (Shahidur et. al., 1998. Simple housewife or a part time farmer has been able to link her through this business to the local production, consumption as well as outside economic activity. The poor people are able to work and increase their working days after joining the rural credit programs (Hossain, 1988).

Women empowerment is other main purpose of micro credit programs. "Empowerment is about change in favor of those who previously exercised little control over their lives. This has two sides. The first is control over resources (financial, physical and human). The second is control over ideology (beliefs, values and attitudes) - Sen (1997). Now, question is "the empowerment is for whom". The answer is, it is for rural women in Bangladesh, who are governed by the two powerful forces such as patriarchy and class structures (Amin, et. al., 1994). The literature on micro credit and women empowerment provides a number of empowerment measures including borrowers control over her loans (Goetz, et. al., 1996; Montgimery, et. al., 1996), her knowledge of the enterprises accounts (Ackerly, 1995), her mobility, intra-household decision making power and general attitudes about her children's lives (Amin and Pebley, 1994; Hashemi, et. al., 1996) as well as on her control over resources and incidence of domestic violence (Naved, 1994).

Social empowerment is essential for the development of poor rural women in Bangladesh. The positive view is that micro credit programs help rural women to be more empowered (Zaman, 1999; Acharya, 1994). Empowerment is characterized as the mobility of women, economic security, ability to make purchase, involvement in major household decisions, relative freedom for the domination within the family, political and legal awareness, and involvement in public protest and political campaign. Women's participation in such programs increased their mobility to visit market place for buying products, medical center for medication, cinema hall for watching movie, other houses in the village, and outside village for more relations. It enhanced the ability to make small and large purchases. Small purchases include small items used for daily in preparation for the family (e.g., kerosene oil, cooking oil, spices), for oneself (e.g., hair oil, soap, glass etc), buy ice-cream or sweets for the children. The large purchases are related to pots and pans, children clothing, own clothing (e.g., Saries), family's daily food etc. the ability to major household decisions is concerned with repairing and innovation of house, buying animals, lease land, buy land, boat, rickshaw etc. Micro credit increases the ownership of productive assets for the women. The micro credits programs also influence legal and political awareness and participation in public campaigns. Campaigns are for the members for chairman for the locality and political leader. The protests are against beating waif by the man, divorcing or abandoning waif, unfair prices, unfair wages, misappropriation of relief goods, misbehavior of police or government officials (Hashemi, et. al., 1996). The longer the involvement of a woman in credit program the greater the likelihood of being empowered. She is likely to contribute more to her family and the society in the long run. The credit programs enable women to negotiate gender barriers. This increases the control of women over their own lives, improves freedom in the family, increased convincing power for both controls which improves relative positions of women in their families and society as well.

The improvement nutrition and health conditions of the rural women and their family members is an important positive impact of micro credit programs on rural women (Srinivasan and Bardhan, 1990; Hossain (1986). Micro credit increases awareness about modern medication. Tube-well water is normally not used by the poor people. Sanitary latrines and urinals are dreams for the villagers. One of the major incidences of poverty is the non-availability of such requirements. The rural credit providers usually try to address this problem to improve the quality of life of the rural poor. A number of studies show that the credit programs have increased daily intake protein and calorie of the rural people (Shahidur, 1996). The children of the borrowers are in better nutrition status compared to the children of non-borrowers. Rural credit projects help increasing the income of the poor women, which lead to higher food security and better life. The ability to spend more on sanitation and the health care activities are increased by the credit programs. Women borrowers can improve their housing conditions from the money they earn from the credit-supported projects. This is often termed as an insurance against rural poverty in Bangladesh.

Rural credit increased education and awareness among the rural woman. The involvement of women in income-generation activities changes their attitudes (Ahmed, et. al., 1997). With the interaction of fellow borrowers and loan providers, women feel the need for education. Education might be for her children, for the husband, and for herself. Credit programs increase girl's schooling for female than for male borrowers (Pitt and Khandoker, 1996;

Kabeer, 2001). It has generated awareness especially among rural women about women's, children's education and the education of the other household members. Due to the increase in income they are able to send their children to school, which increase the literacy rate for the country. Micro-credit programs create awareness among the rural women through the interactions with the group members and health workers. It increases contraceptive use for birth control. The exchange of ideas with other outside a woman's household, social support social legitimization of innovative reproductive behavior, and group formation and interactions encourage rural women to use more contraceptives (Amin, et. al., 1994). Micro credit decreases the level of desire for additional children. Once a woman achieves economic security and is able to contribute to her family, she has freedom of mobility, freedom from domination by the family, better control on her body, and birth control. Free movement in the village and traveling outside the village help women to seek family planning information, advice, methods, and other types of assistance (Schular, et. al., 1997). Women earning independently and contributing to their families are now less insecure and less vulnerable to the threat of abandonment. Cash and other assets make women less fearful of the repercussions of contraceptive side effects. Different studies have been conducted by the researchers regarding the impact of micro credit. It shows that almost all cases the impacts are positive in nature in case of return on investment, household income, employment non-agricultural investment, labor force participation rate, economic empowerment, household expenditure and consumption pattern, and human capital and fixed investment, social empowerment, etc. (Hossain 1988, Rahman 1996).

Rural entrepreneurship is a key to economic development in many countries across the globe (OECD 1998, OECD 2003, UN 2004). About half of the population of Bangladesh is women who usually remain idle and unproductive at the house. They have no scope to participate in the economic and income generating activities except nursing their babies and family members. Thus, these women can be more productive by involving in economic activities of the country. By providing stimulatory, supporting and sustaining supports these women could be made able to initiate businesses and income generating projects. Hence, the developed and developing countries both are focusing more backward group such as, rural women of the society in order to engage them in income generating activities (Chowdhury 2002). They focus on women entrepreneurship development by proving financial and other assistances, which can lead to reduce fertility and increase economic growth of the country.

Research shows that the definition of entrepreneurship has been changed over time. Islam and Mamun (2000) have done compilation of the definition. It shows the shifting focus of global entrepreneurial success factors. Before 1990, the focus was on personal and psychological factors while after 1990 focus was given on managerial and environmental factors. The common themes found in the definitions of entrepreneurship include: the entrepreneur, innovation, organization, creation, value creation, opportunity taking, profit or non-profit, growth, uniqueness, process, flexibility, dynamic, creative, and risk taking. These themes can be put into overlapping typologies, and the remainder of this section sets out five different types of perspectives on what is meant by entrepreneurship such as, (i) an economic function (ii) a form of behavior (iii) a set of characteristics (iv) a small business (v) and as the creation of wealth (Ahmed, and McQuaid 2005). In fact, in almost all definitions of entrepreneurship and entrepreneur, there is an agreement that entrepreneurs have a kind of behavior that includes (i) initiative taking (ii) the organizing and reorganizing of social and economic mechanisms to turn resources and situations to practical account and (iii) the acceptance of risk or failure.

The concept of entrepreneurship has a wide range of meaning. It has been debated among scholars, educators, researchers and policy makers since early 1700s when it was established. It is very difficult to give unanimous definition of entrepreneurship. It is an elusive concept (McQuaid 2002). As the expectations of different stakeholders are different, their views regarding enterprise, entrepreneurship and small business are also different. Therefore, there is no clear-cut definition of these terms. Rosa (1992) argued that the vagueness of enterprise has been to the advantage of both government and academics in the 1990s in their attempts in the UK to change the national culture. Katz (1991b) commented over this debate that small business is sub-set of entrepreneurship, while others argue that small business commencement is an integral part of entrepreneurship. Kearney (1996) defined that enterprise is the capacity and willingness to initiate and manage creative action in response to opportunities or changes, wherever, they appear, in an attempt to achieve outcomes of added value. These outcomes can be personal, social and cultural. Typically enterprise involves facing degrees of difficulty or uncertainty. The associated risks are not necessarily financial but may be physical, intellectual or emotional.

Innovation is a characteristic of any entrepreneur. Austrian Economist Schumpeter (1949) defined entrepreneurship focusing on innovation in four different areas such as new products, new production methods, new markets, and new forms of organization. Anyone combines inputs in an innovative manner to generate value to the society that results in the creating of wealth. According to Schumpeter, the carrying out of new combinations call enterprise and the individuals whose function is to carry them out call entrepreneurs (Cited in Carton, Hofer, & Meeks, 1998).

Industrial revolution also added this dimension in the entrepreneurship concept. Audretsch (1995) and Cunningham and Lischeron (1991) emphasized on innovation issue of an entrepreneur. They identified three levels of the term of entrepreneurship. The levels are: (i) small firms and enterprises level (ii) new firm formation and (iii) innovation and a system-wide coordination of complex production. Innovation and system-wide coordination is also emphasized in other studies (Malechi 1997; Casson 1990, Casson 1999). Behavioral and social scientists also focused on risk taking, innovation, and initiative taking capabilities in their definitions of entrepreneurship (Weber 1930, Hoselitz 1952). These characteristics are related to the cognitive aspects of the entrepreneurship.

Risk taking is the prime factor for the success of an entrepreneur. When an entrepreneur initiates a business venture, he or she has to take risk and face uncertainty. In the 18th century, the French term '*entrepreneur*' was first used by Cantillon (1755) to describe a 'go-between' or a 'between-taker' whereby they bought goods at certain prices but sold at uncertain prices (as when they purchased the goods at a given price they could not be sure what price they would sell them for). So, he or she bore the risk and uncertainty of a venture but kept the surplus after the contractual payments had been made (As cited in Ahmed and McQuaid 2005). Drucker (1971) also emphasized on risk taking capability as an important characteristic of an entrepreneur. Ahmed (1981) identified entrepreneur as a risk taker as he or she invests money, and he or she is involved in making decisions, the success of which brings rewards; and the failure of which could lead to the loss of the rewards, as well as, even the loss of the principal (i.e., invested money). Therefore, it is very logical to place risk taking at the focal point of entrepreneurship. Anybody doing business is not an entrepreneur. The person who takes risk for establishing new venture or who has the capability of taking moderate risk is an entrepreneur (Ahmed 1982; Ahmed 1987). A person is entrepreneurial when he or she has very strong eagerness to achieve, which was emphasized by McClelland (1961). He found *achievement motivation* as an important foundation characteristic of a successful entrepreneur. The person who likes to reach at the top of the success ladder by taking moderate risk is achievement motivation oriented. An entrepreneur not only initiates new business venture but also runs the business efficiently. In this regard, Jean-Baptiste Say identified few dimensions of entrepreneurship with the idea given by Cantillon such as, planning, supervising, organizing, and even owning the factors of production. These activities are primarily related to the managing and running the business.

Opportunity seeking is another characteristic of an entrepreneur. In this regard, Stevenson (2000) explained that entrepreneurship is an approach to management that can be defined as the pursuit of opportunity without regard to resources currently controlled. In this approach, he examined six critical dimensions of business practices such as, strategic orientation, commitment to opportunity, commitment and control of resources, management structure, and reward philosophy, which are related to entrepreneurship development. Entrepreneurship is the pursuit of a discontinuous opportunity involving in the creation of an organization with the expectation of value creation to the participants. The entrepreneur is the individual (or team) that identifies the opportunity, gathers the necessary resources, creates and is ultimately responsible for the performance of the organization. As a catalyst agent, an entrepreneur creates the forces of change and utilizes the same in accelerating the socioeconomic value-addition of a country through resource utilization, employment generation, capital accumulation and industrialization (Rahman 1979; Rahman 1996). Self-employment is the result of the development of entrepreneurship. Entrepreneurs create employment for him and for others to work with innovative and economic projects. People who are self-employed and have the ownership of the business are called entrepreneurs (Chowdhury 2002). They are the owners of the business enterprises. In this regard, women entrepreneurs are defined as conventional or traditional entrepreneurs, innovators, radical proprietors, domestic traders and dynamic groups (Begum 2003).

In conclusion, it is evident that some definitions of entrepreneurship are concerned with business development aspects, while some are related to behavioral aspects of entrepreneur (Ahmed and McQuaid 2005). Business development aspects could be defined by opportunity seeking, initiative taking for establishing new business venture, creating wealth etc. While, behavioral aspects are related to achievement motivation, risk taking propensity, inner urge to do something for him and for the society as well. Essentially, entrepreneurship is the dynamic process of creating incremental wealth, which is created by the individuals by adopting risks in terms of equity, time, career commitment etc. It is the process of creating something new value by devoting the necessary time and effort, assuming the accompanying financial, psychic, and social risks, and receiving the resulting rewards of monetary and personal satisfaction and independence. Entrepreneurship can be emerged through the actions of four actors. The actors are support system, socio-sphere system, resource system, and self-sphere system.   First, Support system that includes structure, Organizational goal /policy, program in activities, technical competence, Organizational climate, and style of functioning, Second, *Socio-sphere system,* includes value orientation, which is defined by work, independence, initiative, innovations and risk taking norms. Third, Resource system includes manpower, market, raw material, transport communication, other industries / enterprise, and technology and technical manpower. Fourth, self-sphere system includes motivation and skill. Motivation is explained by personal efficiency, coping

capability and skill is defined by selection of product/process, project development, and establishing and managing enterprise.

The emergence of women entrepreneurs in a society depends mainly on economic, social, religious, cultural and psychological factors (Habib, et. al., 2005). The reasons or motivations for starting business or economic activities by the rural women are enormous. The important reasons are earning money or attractive source of income, enjoying better life, availability of loans, favorable government policy, influence of success stories, personal satisfaction, desire to utilize own skill and talents, unfavorable present working environment, self employment and employment of others, assurance of career and family security, fulfillment of creative urge of the borrowers, experience in family business, self confidence, unable to find suitable job or work, encouragement and advice of the family members, economic necessity, income from business is a supplement of family income, self dependent, self interest, inner feeling to do something or to make difference, utilization of self competence, contribution to economic growth of the locality, do something for social development, gain family and social status, gain technical and business knowledge, etc.

One of the key factors for the development of women entrepreneurship in Bangladesh is recognition (Saleh, 1995). When the activities performed by the family members or by the neighbors, rural women feel encouraged to do it. Therefore, whatever the rural women do must be first recognized by their husbands and then by the family members and others. The types of family in the rural areas have impact on the development of rural women entrepreneurship. Study shows that rural women coming from a nuclear family become more entrepreneurial than joint family (Surti and Sarupia, 1983). The level of family liability can attribute the reason. This family has less liability than the joint family.

Age of the rural women entrepreneur is another factor for developing rural women entrepreneurship in Bangladesh. Study shows that the majority of the rural women entrepreneurs started their business at the age of 20-29 years (Punitha, et.al., 1999). At this age, they do not have many family bindings and as such they can work freely in their projects. There are many places of Bangladesh, where there is no touch of development. Because of their presence of the rural micro credit programs at those areas rural women are becoming more enthusiastic to initiate new economic projects with the help of micro providers. Therefore, properly supervised micro-credit can help to improve socio-economic conditions of the rural poor women in Bangladesh (Begum, 2005). However, lack of economic socioeconomic backwardness of the family, lack of family and community support, ignorance of opportunities, lack of motivation in initiating new projects, shyness and inhibition to involve with economic activities, preference for traditional occupations, etc. are the factors that inhibit the promotion of grass roots entrepreneurship development among rural women (Rao, 1991).

3. Methodology

The respondents of this study are rural women borrowers of two leading organizations such as ASA in private sector and BRDB in public sector. The total number of women borrowers interviewed is 246 of which 198 are from ASA and 48 are from BRDB. All the borrowers of BRDB are Hindu, while the borrowers of ASA comprise 77.60% Muslims and 22.40% Hindus. The age distribution of the borrowers of ASA and BRDB is different. About 29% of ASA's borrowers are between the age of 20 to 25 years followed by 30 to 35 years (24.50%), 35 to 40 years (22.40%), 25 to 30 years (18.40%) and between 15 to 20 years (6.10%). On the contrary, 49% of the borrowers of BRDB are between 35 to 40 years old. About 21% of this group is between the age of 25 to 30 years followed by 20 to 25 years (15.20%), and 30 to 35 years (15.20%). The average age for the borrowers of ASA is 29 years and for BRDB is 32 years. About 88% of the borrowers of BRDB and 98% of ASA are married. The difference between the educational qualification of the borrowers of ASA and BRDB has been observed. About 33% of the ASA's borrowers are self-literate. They become literate after joining micro credit program to manage financial matters. About 29% of them are primary educated followed by illiterate (22.40%) and secondary educated (16.30%). About 36% of the borrowers of BRDB are secondary educated. The illiterates of this group are also similar (36.40%) like ASA. The self-literate borrowers in BRDB are 15.20% and primary educated borrowers are 12.10%. This education status of the women borrowers indicates that the borrowers were self-literate after the involvement with credit programs.

The training status of the rural women borrowers shows that the majority of the respondents have no training on technology or marketing. More than 75% of the borrowers in both the groups did not receive any formal training from the credit providers. Only 18% of the borrowers of ASA and 12% of BRDB have received technical training from other than loan provider. Only 8.20% of ASA's borrowers and 12.10% of BRDB's borrowers obtained non-technical training from the credit providers. The nature of this training is only to give idea about technology and other aspects of the business. This study noticed that ASA and BRDB have no arrangement for organized training in the study area.

BRDB started its credit activities in the study area in 1993, while the inception of ASA was 1996. The target people of BRDB for credit programs are poor farmers and rural women who have at least some productive assets. On the other hand, the focus of ASA is to give credit to the poor women who have no productive assets to earn. ASA provided micro credit to 1,200 women and for BRDB it is 295 in the study area.   BRDB gave loans for the purpose of poverty alleviation primarily in the projects of agriculture, fish culture, poultry raising and petty trading. ASA gave credits for poverty alleviation in the projects of paddy husking, rice fry (Muri Vhaza), small hotel (café), petty trading (vegetables trading, molasses trading etc.) purchasing van/rickshaw, purchasing cow, fish culture, and poultry raising. The minimum amount of credit given by BRDB is TK.2, 500 and the maximum is Tk. 7,000. While, the same is for ASA ranged from Tk. 3,000 to Tk.12, 000. Along with micro credit, ASA has micro insurance services. But BRDB does not offer insurance policy. However, BRDB provides advice in family planning along with micro credit but ASA does not. ASA is very much strict about the installments supposed to give every week. BRDB's loanees repay installment in a month, which is less strict compared to ASA.

To select the sample respondents, khulna divisions (Note 2) has been selected. Under this division, Khulna is an important district (Note 3) under this district; there are 10 Thanas (Note 4) such as Khulna Sadar, Batiaghata, Dacope, Daulatpur, Dumuria, Koyra, Paikgacha, Phultala, Rupsa, and Terokhada. The reason for selecting Khulna district is that the most densely populated district in Khulna Division. There are about 2.38 million people living in this district with 375,000 households (BBS, 2005). About 50% of population in this district is female.

Batiaghata Thana was selected as the sampling area which is located adjacent to Khulna City. This Thana consists of 7 Unions with 159 villages. The population of this Thana is 128,184 with 516 persons per sq. km. The plane land is 1,468.38 acres. Only 37.70% of the population is literate. There are 23,698 families in this Thana. The total number of dairy and poultry firms is 12 and 57 respectively. There are 12,088 sanitary latrines and 1,024 tube wells in the Thana. The numbers of deep tube wells are 896.   Most of the families are involved in agricultural farming followed by petty trading, fishing, pottering, paddy husking, gold-making business, kamar, and spinning. There are 26 village hat/bazaars in the Thana.

Borrowers who are already engaged in 3-10 years or more with the credit programs are considered as respondents. *Purposive Sampling Method* was used to select the types of activities or projects including fish culture, paddy husking, poultry farming, petty trading, grocery, animal husbandry, weaving, handicrafts, dairy farming, plant nursery etc. of rural women borrowers. All women borrowers of BRDB were selected from the Rajbadh village and 25% of the borrowers of ASA were selected purposively from Hatbati, Wazed Akundi Nagar, Sachibunia villages who have been involved in micro credit programs.

Based on the criteria such as, (i) the intensity of credit programs, (ii) the density of population, (iii) intensity of poverty were used to select two Unions of Batiaghata Thana have been selected purposively for this survey. Under each Union there are about 14 to17 villages. One village named Rajbadh has been selected for interviewing the borrowers of BRDB and three villages named Hatbati, Wazed Akundi Nagar, and Sachibunia have been selected for interviewing the borrowers of ASA. ASA and BRDB have intensive micro credit programs in these selected villages because of large population size and high poverty.

This study is mainly based on primary data collected from the survey of rural women. A survey has been conducted among the rural women borrowers of BRDB and ASA to collect information about the development of rural women entrepreneurship through micro credit programs with the help of a structured questionnaire. A structured questionnaire in a 5-point scale was developed for the variables relating to the development of rural women entrepreneurship. A five-point scale ranging from 1 to 5 with 1 indicating strongly disagree and 5 indicating strongly agree was used in this regard. This study used 40 entrepreneurship related variables to explain the chance of rural women for being entrepreneurial identified from the literature. The dependent variable is explained by four variables such as, independence, ability to make complex decision, ability to seek & grasp opportunity and ability to take risk & initiative. The survey has been conducted with the assistance of MBA students of Khulna University, who explained the questions to the borrowers in detail. The interviewers were trained on the variables representing the questionnaire for data collection before starting interview. Borrowers were surveyed during January 2006 to March 2007.

Along with descriptive statistics, multivariate analysis techniques such as, Factor Analysis and Structural Equation Modeling (SEM) were used to analyze the relationships of the variables relating to the development of rural women entrepreneurship. A Principal Factor Analysis with an orthogonal rotation[4] (Varimax) using the SPSS statistical package was performed on the survey data and was used to separate the factors for developing entrepreneurship. The relationship of entrepreneurship factors with the overall entrepreneurship development is assessed through Analysis of Structural Equation Modeling by using Amos version 4.

It was the ultimate intention of this study to test the conceptual model developed from the theoretical analysis and to estimate the parameters for the structural equation model. Hence, data were analyzed through structural equation model using AMOS or *Analysis of MOment Structures* to perform path analysis (Note 5). Amos implements the general approach to data analysis known as *Structural Equation Modeling* (SEM) – also known as *Analysis of Covariance Structures*, or *Causal Modeling*. It is a computer program for estimating the unknown coefficients within a system of structural equations, and is one of several computer-based covariance structure models for conducting such analysis. Amos, as like as LISREL, is useful when the researcher desires to explore the causal relationships among a set of variables. The method is called covariance structure analysis because the implications of the simultaneous regressions are studied primarily at the level of correlations or covariances. Typically, a covariance structure model is specified through a simultaneous set of structural linear regressions of particular variables on other variables. The field of covariance structure analysis actually covers a wide range of topics, including confirmatory factor analysis, path analysis, and simultaneous equation and structural equation modeling. Much research in the social sciences including business involves the measurement of latent constructs. The method is useful for analysis of structural equations involving experimental data. In business applications, theoretical constructs are typically difficult to operationalize in terms of a single measure and the measurement error is often unavoidable. As a result, given an appropriate statistical testing method, the structural equation models are likely to become indispensable for theory evaluation in business research. The approach provides a means for examining causal relationships among multiple variables, the magnitude of hypothesized relationships, and the extent of measurement error of constructs in application of experimental designs (Bagozzi 1977). When researchers attempt to measure constructs such as perceptions to something, they are attempting to gauge unobservable cognitive processes with measurement devices that can only approximate the latent constructs of interest. This process is typically fraught with measurement error. Because of their ability to control or allow for such measurement error when estimating the relationships between variables, covariance structure models have been gaining in popularity in business studies (Bagozzi 1980, Bagozzi 1981). Howard (1977) suggests in this regard that structural modeling sharply highlights the intimate, powerful, mutually reinforcing relationship between theory and measurement. In this study, it was perceived that structural equation modeling would be the best approach to understand the relationships between the constructs.

In this study, covariance and structural modeling program was performed in two distinct. *First*, observed variables are linked to unobserved variables through a confirmatory factor analytic (CFA) model. CFA is a means of discovering an underlying structure in one's data, given some prior theoretical or empirical information. The set of connections between the observed and unobserved variables is often called the measurement model. The measurement model specifies how the latent variables are measured in terms of observed indicators and explicitly introduces measurement error. *Second*, the causal relationships between the resulting latent variables are examined in a structural equation model. The model component connecting the unobserved variables to each other is often called the structural model. The structural equation model specifies the causal relationships among the latent and unobserved variables.

4. The results of factor analysis

Multivariate Analysis technique such as, Factor analysis was used to identify the factors responsible to development women entrepreneurship in the rural areas of Bangladesh with the support of micro credit. A Principal Factor analysis with an orthogonal rotation[4] (Varimax) using the SPSS statistical package was performed on the survey data and was used to separate the factors. Factor Analysis[5] of 40 variables in the rural women entrepreneurship survey identified 13 main factors[6] that account for 75.74% of the variance[7] in the data (Table 1). The initial factor structure derived from varimax rotation extracted thirteen factors. Scrutiny shows that some of the factors were unclear, particularly when several items loaded simultaneously on more than one factor. The factors are Financial management skill and group identity, Creative urge and self interest, Family fund and gender discrepancies, Family employment and new job, Independence and keeping thyself busy, Business knowledge, Family experience and option limitation, Economic necessity, Self confidence, Technical and non-technical knowledge, Earning money, Unable to find suitable work, Contribute to the economic growth.

The first factor was identified as *financial management skill and group identity* accounts for 18.16% of the variance in the data. The development of financial skill and the creation of group identity by the micro credit is the most important factor for the development of rural women entrepreneurship in Bangladesh. The eigenvalue of this factor is 7.26. Financial management skill and group identity are related to six variables including such as increased family relationships and cohesiveness (0.536), involved rural women-folk (0.822), development of financial management skills (0.866), realized self and collective identity (0.880), getting adult education (0.621), and developing awareness of health and women's rights (0.696), etc. A relatively higher level of factor loading[9] of almost all the variables

indicates that these variables are very important to constitute the rural women entrepreneurship development factor. The communality[10] values for these variables are 0.705, 0.818, 0.835, 0.901, 0.742 and 0.630 respectively. The higher level of communality of the variables associated to financial management skill and group identity indicates that each variable is very much related to the factor.

The next important factor is *creative urge and self interest* with an eigenvalue of 3.57. The variance of this factor is 8.93%. It indicates that creative urge and self interest is an important factor for the development of rural women entrepreneurship. Seven variables constituted this factor. The variables are creative urge (0.843), self interest and self dependent (0.815), inadequacy of family supplement income (0.538), family support is required (0.534), attractive source of income (-0.441), competent to take and use loan (-0.426), and getting educated (0.416). These variables are highly important for determining the entrepreneurial status of the rural women borrowers. The communality of the variables is also higher.

Family fund and women involvement is the third important factor for the rural women entrepreneurship development with an eigenvalue of 2.76. This factor explains 6.90% of the variance. The women borrowers are concerned with self independent (0.852), family peace (0.787), gaining social prestige (0.664), ability to accumulate family fund (0.525), and alleviation of gender discrepancies (0.488). Another entrepreneurship factor is *employment of family members and the creation of new jobs* with eigenvalue of 2.75 and variance of 6.87%. This factor is constituted by four variables such as, can employ others (0.827), new work and work environment (0.761), training (0.758), and scope to utilize own skills and talents (0.549). Independence and keeping thyself busy is the 5th factor for the development of rural women entrepreneurship in Bangladesh. The eigenvalue and the variance of this factor are 2.205 and 5.515 respectively. The variables formed this factor includes doing something independently (0.920), can keep myself busy (0.825), and career and family security (-0.447). *Family Experience and Option Limitation* is the next important factor for the development of rural women entrepreneurship in Bangladesh. Two variables constituted this factor such as, experience and competencies (0.835) and no other option available (0.764).

Other factors like knowledge of business, economic necessity of the family, self confidence, technical knowledge of business, money earning, unable to find suitable work or job, and contribute to the economic growth were found not significant to build the model.

5. Results of structural equation modeling (SEM) analysis

The data of this study were analyzed in two stages. First, the measurement model was assessed to confirm that the scales were reliable. Second, when the reliability of the measures had been established, the structural model was tested. This testing determined the strength of individual relationships, goodness of fit of the model, and the various hypothesized paths.

The first step of the analysis was a test of the measurement model. Objectives of this test were: (1) to contain the validity and reliability of measures; and (2) to select the best subset of observed measure for use in testing the structural model. The data depicted a normal distribution with acceptable skewness and kurtosis values. Coefficient alpha was computed for each set of observed measures associated with a given latent variable, and a Confirmatory Factor Analysis (CFA). Alpha values of each item in each dimension were performed separately and were found acceptable. Estimation of Measurement model for the six constructs (factors) of interest was performed using AMOS 4.01.

The results of overall structural model fit as indicated by the chi-square statistic (Note 6), which was significant chi-square = 707.80; df = 168; p = 0.000 (Table 2). The statistic is computed under the null hypothesis that the observed covariances among the answers came from a population that fits the model. A statistically significant value in the *goodness of fit test* would suggest that the data do not fit the proposed model, i.e., that the observed covariance matrix is statistically different than the hypothesized matrix (Note 7).

The fit of the structural model was estimated by various indices and the results demonstrated good fit. For models with good fit, most empirical analyses suggest that the ratio of chi-square normalized to degree of freedom (chi-square/df) should not exceed 3.0 (Carmines and McIver, 1981). In addition, the obtained goodness-of-fit (GFI) measure was 0.809 and the adjusted goodness-of-fit (AGFI) measure was 0.737 respectively, which are both higher than the suggested values. The other two indices of goodness-of-fit – the normalized fit index (NFI) and the comparative fit index (CFI) are recommended to exceed 0.90. The results also meet these requirements. Finally, the discrepancies between the proposed model and population covariance matrix, as measured by the root mean square error of approximation (RMSEA), are in line with the suggested cutoff of 0.08 for good fit (Byrne, 1998). The complete model of micro credit program and the development of rural women entrepreneurship is shown in Figure 1.

Table 3 shows that the relationships of the factors built the model for the women entrepreneurship development in Bangladesh through micro credit programs. After identifying the women entrepreneurship development factors, hypothesis was developed for each construct and the important factors together found significantly associated to the rural women entrepreneurship development.

5.1 Financial management skill and group identity

In hypothesis 1 (H_1), it was predicted that the financial management skill and the group identity has a direct and positive relationship with the women entrepreneurship development (WED) in rural areas of Bangladesh. It was presumed that the higher the financial management skill and group identity will lead to higher level of encouragement among the rural borrowers for taking new initiative of business. The results show that the direct effect of financial management skill and the group identity on the development of women entrepreneurship is positive and significant (β= 0.24, $p < 0.008$). This result indicates that the higher the financial management skill and better the group involvement the higher the chance of being entrepreneurial will likely be.

5.2 Family experience and option limitation

Hypothesis 7 (H_7) states that family experience and option limitation has a direct positive effect on the development of rural women entrepreneurship in Bangladesh. This means that if the rural woman has business orientation from her parent's family and if she has some fund from the micro credit providers she will take initiative to do business or she will initiate economic project which will help her to earn money   nd obtain social status. This hypothesis was supported by the analysis that provides positive and significant values (β= 0.13, $p < 0.11$). Although, this factor is significant at 11% of significance it an important factor to be entrepreneurial for the rural women through micro credit programs. As this study a first of its kind, this result can be acceptable.

5.3 Independence of the women and the urge to keep busy

In hypothesis 5 (H_5), we hypothesized that independence of the rural women and the urge to be kept busy can make them entrepreneurial which has positive and significant effect on the women entrepreneurship development in the rural areas of Bangladesh. This indicates that the more the independent and more enterprising the rural women will lead to higher level of entrepreneurial. The results support this hypothesis and is found positive and significant (β= 0.08, $p < 0.14$). This means that the higher the independence and enterprising of the rural women the higher the chance to be entrepreneurial will likely be. We also accept this result on the ground of pioneering attempt in this regard even the significant level is 14%.

5.4 Other factors

In hypothesis 2 (H_2), we predicted that the relationship between creative urge and self interest and the rural women entrepreneurship is positive and significant. But the results show that the relationship between these constructs are negative and not significant (β= -0.063, $p > 0.38$). This indicates if there is a change in the creative urge and self interest factor it will not lead to the development of rural women entrepreneurship through micro credit program in Bangladesh. That means, through micro credit program the creative urge and self interest is not developed among the rural women borrowers.

In hypothesis 3 (H_3), it was predicted that the relationship between family fund and involvement in business and the rural women entrepreneurship is positive and significant. However, the results show the opposite situation in this regard (β= -0.120, $p > 0.21$). This indicates that with the change in financial status and women involvement with money matters will be not change in the entrepreneurship development characteristics among the rural women in Bangladesh.

In hypothesis 4 (H_4), it was perceived that there is a positive and significant relationship between new job and employment of family members with rural women entrepreneurship development. But the results show that there is no significant relationship between the two constructs (β= 0.035, $p > 0.67$). This indicates that employment of family members and the new job will not develop any entrepreneurial characteristics among the rural women borrowers through micro credit programs.

6. Conclusions and recommendations

It is generally perceived that the micro credit program helps to develop socioeconomic status of the rural women in Bangladesh. In addition, it is perceived that micro credit is helping not only to bring the socioeconomic change but also to make them entrepreneurial. This study tried to resolve these questions by constructing a model which was supported by the multivariate analysis.

The most important finding of this study is that the financial management skill and the group identity of the borrowers have a direct and significant relationship with the development of rural women entrepreneurship (WED)

through micro credit programs. When rural women receive financial support from the micro credit providers they feel encouraged to involve themselves in the financial projects that subsequently increases the financial management skills of the borrowers. Micro credit also provides group identity to the rural poor women as they are used to participate weekly meeting. When women acquire knowledge of financial management and get the group identity they become more enthusiastic to initiate new business project. The significant relationships indicate that if the micro credit borrowers can enhance this skill among the rural women borrowers it would lead them towards the development of entrepreneurship. As a result, the borrowers will be able to stand on their own feet.

Another important finding of this study is that the experience from the parent's family of the borrower and option limitation has a direct positive impact on the development of rural women entrepreneurship in the rural areas of Bangladesh. This means that if a rural woman has business orientation from her parent's family and at the same time if she has some fund at her hand she will take initiate new business or she will initiate economic project which will help her to earn profit and obtain social status as well.

Rural women who are independent by nature and would like to keep them busy with economic activities could be picked up by the micro credit providers for credit. This section of rural women has the potential to be entrepreneurial. This study supports this observation for the rural women borrowers in Bangladesh.

Therefore, micro credit providers would focus on the development of financial management skills, group cohesiveness and group identity of the borrowers who have business orientation in their families and provide them financial support. This would lead to the rural women borrowers to be entrepreneurial and as a result the women borrowers will be able to stand on their own feet and rural women entrepreneurship will be developed in Bangladesh.

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Notes

Note 1. Ability and efficiency are considered here to denote productivity of the rural women borrowers. Through this variable, inquiry was made to know whether productions of goods have been increased by the borrowers after the involvement in credit-financed project.

Note 2. Bangladesh is divided into six divisions, the second level administrative unit of Bangladesh.

Note 3. District refers to third administrative unit of Bangladesh. A group of Thanas constitutes a District.

Note 4. Thana is also called Upa-Zila. It is the fourth level administrative unit of Bangladesh. It consists of a group of Unions and every Union is formed with a group of villages.

Note 5. Amos's method of computing parameter estimates is called *maximum likelihood*. The claim that Amos's estimates are maximum likelihood depends on certain statistical distribution assumptions that have to be met by the input data. Hypothesis testing procedures, confidence intervals and claims for efficiency in maximum likelihood or generalized least squares estimation by Amos depend on certain statistical distribution assumptions. First,

observations must be independent. Second, the observed variables must meet certain distributional requirements. For instance, it will suffice if the observed variables have a multivariate normal distribution.

Note 6. The overall fit of the confirmatory factor analysis model to the sample variance/covariance matrix, as measured by chi-square, provides a test of the overall reliability of observed measure (Bagozzi 1980).

Note 7. The assumptions required to employ chi-square as a significance test (in support of the hypothesis that the predicted covariance matrix does not differ from the sample covariance matrix) are typically violated in most covariance structure analysis. Accordingly, when the results of chi-square analysis are favorable, it is best to say that the fit between predicted and observed covariance matrices is "acceptable" rather than "significant" (Joreskog and Sorbom 1986). In this study, however, both the terms used interchangeably to mean "acceptable".

Table 1. Women entrepreneurship development factors

Name of the factors	Eigenvalue	Cumulative variance (%)
1. Financial Management Skill and Group Identity	7.26	18.16
2.Creative Urge and Self Interest	3.57	27.89
3. Family Fund and Women Involvement	2.76	33.99
4. New Job and the Employment of Family Members	2.75	40.86
5. Independence and Keeping Thyself Busy	2.21	46.37
6. Knowledge of Business	2.15	51.73
7. Family Experience and Option Limitation	1.80	56,24
8. Economic Necessity of the Family	1.55	60.12
9. Self Confidence	1.47	63.78
10. Technical Knowledge of Business	1.41	67.32
11. Money Earning	1.20	70.32
12. Unable to Find Suitable Work or Job	1.11	73.09
13. Contribute to the Economic Growth	1.01	75.74

Table 2. Fit indices of the model

Fit indices	Recommended values	Observed values	df	Significance
Chi-Square	N/A	707.80	168	0.000*
GFI	≥ 0.90	0.809		
AGFI	≥ 0.80	0.737		
RMR	≥ 0.09	0.083		
NFI	≥ 0.90	0.920		
CFI	≥ 0.90	0.950		
RMSEA	≤ 0.08	0.070		

*Significant

Table 3. Standardized regression weights

Relations	Estimates (Standardized)	S.E.	C.R.	P
RWED - F1	***0.238***	***0.058***	***2.670***	***0.008****
RWED – F2	-0.063	0.078	-0.870	0.384
RWED – F3	-0.120	0.083	-1.252	0.210
RWED – F4	0.035	0.158	0.423	0.672
RWED – F5	***0.082***	***0.030***	***1.479***	***0.13****
RWED – F7	***0.130***	***0.101***	***1.595***	***0.111****

* Significant at 10% level of significance

** Significant at 15% level of significance

Figure 1

A Model for the Development of Rural Women Enterpreneurship through Micro Credit Program

Notes: FSGI= Financial Skill and Group Identity; CUSI= Creative Urge and Self Interest; FFGD= Family Fund and Gender Discrepancies; FENJ= Family Employment and New Job; IKTB= Independence and Keeping Thyself Busy; FEOL= Family Experience and Option Limitation; RWED= Rural Women Enterpreneurship Development; y's= Observed measures of the endogenous variable; x's= Observed measures of the exogenous variables; d's= errors associated with y's; e's= errors associated with x's

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