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# Culture and Conflict Management

## Style of International Project Managers

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### **Abstract**

The management of culture has become increasingly important to many organisations and business disciplines, particularly multicultural and international project management. Cultural differences often result in varying degrees of conflict and require careful consideration. This study surveys 116 Project Managers using the Thomas-Kilmann Conflict Mode Instrument to determine their approach toward managing conflict. Indian, French and UK Project Managers' conflict management style are correlated with Hofstede's description of their cultural characteristics. We find that significant links between the cultural dimensions of Individualism and Masculinity with the propensity for Project Managers to adopt a Competitive style of conflict management. We also find Uncertainty Avoidance correlates with a tendency for Project Managers to adopt an Avoiding approach to conflict management. Other relationships are found between Hofstede's cultural dimensions and conflict management styles in Project Managers but their meaning requires further study.

**Keywords:** Culture, Conflict, Project Managers

### **1. Culture**

The term business culture has become increasingly used since its introduction in the 1980's and its importance and effect upon all manner of organizations has achieved considerable significance especially as those organizations have engaged in more international exploits (Pheng and Yuquan, 2000). While internationalisation of business provides opportunity in terms of economies of scale and growth for example, it also presents special managerial difficulties. Failing to handle the diversity and complexity of host cultures and their integration with existing or intended organisational culture can be catastrophic. Poor employee motivation, low staff retention, marketing ineffectiveness and loss of competitive advantage are the potential results. On the other hand, successful cultural management can foster innovative practices, organisational knowledge creation and become a potential source of competitive advantage (Hoecklin, 1996; Evans, Hau & Scuh, 1991; Hofstede, 1985).

It is widely understood that 'culture' represents an 'average' of the group or nation that is under consideration and that individuals may differ from this norm (Trompenaars and Hampden-Turner, 1997). This not only means that any approach toward cultural management will by definition be a compromise, but that many different approaches may be required for the numerous working groups that have been identified as having particular cultures, such as national culture (Hofstede, 1991), founder culture (Schein, 1985), professional culture (Hofstede, 1991; Schein, 1985), and organizational and corporate culture (O'Reilly and Pfeffer, 2000; Schwartz and Davis, 1981). One of the most influential pieces of business-culture research is that of Hofstede (1984) upon the employees in the international offices of IBM, yet even this has been subject to significant criticism. McCoy (2003) among others (Akande, 2002; Tardif, 2002; Giddens, 2000; Norchi, 2000), summarise these criticisms; that any description of culture will be an average, the model proposed by Hofstede identifies five characteristics of culture but does not describe their interrelationships, the model does not explain whether the observed culture displays for example the 'IBM-ness' of India or the 'Indian-ness' of IBM, and that the study is now out of date for reasons including changes in gender equality in developed countries and the globalisation of skilled personnel which has tended to dilute national distinctiveness.

Despite these criticisms, Hofstede's work has proved to have value in determining or predicting cultural traits (Samarah and Mykytyn, 2002; Triandis, 1995; Bartlett and Ghoshal, 1989). For example, Hofstede hypothesized that Russian managers would be characterized by high power distance, high uncertainty avoidance, medium-range individualism, and low masculinity (Hofstede 2001). Bollinger (1994) tested Hofstede's hypothesis in studies of Russian managers and found support for these predictions. Elenkov (1998) in his comparative study found that US

managers are more individualistic than their Russian counterparts and the managerial culture in the United States is also characterized by lower power distance and uncertainty avoidance than the Russian managerial culture.

## 2. Conflict Management

Capozzoli (1999, p28) recognized that conflict “lies in the minds of those who are in conflict” and is usually only seen when it manifests as discord. Despite the immediate connotation of conflict being a destructive or inhibitive force it can in fact be healthy for an organisation if managed constructively. It may bring to light previously unseen pressures or discontents, it promotes problems to be addressed and may improve individuals’ understanding of the goals and motives of others (Rollag, 2005; Van Slyke, 1999; Capozzoli, 1999; Singh and Johnson, 1998; Klunk, 1997; Butler, 1973). Poor management however leads to the inevitable loss of team and organisational trust and bonds, and reduced motivation (Cloke and Goldsmith, 2000; Capazzoli, 1999). A multi-cultural team is exposed to many of the sources of conflict to an even greater degree than a mono-cultural team, because of the different value systems among its members. Thus the multi-cultural project manager must be capable of managing cultural conflict and be able to handle the conflicts effectively in order to improve the team’s performance. Kezsbom (1992) identifies potential sources of conflict in a project including scheduling, managerial and administrative procedures, communication, goal definition, resource allocation, reward methods, personalities, cost, technical knowledge, politics, leadership style and presence of ambiguity. The cultural traits identified by Hofstede and others that are likely to contribute to each of these sources of conflict are listed although their relative significance is not known.

Much of the current conflict management research stems from the work of Blake and Mouton (Borisoff and Victor, 1989), who identified five main conflict management approaches, namely problem-solving, smoothing, forcing, withdrawal and sharing. Subsequent authors have built on this framework with subtle changes to terminologies such as the Thomas-Kilmann model which is based on five conflict management methods of competing, collaborating, compromising, avoiding and accommodating (Table 1). The survey is used to identify an individual’s conflict management behaviour, but also to demonstrate that the individual can increase his/her effectiveness through deliberately choosing a mode in conflict situations (Kilmann, 2007). Thomas and Kilmann maintain that we are all able to use each of the five approaches to conflict management though we may naturally prefer one style above another. Furthermore, this preference may change depending upon the specific circumstances of an instance of conflict, or it may change in response to our own personal disposition at that particular time.

## 3. Project Management and Culture

According to Hoffer, George and Valacich (2002), it is important for a Project Manager to possess a diverse set of skills; management, leadership, technical, customer relationship, and conflict management. Project Managers must be able to use this suite of skills to build an environment in which the project not only achieves its immediate goals but also operates successfully in terms of meeting the subtle needs of its individual members. The importance of the cultural dimension of management is especially significant in the field of Project Management. Jessen (1992) for example, proposed that the requirements for Hofstede’s cultural dimensions of power distance, individualism and uncertainty avoidance differ throughout the life cycle of a project, and therefore that cultural values have different effect during the phases of the project. Cultural patterns in project environments reflect cultural patterns in the wider society. Project Managers therefore operate within the entwined cultures of their society and of their organization and of their own specific project teams (Earley and Mosakowski, 2004).

Consequently, Project Managers must be sympathetic to the understated cultural requirements of each sector of their working environment. For example, the ability to communicate “bad news” and to manage performance are considered key skills for a successful Project Manager. Hofstede (2001) and others note that many cultures have subtle ways of operating (Yeung and Tung, 1996; Kohls, 1994). For instance providing feedback is commonly made in some collectivist cultures via a third party, and that failure to observe such practices may result in significant harm to the project environment (Slevin and Pinto, 2004; Aycan and Kanungo, 2000).

Previous work by Prabhakar (2006, 2005a b, 2004a b,) and Prabhakar & Walker (2005, 2004a b c) based on 153 projects in total from 28 nations demonstrate that leadership in projects is a unique challenge as opposed to the leadership of operations. In projects the Project Manager has to continuously evaluate his or her style of leadership and change according to the requirements of the phase a project is in due to varied time pressures, deadlines etc. This ability to change from one style to another in projects has been termed *switch leadership*. Further studies by Walker & Prabhakar (2006, 2005) across 25 nations studying 111 projects identified that leading multicultural teams is an enormous challenge where the choice of project manager and his or her team is crucial. Therefore in choosing the ‘right’ Project Manager and team they have identified four levels of maturity, viz.: ready, willing, able and optimal. Knowing a persons maturity level can facilitate the choice of a Project Manager and his or her team in multicultural projects.

#### 4. Statement of Research Purpose

Culture has been shown to be a significant factor in organisational management, particularly during the management of projects where multiple cultures are encountered simultaneously. Inability to successfully manage this conflict is likely to result in significant reduction in organisational performance and can inhibit the successful operation of project teams. This study aims to investigate the link between Project Managers' nationality and their preference to adopt a specific method for managing conflict.

The Thomas-Kilmann Conflict Mode Instrument is employed to ascertain the mode of conflict management that international Project Managers utilise. These results are correlated with Hofstede's values for each of the cultural indices; Power Distance, Individuality, Masculinity, Uncertainty Avoidance and Long-Term Orientation.

Hofstede suggests that the cultural attribute of Power Distance Index (PDI) relates to the way in which the society deals with uncertainty or ambiguity (Hofstede, 1983). In organisational or Project Management terms this may be interpreted as the degree to which authority is centralised. Individualism (IDV) is the relationship between an individual and his or her colleagues. Societies or cultures may be found where individuals exhibit high degrees of self-interest or concern for themselves and their immediate family, and these are termed Individual. Alternatively, Collective societies are those where an individual is concerned with the wellbeing of a wider group. In terms of Project Management a Collective culture may be desirable to ensure that the often multiple goals of the team are pursued above the goals of the individual. The importance that genders attach to social goals and personal goals is termed the Masculinity Index (MAS). Females are said to value relationship goals while males favour egotistic goals such as career and reward (Triandis, 1995). Masculine cultures tend to be assertive and highly competitive. Uncertainty Avoidance Index (UAI) measures anxiety about future changing conditions or events. This can manifest as the society's attempts to control uncertainties sometimes through the application of rules and protocol (Shackleton and Ali, 1990) whereas others tend to be more accepting of those future uncertainties. Hofstede later expanded his cultural dimensions to include Long-Term Orientation (LTO) that considers a culture's preference for perseverance; a comparatively short-term orientated culture would be one that valued tradition and social obligation.

We expect that the cultural indices of Individualism and Masculinity to show some degree of correlation with a propensity to adopt a Competitor conflict management style. We also expect countries with a high Uncertainty Avoidance Index to correlate with the propensity of their Project Managers to adopt an Avoider style of conflict management.

#### 5. Method and Results

A survey was conducted among 150 Project Managers in a multinational telecoms organisation. The survey tool was posted on the internet to minimise cost and time of distribution and the survey sample were directed to the survey via a hyperlink within a mass email. 116 online questionnaires were completed, giving a response rate of 77%. Figure 1 shows the proportion and nationality of project managers in the survey.

To maximise validity of the analyses those nationalities that were represented by less than fifteen responses were not included in the analysis. This study therefore focuses on the cultural characteristics and conflict management styles of Project Managers in France (15%, 17 responses), the UK (28%, 34 responses) and India (18%, 21 responses).

Table 2 depicts the average Thomas-Kilmann conflict management style values for each national grouping (represented as percentages) and the number of respondents in descending order. It shows that a high percentage of Project Managers in France, and to a lesser extent in the UK, adopt a Competitive style of conflict management (17.86% and 32.14% respectively) whilst the propensity to take this approach in India is very low (7.14%). The next significant factor is that there is a tendency for Indian Project Managers to adopt an Avoider style of conflict management (32.68%) whereas in France and the UK this is less prevalent (18.38% and 27% respectively).

The Conflict Management Styles across the 116 respondents in Figure 2 indicate that there is no particular dominant style among the observed sample of project managers.

Correlation-coefficient was used to identify the correlations between the results and Hofstede's dimensions. Cohen (1988) has suggested small, medium and large interpretations for correlations in psychological research, shown at the top of Table 3, and these interpretations of analyses have been adopted in this study.

#### 6. Analysis and Discussion

The correlation coefficients between Hofstede's cultural attributes and the Conflict Management Styles are reported in Table 3.

As seen from Table 3 the values of the correlations between Competing-IDV (0.82, -0.21, 0.75) are large for both France and UK and small but negative for India. France and UK are both identified by Hofstede as being highly

Individual cultures where people are more concerned with their own well being than that of others. The correlation confirms a logical link between an individual's self-concern and their likelihood of adopting a Competitive style of conflict management. India, being less Individual than both France and UK displays a corresponding reduction in its Project Managers tendencies to behave in a Competing fashion.

Competing-MAS (0.56, -0.03, 0.94) shows a strong correlation for France and UK and small for India. Hofstede finds that the UK is most Masculine of the three countries, followed by India then France. Highly Masculine cultures may be expected to display more aggressive or assertive traits and therefore be likely to correlate highly with Competing styles of conflict management. As expected, the correlations between Competing and Masculinity mirror those of Competing and Individualism with both France and UK appearing Competitive.

Avoiding-PDI (-0.29, 0.57, 0.93) are large for India and the UK and small but negative for France. Power Distance Index relates to the accepted inequality of power in a social system and Hofstede found that France and India displayed this to a higher degree than the UK. The strong correlations between these factors in both India and UK do not reflect the relative differences found by Hofstede and thus suggest that any link between an Avoiding conflict management style and PDI is not necessarily meaningful.

Avoiding-UAI (0.52, 0.55, 0.46) are large for both France and India and medium for UK. Uncertainty Avoidance Index represents the tolerance of uncertainty or ambiguity. A culture with high UAI would be expected to enforce rules or procedures to minimize unstructured situations. It could be expected that any culture that avoids uncertainty would also avoid confrontation and therefore adopt an Avoiding strategy. Hofstede reports considerably higher tolerance in France than either UK or India. While these results do not reflect the scale of difference that Hofstede identified within this cultural dimension it is notable that propensity to adopt an Avoiding style is correlated across all three observed countries with the dimension of Uncertainty Avoidance.

## 7. Conclusions

This study finds significant links between Hofstede's cultural dimensions of Individualism and Masculinity with the propensity for Project Managers to adopt a Competitive style of conflict management. It also finds Uncertainty Avoidance correlates with a tendency for Project Managers to adopt an Avoiding approach to conflict management. Other relationships are found between Hofstede's cultural dimensions and conflict management styles in Project Managers but their meaning requires further study.

It is clear that cultural traits influence the approach of Project Managers toward conflict management and this is a new insight into the complexities of the management of multicultural projects. Project Managers need to be aware of the cultural attributes of their teams but also of the ways in which their actions are somewhat determined by their own cultural attributes.

There is some conflict around how the cultural tensions within project teams should be managed. Sujansky (2004) suggests a number ways for Project Managers to improve their ability to handle cultural issues, while White (1999) asserts that they must respect and support team diversity, and Evaristo (1993) suggests that Project Managers demonstrate inclusiveness by being receptive to alternative perceptions and thus encourage novel solutions to problems. Vereen (2004) however adopts a different perspective and highlights the importance of each individual in the project team to take responsibility for recognizing and appreciating others.

While this study illuminates the degree to which cultural attributes affect the likely approach that Project Managers may take in dealing with team conflict further research is needed to understand how Project Managers may moderate or change their attitude for the benefit of the project team.

This research has been undertaken in a single multinational telecoms company hence the sample may be more indicative of the multi-national business culture than of their national culture. Future studies may explore the link between conflict management style and cultural traits in other single culture and multi-culture working environments.

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Table 1. Thomas and Kilmann's Conflict Management Styles

<b>Competing</b>	Individuals pursue their own goals at the expense of others. Authoritarian.
<b>Accommodating</b>	Individuals support others in the pursuit of their goals. Sympathetic.
<b>Avoiding</b>	Individuals neglect their own goals and those of others. Circumventive.
<b>Collaborating</b>	Individuals attempt to find ways for themselves and others to achieve their goals.
<b>Compromising</b>	Individuals attempt to partially fulfill their own goals and those of others.

Table 2. Conflict Management Styles by Country

Country	Responses	Competitor	Collaborator	Compromiser	Avoider	Accommodator	TOTAL
United Kingdom	34	17.86%	20.64%	19.64%	27.00%	14.86%	100.00%
India	21	7.14%	17.86%	19.64%	32.68%	22.68%	100.00%
France	17	32.14%	17.86%	21.41%	18.38%	10.21%	100.00%
South Africa	11	22.22%	14.81%	18.52%	18.52%	25.93%	100.00%
Germany	8	20.30%	17.29%	23.12%	18.80%	20.49%	100.00%
Holland	7	23.57%	16.43%	21.07%	19.29%	19.64%	100.00%
Australia	4	12.50%	16.07%	26.79%	19.64%	25.00%	100.00%
Nigeria	3	20.00%	19.64%	24.64%	20.71%	15.01%	100.00%
Poland	3	25.00%	21.43%	17.86%	14.29%	21.43%	100.01%
Pakistan	2	14.29%	7.14%	28.57%	25.00%	25.00%	100.00%
Ghana	2	20.71%	15.01%	20.00%	24.64%	19.64%	100.00%
New Zealand	1	21.43%	12.50%	19.64%	25.00%	21.43%	100.00%
Sweden	1	18.52%	14.81%	14.72%	25.73%	26.22%	100.00%
Russia	1	25.00%	17.86%	17.86%	19.64%	19.64%	100.00%
Spain	1	23.12%	18.80%	20.30%	20.49%	17.29%	100.00%
<b>TOTAL AVERAGE</b>	116	20.25%	16.54%	20.92%	21.99%	20.30%	<b>100.00%</b>

Table 3. Correlation Coefficients

**Correlation**

Small	0.1 to 0.29
Medium	0.3 to 0.49
Large	0.5 to 1.0

<b>France</b>	Competitor	Collaborator	Compromiser	Avoider	Accommodator
PDI	-0.28	-0.03	-0.22	-0.29	-0.09
IDV	0.82	-0.07	0.14	0.38	-0.08
MAS	0.56	0.24	-0.12	0.11	-0.12
UAI	0.16	0.28	0.24	0.52	-0.02
LTO	x	X	x	x	x

<b>India</b>	Competitor	Collaborator	Compromiser	Avoider	Accommodator
PDI	0.14	0.11	-0.14	0.57	0.22
IDV	-0.21	0.28	-0.02	0.28	-0.12
MAS	-0.03	0.11	-0.02	-0.9	-0.19
UAI	0.17	0.27	0.18	0.55	-0.21
LTO	0.12	0.46	0.12	-0.07	0.91

<b>UK</b>	Competitor	Collaborator	Compromiser	Avoider	Accommodator
PDI	-0.12	0.28	-0.02	0.93	0.32
IDV	0.75	-0.21	-0.11	-0.01	-0.16
MAS	0.94	0.04	0.16	-0.8	-0.03
UAI	0.14	0.21	0.21	0.46	-0.15
LTO	-0.7	0.32	0.02	-0.14	0.12

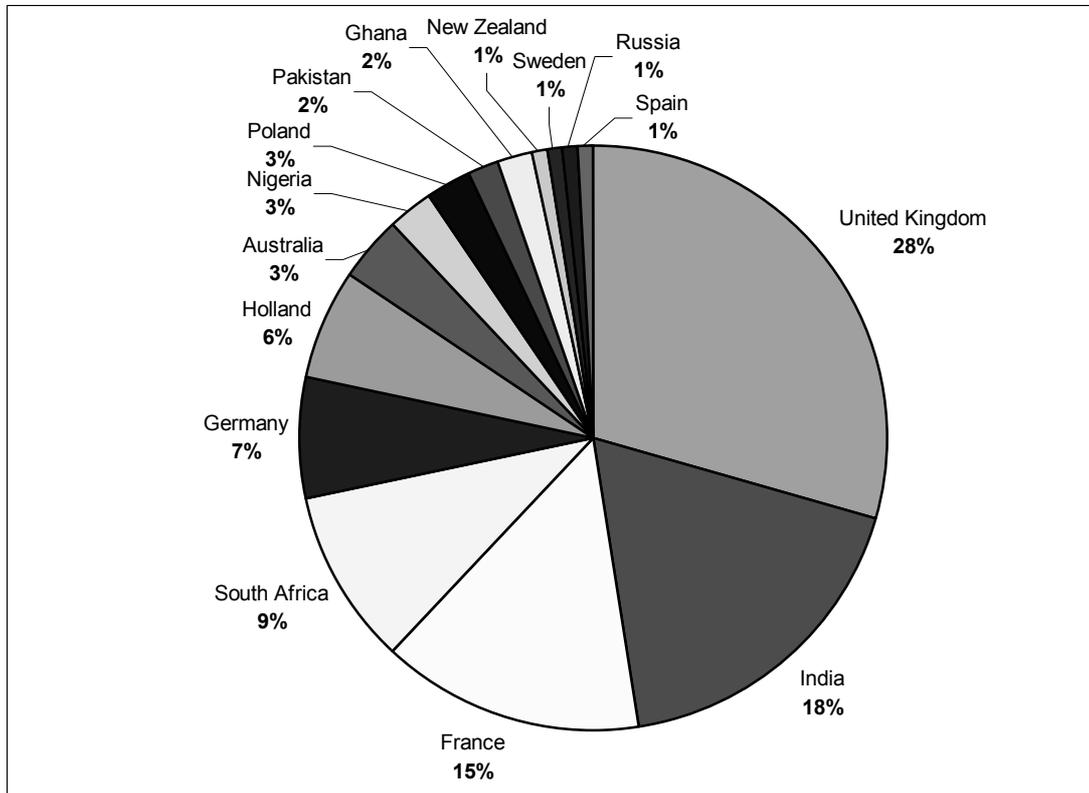


Figure 1. Survey Sample

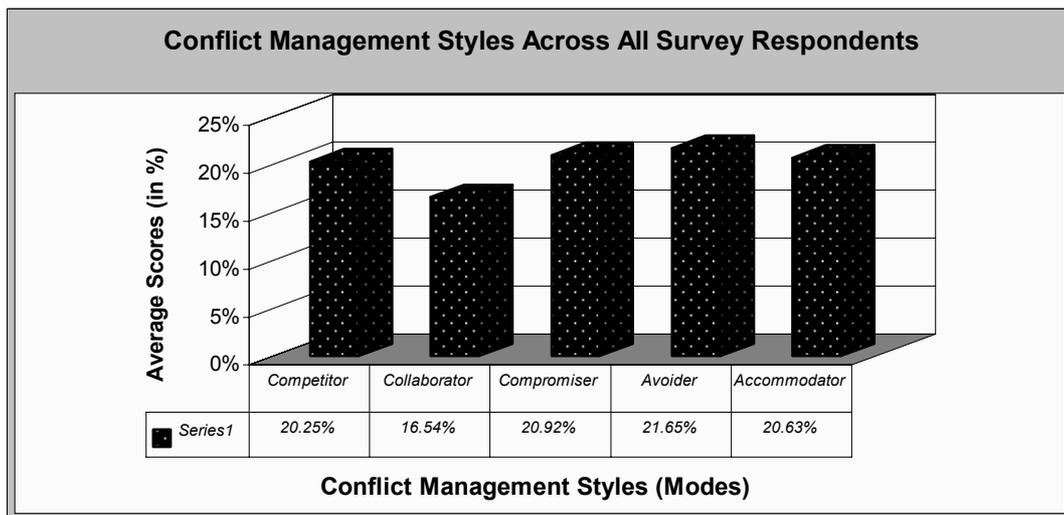


Figure 2. Average Conflict Management Styles across Survey Respondents

# Nonmarket Strategy and Firms' Strategic Change

## Evidence from the China Telecommunications Industry

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### Abstract

This study addresses a linking mechanism between nonmarket strategy, Austrian economics and firms' strategic change. Drawing on the results from a case study of China's telecommunications industry, we develop an integrative framework suggesting that telecommunications development and strategic change in China does not depend merely on economic growth, the nonmarket factors play a more significant role during this process. These results provide a strong incentive for future researchers to consider nonmarket strategy as a key variable in relation to strategic change success in transitional economies, which generates both theoretical and practical implications.

**Keywords:** Nonmarket Strategy, Austrian economics, Strategic Change

### 1. Introduction

In recent years, public policy scholars have attempted to integrate concepts of strategic management with the business-government literatures (e.g., Baron, 1995; Shaffer, et al. 2000), but it is fair to say that the two areas are treated as separate subjects by the academic literature. The current research draws from theories of strategic management and Austrian economics treat actions as sources of sustained competitive advantage. Previous business and policy researchers has generally focused on market-based actions, and not taken into account the social, political, and legal activities of the firm (Quasney, 2003). Clearly, nonmarket strategies, such as manage regulation, legislation, public affairs, media affairs and government relations, serve the primary objectives of firms to raising their market barriers, defending profit potential, and shaping and controlling their competitive environments, both market and nonmarket activities must be considered.

Therefore, our paper is an effort to fill this gap by exploring, both theoretically and empirically, nonmarket strategy performance in the literature. The telecommunication industry in China provided a uniquely appropriate setting for this study.

### 2. Theoretical background

#### 2.1 Nonmarket strategy

In the past several years a number of authors have begun to investigate the nonmarket strategy (e.g., Baron, 1995; Shaffer, et al. 2000). According to previous research, the notion of "nonmarket" strategy, which concern efforts to respond to and influence the political-economic-social environment, addresses the behavior of firms toward stakeholders and legal, social and political actors. This set of actors includes, but is not limited to the courts, regulators, trade authorities and legislators, the mass media, environmentalists, educators, public affairs specialists, and health professionals. Examples of nonmarket action include the lobbying, filing of antitrust law suits or administrative petitions, grassroots activities, providing testimony, holding a press conference or underwriting public broadcasting programming, issue advertising, publicizing a "green" campaign, organizing a political action committee, making political contribution or philanthropic donations, and sponsoring educational scholarships(Quasney,2003).

To date, no generally accepted nonmarket strategy exists. The literature suggests the following two distinct levels of nonmarket activity in business research. One level addresses the roles and motivations of firms to participate in the public policy process; a second level focuses on describing the general corporate political strategies firms pursue. Actually, strategic nonmarket actions are becoming more common occurrences in a period of rapidly increasing

corporate wealth, the view expands the strategic management theory with the core of market and competition. Firms should integrate nonmarket strategy with market strategy to realize the strategic goals.

### *2.2 The Schumpeterian Perspective*

The Austrian School of Economics, which has long argued that firms undertake purposeful action with an eye toward earning profits (Schumpeter, 1934), provides a broadened conceptual basis for this paper. The Austrian perspective emphasizes actions are implemented by entrepreneurs, or managers who discover a profit-making opportunity and are motivated to exploit that opportunity. Ferrier, et al. (1999) note that industries or market segments that generate excessive short-run profits will attract competitors also seeking excessive short-run profits. This market dynamic, in turn, will eventually lead to reaction by competitors that “imitate strategies known to generate above normal profits” (Jacobsen, 1992: 785), which subsequently leads to the washing away of the particular surplus profit of the industry (Schumpeter, 1950:31), erosion of advantage Ferrier, et al., 1999) and the loss of the incumbent firm’s level of strategic competitiveness, in a process described by Schumpeter (1934) as creative destruction.

## **3. Research Method**

In order to investigate the strategy change process in Chinese telecommunications industry, the case study method as a ‘research strategy’ (Yin, 1994) is preferred mainly because strategic issues are inherently contextual (Pettigrew, 1987). The Chinese telecommunications industry offered us a useful case for examining this aspect of nonmarket strategy and strategic change longitudinally.

### *3.1 Sample and Data Collection*

We conducted field and ethnographic analysis at five large organizations in the China’s telecommunication industry. Field methods are advantageous here because they provided rich data for theorizing and conducting a detailed analysis of the dynamics of interfirm ties. Table 1 provides descriptive characteristics of the sample.

### *3.2 Data Analysis*

We used the extended case method (Burawoy, 1991) as a guide to data analysis. This methodological approach uses empirical data gathered through case study to reconceptualize and extend theory. We began our analysis by working from the basic question, “how China telecommunication industry change has been successfully carried out by practically handling nonmarket factors?” This basic question allowed particular themes about control to emerge from our data that we could compare, revise, and refine as we collected more data and grew more familiar with the case. The result of our analysis is a four-part narrative about the four phases of the evolution of strategic change of China telecommunications industry.

## **4. Four phases of telecommunications development in China**

Telecommunication industry is one of the most dynamic industries in China. Before 1980s, this industry was dominated by a large number of state-owned enterprises (SOEs) and mainly focused on fixed phone set and some component manufacturing. Since 1980s, the industry has become the fastest growing one in China and in the world. Even in the dismal period after the bubble of .com collapsed in USA, telecommunication industry in China keeps its high growing pace.

Telecommunications development in China can be divided into four phases (see Figure 2): Centrally planned economy (1949–1978), slow growth (1978–1994), from monopoly to duopoly (1994–1998), and market liberalization (1998–present) (See figure 1).

### *4.1 Phase 1: Before 1978*

When the People’s Republic of China (PRC) was established in 1949, it only held the capacity of switch system with over 310 thousand lines, and 208,750 telephones subscribers, 620,000 telephones in the countryside and 2,000 long-distance lines, the national telephone density was only 0.05% and there were no rural telephones. (China Yearbook of Information Industry, 2000). So telecommunications, as a foundational industry, was very laggard at that time.

One major reason for the poor development of the telecom industry was that the government gave it low priority in its development plans between the 1950s and 1970s. The nation’s economic development priority was in heavy industry. Telecom services were used mainly by the state administrative agencies and regarded as part of the national defense and security system. The central planners regarded telecom services as non-productive and hence allocated more resources to other sectors with higher priorities.

Therefore, firms in China’s telecommunication industry before 1978 lacked autonomy and growth initiatives. They had no incentives to pursue such objectives as efficiency and profit. The only objective of these firms “tends to be...

fulfilling the plan quota and thus winning recognition from its administrative superiors” (Peng, 2000: 75). As a result, the whole industry operated with low efficiency. By the end of 1977, the telephone density was only 0.36%, increasing less than 0.02% every year. (International Telecommunication Union [ITU], 2001). When the Chinese government started its economic reform could call “act after trials” in 1978, it realized that the poorly developed telecommunication infrastructure had seriously deterred foreign investment and had acted as a bottleneck for domestic economic growth. To cope with this, the Chinese government started its telecommunication reform by changing its existing institutional framework and pushing firms toward marketization.

#### *4.2 Phase 2: From an Instrument to an Industry during 1978-94*

Since the beginning of reform and opening in China, the significance of telecommunications was recognized gradually. Central government leaders realized that domestic communications infrastructure and equipment could not meet the needs of a growing economy; the unsatisfied demand for telecommunication service was in fact acting as a bottleneck for the development of economy. In order to enhance the development of the telecom industry, the government gave high priority to this sector and carried out a series of policies, such as first-installation fee of telephone, in order to support the development of telecommunications. It was very important to the development of telecommunications afterwards.

Another important national strategies targeted at the sector was the ‘three 90 percents’ policy of 1982. It stated that: 90 per cent of central government investments put into telecommunications were not regarded as repayable loans; provincial and regional telecom authorities could keep 90 per cent of their taxable profits (in other words, the tax rate is 10 percent for telecommunication, much less than the 55 percent tax rate for other industries); and, the Ministry of Posts and Telecommunications (MPT), which regulated and managed both telecommunications operations and much of the nation’s telecommunications equipment manufacture, could keep 90 per cent of its foreign currency earnings from international traffic. (Wu and Zhang, 1992). At the same time, MPT began to actively introduce into foreign fund and modern technologies to drive the development of telecommunications. In 1982, the first SPC (Stored Program Control) Exchange in China was introduced into and installed in Fuzhou, which indicated the beginning of new period of telecommunication industry.

All of these favorable policies and huge investment had effectively accelerated the development of the telecommunication industry. The average annual growth rate of telephone mainlines between 1980 and 1994 was 21.58 percent, which was the highest in the world. In 1994, the telephone penetration rate reached 3.2 percent (ITU, 2001).

#### *4.3 Phase 3: From Monopoly to Duopoly during 1994 - 1998*

In 1994, the MPT announced that the basic demand for telecommunications had been met and the waiting list for telephone line installation no longer existed. To further ease the market transition, the Chinese government gradually withdrew the preferential treatment once granted to the telecommunication industry and opted to deregulate the telecommunication market.

The reforms were to introduce competition to the market for two purposes. Firstly, the domestic industry needed to provide better and more telecom services to Chinese customers. Secondly, local service providers needed to improve their competitiveness against foreign rivals for when China would open its domestic market to the world. Establishing China Unicom in 1994 was another step in the reform process, and created a duopoly competition in basic service areas. China Unicom was a joint venture with stockholders from the Ministries of Electronic Industry, Railways, and Electrical Power, and 13 other large state-owned corporations.

Simultaneously, as a first step toward separation from the MPT, the Directorate General of Telecommunications officially registered as a company called China P&T Directorate General of Telecommunications, which became known as China Telecom. The transition from monopoly to duopoly marked a breakthrough in China’s telecommunications industry. The entry of China Unicom into the market brought competitive elements into the telecom industry. Figure 2 shows the more complicated structure of China’s telecommunications networks at the end of 1998.

#### *4.4 Phase 4: Market Liberalization since 1998*

In many respects, 1998 marks a turning point in the telecom reform process taking place throughout the China. Before 1998, China’s telecommunication industry operated as a hierarchical structure. In 1998, the telecom Administration Bureau was founded, it is the regulator to the China Telecom market, which also independent to the operator and the manufacture companies.

The foundation of MII was a significant step in the establishment of a normal market environment for the telecommunications industry. But another problem was revealed. Compared with China Telecom, China Unicom

was too weak to compete with it fully, so even after the entrance of China Unicom; China Telecom still enjoyed actual monopoly profits. Then in mid-1999, another reform step was taken, which was to split China Telecom into four companies, each separately responsible for the operations of fixed telephony, mobile communications, wireless paging, and satellite communications. They are respectively called China Telecom, China Mobile, Guoxin Paging Company, and China Satellite. Guo Xin Paging was subsequently merged with China Unicom to enhance the latter's financial strength.

It is no doubt that the system reform of China's telecommunication regulation in 1998 will have a significant effect. The total turnover of telecommunications reached 584.1 billion RMB in 2005, increasing by 53 times more than 10.95 billion RMB in 1990. (See Figure 3).

The newly restructured regulatory framework has changed the whole industry structure. The MII became a relatively neutral regulator because there was no affiliation with telecommunication firms. This status has enabled the MII to take a more procompetitive stance and thus to facilitate competition in the Chinese telecommunication market. However, considering of the development of telecommunications in China and the challenge telecommunication operators will face, we should say that the reform should go further deep.

## 5. Discussion and Conclusion

This paper is the first, we think; to systematic analyze the China telecommunications industry strategic change from a nonmarket perspective. To our knowledge, no previous attempt has been made to examine industry strategic change process within the context of the nonmarket strategy. In the current study, an explicit attempt was made to merge the literatures on strategic change and nonmarket strategy. The outcome of our study indicates that telecommunications development and strategic change in China does not depend merely on economic growth, the nonmarket factors play a more important role during this process. These results provide a strong incentive for future researchers to consider nonmarket strategy as a key variable in relation to strategic change success in transitional economies.

This paper demonstrates that, subject to China's institutional endowments, the telecommunications change is identified with deep-rooted political involvement and frequent bureaucratic bargaining. China's telecommunications market of state competition made it easier for the government to restructure it thoroughly. In China, telecommunication reform has been a part of macro reform and national strategy of economy and politics, like joining WTO. The restructuring of telecommunications hence has been executed as section of a national policy of "strategic restructuring" and "optimizing national resources".

Our present study also makes important contributions to the literature. The current research moves beyond normative discussions about why firms should care about the role of nonmarket strategy (Baron, 1995), and will attempt to provide empirical evidence of the positive relationship between nonmarket strategy and industry-level change. With the relevant results, we hope to support the perspectives of business and society scholars, whose work emphasize the importance of nonmarket strategy to both business students and business practitioners.

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Table 1. A Summary of the Major Characteristics of the Sample during the Fiscal Year Ended December 2005

	China Telecom	China Unicom	China Railcom	China Netcom	China Mobile
Year founded	1994	1994	2000	2002	2000
Initial investment	158	16.92	10.3	60	51.8
Revenues	162.53	87.05	13.8	87.23	243.04
Number of employees	350,000	136,700	72,000	231,000	111,998
Name of the top leader	Xiaochu Wang	Xiaobing Chang	Jibin Zhao	Chunjiang Zhang	Jianzhou Wang
Headquarter	Beijing	Beijing	Beijing	Beijing	Beijing
Net profit	27.95	4.93	0.14	10.48	73.69
Total assets	412.57	142.63	58.3	300	421.03

Note: All amount units are billion RMB except Number of employees.

Source: China Yearbook of Information Industry (2005), <http://www.mii.gov.cn>

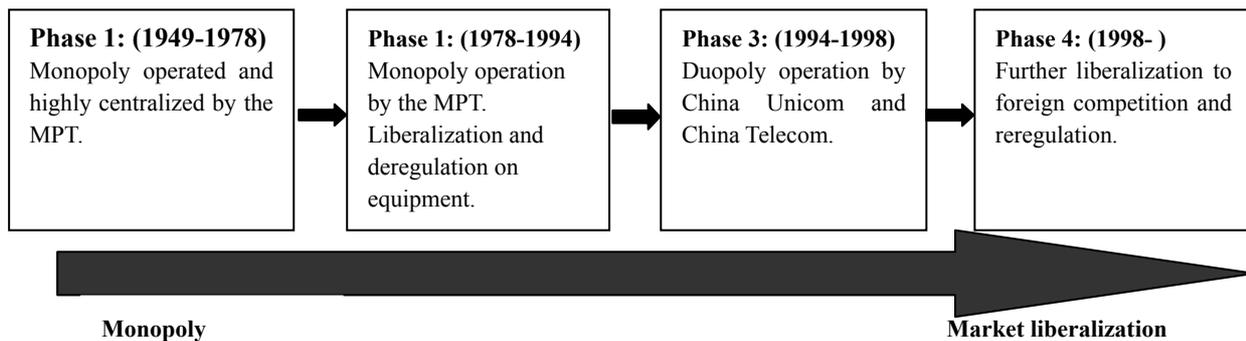


Figure 1. Regulatory Framework Evolution in China's Telecommunications Industry \*

\*: The MPT is the Ministry of posts and Telecommunications; the MII is the Ministry of Information Industry.

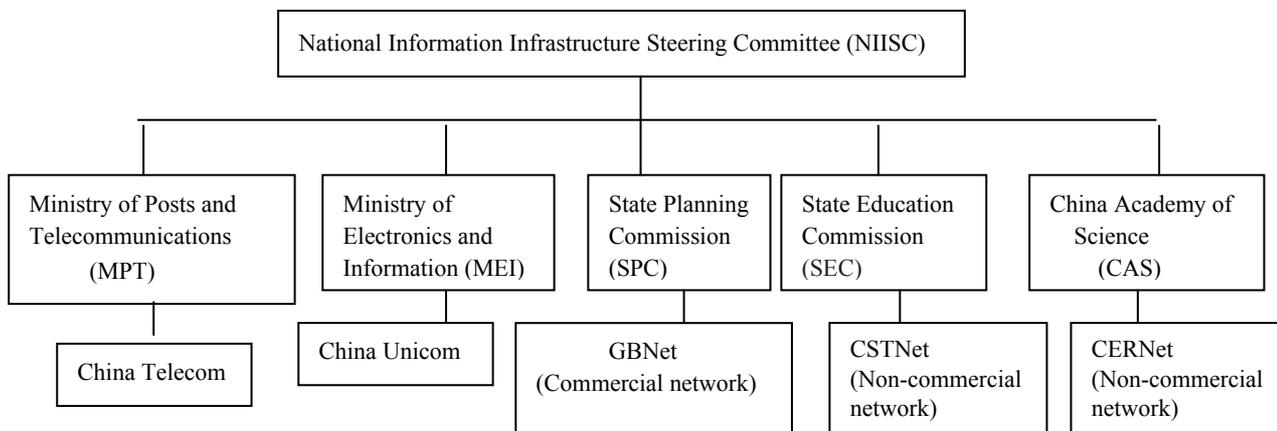


Figure 2. The Structure of China's Telecommunications Networks at the end of 1998

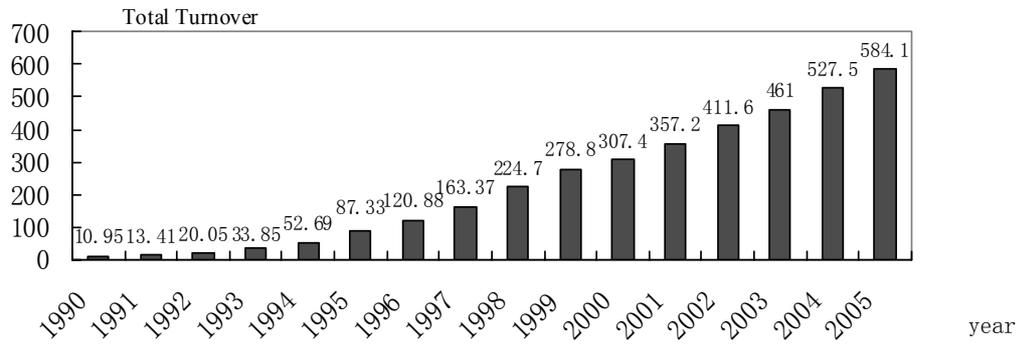


Figure 3. Developing Trend of Total Turnover of Telecommunications in China (In Billion RMB)

# An Analysis of the Nuances and Practical Applications of Situational Leadership in the Management and Administration Of International Health Care Organizations

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## Abstract

Over the past 10-20 years, the healthcare industry has experienced a volatile existence. This volatility is a direct result of competition, the growth of for-profit hospitals, the evolution of managed care, consumer demand for quality measures, the high cost of new medical technology, and increases in aging patient populations. These shifting environmental factors have forced international health care organizations and healthcare managers to develop new strategies to respond. The challenge that makes development of these skills so complex is that most health care practitioners received academic training in curriculum areas that are more focused on the clinical and operational aspects of healthcare and not heavily focused on the advanced study of organizational and situational leadership. The most common leadership development programs of choice are often Master of Nursing, Master of Public Health, Master of Counseling, Master of Social Work, the Doctor of Medicine, and Master of Health Administration. Although most healthcare related graduate programs often provide outstanding clinical skills development and a good framework advanced analysis, frequently the absence of academic courses that can effectively teach clinical professionals the aspects of adaptive and situational leadership are not offered.

**Keywords:** International healthcare, Situational leadership in healthcare, Situational leadership in management

## 1. Introduction

In the 2002 book, *Primal Leadership*, authors Daniel Goleman, Richard Boyatzis, and Annie McKee analyzed six different leadership styles as follows:

### 1.1 *The commanding leader*

Style: Gives clear directions and expects compliance.

Best used: In times of crisis, to kick-start a turnaround, and in dealing with "problem employees" who do not respond to other methods.

Most likely to say: "Do as I tell you!"

### 1.2 *The pace-setting leader*

Style: Sets goals and expects them to be achieved.

Best used: For getting results from a motivated and competent team.

Most likely to say: "Go for it!"

### 1.3 *The visionary leader*

Style: Moves people towards a shared vision.

Best used: When a new strategic direction is needed.

Most likely to say: "Come with me."

### 1.4 *The coaching leader*

Style: Develops people for the future.

Best used: To help employees improve performance and develop long-term strengths.

Most likely to say: "Try this."

### *1.5 The affiliative leader*

Style: Creates harmony and builds emotional bonds based on loyalty and trust.

Best used: To heal rifts in a team or to motivate people during stressful periods.

Most likely to say: "People come first."

### *1.6 The democratic leader*

Style: Forges consensus through participation.

Best used: To build 'buy-in' and encourage input.

Most likely to say: "What do you think?"

The authors outline that the best leaders maintain a style repertoire, switching easily between "visionary," "coaching," "affiliative," and "democratic," and making rare use of less effective "pace-setting" and "commanding" styles. The authors' analysis of these methods is informed by research on the workplace climates engendered by the leadership styles of more than 3,870 executives.

Over the past 10-20 years, the healthcare industry has experienced a volatile existence. This volatility is a direct result of competition, the growth of for-profit hospitals, the evolution of managed care, consumer demand for quality measures, the high cost of new medical technology, and increases in aging patient populations. These shifting environmental factors have forced international health care organizations and healthcare managers to develop new strategies to respond. The challenge that makes development of these skills so complex is that most healthcare practitioners received academic training in curriculum areas that are more focused on the clinical and operational aspects of healthcare and not heavily focused on the advanced study of organizational and situational leadership. The most common leadership development programs of choice are often; Master of Nursing, Master of Public Health, Master of Counseling, Master of Social Work, the Doctor of Medicine, and Master of Health Administration. Although, any graduate program often provides outstanding clinical skills development and a good framework advanced analysis, often an absence of academic courses that can effectively teach clinical professionals the aspects of adaptive and situational leadership are not integrated.

## **2. Nuances of Administration**

The hospital and healthcare administrator plays a vital a role in saving lives, without having to take scalpel in hand. Hospital administrators and executive manage hospitals, outpatient clinics, hospices, and drug-abuse treatment centers. Administrators make sure hospitals operate efficiently and provide adequate medical care to patients. Their responsibilities are numerous, constantly changing, and sometimes require the assistance of the medical and support staff. They act as liaisons between governing boards, medical staff, and department heads and integrate the activities of all departments so they function as a whole. Following policies set by a governing board of trustees, administrators plan, organize, direct, control and coordinate medical and health services. Administrators recruit, hire, and sometimes train doctors, nurses, interns, and assistant administrators. Administrators plan budgets and set rates for health services. In research hospitals, administrators develop and expand programs and services for scientific research and preventive medicine.

In teaching hospitals, administrators and managers aid in the education of new doctors. Administrators plan departmental activities, evaluate doctors and other hospital employees, create and maintain policies, help develop procedures for medical treatments, quality assurance, patient services, and public relations activities such as active participation in fund-raising and community health planning. Administrators also attend staff meetings, participate in health planning councils, go to fund-raising events, and travel to professional association conventions. A hospital administrator's job is difficult and demanding. They need to keep up with advances in medicine, computerized diagnostic and treatment equipment, data processing technology, government regulations, health insurance changes, and financing options. While doctors strive to keep patients healthy and alive, the hospital manager is doing his job in keeping the hospital alive and healthy.

Due to the turbulent and changing nature of the healthcare industry, administrators need to be more flexible, innovative, and adaptive in the ways that they lead. Past leadership processes have included large bureaucracies and inflexible structures. Although mechanistic structures can be effective in predictable and stable environments, they are not effective in rapidly changing environment.

### **3. Practical Applications of Situational Leadership**

To respond to challenges of leadership, professionals in the realms of health care will have to develop an effective understanding of a genesis of the situational or adaptive leadership model that was developed by Hershey and Blanchard, but one that responds to the changing aspects of organizational culture. Basically this means that based on the situation, leaders will have to use a variety of leadership styles to be effective. Leading today is about administrators and managers developing a firm understanding of the relationship between the leadership style, the organizational structure, and the organizational culture.

Organizational structure here means a framework that defines the boundaries of the formal organization and within which the organization operates, this definition is in consonance with Hatch and Cunliffe (2006) as “the relationships among the other parts of an organized whole (p. 101).” An effective organizational structure must ensure efficiency, precision, speed, continuity, discretion, and produce clear and light at the end of the tunnel.

It is known that every individual has something that psychologists have termed “personality.” An individual’s personality is made up of a set of relatively permanent and stable traits. When a person describes someone as innovative, angry, conservative, or wild, they are describing personality traits. An organization has a personality that is called the organization’s culture.

The Hawthorne Studies research provided support and insight to the importance of organizational culture. His research outlined how work groups develop social networks that influence group behavior. These social networks are the building blocks of an organization’s culture. Through and understanding of these social networks, leaders would be less likely to be frustrated and confused when challenging behavior and activities on the part of employees exist. Understanding the social structure of employee groups is necessary to decipher that an organizational culture is the result of a complex group learning process that is only partially influenced by the individual behaviors of one leader (Sonnenfeld, 1985). Organizational culture is a product of the experiences, expectations, values, and the approval of the organizational community. The culture develops and changes only when employees join together with their actions and activities to move the meter in the right direction (Schein, 1992).

Organizational culture refers to a system of shared meaning within an organization that determines, in large degree, how employees behave or act. In every organization, systems or patterns of values, symbols, rituals, myths, and practices that have evolved over time are present. These shared values determine, in large degree, how employees perceive their organizational environment and community. When confronted with a problem, the organizational culture restricts or dictates what employees do by suggesting the organization’s “correct way” or “the way that we do things here” to conceptualize, define, analyze, and solve the problem.

Situational leadership is based on the premise that there is no single best way to lead. Leadership style needs to be adjusted based on the members of the group and based on the situation. Another factor involved in situational leadership is the maturity of the group. Hershey and Blanchard asserted the leader must assess the maturity of followers and adjust leading to the level demonstrated (Hersey & Blanchard, 1977). The optimal leadership style of supervision, which is defined in terms of the combination of task-oriented behavior and relationship-oriented behavior, changes over time as the maturity level of the follower increases (Hersey & Blanchard, 1977).

Low-maturity followers have low motivation and possibly low initiative, therefore, they require more direction; Low to moderately mature followers need direction plus personal attention; Moderate to highly mature followers require greater attention and a share in decision-making; Highly mature followers require freedom. Hersey and Blanchard also referred to this premise as the Life Cycle Theory (Hersey & Blanchard, 1977).

In effect, Hersey and Blanchard are offering a very sensible premise: as the leader's subordinates become more mature, effective, and efficient, the leader should decrease the emphasis on structuring tasks and increase their emphasis on consideration of the whole picture.

### **4. Historical Aspects of Situational Leadership**

The literature suggests that the application of situation leadership are dependent upon the task, the characteristics of the group, interpersonal relationships within the group and the characteristics of the organizational culture. The leader must outperform other members in the group through the examples that they and through their abilities to coach and develop others. Hoy and Miskel attempted to find the specific attributes of situation that would result in leadership emerging (Hoy & Miskel, 1987). Hencley explained that "the situation approach maintains that leadership is determined not so much by the characters of the individuals as by the requirements of social situation" (Hencley, 1973, p. 38).

Hersey and Blanchard explained there were levels of support:

- (1) Directing Leaders define the roles and tasks of the 'follower', and supervise them closely. Decisions are made by the leader and announced, so communication is largely one-way (Hersey & Blanchard, 1977).
- (2) Coaching Leaders still define roles and tasks, but they seek ideas and suggestions from the follower. Decisions remain the leader's prerogative, but communication is much more two-way (Hersey and Blanchard, 1977).
- (3) Supporting Leaders pass day-to-day decisions, such as task allocation and processes, to the follower. The leader facilitates and takes part in decisions, but control is with the follower (Hersey and Blanchard, 1977).
- (4) Delegating Leaders are still involved in decisions and problem-solving, but control is with the follower. The follower decides when and how the leader will be involved (Hersey and Blanchard, 1977).

Effective leaders can adopt any of these four styles based on the situation and the persons being supervised (Hersey and Blanchard, 1977).

Many have written about the complex and contradictory advice given about being effective leaders (Sleeth and Johnston, 1996). Managers have taken on any number of new roles over the past decade leaving them rightfully confused in terms of what leadership or management style to adopt. Sleeth and Johnston argue that the Leadership Linking Model "incorporates several well-known leadership models, such as that promoted by Hersey and Blanchard, and facilitates the integration of their prescriptions" (1996, p. 16). These authors reinforce the situational leadership model when they say that leaders must adapt their styles based on the physical and psychological elements of the workplace and the task at hand (Sleeth and Johnston, 1996). The linking model comes into play in the diagnosis and planning of the needs of the work environment and the employees (Sleeth and Johnston, 1996).

Leebov and Scott (1991) asserted that managers in healthcare organizations are taking on new roles and must, therefore, change their styles of supervision and leadership. Two of those changes involve a focus on customer service and empowering employees.

Morrison (1996) also noted the velocity of change that is occurring today. Morrison calls it the second curve for executives and states that it is fueled by forces that cannot be controlled, such as new consumers, new markets, and new technology. The environment demands an executive, who is a visionary and who learns how to anticipate the next round of changes then, adapts the organization to meet them (Morrison, 1996).

Speaking directly to health care, McDonagh (1997) noted the changes in the field: the move to managed care, the increasing complexity of the system, multidisciplinary models of governance, the need for more collaboration, the influence of human rights, a patient-orientation, and the impact of technology, among others (McDonagh, 1997).

Leaders in today's healthcare organization need a different set of skills than in the past and, in fact, those who rely on older models of management will be far less successful than those who either incorporate what still works from previous styles with new styles or those who adopt the new ways to supervise, set expectations, develop accountabilities, shape behavior, and reinforce organizational strategy.

Situational leadership makes sense for health care institutions because, as Jobs and Steinbinder (1996) noted, these are turbulent times in the industry. This turbulence and lack of stability means dramatic changes in the roles of nurse executives and leadership styles that were successful in the past do not meet the demands of today's environment (Jobs & Steinbinder, 1996). With the industry experiencing rapid and dramatic changes, one leadership style that has the potential for success is situation leadership.

Hernandez, Spivack and Zwingman-Bagley cited William Bridges, who said: "Change is situational: the new site, the new boss, the new team roles, and the new policy. Transition is the psychological process people go through to come to terms with the new situation" (Hernandez, Spivack & Zwingman-Bagley, 1997, p. 38). Different situations, different employees require different leadership styles, those that consider the changes that are happening and that adjust for those changes.

The early research addressing situation leadership has been conflicting with more mixed results than those pointing either to its proven benefit or showing that it does not improve the environment. For instance, in 1991, Johnson and D'Argenio trained nurse administrators and executives in the Hersey and Blanchard Situational Leadership model (Krejci & Wessel, 1997). These investigators did not find any significant changes in how nurse administrators perceived their own leadership style twelve months after the training (Krejci & Wessel, 1997).

Norris and Vecchio (1992) conducted a study to determine the efficacy of situational leadership in health care; it was one of the first studies to be conducted in this venue. Situational leadership is perceived as having relevance to healthcare environments because there is are very clear norms in terms of supervisor-subordinate behaviors as well as a clear hierarchy of authority (Norris & Vecchio, 1992).

Situational leadership has garnered only mixed support through research studies (Norris and Vecchio, 1992). Norris and Vecchio's study contributed to the mixed results (1992). One of the major problems has always been how to determine which level of maturity subordinates fall into (Norris and Vecchio, 1992). The investigators, however, suggested that situational leadership may offer immeasurable benefits but those benefits will not be clearly outlined in literature until a variety of research issues can be overcome (Norris & Vecchio, 1992).

The reality is that organizational culture is a set of shared values, beliefs, attitudes, norms, that shape the behavior and expectations of each member of the organization. The use of situational leadership with monthly, quarterly, semi-annual, and annual performance report cards for employees, managers, and the organization allows leaders to establish important understandings and accountabilities that influence and change organizational culture.

For instance, Tushman and O'Reilley (1997) stated: "Great managers are architects, network builders, and jugglers. They understand how to employ these roles to foster a culture that celebrates stability and change in order to endure success tomorrow." Simple common sense tells us that if managers are builders and architects then this seems realistic that they must adapt and juggle as problems arise and change occurs.

The application of situational leadership understands that distinct differences in being a manager and being a leader exist. Management develops the capacity to achieve set plans by planning, organizing, directing and controlling –creating organizational structure that helps to achieve these set goals. By contrast, leadership has to do with setting direction, aligning people, and achieving vision by inspiring and motivating employees (Kotter, 2001, p103). The major aspect of the an effective situational leader is to facilitate and foster collaboration, pooling employee knowledge, defining who needs to participate in strategy discussions, and asking critical questions. Successful situational leadership is about providing focus and learning in a manner that listens to employees at the bottom as well as employees at the top of the organization (Bennis, 1992).

### **5. Situational Leadership Emerging Models**

According to the proponents of situational leadership, universal traits and behaviors do not exist, rather the success of the effectiveness of a leader is demonstrated on how well their behaviors adapt to different situations (Bateman & Snell, 2004). Situational leadership allows individuals to become responsive to the potential benefits of the participatory approach to decision making and simultaneously knowing that in certain situations, they will have to make decisions on their own. The first situational model was proposed by Tannenbaum and Schmidt in 1958, this model and its arguments continue to be valid today. The premise of this model describes how managers should first consider the following three factors before leading: forces in the manager, which means the manager must incorporate personal values, preferences, feelings of security and confidence in subordinates. Forces in the subordinates signifies the employee's knowledge and experience, willingness to take on responsibility for decision making and take an interest in the problem and accept the organization's goals. And finally, forces in the situation, which include the type of leadership style, the organization values, the extent to which the group works efficiently as a unit, the problem and the resources needed to resolve it and the amount of time the leader takes to make the decision (Bateman & Snell, 2004). These forces are critical areas in the healthcare industry and must be continuously examined and evaluated in different situations to determine the best choice of leadership style.

Since the emergence of this first model two other situational models have surfaced. The Vroom Model aids in the decision making and focuses on the participative dimension of leadership. The Path-Goal Theory deals with how leaders can influence their subordinates' perceptions of their work goals and the path they follow to achieve those goals (Bateman & Snell, 2004). In the ever changing environment of the healthcare industry, administrators need to know what factors to consider when analyzing a situation and decide what leader decision style best fits the problem to be resolved. The Vroom Model of Leadership offers just that, factors in the areas of decision significance, knowing the significance of a decision and its impact to the success of the organization, the level of importance of team members to the decision, the leader's expertise, the commitment level of team members to the decision made by the leader, the group support for goals and their expertise and finally the capability of team members to work as a unit in resolving problems. These factors are then rated as High or Low in five style categories; decide, consult individually, consult group, facilitate and delegate (Bateman & Snell, 2004). The style with the majority of High ratings will be the recommended style approach to that specific problem. This approach is particularly effective when administrators have to make major decisions, this process, even though complicated makes certain that the most important factors are considered; therefore, implementing the most appropriate style.

The Path-Goal Theory has two key situational factors; the characteristics of followers and environmental factors. These factors help to determine, which of the four behaviors will lead. The four leadership behaviors are; directive leadership, supportive leadership, participative and achievement-oriented leadership (Bateman & Snell, 2004). Healthcare leaders in order to be successful, must communicate the goals of the organization, influence

subordinates' perceptions of those goals and most importantly guide their subordinates in the right path in achieving those goals.

## **6. The Final Analysis of Situational Leadership**

In its purest execution, situational leadership is about being able to move easily from a controlling leadership style to a serving leadership style based on the changing aspects of a situation. It takes adaptability to go from perspective needed to affirmatively and effectively address an organizational board to a perspective of serving the employees as if they were customers. In many organizations senior leaders act as if their only job is to change the boxes and the organizational chart and serve the needs and expectations of the board members and stockholders. The truth is that the employees are the internal customers of leadership and management. Developing a bonded and successful organizational democracy is not defined by the actions, values, or demands of leadership, rather through collaborative efforts. The goal of senior leadership should be clearing out the roadblocks and barriers that hinder employees from doing the appropriate and needed actions and activities (Bennis, 1992). This includes removing bureaucratic barriers that have been established even if they were originally established in the best interest of the organization.

Given the fact that situational leadership is based on the premise that leaders use a different style based on the situation and the maturity of the followers. Leaders also need to use a flexible platform to influence or respond to the traits and changing environment of organizational culture. This model would seem to have promise in the healthcare industry provided it includes monthly, quarterly, semi-annually goals, report cards, and measures.

## **7. Theory and Observation**

How do we truly define the role of a leader in any organization, what are the characteristic of those individuals and its organizational culture? What has become very clear is that the culture the organizational infrastructure tends to dictate how it will service its customer both internal and external.

When observing the actions and thought processes that lead to decisions based on a particular situation, this is where the role of situational leadership or understanding of what it means to apply such actions becomes confusing to the organization and its customer. The healthcare industry itself can and is very difficult to manage on many levels, as mentioned previously it has become the numbers game more often. An example that comes to mind, is asking the question, why most hospitals are not funded adequately?

What is it about the management process that appears not to be able to handle its operational aspects of the job to the level in which its customers need to fully provide adequate healthcare. Again, we must try to understand what it fully means to apply the applications of situational management processes and theories into the day to day operation of the healthcare industry. Most of our leaders within the organization are limited in its ability to provide the best training for its employees, this also would relate to educational background and level of expertise.

This would constitute sometimes promoting not necessarily the best knowledgeable person, but the best available person. The questioned then comes to mind is the person a sectional thinker, or do they evaluate from a sit and wait approach. Maybe the person is a reactionary, based on the particulars of the obvious or not so obvious and how does that person understand what is needed to resolve the issue. When asked the question of short term as well as potential long-term needs, how do we attack the heart of that question? Another school of thought surrounding situational leadership, may suggest have more than one leader to share in the strategy approach, in to many instances leaders in the current workplace suggest sharing the load but not the knowledge to fully handle the load.

The ideal response would suggest having someone or group whom has an understanding of what the situation requires, it may in fact suggest something specifically related to that problem to be able to find a resolution. A leadership mentality approach is something that can be instilled in all workers; it can be a shared process which allows everyone involved to share in the maturation process of understanding the situational observational process and outcome. It is critical that we empower our employees to take a leadership approach towards solving problems and facing adversity in the workplace.

The workplace continues to evolve both in its culture and the relationship that it builds with its employees and its customers, the two eventually become one in the same, suggesting that we are all customers at some point. Having a full understanding of change will help with better managing employees who may have reservation about the process.

Four basic foundational concepts that should always serve as a part of any organizational structural development (1) Change management (2) Transitional leadership (3) Situational leadership (4) Cultural dynamics, the four areas mentioned play a vital role in the success of serving its customers both internal and external. On many occasions one or the other is almost underserved and it eventually leads to problems within the organization. The key is to somehow determine what is applicable and feasible to provide the best for both.

This within itself will reduce some of the pitfalls in which most organization experience, situational leadership at the end of the day, simply suggest that the right people or groups of people can handle a situation knowing that they are at their best and their best are handling the task at hand most effectively.

### 8. Distance learning executive programs that develop skills in situational leadership

Several non-traditional university programs exist that provide a framework for developing situational leadership skills.

Colorado Technical University has an on-line Executive Doctor of Management program that requires 4 applied research projects instead of a dissertation. The program has classes and a curriculum focus on developing professionals with adaptive leadership skills.

<http://www.instituteforadvancedstudies.com/>

Colorado Technical University offers on-line graduate degrees in Management in Change Management and Conflict Management with focuses on the development of adaptive leadership skills

<http://www.ctuonline.edu/online-degree-programs/online-masters-degree-management/#desc>

<http://www.ctuonline.edu/online-degree-programs/online-masters-degree-media-dispute-resolution-mba/>

Mountain State University in West Virginia offers an on-line and weekend graduate degree in Strategic Leadership that can be completed in 12 months.

<http://www.mountainstate.edu/majors/whystudy/sl/default.aspx>

These courses can provide practical hands-on training for professionals on how to apply the practical applications of situational leadership in organizational problem solving. By developing these tools, while completing an advanced academic credential, leaders can enhance their ability to constructively adapt to organizational change.

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# Choosing Method of Technical Combinations

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## Abstract

The enterprises often encounter problems of how to make choice among several technical combinations. This article introduces a practical method --- sorting. The first is sorting method of incremental efficiency, which is based on the comparison of mean square deviations. The second is more complicated method, which is based on the comparison among efficiency index. Both are very useful in project management and production scheduling.

**Keywords:** Mean square deviation, Incremental efficiency, Incremental cost

## 1. Problem raising

In everyday management, the enterprises often encounter majorization solutions to technical proposals. For instance, a factory is producing two mutually supporting products A and B. The inside diameter of A is X and that of B is Y. The clearance between A and B is Z, and thus  $Z=X-Y$ . According to theory of probability, the mean square deviation (MSD) of the clearance  $\sigma^2_z=\sigma^2_x+\sigma^2_y$ . The machining ways are lathing, milling and casting etc. with the clearance at  $\pm 4.5\mu$ . The acceptable processing cost is 300 Yuan each set.

Table 1 indicates the processing ways, precision and cost of part A and B.

Table 1. Processing Measures, MSD and Cost of A and B

A			B		
Measures	Cost(Yuan)	MSD( $\mu^2$ )	Measures	Cost	MSD( $\mu^2$ )
1	165	36	1	100	16
2	170	16	2	103	9
3	175	9	3	115	4
4	185	4	4	145	1
5	200	1			

The problem is the optimum choice the enterprise should make under the constraint conditions above.

This is obviously a problem of technical and economic evaluation on 20 combinations. Of course, enumeration method (it is also called mutex method) can be used to work out the mean square deviation and) the one that can satisfy the constraint conditions.

Is there any simple way to work out the satisfactory solution?

## 2. Sorting method

We believe that efficiency index or sort of incremental efficiency index can help to solve this problem.

The so-called efficiency index refers to the output of each unit of constraint resources, which is the ratio of each unit of incremental constraint resources and the corresponding increment of output. In this example, the incremental efficiency refers to the ratio of each unit of incremental cost and the decrement of MSD, which can be shown as: incremental efficiency = decrement of MSD/decrement of cost. Take the processing of A as an example, if measure 2 is used instead of Measure 1, the increment of cost is  $170 - 165 = 5$  (Yuan), and the decrement of MSD is  $36 - 16 = 20 \mu^2$ . Therefore, the incremental efficiency =  $(36 - 16) / (170 - 165) = 4.0 (\mu^2 / \text{Yuan})$ . Namely, 1 Yuan of incremental cost will result in  $4 \mu^2$  of decrement on MSD. In the same way, the numerical value of each incremental efficiency can be obtained.

Suppose  $[i, j]$  represents the combination, in which  $i$  stands for the processing measure sequence number of A and  $j$  stands for that of B. In view of economy, the lower the cost is, the better it will be, and thus the one with the lowest cost should be chosen first. In this way, the combination  $[1, 1]$  is selected with total cost 265 Yuan / per set meeting

the condition. However, there is a bigger error because  $\sigma z = 52\mu^2$ , which means  $\sigma = \pm 7.2\mu$ , exceeding the consumer's requirement  $\pm 4.5\mu$ . Therefore, the combination of processing measures has to be changed with more input to improve the quality. Obviously, the increased unit input should lead to the greatest decrease of MSD.

Table 2. The Incremental Efficiency of Machining A and B

A		B	
Machining Measure	Incremental Efficiency	Machining Measure	Incremental Efficiency
1	---	1	---
2	4.0	2	2.3
3	1.4	3	0.4
4	0.5	4	0.4
5	0.2		

From Table 2, it is obviously seen that when the machining method of Part A is changed from 1 to 2, the incremental efficiency becomes the biggest with 4.0. The second biggest is 2.3 with Part B when the machining method is changed from 1 to 2 ... The order of excellence for the combinations should be [2 , 1], [2 , 2], ... Table 3 shows the order of excellence for all possible combinations.

Table 3. The order of excellence for the possible combinations

Combination [ I, j ]	Cost (Yuan / Each set)	MSD ( $\mu^2$ )	Standard Deviation ( $\mu$ )
[1 , 1]	265	52	$\pm 7.2$
[12, 1]	270	32	$\pm 5.7$
[2 , 2]	273	25	$\pm 5.0$
[3 , 2]	278	18	$\pm 4.2$
[4 , 2]	288	13	$\pm 3.6$
[4 , 3]	300	8	$\pm 2.8$
[5 , 3]	315	5	$\pm 2.2$
[5 , 4]	345	2	$\pm 1.4$

According to Table 3, the recession curve can be drawn in Figure 1. The lines of cost restraint and MSD restraint can also be drawn there. Thus, combinations which can satisfy the restraint conditions are [3, 2], [4, 2] and [4, 3]. If (the) lowest cost is the target, combination [3, 2] should be selected.

By the way, the curve of incremental efficiency [1, 1] → [2, 1] → ... → [5, 4] gives another restraint line, on which the qualified combinations are located. In other words, the rest 12 combinations are located on the upper right quadrant of the curve of incremental efficiency, composing the unqualified combinations. Therefore, the method of incremental efficiency index excludes the unqualified combinations automatically, which simplifies the decision-making process (see Figure 2).

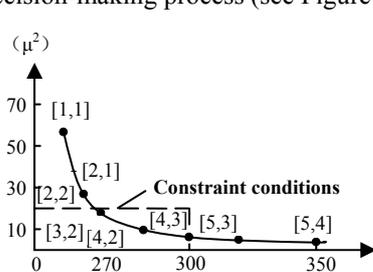


Figure 1. Solution of Marginal efficiency index sorting

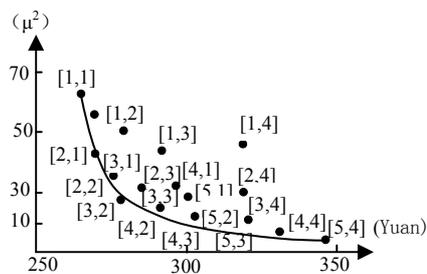


Figure 2. All the solutions and unqualified

### 3. Solution to problems of complicated machining control

Control of project and construction dispatching are problems enterprises often have to face. For example, one enterprise has to complete 3 independent machining projects I, II, III, which have to get through 3, 4, 3 machining procedures correspondingly. Five project groups ( $M_1, M_2, M_3, M_4, M_5$ ) are assigned to finish the 10 procedures,

and each group can conduct any of the 10 procedures. Table 4 gives out the time and cost each procedure requires. The cost includes fixed cost and variable cost. In the table, figures above “/” represents cost and “\” stands for time needed. Each procedure has to be conducted by one group individually. The problem is how to assign the procedures to each group with better economic benefits.

Table 4. Time and Cost Needed by Each Group for Each Procedure

Project	Procedure	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
I	1	②30/16	①25/15	80/24	③60/18	70/20
	2	①60/13	90/18	②70/15	100/20	③75/16
	3	②60/15	①40/13	100/27	③70/18	120/30
II	1	②120/20	①100/15	180/30	150/23	③135/18
	2	①80/14	②90/15	③100/16	100/18	140/20
	3	①70/12	③120/17	②100/15	160/19	130/19
	4	100/14	①60/10	③80/12	②75/12	85/13
III	1	③50/18	①40/14	60/20	②45/15	70/22
	2	①45/13	③70/24	110/24	②60/18	80/26
	3	①35/18	②45/20	100/40	80/30	③70/25

It is inconvenient and unpractical to solve this kind of problems with linear programming technique. However, the method of efficiency index sort can give us very satisfying result.

First, without regard to time, mark the procedure with the lowest cost with ①, the one with the second lowest cost with ② and the one with the third lowest cost with ③. For example, in the top line of Table 4, the order of the procedures is M<sub>2</sub>, M<sub>1</sub>, and M<sub>4</sub>.

Moreover, add up all the time of procedures with ① for each group, it turns out that the time for M<sub>1</sub> is 70 hours, that of M<sub>2</sub> is 67 hours and there is no time for all the others (see Table 5).

If working time is unlimited for each group, of course, it is most economical to assign all the tasks to M<sub>1</sub> and M<sub>2</sub>. However, working time is usually limited. Let's suppose the longest working time for each group is 42 hours, and then some procedures have to be done by other groups.

Table 5. Combinations of the Lowest Cost

Project	Procedure	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
I	1		25/15			
	2	60/13				
	3		40/13			
II	1		100/15			
	2	80/14				
	3	70/12				
	4		60/10			
III	1		40/14			
	2	45/13				
	3	35/18				
Time available (hour)		42	42	42	42	42
Total time needed (hour)		70	67			

If the possible combinations and cost are calculated, it is easy to find the right choice. However, there are too many such combinations and they can not be listed for all. Therefore, we have to find a simple method to solve this problem. In order to have the lowest incremental cost, we should make the best use of M<sub>1</sub>, and thus the procedures done by other groups will take 28 hours (70 - 42 = 28). If I - 2 (the second line in Table 5) is taken away, 13 hours work will be cut down from M<sub>1</sub>. If this procedure is distributed to M<sub>2</sub>, the incremental cost will be 30 Yuan (90 - 60

= 30). Accordingly, if it is given to M<sub>3</sub>, the incremental cost is 10; and if given to M<sub>4</sub>, the incremental cost is 40; and etc. Based on the principle of lowest cost, the best choice is to assign this procedure to M<sub>3</sub>. By the same token, it is the most economical to transfer II – 2 from M<sub>1</sub> to M<sub>2</sub>. If all the procedures are taken away from M<sub>1</sub> and given to the first alternates (with mark ②), the loss rates (rate of incremental cost and time) can be calculated as follows:

If I – 2 is given to M<sub>3</sub>:  $(70 - 60) / 13 = 0.77$     If II – 2 is given to M<sub>2</sub>:  $(90 - 80)/14 = 0.71$

If II – 3 is given to M<sub>3</sub>:  $(100 - 70) / 12 = 2.50$     If III – 2 is given to M<sub>4</sub>:  $(60-45) / 13 = 1.15$

If III – 3 is given to M<sub>2</sub>:  $(45 - 35) / 18 = 0.55$

Obviously, the smaller the loss is, the better the transfer will be. Therefore, we can transfer the procedures from M<sub>1</sub> to others with the least loss rate until there is less than 42 hours of work for M<sub>1</sub> (III -3 and II -2 are transferred in this step). In this way, the sound result can be got (see Table 6).

Table 6. Combinations after the First Transfer

Project	Procedure	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
I	1		25/15			
	2	60/13				
	3		40/13			
II	1		100/15			
	2		90/15			
	3	70/12				
	4		60/10			
III	1		40/14			
	2	45/13				
	3		45/20			
Time available (hour)		42	42	42	42	42
Total time needed (hour)		38	102			

After rechecking the result after the redistribution, it is easy to find that M<sub>2</sub> has too much to do and some procedures have to be taken away form M<sub>2</sub> to others in the same way as above. Let’s first calculate the loss rates (procedures transferred from M<sub>1</sub> to M<sub>2</sub> can not be returned to M<sub>1</sub>):

If I-1 is given to M<sub>1</sub>:  $(30 - 25) / 15 = 0.33$     If II-3 is given to M<sub>1</sub>:  $(60 - 40) / 13 = 1.54$

If II-2 is given to M<sub>1</sub>:  $(120 - 100)/15 = 1.33$     If II-2 is given to M<sub>3</sub>:  $(100-90)/15 = 0.66$

If III-4 is given to M<sub>4</sub>:  $(75 - 60) / 10 = 1.50$     If III-1 is given to M<sub>4</sub>:  $(45 - 40) / 14 = 0.35$

If III-3 is given to M<sub>5</sub>:  $(70 - 45) / 20 = 1.25$

Redistribute the assignments according to the principle of least loss rate, if procedure I -1, III -1 and II – 2 are taken away from M<sub>2</sub>, and 38 hours of work is left, within the time limit. However, after the redistribution (see Table 7), tasks assigned to M<sub>1</sub> exceed its time limit. Therefore, by the same means, some procedures have to be taken away from M<sub>1</sub> and transferred to others except M<sub>2</sub>. The result is shown in Table 8.

Table 7. Combinations after the Second Transfer

Project	Procedure	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
I	1	30/16				
	2	60/13				
	3		40/13			
II	1		100/15			
	2			100/16		
	3	70/12				
	4		60/10			

III	1				45/15	
	2	45/13				
	3					70/25
Time available (hour)		42	42	42	42	42
Total time needed (hour)		54	38	16	15	25

Table 8. Combinations after the First Transfer

Project	Procedure	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
I	1	30/16				
	2			70/15		
	3		40/13			
II	1		100/15			
	2			100/16		
	3	70/12				
	4		60/10			
III	1				45/15	
	2	45/13				
	3					70/25
Time available (hour)		42	42	42	42	42
Total time needed (hour)		41	38	31	15	25

Though we can just get an approximate result, yet it is a very satisfactory method in practices. It is worth using in project management and production scheduling.

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# An Overview of Foreign Investment Laws and Regulations of Lao PDR<sup>1</sup>

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## **Abstract**

This paper aims to examine foreign investment laws and regulations of Lao Peoples Democratic Republic (Lao PDR or Laos), which can provide information for better-informed decision-making by potential investors who wish to invest in Laos. The first regulatory reform in Laos aimed at shifting the country's foreign economic relations was the enactment of the foreign investment laws. The laws and regulations have been revised recently to create a more favourable investment climate. The Lao government has provided a wide range of tax and non-tax incentives for investment projects within the Special Economic Zones (SEZs), reduction on import taxes and tax on foreign corporate profit that is lower than for domestic enterprises. Foreign direct investment (FDI) laws are relatively liberal, allowing 100 per cent foreign ownership across a wide range of sectors.

**Keywords:** Foreign direct investment, laws, regulations, Special Economic Zones, state-owned enterprises, government of Lao PDR.

## **1. Introduction**

The legal system of Laos has been a mixture of Lao tradition and custom, the French style, Chinese style, and the Soviet style. The French ideology and the Soviet style socialist ideology have been adopted following the 1975 communist regime. Since 1986, Laos has gone through a period of changes in foreign investment law. Several new laws and decrees have been amended to make it conducive to do business in Laos. According to Flipse, Doran and Lê (2002), the Legal system of Laos has been influenced by the legal and economic transitions taking place in neighbouring countries such as Vietnam and China. The legal system of Laos still contains the elements of legal systems of those countries.

At present, the Lao government is working towards improving the trade and investment laws to encourage FDI and trade in the country. Laos is exploring the laws of a variety of market-oriented countries around the world. At present, it has over forty laws and hundreds of decrees and regulations. Since 1989, most of the decrees and regulations drafted such as the Decree on liberation of FDI have been added by many Decrees, Regulations and Decisions, the Law on FDI in 1994, the Decree N. 46/pm in 2001 concerning the investment regulation, the decision No.13/pm concerning the improvement of the rules for consideration and approval procedure of FDI (Flipse, Doran and Lê, 2002).

Several foreign law firms including Australian firms have been operating in Laos since 1988. Australian firms operate in Laos on a fly-in-fly-out basis. However, foreign law firms cannot appear in court but are permitted to practice the local law (DFAT, 1997).

## **2. Investment Promotion Acts**

Laos has one of the liberal investment regimes in the region. Since 1994, foreign investment law in Laos has been regulated by the Investment Promotion Acts, which are the laws on the Promotion and Management of Foreign Investment (2004), Law on Domestic investment (1995), the Business law (1994), the Customs law (1994) and the Tax law (1998). Other laws governing foreign investment include mining law, land law and electricity law (Department of Domestic and Foreign Investment of Lao PDR (DDFIL), 2003). Commercial law and land law are being developed. Foreign enterprises or foreign investors cannot own land as stated in Article 25 of the Use of

Land: "...It is prohibited for a Foreign Investor, a foreign investment enterprise or a foreign national to be allowed to own land in the Lao PDR. Foreigners can lease land directly from the Lao PDR or a Lao national under the terms of a land lease agreement made in accordance with the land law. All land belongs to the Lao national community" (DDFIL, 2001, p. 12).

According to the DDFIL (2003), the 1994 FDI law describes the procedure for foreign investment in Laos. This law is also designed to attract capitalist style enterprise and contains liberal provisions for repatriation of profits and the involvement of foreign equity in Lao businesses. It outlines the areas in which foreign investment is encouraged and those areas where foreign investment is not allowed.

Foreign Investment law in Laos was established under the Investment Promotion Act in 1988 and has created the Department of Domestic and Foreign Investment of Lao PDR (formerly known as the Foreign Investment Management Committee of Lao PDR (FIMCL) to administer investment licensing and promotion and set out investment regulations. The law sets out the terms and conditions of investment in Laos. Within one year of the introduction of the foreign investment law, the country received 124 applications for investment projects, and 60 projects were approved. However, the government was concerned that some projects approved in the early 1990s were not consistent with the government development goals. For instance, many proposed projects involved the Thai investments in forestry, which the Lao government considered as more exploitative than productive, and not for the purpose of exporting. Since then, the Lao government focused on projects, which involve modern technology transfer to Laos (Brahm and Macpherson, 1990, p.23).

### **3. Recent Changes to the Legal Framework**

The government of Laos has taken steps to improve the investment climate in the country in recent years. The government has amended its constitution including incentives for various sectors and investment zones and updated on investment regulations, mainly decentralised investment and approval process at the central and provincial levels (World Bank Group (WBG), 2005). The new decree issued on April 23, 2003, defines the responsibilities of relevant ministers and authorities at central and local levels (DDFIL, 2003). Further, the investment law sets out new policy incentives including the promoted zone areas. The legislation shortens the investment application procedures and processing time. It has reduced the time in the investment license approval from 60 days to less than 50 days for promoted sectors, 25 working days for promoted sectors with some restrictions, and 45 days for large-scale projects/or projects related to natural resources (WBG, 2005).

The 1994 investment promotion law was revised and issued by the Presidential Decree No. 11/NA on 22 October 2004. The New Decree of the Lao People's Democratic Republic Peace Independence Democracy Unity Prosperity National Assembly No. 11/NA Vientiane Capital City, is to replace the law of FDI of 1994. At present, foreign investment law in Laos is based on the new Law on the Promotion of Foreign Investment (2004), the Business law (1994), the Customs Law (1994), and the Tax Law (1995). The revised law on the Promotion of Foreign Investment (2004) came into effect on 14th January 2005 (United Nations, 2005, p.36). The decree details the investment procedures, new duties and incentives. The decree also reduces investment timeframe. It also sets out the revised tax incentives to foreign investors according to promoted activities and promotion (Note 2).

Although the government has taken reasonable steps in making it easier for foreign investors to do business in Laos, the legal environment lacks transparency with informal red tape and practises that increase the cost of doing business in Laos. There is a need to further improve the institutional and legal framework (WBG, 2005).

One of the key features of the revised FDI law is that the Lao government is embarking on structural reform on decentralisation of foreign investment management power; allowing local authorities to attract investment to their regions. In addition, the revised law outlines the forms of acceptable foreign investment and the rights, benefits and obligations of each type of investment. However, the law excludes indirect investment, such as loans, aid and general buying and selling of commodities.

### **4. Flexibility of the Law**

One of the advantages that Laos has over its neighbours is that foreign firms may wholly own and operate a business in any promoted sectors (American Embassy 2005, p.20). However, foreign investors are restricted from engaging in certain commercial activities without permission by the Lao government. The restricted commercial activities include forest exploitation, accounting, tourism, heavy vehicle or machinery operation, and rice cultivation. These restrictions are intended to protect state-owned enterprises (SOEs). Technically, foreigners are engaged in most of these activities. Foreigners are occasionally active in telecommunications (Note 3). In contrast, in Vietnam and China, there are restrictions on the activities in which a wholly foreign owned investment enterprise can engage. Under the People's Republic of China (PRC) law on wholly foreign owned enterprises, enterprises may only be established if they engage in technology transfer and export all or most of their products. In Laos, a wholly foreign

owned enterprise can be established, regardless of whether those enterprises are established with foreign or local investment (Brahm and Macpherson, 1990, p.36).

## **5. Foreign Ownership**

There are certain restrictions concerning investment approval in a joint venture project. The DDFIL considers foreign investments on a case-by-case basis of the proportion of foreign ownership in certain sectors. The foreign investment law of 2004 permitted one hundred per cent foreign ownership in all sectors. Investment projects involving mineral exploration and mining, and wood processing are subject to government agreement and processing. A foreign partner must contribute a minimum of thirty per cent of the amount of capital. Prohibited activities involving foreign investments include activities detrimental to the environment, health or national culture.

For large investment projects involving natural resources exploitation and energy generation, concessions may be granted. According to the DDFIL (2003), foreign companies are granted special privileges, which include a reduction or exemption from import duty rate because of the large size of their investments.

Most of infrastructure and services in Laos such as electricity, water, and domestic air travel are provided by SOEs, though in telecommunications private providers have been delivering these services. The most recent phase of State reform began after the government committed to attracting FDI in Laos. The SOEs manages a number of utility sectors. These include Electricite Du Laos, Enterprise of Telecommunications Lao, Lao Airlines, Lao State Fuel Company and Capital Water Supply State Enterprise, Nam Papa Lao (Nam Papa State-Owned Enterprises (NPSEs) in Bokeo, Bolikhamxay, Champasak, Huaphanh, Luang Phabang, Oudomxay, Savannakhet, Sekong, Vientiane Province, and Xieng Khouang; two NPSEs (Luang Namtha and Nam Papa Lao), Lao Brewery Co. Ltd, Lao Soft. Drink Co. Ltd, Lao Insurance Co. Ltd, Lao Tobacco Co. Ltd and Lane Xang Hotel Enterprise. The government of Laos is also restructuring four SOEs. They are Lane Xang Phatthana, Lat Visahakit Sanong Vatthou Technique, Lat Visahakit Konchak Kasikam and Borisath Phalithaphanh Beton Lao. The Restructuring Unit in the Business Promotion Office has been appointed to oversee the preparation of restructuring plans (WBG, 2006, p.10).

In 2004, the revenue of the eleven largest (SOEs) (including joint ventures and excluding banks) accounted for more than 70 percent of all SOEs revenues. Among these, revenues of five SOEs fully owned by government of Lao PDR accounted for about 42 percent, revenues of six joint venture SOEs for around 31 percent, revenues of others (more than 120 SOEs) comprised less than 30 percent (WBG, 2006, p.9).

The Lao telecommunication sector has been growing fast. Ten years ago, the sector was dominated mainly by one player Lao Telecom Company. Now, there are five companies (state-owned, joint-venture and private) that provide telecommunications services in Lao PDR. A Thai Sky Telecomm Company entry in 2006 is the most recent addition to the sector. The number of internet service providers (ISP) has increased from two firms in 1990s, to about six players in early 2000 and now about ten ISPs, such as STEA, ETL Internet, Lao Telecom, Champalao Internet, Lanexang Internet, Sky Telecom, KPL, Unicom and MLL.com (the last two are developed and will go into operations soon) (WBG, 2006, p.12).

There are four authorised enterprises to provide fixed and mobile telecommunications in Laos, with all four providing mobile phones but only three providing fixed lines. All of them have some government ownership. The enterprises are as follows: Lao Telecommunications Co Ltd (LTC shareholding is government of Lao PDR (GOL) 51%, Shinawatra 49%); Enterprise des Telecommunications Lao (ETL, GOL 100%); Lao Asia Telecom (LAT, Ministry of Defense 100%); Millicom International Cellular SA (GOL 22%, Millicom 78%). The first three provide fixed line, mobile and other services, while the last one provides mobile and other services (WBG, 2006, p.12).

The entry of Millicom, the large shareholding by Shin Corp, the operations of PlaNet and the prevalence of Voice over Internet Protocol (VoIP) operators show that private investors are willing to invest in Laos under the current policy regime. However, such investment is still limited to activities in Vientiane (WBG, 2006, p.12).

The banking sector of Laos is dominated by State Owned Banks (SOBs) which are starting to become market oriented. Private domestic banks play a small role and foreign banks have made little impact in the context of market share. The small size of the private sector and foreign banks is attributed to the role of the Government in many segments of the economy (directly or indirectly). Banque Pour Le Commerce Extérieur Lao retains a dominant position, accounting for about half of total deposits and loans in the system. The Lao Development Bank, resulting from the merger of two smaller SOBs - Lao May Bank and Lane Xang Bank is smaller. Low levels of capital, significant levels of non-performing loans and the accompanying weak profitability are found at the large state owned commercial banks (SOCBs). The State-Owned Policy Bank, the Agricultural Promotion Bank which lends mainly to rural areas, suffers form the same symptoms. Another bank owned by the state are the Bank of Lao PDR (WBG, 2006, p.12).

FDI in the hydropower sector made up more than half of the total foreign investment in Lao PDR. Currently, there are three large projects under construction: Nam Theun 2 (NT2), Nam Ngeum 2 and Se Kaman 3. All three projects together are worth more than US\$2 billion. They are as follows:

(1) Nam Theun 2 is the largest hydropower project in Lao PDR (US\$1.2 billion, 1070 MW, in KM province) in which French EDF has 35 percent of the total share; GOL and EGCO each hold 25 percent and Italian Thai development 15 percent. The electricity produced by NT2 will be mainly for exports to Thailand.

(2) Nam Ngum 2 project (about US\$800 million, 615 MW, in VTE province) is sponsored by South East Asia Energy Limited - a joint venture comprising Karnchang Public Company (28.5%), EDL (25%), Ratchaburi Electricity Generating Public Company (25%), Bangkok Expressway Public Company (12.5%), Shlapak Development Company (4%), PT Construction and Irrigation Company (4%), and TEAM Consulting Engineering and Management Company (1%). The project is mainly for exports to Thailand.

(3) The Xe Kaman 3 project (about US\$360 million, 260 MW, in Attapeu province) is owned by Vietnam-Lao PDR Investment and Development Company (EDL has a 15 percent share) and the electricity is expected to export to Vietnam (WBG, 2006, p.25).

In recent years, many foreign investors have invested in SOEs in Laos and became their strategic partners. These include Lao Brewery Company (LBC, 50/50 share holding for FDI/GOL), Lao Soft Drink Company (70/30), Lao Tobacco Company (53/47), Lao Telecommunication Enterprise (LTE, 49/51), Lao Insurance Company Ltd (51/49), and a few other hotel and tourism businesses. The majority of these joint projects is profitable and have been performing well, especially the biggest two joint ventures: LTE with total investment of about \$180 millions and LBC or Beer Lao – more than \$30 millions in 2004. As the leader of food processing industry, LBC is planning to expand its production capacity by almost 80% in 2006-2007 by building the second brewery factory in Champasack with an estimated cost of about US\$20 millions (WBG, 2006, p.25).

## 6. Tax and Duty Incentives in Special Promotion Zones

Since Laos implemented its open door policy in 1988, there has been a declining foreign investment levels in areas outside Vientiane. In the past ten years, tax and non-tax incentives were not promoted greatly to attract foreign investment into the SEZs. Thus, there was a lack of transparency in the promotion of foreign investment in Laos, which has resulted in declining foreign investment levels in rural areas. On April 13, 2003, the government of Laos introduced duty incentives to facilitate investors under the country's first establishment of SEZs aimed at attracting FDI and know-how. The importance of the SEZs is to develop the border areas with China, Vietnam, Cambodia, Myanmar and Thailand. The SEZ is approximately 500km south of Vientiane and located in the province of Savannakhet along the East-West Economic Corridor (EWEC) linking Myanmar, Thailand, Laos and Vietnam (Route No.9).

One of the government policies in promoting FDI to the SEZs is to encourage foreign projects in which to develop infrastructures and grant more preferential projects. The government is implementing this policy in recognising the need to attract foreign investments to areas outside Vientiane to improve the socio-economic conditions, thereby improving the standard of living of people in rural provinces. The effects of the new decree should assist in creating job opportunities in the rural provinces, generate foreign exchange earnings and build local infrastructures.

The Lao government has divided investment promotions zones into specific activities and zones. According to the law on the Promotion of Foreign investment, the three promoted zones based on social-economic conditions and geographical locations in the zones are as follows:

*Zone 1:* Mountainous, plain and plateau zones with no economic infrastructure to facilitate investment.

*Zone 2:* Mountainous, plain and plateau zones with a moderate level of economic infrastructure suitable to accommodate investment to some extent.

*Zone 3:* Mountainous, plain and plateau zones with good infrastructure to support investment.

According to Article 18 of the revised law (2004), foreign investors investing within the promoted activities and zones are entitled to the following tax incentives:

*Zone 1:* Investments in Zone 1 will be entitled to a profit tax exemption for 7 years and thereafter will be subject to profit tax at the rate of ten percent (10%).

*Zone 2:* Investments in Zone 2 will be entitled to a profit tax exemption for 5 years, and thereafter will be subject to a reduced profit tax rate of half of fifteen percent (15%) for 3 years and thereafter a profit tax rate of fifteen percent (15%).

*Zone 3:* Investments in Zone 3 will be entitled to a profit tax exemption for 2 years and thereafter will be subject to a reduced profit tax rate of half of twenty percent for 2 years and thereafter a profit tax rate of twenty percent (20%).

Under this law, profit tax exemption starts from the date of the foreign enterprise's commencement of business operations. For some tree plantation activities, profit tax exemption commences from the date the enterprise starts making a profit. Once the profit tax exemption period is over, the foreign investment enterprise shall pay profit tax in accordance with the laws and regulations.

In addition to the above incentives, foreign investors are entitled to the following incentives:

- (1) During the tax exemption period and during the tax reduction period, the enterprise is entitled to an exemption of minimum tax.
- (2) The profit used for the expansion of licensed business activities will be exempted from profit tax during the accounting year.
- (3) Exemption of import duties and taxes on equipment, spare parts, vehicles directly used for production, raw materials which do not exist domestically or exist but are insufficient, semi finished products imported for manufacturing or for processing for the purpose of export.
- (4) Exemption of export duty on export products.

Another attractive feature of this law is that raw materials and semi-finished products imported for manufacturing or assembly for import substitution will be exempted from import duties and taxes or will be subject to reduced rates of import duties and taxes.

SEZs, Industrial Zones, Border Trade areas and other specific economic zones shall follow the laws and regulations of such specific areas.

#### *6.1 Investment Incentives of the Savan-Seno Special Economic Zones (SSSEZs)*

In collaboration with the Asian Development Bank, the Lao government decided to establish a first Savan-Seno Special Economic Zones (SSSEZs) in Savannakhet province of Laos. The objectives of the establishment of the SSSEZs are as follows:

- (1) To develop the SSSEZs as a trade and service hub of the EWEC;
- (2) To develop bases for the industrialisation and modernisation of Laos;
- (3) To make use of the vantage ground and strategic location of this SSSEZs to attract and promote investment; and
- (4) To create jobs for, and upgrade know-how and skills of the Lao servant-labour.

Economic sector zones promoted in the Zone are as follows:

- (1) Export (oriented) processing zone;
- (2) Free trade Zone; and
- (3) Free Service and logistics centre.

Many incentives are available to investors who wish to invest in the SSSEZs. The main incentives are the exemption of taxes such as: Exemption of turnover tax, exemption of utilization (consumption) tax and exemption of minimum tax. Table 1 lists the main special investment incentives of the SSSEZs. Other special investment incentives are shown in Appendix 1.

With regard to the SSSEZs, there is the Prime Minister's Decree No.177/PM on the management regulations and incentive policies, dated 13 November 2003. The SSSEZA authorises licensing of investment in the zone and provides investors and developers with all the necessary facilities and assistance, including processing of their investment request through a One-Stop service. The SSSEZA also has the full responsibility in the management, design and construction of the zone. The approval or rejection of application and granting of investment license would be within 5 working days (United Nations, 2005, p.41).

#### *6.2 Non-Tax Incentives*

Under the FDI Law, the government does not offer incentives of import protection (increasing duties or banning imports) for import substituting investments and it does not provide measures to restrict further entry to reduce competition for investors (DDFIL, 2003). Appendix 1 lists all non-tax incentives available in Laos.

### **7. Intellectual Property Rights Protection**

Since 1999, the Science, Technology, and Environment (STEA) Agency has been responsible for the protection of Intellectual Property Rights (IPR) in Laos. It is also responsible for drafting Industrial Property Laws, and is

responsible for the country's ability to adhere to conventions and international protocols. Laos became a member of the World Intellectual Property Organisation (WIPO) in 1995 and the Paris Convention (Industrial Property) in 1998, and has also been accepted international assistance in drafting an IPR law. Laos is planning to join the Association of South-East Asian Nations (ASEAN) trademark and Patent Common Filing system (United Nations, 2005, p.48). Laos' IPR enforcement in protecting trademark and copyright materials is rather weak. It appears that STEA lacks the power to arrest persons for the use of unauthorised patents and trademarks, and appears to have no coordination with the police. Implementation of trademark and copyright regulations are still lacking. However, the IPR law is being developed, and multilateral institutions and private consultants are assisting the Lao government with establishing of an intellectual property system in the country. Laos became a member of the ASEAN Common Filing System on Patents in 2000, but lacks qualified patent examiners. A decree protecting patents, petty patents, and industrial designs was approved in January 2002. At present, no system exists for issuing copyrights. However, a draft copyright law was developed in 2005 (U.S Trade, 2005, p.20).

## **8. Legal Constraints**

Laos's legal system is inadequate in many respects. Existing legislation lacks consistency and implementing regulations. Following are some of the legal barriers to foreign investment in Laos:

### *8.1 Services Constraints*

The Central Bank of Laos (BOL) and two state-owned commercial banks are the major banks of the domestic and foreign banks in Laos. At present, there are six foreign banks in Laos, which offer limited services primarily to foreigners. It appears that the majority of foreign banks are operating in Vientiane, which severely impacts on their competitiveness in providing financial services to the South of Laos where business is concentrated. There is also the lack of regulatory supervision of the SOCBs, where enforcement of prudential guidelines is ineffective and standards for credit worthiness are low. There is also the need for laws and regulations for loan collection and collateral enforcement, in order to improve the financial sector (U.S Trade, 2005, p.20).

*Legal:* Enforcement in the laws and regulations of Laos remains a significant challenge to the government of Laos. Foreign attorneys are not prohibited to represent clients in Lao courts. Many areas of business and finance are not yet covered by viable statutes. Therefore, Laos requires assistance from international organisations to develop the legal sector, and new laws are gradually updating prevailing in draft form.

*Accounting:* Generally, foreign accounting firms may not operate in the field of accounting in Laos. However, one international accounting firm does offer auditing (rather than accounting).

*Foreign exchange system:* There are no restrictions on foreign exchange within Laos, nor are there any legal limits on remitting foreign exchange abroad. There are practical limitations, however, in that the availability of foreign exchange is sometimes limited, which inconveniences large single-sale and large-volume businesses, such as those selling heavy equipment or fuel and petroleum products, both areas in which American businesses currently operate (U.S Trade, 2005, p.20).

### *8.2 Investment Constraints*

Laos is faced with challenging investment environment due to the lack of unclear regulations, mix of Chinese and Vietnamese law styles, inefficient infrastructure and services in the financial services. FDI is not accurately reported by the Lao government (the official figures show approved, not actual investments), and real investment levels are therefore difficult to estimate. The real level of foreign investment is probably higher than the official estimates.

The Law on the Promotion and Management of Foreign Investment of Laos is very basic. Laos's legal system lacks consistency and implementing regulations. For example, import duties and tax exemptions, supposedly guaranteed to foreign investors, are not reflected in either customs or tax law. Multilateral institutions and private consultants are assisting the Lao government implementing regulations, including the FDI law. However, it appears that bureaucracy often obstructs this process. In addition, international donors are helping Laos' accession to the World Trade Organisation (WTO). This also assists commercial law of Laos into conformity with WTO standards, and may promote greater transparency and consistency in the legal and regulatory of FDI law in Laos (American Embassy, 2005, p.17-20).

Dispute arbitration and mediation in Laos are vaguely defined. The United States has recommended Laos to move from a business licensing to a business registration system, through the Industrial Processes Law. For example, the industrial processes law requires manufacturers to apply for permission to make minor changes to their methods of production. There is the lack of clarity in the tax law in Laos, in which foreign investors complain that taxes are

often assessed in an inconsistent manner. The tax code was constructed and simplified in January 1999, and revised in 2002-2003. However, some investors still report significant difficulties in obtaining tax certifications and clearances in a timely manner (U.S Trade, 2005, p.20).

### *8.3 Electronic Commerce Constraints*

There is no law governing e-commerce, nor does the Lao government recognise the need for developing a dispute resolution in Internet/E-commerce transactions. Internet is available in all major towns of Laos, though not widely used in the country.

### *8.4 Other Constraints*

The Prime Minister's Office issued an anti-corruption decree in November 1999, but implementation remains low. The Counter-Corruption Committee in the Prime Minister's Office is the Lao government agency responsible for fighting corruption. Under the Lao law, giving and accepting bribes are criminal acts, punishable by fine and/or imprisonment. Corruption remains an issue in Laos. Some of the issues concerning corruption known to occur in Laos include bribes to Lao officials to speed up FDI investment applications, such as business licenses or importation of perishable items (U.S Trade, 2005, p.20).

### *8.5 Labour Law*

The Labour Law of 1994 covers labour and employment in the Lao PDR. This law applies to both Laos' domestic companies and foreign companies. The legislation covers the rights and obligations of employees and employers. The Labour Law requires a written contract between employer and employee. However, in some cases an employment contract must be verbal, depending on employment conditions and the nature of the work, such as work on a temporary or daily basis, or employment involving only a small amount of work. The contracts can be for a fixed term or indefinite period. Article 13 requires that the form and duration of employment contract must be concluded in writing.

Lao law permits foreign investors to employ foreign workers when necessary, if no appropriately qualified workers are available in the Lao PDR. According to Article 7 '...The employment of foreign workers shall be limited in number and in duration, and a detailed scheme shall be established for the transfer of skills to Lao workers to replace such foreign workers once the duration of their employment contract has been completed. The introduction of short-and long-term foreign workers shall be authorised by the labour administration prior to their entry into the Lao PDR, except in cases where workers are imported by international and foreign aid projects to which special regulations shall apply' (DDFIL, 2003, p.2).

If workers are employed on an indefinite contract, to dismiss a worker, 45 days notice must be given to skilled workers and 15 days for other workers. In the case of dismissal because of misconduct by the worker the employer has the right to terminate the contract within 3 days notice. However, the employer must also notify the trade union or worker's representative in the labour unit and the local labour administration. In the case of dismissal to reduce staff numbers, dismissed workers are entitled to compensation dependent on their length of service (DDFIL, 2003, p.4).

The parties to a fixed-term employment contract shall notify each other respective intentions at least 15 days prior to the expiry of such contract. Where they wish to continue their employment relationship, they shall conclude a new employment contract.

Article 16 states that '...An employment contract may be terminated by dismissal where the worker concerned lacks the required specialised skills, where the worker is not in good health and therefore cannot continue to work, or where the employer considers it necessary to reduce the number of workers in order to improve the organisation of work within the labour unit' (DDFIL, 2003, p.4).

In the event of the termination of an employment contract on any of the above-mentioned grounds, the employer shall pay the workers concerned compensation according to their length of service. Such compensation amounts to 10 per cent of the monthly salary that was paid at the time of termination for each month of service. For workers who have worked for more than three years, the compensation shall be 15 per cent of such salary for each month of service.

For workers who are paid on a piece-rate basis or whose wages are not clearly fixed, the calculation of compensation shall be made on the basis of the average salary or wage that the workers received during the three months prior to termination.

The labour law prohibits foreign firms to employ persons under 18 years of age to perform arduous work or work which is damaging to their health, including all mining and quarrying work; work involving chemicals or explosives and poisonous substances; other work specified under Article 25 of this law; work at night in all branches of

industry from 10 p.m. to 5 a.m. the next morning; this period shall be included in the 11 hours of rest before resuming work on the next day. Furthermore, employment of young workers under 15 years of age in all socio-economic sectors is prohibited (DDFIL, 2003, p.3).

In addition to the above requirements, the Foreign Investment Law and Labour Law require foreign investors to give priority to Lao citizens when hiring staff. In line with the government's commitment to attract inward investment, foreign companies have the right to employ skilled or expert foreign personnel when necessary and with approval from the relevant authority. Investors are required to upgrade the skills of their local employees through training within the Lao PDR or abroad.

### **9. Proposed Changes to Current Investment Policy**

Government officials are considering ways to reduce the bureaucratic impediments that foreign investors face when applying to invest in Laos. The government is examining ways to improve investment laws, focusing on investment incentives such as special privileges, tax waivers and collection and customs procedures, speeding up and simplifying application procedures (Pansivongsay, Vientiane Times, 28/01/2005). It is likely that the government may allow foreign investors to receive the same treatment of tax and tariff incentives as domestic investors. Under this system, investments in "promoted industries" would receive tax and duty reduction incentives, but investments in other sectors would pay the normal corporate profit tax, turnover tax and duty rates (DDFIL, 2003). If and when Laos becomes a member of the WTO it is likely that foreign investors receive the same treatment of tax and tariff as domestic investors.

The deputy director of the Planning and Co-operation Department of Savannakhet, Sython Nantharat, comments "...Laos is at a disadvantage to Thailand and Vietnam if it relies on its existing investment laws. The current laws don't protect the country in such things as tax collection" (Vientiane Times, 10 March 2002). Laos is making investment easier by making procedures faster, accepting documents for processing every Friday. According to Vientiane, Deputy Mayor, Dr. Sinlavong Khoutphaythone, "...If the project needs Government permission, the investor will receive an answer within seven days, faster than the 60 days specified in law. For projects worth up to US\$5 million, Vientiane is empowered to make the decision, and will answer within 14 days. He added that this easing has been in operation since the start of the year" (Pansivongsay, Vientiane Times, 28/01/2005).

### **10. Conclusion**

This paper reviewed the legal and regulatory framework for foreign investment in Laos including Investment Promotion Act, recent changes to FDI law on promotion and provisions of the Investment Promotion Act.

The Lao government promulgated the Law on Foreign investment in April 1988, which sets the procedures governing foreign investment. It has drawn much of the law from China and Vietnam. However, the foreign investment law of Laos is more flexible than the Chinese or Vietnamese laws. One of the unique features concerning wholly foreign owned investment enterprises in Laos is that there is no restriction on the activities in which a wholly foreign owned investment expertise can operate. Investment can be 100 per cent foreign owned and can take the form of a new company or a branch or representative office of a foreign company. The Foreign law requires business to be approved and be issued the appropriate licences by the state in order to operate. The law provides that businesses shall have freedom over their assets and be able to operate freely.

Since 1994, foreign investment law in Laos has been governed by the Investment Promotion, which are the laws on the Promotion and Management of Foreign Investment (1994), Law on Domestic investment (1995), the Business law (2004), the Customs law (1994), and Tax law (1998). Other laws governing foreign investment include mining law, land law, labour law and electricity law. The 1994 investment promotion law was revised and issued by the Prime Minister on 22 October 2004. The 2004 law is based on the law on the promotion and management of Foreign Investment (1994), the Business law (1994), the Customs Law (1994), and the Tax Law (1995). The revised law on the Promotion of Foreign Investment (2004) came into effect on 14 January 2005.

The laws and regulations have been revised recently to create a more favourable investment climate. The Lao government has provided a wide range of tax and non-tax incentives on investment projects within the SEZs, reduction on import taxes and tax on foreign corporate profit that is lower than for domestic enterprises. There are issues concerning unclear rules in the law on investment promotion such as investment barriers, services barriers and electronic commerce barriers.

The first SEZ was established in 2003 in Savannakhet province of Laos. Economic sector zones promoted in the Zone are as follows: Export (oriented) processing zone, Free trade Zone; and Free Service and logistics centre. Duty

incentives were introduced in order to encourage foreign investors into the SEZs. The main incentives offered include exemption of turnover tax, exemption of utilization (consumption tax) and exemption of minimum tax.

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### Notes

Note 1. Parts of this paper are derived from Sisombat, (2007).

Note 2. See Section 1.4 for further details of investment incentives in specific zones. An extract of the revised law (2004) is available at <http://www.invest.laopdr.org>. Foreign investors need to regularly check with the DDFIL of the new laws when they change and for clarifications of the law.

Note 3. Source: U.S. Government Trade Department, (2005). [http://www.ustr.gov/assets/Document\\_Library/Reports\\_Publications/2006/2006\\_NTE\\_Report/asset\\_upload\\_file204\\_9256.pdf](http://www.ustr.gov/assets/Document_Library/Reports_Publications/2006/2006_NTE_Report/asset_upload_file204_9256.pdf).

Table 1. Main Special Investment Incentives of the Savan-Seno Special Economic Zones

## A) Tax holidays and profit tax

Requirements	Tax holiday period starting only from the first profit making year onwards	Profit tax rate to be collected after the tax holiday period
<b>1. Industry sector.</b>		
- Production business exporting at least 70% of its production.	10 years	8%
- Production business in high technology.	10 years	8%
- Production business exporting at least 30% to 69% of its production.	7 years	8%
- Production business exporting less than 30% of its production.	5 years	8%
- Other production business.	5 years	8%
<b>2. Service and development sectors.</b>		
- <i>Business having an investment capital:</i>		
- of at least US\$2 Million	10 years	8%
- from US\$500,000- 1,999,999	8 years	8%
- from US\$300,000 - 499,999	6 years	8%
- from US\$150,000 -299,999	4 years	10%
- from US\$50,000 - 149,999	2 years	10%
<b>3. Trade sector</b>		
- Trade business dealing with exportation of products made in the Lao PDR or in the SSSEZs.	5 years	10%
- Trade business dealing with re-exportation of imported goods to third countries.	3 years	10%
- Trade business dealing with general trading activities (except the above mentioned).	2 years	10%

Source: Savan-Seno Special Economic Zones Authority (SSSEZA), 2003.

Table 1 Continued...

B) *Tax on dividends:* 5%

C) *Personal income tax:* 5%

D) *Loss carried forward:* 5 years

E) *Import tariff exemption:* for all materials, construction materials, production machineries, vehicles and their spare parts, materials, semi-finished and finished products for use, consumption, processing or assembly in the SSSEZs.

Table 1 Continued...

F) *Quota on importation of administrative cars \* with 1% of import tariff to investors:*

Business company registered capital	Authorised number of imported car (or quota)
- from US\$100,000 - 499,999	1
- from US\$500,000 - 999,999	2
- from US\$1,000,000 upwards	3

\* Administrative cars referred to sedans, jeeps, pick up and mini bus (with 12 seats at most).

G) *Minimum registered capital required:*

US\$ 10,000 for representative office of companies;

US\$ 50,000 for wholesale business, retail sale business, forwarding company, travel agency;

US\$ 100,000 for other business entities.

H) *Minimum total investment capital required:*

US\$150,000 for tourist and general services enterprises/companies, forwarding companies, wholesale and retail sale business companies;

US\$ 300,000 for industrial activities, hospitals and schools;

US\$ 500,000 for transportation and warehouses;

US\$1,000,000 for hotel, apartment, residential area and tourist site development.

I) *Maximum duration (renewable) of license and land lease:* 75 years

J) *Land leasing payment:*

If the leasing period is more than 30 years, the leasing payment shall be computed on a basis of reduction of 12 years. For example, a leasing period of 40 years shall be considered as 28 years only for the computation of the leasing payment (Savan-Special Economic Zones Authority (SSSEZA), 2003).

*Source: Savan-Seno Special Economic Zones Authority (SSSEZA), 2003.*

## Appendix 1. Non -Tax Incentives

<p style="text-align: center;"><b>Permissions</b></p>	<ul style="list-style-type: none"> <li>• Permission to bring in foreign nationals to undertake investment feasibility studies.</li> <li>• Permission to bring in foreign technicians, experts, and managers if qualified Lao nationals are not available to work on investment projects.</li> <li>• Permission to lease land for up to 20 years from a Lao national and up to 75 years from the government;</li> <li>• Permission to own all improvements and structures on the leased land, transfer leases to other entities.</li> <li>• Right to employ skilled and expert foreign personnel;</li> <li>• Freedom to remit earnings back home or to third countries;</li> <li>• Permission to sell or remove improvements or structures.</li> <li>• Freedom to repatriate profits and capital;</li> <li>• Facilitation of entry and exit visa facilities and work permits for expatriate personnel.</li> </ul>
<p style="text-align: center;"><b>Special Privileges</b></p>	<ul style="list-style-type: none"> <li>• Exemption from import duties for intermediate components and raw materials imported for processing and re-export;</li> <li>• Exemption from export duties for exported finished products;</li> <li>• Exemption from import duties for imported equipment, means of production, spare parts and other materials directly used in operation of investment projects;</li> <li>• Vehicles directly used in investment operations will be exempted from imported duties. Vehicles indirectly used in investment operations will be taxed 1% of their imported values. Foreign and domestic enterprises that have agreements with the Central Government and provincial authorities are entitled to temporarily imported vehicles.</li> <li>• Quantity of vehicles allowed depends on size of investment capital, zone and activities.</li> <li>• Special privileges, including reduction or exemption from the profit tax rate, are given based on the size of investment and the significant positive impacts that such investments have on socio-economic development of Lao PDR.</li> </ul>
<p style="text-align: center;"><b>Investment Guarantees, Rights, Benefits and Obligations of Foreign Investors</b></p>	<ul style="list-style-type: none"> <li>• Provides legal guarantees to foreign investors as well as foreign investment enterprises established in the Lao PDR under the Lao on the Promotion and Management of Foreign Investment;</li> <li>• Refrain from using administrative power to interfere with the lawful activities of foreign investors;</li> <li>• The Lao PDR facilitates foreign investors as well as foreign investment enterprise equally as it does for domestic investors and domestic enterprises except where specially provided otherwise by this decree.</li> <li>• The Lao PDR recognises and accepts the rights of foreign investors in all respects regarding leasing, land use, intellectual property ownership as well as the lawful assets and rights of foreign investors or the rights related to foreign investment enterprises;</li> <li>• To receive support from the Government in establishing and operating their business in accordance with the laws and regulations;</li> <li>• To obtain protection of rights and legitimate interests related to business operations;</li> </ul>

	• To own assets;
--	------------------

Appendix 1 Continued....

<p style="text-align: center;"><b>Investment Guarantees, Rights, Benefits and Obligations of Foreign Investors</b></p>	<ul style="list-style-type: none"> <li>• To receive benefits from the lease of or a concession over land such as the right to use, sell or use assets associated with the leased land or concession as security to any persons or financial institutions or for the purpose of joint venture, to sublease the right to use land, to transfer the land lease or concession agreement in accordance with the lease term, to use the land lease agreement or concession in Joint Ventures or as security with other persons. The details of the rights, benefits and obligations of foreign investors related to the land lease or concession shall be in compliance with the Land Law and other relevant laws;</li> <li>• To use foreign labourers, if necessary, but shall not exceed 10% (ten percent) of the enterprise's labour.</li> </ul>
<p style="text-align: center;"><b>Protection Measure</b></p>	<ul style="list-style-type: none"> <li>• Laos has signed the bilateral treaties for the investment promotion and protection with over 30 countries and trade agreements with 30 countries and currently is in the process of joining the WTO.</li> <li>• Laos has trade relations with more than 50 countries and Laos as a least developed country has been granted GSP from 35 countries;</li> <li>• Authority by the Chairman to for any helpful actions or tax relief measures for the benefits of promoted projects.</li> </ul>

Source: DDFIL (2003, 2004) and Department of Promotion and Management of Domestic and Foreign Investment of Lao PDR (2001).

# Education Tourism Market in China

## An Explorative Study in Dalian

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### Abstract

Educational tourism, a burgeoning section in China's tourism market, has attracted great attention from both industry and researchers, however, the focus always falls on young people, the educational demands of other tourists are largely neglected. The paper, firstly does a comprehensive analysis of situation and problems of Chinese inbound, outbound and domestic education tourism markets, and then, based on an investigation made in Dalian with common residents as subjects, attempts to identify basic characteristics of education tourists demands. In light of information obtained from both supply and demand sides, some useful conclusions are reached, from which derive some marketing policies to cultivate Chinese education tourism markets.

**Keywords:** Educational tour, Demands, Residents, Dalian, China

### 1. Introduction

Education tourism is a kind of special short-term tourism whose purpose is learning and knowledge gaining and whose major participants are students with minor participants teachers (Guo,2000,pp.4-6). The activities involved in education tours are various, ranging from getting to know a school, custom or culture, studying a language, attending a symposium or seminar to attending an academic or research project (Yuan,2003,pp.10). Anyway, the chief purpose of education tourism is about education and study. So the destinations of education tour are always set in reputed schools, institutes, universities or some historical sites and famous scholars' residence. It is expected that each participant can gain skills or knowledge in education tours. It is believed that education tour can enrich a person's knowledge and upgrade tourists products for the local tourism industry , therefore , greater attention are being given to this market nowadays in China.

Education tourism has been prevailing in developed countries. In its initial stage in foreign countries, most of its participants are students. They would take advantage of their vocation time to take tours abroad for sightseeing and knowledge gaining. In countries of Europe and America, education tourism has become a tradition and been considered to be a crucial part of modern education. On the contrary, education tourism had a relative late start in China. An early one can be dated back to 1989, in which a tour to Confucius residence was launched. And most of the tourists in that tour were foreign guests. Besides, the content of the itinerary was about cultural exchange. After that, training tourism gradually starts to take shape. In 1995, travel agencies specializing in the organization of education tours were founded while in December 1995, all these education established a syndicate, which signified the epoch of education tourism (Wen, 2005, 25-29).

### 2. Current situation of Chinese education tour market

In 20<sup>th</sup> century, tourism industry developed at a dramatic pace. Meanwhile it comes into the new age of diversity, with the drastically increasing number of tourists, activities and themes. Among this large tourist population, young students take up a big portion. According to the statistics, education tourism is overwhelmingly popular especially in developed countries. In 1991, totally 42 schools in Japan launched education tour in China and the student participators were 8417(Yuan, 2003, pp.10). However when it came to 2004, the number rose up to 217 schools and 38204 students, which just accounts for 24.4% of the total number of Japanese education tourists that year(Wen,2005,25-29). Though the market is big, it is now just confined within students and young tourists. Education for people with other occupations is still at its initial stage. And this probably results from the inappropriate market segregation of education tourism.

Because China is a country with vast territory and culture, a stable society and a rising status across the world, more

and more foreign education tourists choose China as their education tour destination. At the same time, outbound tour operations with study as the main purpose are also on the increase. Touring for studying languages and experiencing cultures in other countries is becoming one of the top choices for outbound tour among younger generation.

### *2.1 current situation of inbound education tourism in china*

Take the Chinese International Travel Service (CITS) for instance. Organization of inbound education tour has been its traditional service. Each year, CITS has guests from Italy, Germany, Austria, U.K. and Japan. Last year, around 205 batches of tour parties, up to 40 thousands Japanese students, came to China for education tours. Over years, China has been the first destination choice for Japanese education tourists and Beijing hosts almost 85% of them (Dong, 2004, pp.15). It is said that there are 104 schools opening to the Japanese students for education tours in Beijing, including senior high schools, skill training schools and universities. In addition to these academic exchanges, Japanese students also participate in the so-called experiencing education tour, like technology tour, alley tour and environment protection tour. And these Japanese would prefer to live with locals during the education tours so that they may further experience the authentic culture.

Though there is no doubt that inbound education tourism contains tremendous potential, doubt should really be cast onto the discrepancy between the product supply and the demand, because there is indeed a misconception. For example, there are totally 900 thousand Japanese tourists taking tour in Shanghai while there are only 10 thousand education tourists. The figures indicate that such a potential market each travel agency should have competed for is not attractive to Chinese travel services. It is mainly because travel services in Shanghai suppose that since most of the education tourists are students whose purchasing power is not strong, the profits travel agencies could make may be limited. As a matter of fact, though the expenditure per day by students is relatively low, the periods of the education tours are significantly longer. In turn, the total net profits travel services can make through education tours are actually larger than expected. Besides, here are some in-depth relevant effects to enable the inbound education tourists' consumption to grow. Most of the time, students in inbound education tours are always accompanied by their parents or teachers, and the consuming capacity of this group of people should never be ignored. What is more important is that those young students are the potential consumers in the future, so over the long pull, an excellent organization of student education tour can be conducive to the future. In addition, Olympics and World Expo in China are approaching. Tens of thousands foreigners are going to swarm into China. Then we may expect another wave of growth in tourism industry. And an appropriate product and itinerary design would lead to a rise in education tourism in China, too.

### *2.2 Current situation of outbound education tourism*

The living standard in China has been changed drastically since the open and reform. More and more parents prefer to have their children study abroad, because they believe competent people in 21 century should have a broad perspective and global view. And all these attributes can be obtained through overseas study. Propelled by this upsurge of overseas study, Chinese outbound education tourism also takes shape.

Travel agencies doing business on the outbound education tourism specially target on students. Generally, students need to get to know the universities or schools they are going to before they actually study abroad. In 2005, which is the hottest year for education tourism, this kind of "school tour" is popular. However tons of problems jumped out of these school tours: time is too short and limited for students to improve their foreign languages or to have a complete idea about the school; price of the tours is at large high and unacceptable; it is not guaranteed to secure the visa. That means sometimes tourists can't travel abroad though they've got enough money. All these risks made the outbound education tourism shrink a lot after 2005. Yet now the market seems to revivify gradually. Travel services are not only now thinking about making a cut on the price of each tour but also adding something new and informative activity items into the tour itinerary so that students can really benefit or gain some useful knowledge in the tours. There is an advertisement reading "8088 ¥ for 5-day education tour in Japan". The price listed is just the half of that a few months ago (Wang, 2005, pp16.). And there are also some scenic cities included into education tours as tourist attraction. In this trend, we may expect revitalization in the Chinese outbound education tourism.

### *2.3 Current situation of domestic education tourism*

The number of university, middle school and primary school students is between 0.2 billion to 0.3 billion. Yet compared with this figure, the number of student tourists in education tour is nothing. It is not because students are not willing to take education tour or because they are short of money to take tours. Generally it is because none of the travel services has now a large-scale exploration of this market and tour products virtually specializing in student education are rare. In other words, there is a great imbalance of supply and demand in education tourism market.

### 3. An investigation into educational tourism market in dalian city

Dalian, one of Chinese 10 best tourism cities, have attracted tourists from all over the world for its mild coastal climate, spectacular seascape, fascinating theme parks and festivities. Owing to its desirable location neighbored with Japan and Korean and proximity to Beijing, capital of China, It has been attracting overseas students from Japan, Korean, Russia and other countries to study Chinese or pursue degrees in its many notable universities and high schools.

Compared with strong demands, supply of domestic education tourism in Dalian lags far behind, mainly because the product and itinerary are not as various as expected and most of them are intended for students. Travel agencies now don't care about other education groups, like teachers or scholars. As for the contents of the itinerary, it is still far from satisfaction of tourists. Most of the time, travel agencies only base their domestic education tourism on historical and natural sites touring, which essentially is not that much "knowledge gaining". Yet there is still something new about domestic education tourism. In recent years, travel agencies are aware of the demand for prospective university tours. They organize several tour parties with the chief purpose visiting the reputed universities in Beijing and Shanghai, which prove to be welcomed. Yet domestic supply still has a long way to go to catch up with the up-to-date demands. Travel agencies need not only more detailed market segmentation but also an innovative itinerary with a fair price.

However, in China as a whole, educational tours conducted nowadays basically cater to teenagers, while those programs designed for other groups of people are largely neglected(Wang, 2005, pp16.). In fact, educational tour, as a style of traveling with the aim of enlarging knowledge and mastering skills, should be a popular traveling style suitable for all ages. Thus, it would be enormously meaningful for practitioners and researchers to examine the educational tour intentions of common people. To fulfill this objective, between September and October, 2007, a convenience survey was conducted among Dalian residents of all ages to gain an insight into their demands for educational tours.600 questionnaires were administered to residents randomly selected in public places such as parks, squares and campuses, during which 564 valid questionnaires were collected with a valid rate of 94%.

#### 3.1 The Relationship between profiles of urban residents and their demands for educational tour

62.1% of the interviewees express liking of educational tours and are willing to make an educational tours in near future which indicates ordinary urban residents have strong intentions for educational tour.

##### 3.1.1 Residents gender and age and their demands of educational tour

Totally 564 people's survey information is valid. Among these 564, 350 are willing to participate in an education tour, with the proportion of 62.1%. And among 285 male interviewees and 279 female interviewees, male tourists who'd like to take education tours are up to 202, taking up the proportion of 70.9%; female tourists who'd like to take education tours are up to 148, taking up the proportion of 53%. In terms of different age groups, among all the interviewees who are willing to take education tours, 6.6% of the interviewees are younger than 12; 10.5% are between 12 and 18 years old; 16.7% are between 19 and 25; 28% are between 25-40;21.5% are between 40-55; 16.8% are older than 55 years old. Based on the data, we can obviously reach a conclusion that male tourists like education tourism more and the major education tourists' age is from 12 to 40, which can be well demonstrated in Table 1.

Table 1. Relation between residents' age and their intentions for educational tour

Age	<12	12-18	19-25	26-40	41-55	>56
A (%)	6.6	10.5	16.7	28.0	21.5	16.8
B (%)	86.5	89.8	79.8	44.3	51.2	25.1
C (%)	9.1	19.1	21.5	20	17.7	12.8

A: represents proportion of samples based on age

B: represents percentage of those who have intentions for educational tour within each age group

C: represents proportion of people with intentions for educational tour based on age

##### 3.1.2 Occupation and demands

People with different occupation are in favor of education tours in different extents. Here is a list on ratios of number of potential education tourists with different jobs to the total amount of the interviewees with the correspondent occupation: students 89%; scholars 65%; teachers 73%; government officials 42%; corporation managers 34%; enterprise owners 30%; soldiers 32%; workers 21%; mechanics 45%; sales clerks 33%; pension takers 25%. So we may conclude that students, scholars and teachers are more likely to take education tours.

##### 3.1.4 Level of education and demands

Among the interviewees who had working experiences (excluding those who are still at schools), 39% interviewees

with primary school education are willing to take educational tour, while 46% of those with secondary school education, 92% with college education and 89% with graduate education are intent to take educational tour, which clearly indicates that people with higher education are prone to make educational tour.

### 3.2 Interviewees demands characteristics

#### 3.2.1 Traveling style

60.6% of interviewees prefer package tour over individual tour when making educational tour for they would benefit from sharing and communicating, thus optimizing their traveling experience.

#### 3.2.2 Expected expenditure on education tours

In the survey of expenditure of a five-day education tour, we've got the expected expenditure of tourists in different gender, age and occupation. Table2 well demonstrate the differences.

From the Table2, we may tell that people at the age from 26 to 55 have the strongest purchasing power and teachers, scholars and students are the education tourists with the biggest consuming capacity. Generally, it is estimated that since teachers, scholars and students have more access to culture and splendor of history and think highly of those, they would prefer to spend more on education tours so as to gain more knowledge than education tourists with other occupations do. In the meantime, residents with higher education are willing to spend more on education tour programs and those with college education or higher have the stronger purchasing power in touring for education.

It can be concluded that expenditure people are willing to pay for education tours is relatively low compared to expenditures on other tourism products. Although younger people constitute the main body of educational tourists, their purchasing power is rather limited. On the other hand, people at other ages also like educational tour and they have larger consuming capacity, but their demands are basically neglected in practical tour operations nowadays. Moreover, scholars and teachers, though having strong desire and purchasing power for education tour, are given little attention from tour operators. In short, people aged from 19 to 55, scholars and teachers formed vast potential market for educational tourism.

Table 2. Expected expenditure of different groups on Educational Tour

Variables	Items	Price (RMB)	Variables	Items	Price (RMB)
Age	<12	213.2	Occupation	Students	392.5
	13-18	439.5		Scholars	425.8
	19-25	552.2		Teachers	543.9
	26-40	674		Government officials	294.4
	41-55	703		Corporation managers	281.9
	>56	663.8		Enterprise owners	220.8
Education	Primary	344.5		Soldiers	118.7
	Secondary	426.4		Workers	50.8
	College	698		Mechanics	114.3
	Postgraduate	675		Sales clerks	91.7
				Pensioners	169.3

#### 3.2.3 Traveling motivations on education tour

Generally speaking, people take education tours for knowledge gaining and skills improving. However we can divide them into small categories, like scenic sites seeing, historical sites seeing, scientific exploration, language learning, folk arts and crafts making, seminar attending, culture exchange, custom learning and prospective school touring. As a form of cultural tourism, people's main purposes (seen from Table3) on an education tour include visiting historical sites, attending seminars, visiting prospective schools and experiencing local custom, which demonstrate people have diversified motivations when making educational tours.

Table 3. Residents' motivations for educational tour

Traveling motivations percentage%	Natural sites	Historical sites	Scientific exploration	Language learning	Arts & crafts	Seminar& symposium	Custom learning	Culture exchange	Schools touring
	8	30	9	3	1	17	12	5	15

Besides, education tourists can not be content with mere one purpose or monotonous itinerary of an education tour. They prefer an education tour meeting their requirements that they may increase knowledge as well as get themselves relaxed. So an innovative education tour with other supplementary activities is significantly welcomed. In today's high-pace lifestyle, people need this multi-functional education tours. And among all the interviewees, 14% prefer to combine education tours with VFR (visiting friends and relative) tours; 46% prefer to have education

tours combined with sightseeing tours; 27% prefer to combine it with vacation tours; 7% prefer to have it combined with shopping tours.

### 3.2.4 Accommodations choices

According to the survey, students prefer to stay at friends' places or budget hotels; scholars and teachers would like to stay at economical hotels or star hotels; as for government officials, corporation managers and owners, and professionals, their first choices are star hotels possibly due to their high income or coverage of expenditure by government or their employers; one surprise is that pensioners would choose to stay at star hotels considering their economical living style back home; service clerks, workers and soldiers intend to stay at budget accommodations mainly because of their limited income or simple living style.

### 3.2.5 Tourism commodities preferences

Souvenirs and local commodities reminiscent of the traveling experiences are highly welcomed by education tourists. For those who have strong desire for education tour, their favorite tourism commodities include souvenirs with locality such as T-shirts and back bags bearing local logos or features (92% interviewees like such commodities), relish cuisine(78%), crafts and arts(62%), books(47%), local products(43%),stationary(wool pens, drawing paper, ink and stones for grinding ink powders,36%), paintings(31%) and relics(29%). Anyway, commodities with local characteristics are among the most favorites.

### 3.2.6 Information source for education tourists

For a travel agency, it is crucial to have a good command over the education tourists' information source, and that is where they got their knowledge about education tour routes and price, so that they may later intentionally give publicity to their own travel experiences. According to the investigation, 33% of the information comes from travelers' friends and relatives; 27% is from magazines and newspapers; 21% is from schools or universities; 11% is from internet; 6% is from other kinds of books and materials; 2% is from the travel agencies promotion activities. Therefore, it is importation to cultivate a good image and reputation among travelers for a travel service. In addition, travel agencies should take advantage of advertisements put up on magazines and newspapers, which are another imperative information sources for potential tourists.

### 3.2.7 Destination choices for education tour

Destinations are where education tour are conducted. Generally, a destination suitable for education tour may features rich historical relics, or cultural heritages, or ancient culture centers, or places which cultural celebrities born or once lived or studied, or cities having many prestigious research institutions or universities(Li, 2006, pp.78). When interviewed about their most desirable destinations for education tour, the respondents gave highly scattering answers, which means China abounds in educational resources and have huge potential for developing education tourism. The following 12 cities are the most favorites, including Beijing, Shanghai, Wuhan, Kunming, Shenzhen, Xi'an, Chengdu, Nanjing, Dalian, Hangzhou, Chongqing, Guilin, and Hong Kong. Table4 is the final ranking in the popularity of education tourists.

Table 4. Rankings of cities in terms of attractiveness for educational tour

City	H.K.	S.H.	B.J.	N.J.	X.A.	C.D.	W.H.	K.M.	D.L.	H.Z.	S.Z.	G.L.
Ranking	1	2	3	4	5	6	7	8	9	10	11	12
Percentage	14.8	13.9	13.4	10.8	10.5	9.8	8.1	8.0	7.2	6.9	6.8	6.6

We can divide 12 cities into three subcategories, namely cosmopolitans, ancient cities and famous tourist cities. The first category is composed of Hong Kong, Beijing and Shanghai, and all of them are international municipalities enjoying complete infrastructures, many universities and academic conferences and a developed tourism, which are perfect combinations for education tourists. The second category consists of Chinese most ancient cities which have long history and highly developed civilization, many universities and fast-developing tourism. Owing to their relatively remote location from the developed areas in China or smaller in size, they ranked behind the first category. Cities in the third category are among Chinese best tourists destination for their appealing environment, beautiful scenery or unique custom. We can conclude from this assessment that the common features of destination for education tour are culture oriented and that education tourism is closely related to local culture and development stage of local tourism industry.

## 4. Conclusions and Marketing implications

In China, both inbound and outbound education tourism markets are proliferating, while domestic market is just taking off. However, the supply of education tourism still lags far behind demands. Current efforts are primarily made to attract and organize students to participate in education tours, this study finds that people at all ages and

with different occupations show a common preference of education tours and intend to take such tours in near future. Basically, people aged from 18 to 40, students, teachers and scholars, people with high education are the major body of education tourists. Education tourists prefer combine education with other activities in the collective form such as package tour. They like cosmopolitans, ancient cities and famous tourism cities with culture environment and developed tourism industry and economy. On their trip, they prefer to buy souvenirs with local personality and stay at economical accommodations such as budget hotels or friends' places. Though they have a strong intention to make education tour, their prospective expenditure on it is not high.

In general, we should develop education tours with varieties of activities. Products should no longer be confined into the mere purpose of "knowledge gaining". Travel services should place some of its emphasis on the innovation of education tours. It is preferable to develop the multi-functional education tours, like the combination of education tour and vacation tours, education tour with shopping tours, education tours with resort holiday tours. As for its destination, we should base our decision on the city popularity table. So travel agencies are supposed to set their education tour in cities like Hong Kong, Beijing, Shanghai. What is more, the design of the product should cater more for teachers, scholars and students, because of their overwhelming purchasing power in education tours.

Education tourism in China is still in its initial stage. No travel agency has a stable income from this market (Wang, 2002, pp.21-24). So it is important for each travel service to cultivate a good image and reputation. First of all, we should control the current quality of education tour so that they can be thought highly of among education tourists; Besides, travel agencies should take advantages of magazines, newspapers and internet to throw their names into each far-flung corner of China, because according to the previous survey advertisements on magazines and newspapers are the education tourists' crucial information source.

In today's epoch of mass tourism, education tourism has become indispensable. Though it has substantial progress in Dalian City, there is still a significant discrepancy between the market demand and supply. If travel agencies want to clinch this big chance and potential, they need to improve their products in aspects such as price, functions and promotions so that they may catch up with the constantly renewable demands from the prospective tourists.

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# Research on the Dynamic Relationship among China's Metal Futures, Spot price and London's Futures price

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## Abstract

This paper studies the dynamic relationship among futures price, spot price of Shanghai metal and futures price of London with the co-integration theory, Granger causality tests, residue analysis, impulse responses function, and variance decomposition on the VECM. The study shows the three have the long equilibrium relationship: the copper futures price of Shanghai have internalities to the futures of London; the aluminum futures price have externalities; the three have different price discovery functions.

**Keywords:** Futures prices, Vector Error Correction (VEC) model, Price discovery functions, Impulse responses function

## 1. Introduction

London Metal Exchange (LME) is the largest and most influential metal exchange in the world, in which the trend of futures prices reflects the anticipation of international price trend, exerting significant directive effect on world metal production and consumption. Shanghai Futures Exchange (SHFE) is the most normal one in China. Futures contract is the most active and mature transaction in domestic market. It has a nice function of price discovery and begins to exert greater effects on world metal price. Therefore, to study the dynamic relationship among futures price, spot price of China metal and futures price of the world is meaningful to assess the operation efficiency, the price discovery function, and the risk-transfer function of China's futures market at home and abroad, and to perfect futures market's operation mechanism.

Scholars at home and abroad have made lots of researches on the relationship between futures price and spot prices. Lai, K. S. & M. Lai (1991) tested the relationship between futures price and spot price by co-integration theory earlier. Chowdhury (1991) examined the relationship between color metal futures price and spot price. Researches show that futures market has relatively evident advantages over spot market in prices. Spot prices exert relatively strong effects on futures prices. Hasbrouck (1995) studied futures market and spot market's function of price discovery. Haigh (2000), Jian Yang & David A. Bessler & David J Leatham (2001) tested the relationship between futures prices and spot prices by co-integration analysis. Jun Wang and Zongcheng Zhang (2004), and Renhai Hua (2004) made empirical researches on the dynamic relationship between SHFE futures prices and spot prices, concluding that there is a balanced and causality relationship between the two. Renhai Hua and Baizhu Chen (2004) proved there is a long-term equilibrium between futures price at home and that abroad. Jinwen Zhao (2004) showed that there is a co-integration relationship between China's metal futures price and international futures price, thinking that China's futures market is effective basically and formulates a self-restrained price mechanism. Hui Gao (2004, 2005) made empirical researches on the relationship between copper futures price of Shanghai, China and that of London, UK, showing that there is a significant positive correlation between the two markets. Xinmin Tian and Xiaogang Shen (2005) analyzed the causality relationship between the copper futures price of SHFE and that of LME, proving the increasing influences of copper futures price of SHFE on copper futures price in world market. Yunzhong Li (2006) made dynamic quantitative studies on metal futures price of SHFE and that of LME by ADL model. To sum up, present documents focus on the two markets based on the relationship between futures price and spot price at home or the relationship between futures price at home and that abroad. There are no sufficient researches that focus on the short-term mutual-affected relationship between futures markets at home and abroad and spot market, the price discovery function, the effect of exterior information or internal information on the three markets, and the untimely transfer of information in market. Therefore, this paper studies the dynamic relationship among futures price, spot price of SHFE and futures price of LME with the co-integration theory, Granger causality tests, residue analysis, impulse responses function, and variance decomposition on the VECM.

## 2. Variables and explanation

This paper selects the futures prices data from 7th, January, 2002 to 11th, September, 2006. Choose the closing quotation prices of the dominant futures, March copper and aluminum futures that are most representative in LME market. Select the closing quotation prices of copper and aluminum futures contracts in each trading day. Because every futures contract has a deadline, and every trading day has difference futures prices, we choose the latest futures contracts as samples in order to deal with the discontinuousness of futures prices, the small transactions in settlement month, and the unstable prices. As the latest futures contract enters the settlement month, select next latest futures contract. By this way, we can get a continuous and relatively stable futures contracts sequence. Delete the unmatched data caused by different trading dates in domestic futures market and international futures market. At last, we can get the data of the effective copper futures prices of SHFE and LME, and the aluminum futures prices of SHFE and LME, respectively 1109 and 1106, from different futures exchanges. The data of spot prices are from Shanghai Metal Market. In order to reduce hetero-scedasticity, we make logarithmic transformation on futures prices and spot prices, namely  $LNLF_t$ ,  $LNF_t$ , and  $LNS_t$ .

## 3. Empirical analysis on the dynamic relationship between metal futures prices and spot prices at home and abroad

### 3.1 Co-integration analysis on futures price and spot price

Before the co-integration analysis we make stability test on futures price and spot price. ADF and PP tests prove that the futures prices and spot prices of copper and aluminum are one-order unit integer sequence, what is an acceptable fact. Get the best lagged order by making LR statistics, AIC information principles, and SC rules become the smallest at the same time. Tests show that the best way is to choose the lagged second period to construct VAR model, adopting the Johansen-Juselius co-integration test under multiple variable VAR model to test whether there is co-integration relationship among futures prices  $LNF_t$ ,  $LNLF_t$ , and  $LNS_t$ . The test result is in table 1.

According to data in table 1, there is a co-integration relationship between aluminum and copper's futures prices and spot prices in China. Engle & Granger (1987) prove that under the condition of co-integration relation among variables there is an error correction formula:

$$\Delta y_t = \alpha ecm_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + \varepsilon_t$$

The estimation result is in table 2.

According to co-integration vectors, there is a long-term equilibrium among metal futures prices at home or abroad and spot prices. But exterior information has different effect on the three markets during a long period. According to the data of correction coefficients, as the correction coefficient statistics is significant and in accord with error correction mechanism, futures prices and spots prices would repair the non-equilibrium state and the system strays away from the equilibrium state. As the correction coefficient statistics is insignificant, futures prices and spot prices are affected by price changes in the lagged period. Comparing these correction coefficients, the LME futures prices' correction coefficient is less than that of SHFE, Shanghai copper's near to London copper's, and London aluminum's far less than London copper's. It indicates that domestic and international futures markets and spot market would regulate the price departure caused by exterior information, realizing the long-term equilibrium relationship of prices in the three markets. However, the price regulation in spot market is more evident than that in SHFE futures market, and that in SHFE futures market more evident than that in LME futures market. Shanghai aluminum futures price has a greater effect on the price regulation of London aluminum futures price than that on Shanghai copper futures price.

### 3.2 The Granger causality analysis on the relationship of futures price and spot price with VEC model

Although co-integration relationship indicates a causality relation, it does not necessarily distinguish the causality direction among variables. The causality relationship can be tested by long-term co-integration vectors' error correction model (Granger, 1996, 1998). Feldstein and Stock (1994) proved that if there is no co-integration relationship among stable variables, the causality relationship should include the error correction term (ECT). Otherwise, the conclusion may be not correct. Therefore, this paper adopts the new-developed Granger causality test based on VECM,  $\Delta \mathbf{Y}_t = \Gamma_1 \Delta \mathbf{Y}_{t-1} + \Gamma_2 \Delta \mathbf{Y}_{t-2} + \dots + \Gamma_{k-1} \Delta \mathbf{Y}_{t-(k-1)} + \alpha \beta' \mathbf{Y}_{t-1} + \mathbf{u}_t$ , to test the variables' externality and causality relationship. According to the AIC and SC principles, select the best lagged order. The test result is in table 3.

The result shows that futures prices at home and abroad have a directive effect on spot price. In China's futures market, for copper futures, there is a mutually-directive relationship between its futures price and spot price. But for

aluminum, its futures price has a directive effect on its spot price. In the world futures market, SHFE copper futures price has an increasing effect on world copper price, what causes the price change of LME copper futures. In contrast, it is the international futures market that has a dominant effect on aluminum futures price.

### 3.3 The dynamic analysis on the relationship of futures price and spot price with VEC model

VAR model determines the dynamic structure of economic system by real economic data instead of economic theories. It is not necessary to put forward pre-assumption in the construction of the model. But as there is a co-integration relationship among variables, we should adopt VEC model to make further analysis. Use the residence analysis in VEC model to find out what factors associate with changes of futures price and spot price. Use impulse response function to test which one has greater and longer effect on futures price and spot price. Use variance decomposition to make sure what factors can effectively predict futures price and spot price.

#### 3.3.1 VEC model's residence analysis

Residences estimated by VEC model stand for parts of variables' changes that can not be explained by the law of three variables in the model (for example, there is a big residence in Shanghai copper futures price, what indicates that the change of Shanghai copper futures price can not explained by its own rules, Shanghai copper spot price, London copper futures price, and short-term error correction term). The positive or negative effect can help to judge the effect correlation (no residence figures in this paper for the sake of proper length). In the aspect of effect degree, there is a stronger correlation between Shanghai copper and aluminum futures prices and spot price, comparing with correlation between the former and London futures price. And London metal futures price and Shanghai futures price have a greater effect degree than that of metal spot price.

Impulse response function is to describe an internal variable's response toward error. In specific, as we exert an effect that is near to the standard deviation on random error, impulse response function can describe the influences on internal variable's current value and future value. Impulse response function can reflect the prices' mutual effects, relations, and the degree of effects (time and depth) in the three markets. In order to overcome the shortcoming of Cholesky decomposition in co-variance matrix, we adopt Generalised Impulse Responses (GIR) advanced by Pesaran and Shin (1998) to make analysis. The analysis result is in figure 1 and figure 2.

For the metal copper, as current price is affected by SHFE futures price's standard variance information, copper futures price is affected strongly by its information currently. The price increases by 1.16% firstly and then rises slowly. On the third trading day, the price reaches the top. The influence sustains a long period. As the market transfers the information to LME, the London copper futures price increases 0.58% on the day. Then, the price increases stably at 0.82%. On the day, the copper spot price increases by 0.72%, then rises at a lower speed. On the sixth trading day, the price reaches the top increase, 1.14%, exerting a stable driving effect. In current, the positive effect on LME futures price: London copper futures price increases 1.64% on the day and then reduces slowly on the second and the third trading days. Finally, it tends to exert a stable driving effect. SHFE futures price reaches the top increase, 1.25%, on the third trading day. Spot price reaches the top increase, 1.20%, on the second trading day. Both fluctuate during later four trading days, and then exert a sustainable effect. After a positive effect from copper spot price, Shanghai copper futures price begins to increase on the first trading day and finally generates 1.0% sustainable effect. London futures price is not affected severely.

For the metal aluminum, as current price is affected by domestic futures price, copper futures price is affected strongly by its effect currently. On the third trading day, the price reaches the top, increasing 0.85%. Then there is a stable sustainable effect. LME futures price confronts a direct effect. Because the effect is small, the price sustains stable at 0.32%. Spot price rapidly increases 0.89% as current price increases 0.48%, exerting a sustainable effect. As LME futures price is affected by standard variance information, the price changes severely. On the first trading day, the price reaches the top, 1.28%, and then decreases to 1.11% slowly and tends to be stable. SHFE futures price and spot price reach their tops, 0.42% and 0.38% respectively on the second trading day and the fourth trading day. Afterwards, both decrease slowly and exert stable driving effect. As the effect of spot price's standard variance is over, its effect on London and Shanghai' aluminum futures prices.

#### 3.3.3 VEC model's variance decomposition analysis

Variance decomposition is to analyze the contribution degree of every structural effect on internal variables' changes. It can help to further evaluate the importance of different structural effects. Because the changes of futures price and spot price reflect the three markets' responses to new information, the market that possesses amounts of information absorbs more market information, and can exert greater effect in its price discovery function. The three markets' variance decomposition result is in table 4 and table 5.

For the metal copper's SHFE futures price changing variance, in the first lagged period, the total variance is coming

from the futures market thoroughly and decreases along with the rise of variance in the lagged period. Finally it is near to 55.74%. LME futures price tends to increase fast. At last it rises to 39.28%. Spot price increases slowly and finally tends to be close to 4.98%. For LME futures price changing variance, SHFE futures price variance rises fast and finally is close to 30.11%. London futures price decreases gradually and finally is near to 69.02%. There is no other effect if spot market lags behind one period. The final percent is merely 0.87%. For spot market price changing variance, as the lagged period is one, 53.65% is from self. Then it begins to decrease fast from the second lagged period. Finally it is close to 12.64%. SHFE futures market generates 45.90% effects in the first lagged period. Then the effect increases to 58.50% slowly. LME futures price generates relatively small effect in the first lagged period. It increases fast in the second lagged period and finally is close to 28.86%.

Table 5.

For the metal aluminum's SHFE futures price changing variance, in the first lagged period, the total variance is coming from the futures market thoroughly and decreases slowly during following lagged periods. Finally it is near to 83.15%. LME spot price tends to increase. Finally they are near to 16.62% and 0.23% respectively. For LME futures price's variance, SHFE futures price variance rises slowly and finally is close to 8.64%. London futures price decreases gradually and finally is near to 91.33%. The proportion of spot market is merely 0.03%. For spot market price changing variance, as the lagged period is one, 52.59% is from self. Then it begins to decrease fast and finally it is close to 1.85%. SHFE futures market generates 47.38% effects in the first lagged period. Then the effect increases to 82.63% rapidly. LME futures price finally increases to 15.52%.

#### 4. Conclusion

Because SHFE adopts a physical delivery policy, futures price is evidently close to spot price nearing the settlement day. Numerous trans-market arbitrageurs make SHFE futures price be close to LME futures price. Therefore, prices in the three markets tend to be equal. That is rightly the result of co-integration analysis. SHFE, LME metal futures prices and spot price stay in a long-term equilibrium. Short-term fluctuation will be consumed by the three markets' inner regulation mechanism. It indicates that China's futures market has a self-restrained price mechanism. But the three markets response differently toward exterior information.

According to the result of VECM causality test, for the metal copper, there is a mutual directive effect between SHFE futures price and spot price, and LME futures price exerts a unilateral directive effect on spot price. There is a bilateral directive relationship between LME futures price and SHFE futures price. Shanghai copper futures price possesses a long-term internality effect, in contrast with London copper futures price. For the metal aluminum, spot price does not exert a directive effect on futures price. There is a unilateral directive effect. LME futures price has a unilateral effect on spot price and SHFE futures price. Shanghai aluminum futures price has an externality, in contrast with London aluminum futures price.

According to VECM impulse response function, LME futures price, SHFE futures price, and spot price response strongly toward self new information. Shanghai copper futures price information and London copper futures price information can generate similar sustainable effect on each other. London copper futures price information has a greater effect on spot price, slightly higher than the effect of Shanghai copper futures price information on spot price, what reflects London copper and Shanghai copper's market dominant effect. London aluminum futures price information has a relatively higher effect on Shanghai aluminum price. The effect of Shanghai aluminum futures price standard variance information on spot price is higher than the effect of London aluminum futures price on spot price, showing the dominant effect of London aluminum futures market on Shanghai aluminum market. In China, Shanghai aluminum has a dominant effect on spot market.

According to variance decomposition, in the aspect of SHFE and LME copper futures markets' price discovery function, the two markets possess similar dominant positions. In the aspect of spot market's price discovery function, SHFE futures market holds the dominant position. For the metal aluminum's price discovery function, futures prices exert decisive effect on each other. But London aluminum futures price has a stronger effect on Shanghai aluminum futures price. In the aspect of aluminum spot market's price discovery function, SHFE futures market stays in a dominant position.

In a word, SHFE metal futures market is effective in the field of resource allocation. It has better price discovery function and risk-transform function. Copper has already held a position in world metal pricing system. Since China consumes and imports amounts of copper from other countries, it is an inevitable trend for China's copper futures market affecting international copper price more and more. Speculators who participate in copper futures market and arbitrators must notice both London futures market and China's copper futures market in order to escape from risks. Participators in copper spot market should notice the price changes in Shanghai copper futures market. In contrast, aluminum futures' market has a weak ability in international pricing system, what indicates that China's aluminum futures market needs for further perfection. At present, participators in Shanghai aluminum futures market should

notice London futures market closely in order to escape from risks caused by price changes. However, participators in aluminum spot market should notice Shanghai aluminum futures market all the time.

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Table 1. Johansen-Juselius co-integration test result

Type	Zero assumption	Eigen-value	Maximum SR	5% critical value	Trace statistics	5% critical value
Copper	r = 0	0.060	68.64	21.13	80.29	29.80
	r = 1	0.009	10.08	14.26	11.64	15.49
Aluminum	r = 0	0.022	24.24	21.13	34.34	29.80
	r = 1	0.009	10.03	14.26	10.1	15.49

Table 2. The estimation result of co-integration vector and regulation coefficient

Copper	Co-integration vector ( $\beta$ )	Regulation coefficient ( $\alpha$ )	Aluminum	Co-integration vector ( $\beta$ )	Regulation coefficient ( $\alpha$ )
$LNF_t$	1.000	-0.168(-5.22)	$LNF_t$	1.000	-0.007(0.32)
$LNLF_t$	-0.259(-9.50)	0.092(2.03)	$LNLF_t$	-0.011(-0.33)	0.003(0.08)
$LNS_t$	-0.723(-25.37)	0.014(0.47)	$LNS_t$	-0.979(-18.81)	0.074(-3.79)

Notice: ( ) means test value  $t$ .

Table 3. The result of VECM-based Granger causality relationship test

Copper	$\Delta LNF_t$	$\Delta LNFL_t$	$\Delta LNS_t$	Aluminum	$\Delta LNF_t$	$\Delta LNFL_t$	$\Delta LNS_t$
$\Delta LNF_t$	-	13.84	22.02	$\Delta LNF_t$	-	6.44	81.85
$\Delta LNFL_t$	422.85	-	676.64	$\Delta LNFL_t$	317.82	-	319.97
$\Delta LNS_t$	9.92	4.87	-	$\Delta LNS_t$	8.84	4.15	-

Notice: the number is  $\chi^2$  (Wald) statistics value (free degree 4), the critical value of  $\chi^2_{0.05}$  is 9.448.

Table 4. Copper predicted variance decomposition result.

Variance	$LNF_t$ is from			$LNFL_t$ is from			$LNS_t$ is from		
	$LNF_t$	$LNFL_t$	$LNS_t$	$LNF_t$	$LNFL_t$	$LNS_t$	$LNF_t$	$LNFL_t$	$LNS_t$
0									
1	100.00	0.000	0.000	12.374	87.626	0.000	45.904	0.451	53.645
2	80.422	19.236	0.342	16.554	83.359	0.087	47.571	24.053	28.376
3	75.190	24.373	0.437	19.275	80.649	0.076	52.096	26.461	21.443
4	74.120	25.277	0.603	20.432	79.487	0.081	53.666	26.617	19.717
5	72.413	26.789	0.798	21.464	78.425	0.111	54.166	27.526	18.308
:	:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:	:
N	55.739	39.284	4.977	30.106	69.022	0.872	58.503	28.860	12.637

Table 5. Aluminum predicted variance decomposition result.

Variance	$LNF_t$ is from			$LNFL_t$ is from			$LNS_t$ is from		
	$LNF_t$	$LNFL_t$	$LNS_t$	$LNF_t$	$LNFL_t$	$LNS_t$	$LNF_t$	$LNFL_t$	$LNS_t$
0									
1	100.00	0.000	0.000	5.255	94.745	0.000	47.378	0.032	52.590
2	88.870	10.990	0.140	6.586	93.409	0.005	62.147	7.868	29.985
3	86.207	13.637	0.156	6.869	93.061	0.070	67.145	9.283	23.572
4	85.509	14.313	0.178	7.294	92.627	0.078	68.623	10.463	20.914
5	85.033	14.791	0.176	7.558	92.364	0.078	69.909	11.078	19.013
:	:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:	:
N	83.150	16.617	0.233	8.637	91.331	0.032	82.633	15.514	1.853

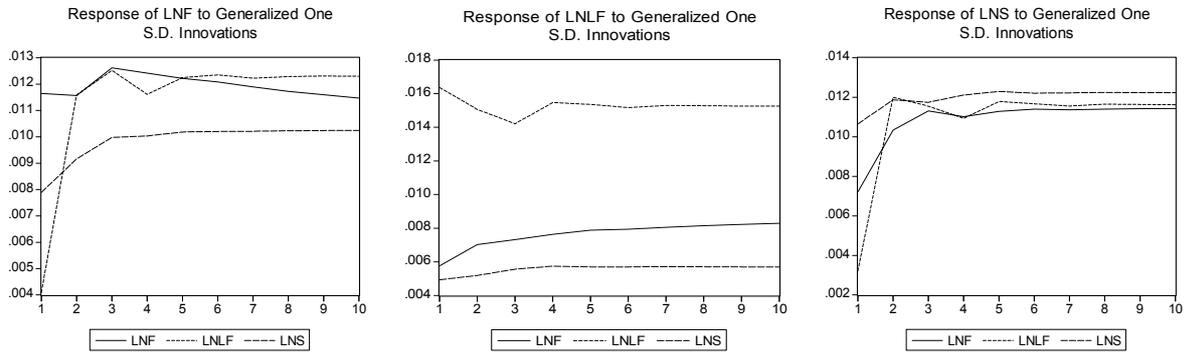


Figure 1. The Impulse Response Figure for Shanghai and London Copper Futures Prices and Spot Price.

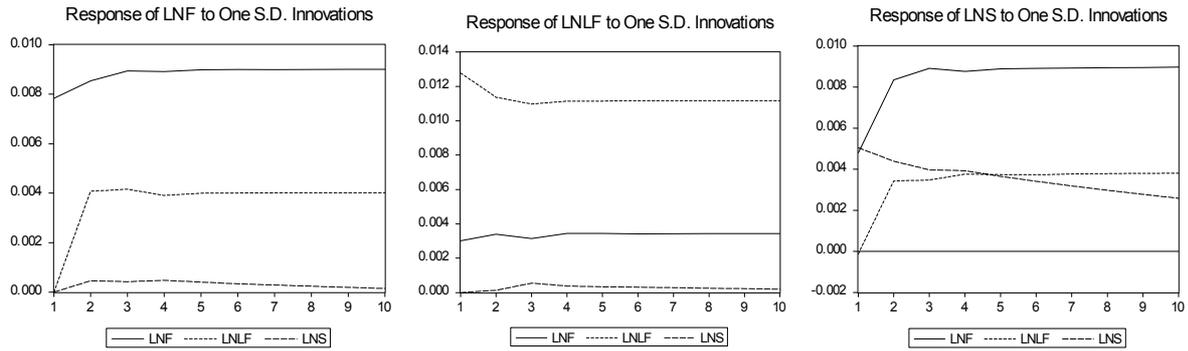


Figure 2. The Impulse Response Figure for Shanghai and London's Aluminum Futures Prices and Spot Price.

# Migration Issues in Modularity for 1<sup>st</sup> Tier Automotive Suppliers

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## Abstract

This research attempts to explore the challenges and issues which local automotive component suppliers face as they make the transition to cockpit module suppliers. The paper firstly provides a description of modularity and then discusses the changing supplier roles and relationships in modular outsourcing. An exploratory case study approach involving two suppliers and one OEM is then used to investigate these themes and provide some insights into the motivations and implications for local component suppliers becoming cockpit module suppliers. The paper argues that there are a number of key issues facing suppliers and OEMs in their quest for modular production and supply. These relate to local expertise, supplier management, financial risk, and on-site/off-site (proximity) operations. This study sheds light on important emerging trends within automotive 1st tier/OEM relationships, in particular issues relating to changing supplier roles.

**Keywords:** Modularity, Suppliers, Automotive, Migration

## 1. Introduction

An intriguing and emerging trend in Supply Chain Management in the automotive industry is the relationship between the Original Equipment Manufacturer (OEM) and its first-tier suppliers with respect to the design, development and delivery of complex engineered products in a modular form (Fixson et al. 2004). Whilst module production and modularity are not new concepts (Starr, 1965), it appears that more and more automotive manufacturers are now realising that modular strategies for production can offer potential long-term benefits to OEMs, suppliers and customers (Kochan 2003, Innovations report 2005, Siemens 2005).

Modularity as a concept has its roots in product design (Galsworth, 1994) and in recent years a number of modularity themes have emerged. The theme of Modularity in Product Design and Product Architecture has been explored by a number of authors. Fixson and Sako (2001) discuss modularity in product architecture in relation to a comparison of the automotive and computer industries, they concluded that the consolidation in the auto industry between OEMs and suppliers may lead to an industry-wide standard for global product architectural rules.

The aim of this paper is to explore an interesting facet of outsourced modular supply; the challenges and issues which local automotive component suppliers face as they make the transition to cockpit module suppliers. To facilitate understanding of the key concepts associated with modularity in the automotive industry the remainder of the introduction is divided into three thematic areas: ‘modularity within the automotive sector’, ‘the operational benefits for the OEM’ and ‘changing supplier roles and relationships’.

## 2. Modularity within the Automotive Sector

In recent years the concept of modularity has been extensively applied within the automotive sector. However, it has been suggested that ambiguity exists in relation to what modularity constitutes in the automotive sector and therefore the term has been used to cover a variety of practices (Camuffo, 2000). The analytical framework suggested by Takeishi and Fujimoto, covering modularity in the automotive industry, is useful in helping to clarify the different, and therefore distinguishable, facets of modularisation. Firstly, ‘*Modularization in Product*’, focuses upon product architecture and the required interrelationship between product function and structure. Achieving this ‘one to one correspondence between the products subsystems and their functions’ (Takeishi and Fujimoto, 2001, p. 3), allows modules to be designed with a high degree of autonomy and reduces the interdependence with other

modules In essence, this refers to introducing and achieving modularity in product design. Others concur with the issue of interdependence, as they describe modularity in design as something which ‘intentionally creates a high degree of independence or ‘loose coupling’ between component designs’ (Sanchez and Mahoney, 1996, p. 65)

Secondly, ‘*Modularization in Production*’ – describes the manufacturing system structure where, as a result of a modular product design, the product (car) is produced from a series of modules each assembled on a sub-line before transfer to the product assembly line. A non-modular manufacturing system would be as a result of the product structure not containing any ‘structurally cohesive large modules’ (Takeishi and Fujimoto, 2001, p. 3).

Thirdly, ‘*Modularization in Inter-firm Systems*’- describes the situation where ‘large modules are assembled by suppliers on their own assembly lines and are delivered and assembled into finished products on the main line of the automaker’ (Takeishi and Fujimoto, 2001, p. 4). This facet of modularity is essentially the outsourcing of the assembly of the module to the supply base. Graziadio and Zilbovicius (2003) accord with the previously outlined distinctions as they have separated modular strategy in the automotive industry into ‘modularity’ (changes to product and production systems) and ‘outsourcing’ (transference of activities, responsibilities and costs) to suppliers.

Therefore a clearer distinction of what constitutes modularity in the automotive sector has emerged which can be summarised as changes to product architecture to create modular based designs which in turn enables modular based production systems to function. These changes could be executed within an OEM without the need for a change in the role of suppliers; they would remain as component suppliers. However, it would appear that the most radical and challenging aspect of the adoption of modularity in the automotive sector is that of outsourcing module design and assembly into the supply base.

The aim of this research as outlined earlier is to explore the challenges and issues which component suppliers face as they make the transition from component manufacturers to cockpit module suppliers. Therefore it is useful to briefly outline what the cockpit module is and why it is an appropriate module to investigate this transition. The cockpit module concept is based on the principle that a complete unit is built that comprises the vehicle instrument panels, air-conditioning, steering column, audio system and other components that is then delivered to the OEMs final assembly line as one single module. A typical arrangement for a cockpit module configuration is shown in Figure 1. The cockpit module is a very complex module which requires knowledge and capabilities across a number of technologies and disciplines and is therefore suitable to analyse the issues and challenges faced by local component suppliers as they make the transition to module suppliers.

### 3. Operational Benefits for the OEM

Modular product design allows significant operational benefits for the OEM largely as a result of the reduction in product complexity at the final assembly stage, i.e. a reduction in the number of components to be assembled. The assembly of the module, constructed as a module, off the main assembly line reduces final assembly complexity (Sako and Murray, 1999). It is generally the considered opinion that the greatest benefits forthcoming from modularity within the automotive industry are achieved when the design and manufacture of the module is transferred to a module supplier (outsourcing). The resulting benefits for the OEM achieved through this transfer are considered to be:

- (1) A reduction in the cost of assembly resulting from lower supplier wages. Welch (2001) has outlined this position in the US, where the wage gap between OEM and unionised supplier employees was approaching \$7/hr. However, Sako (2003) has suggested that this gap will be eroded over time or be offset by a reduction in supplier productivity.
- (2) The *transfer of development costs*, e.g. design and engineering, as some activities are undertaken by the module supplier. In addition to the cost advantage some OEMs need to make these strategic partnerships as they need to gain access to their supplier’s R&D and other capabilities (Morris et al, 2004).
- (3) The *reduction in supply chain management costs* (Velooso and Kumar, 2002) as the supplier now undertakes the management and coordination of the module supply chain. A clear example of this type of supply chain task reduction is that associated with the SMART car produced by Mercedes- Benz and Swatch. This collaboration manages 25 module suppliers instead of the 200-300 associated with non-modular manufacture (Doran, 2005).
- (4) The reduction in plant and equipment costs as the products are manufactured by the supplier. However, this logically assumes an increase in the supplier’s costs and therefore no overall reduction. McAlinden et al (1999) have suggested that the justification, or perhaps more aptly, the sector’s rhetoric, supporting this approach is that supplier investment may be less as a result of better line design and the fact the line may be used to produce modules for more than one customer.

Therefore, it would appear that significant OEM cost savings, combined with an associated reduction in investment risk, are driving modular outsourcing in the automotive sector.

#### 4. Changing Supplier Role and Relationships

The position of the module supplier has been termed 'tier 0.5' (Harrison & Van Hoek, 2002) and logically sits between the OEM and the traditional first tier supplier level. This labelling is largely due to the enhanced product development and manufacturing role they have to undertake in addition to an expanded supply chain management role. The desire to be recognised as a 0.5 tier supplier would appear to be immense, and as the modular strategy, including outsourcing, becomes embedded within more OEM production systems this pressure will increase (Baldwin and Clark, 1997). The transition to 0.5 supplier status brings with it a number of fundamental changes which the supplier has to address.

Firstly, *new capabilities* will have to be developed as they expand the scope and boundary of the role. This largely can be broken down into technical, production and administrative capabilities (Graziadio and Zilbovicius, 2003).

Secondly, *the 0.5 tier role* presents an enhanced level of supplier management duties and responsibilities for the module supplier due to the increase in the number of component suppliers which now come under their control. The importance of this role can not be underestimated nor is the OEMs reliance on the supplier's ability to manage the module supply chain (Frigant and Lung, 2002).

Thirdly, *the location or proximity* of the supplier to the OEM's final assembly facility. As the role of 0.5 supplier is adopted, the relative location of the supplier to the OEM becomes an important factor. As would be expected in a diverse automotive sector there are a variety of different proximity models which have been adopted, influenced by factors such as: manufacturing system design, the specific supplier role, delivery lead-times and transport constraints associated with large and bulky modules. Perhaps the ultimate in supplier proximity is the VW plant in Resende, Brazil where seven module suppliers are located on the VW site, where they manufacture their respective modules and also assemble them into the vehicle for the OEM (Collins et al, 1997). In this example the location of suppliers on-site at the OEM is essential to the operation of the final assembly line. Another example of close supplier proximity is in the SMART car plant in France, where on-site suppliers supply modules directly to the SMART final assembly line and are fully integrated into its operation. However, not all module suppliers are located on the OEMs site, but exist as separate, autonomous suppliers off-site. The Delphi facility is located ten minutes away from the Mercedes plant into which they supply cockpit modules. These examples indicate that module production and assembly can equally take place on or off the OEM's site, the localised context in particular relating to the scope of the suppliers role would appear to be a heavy influence.

Fourthly, *relationship changes* – To understand this change it is first best to consider the traditional relationship of a component supplier with the OEM. The OEM may adopt a policy of dual sourcing for some of its key components. This policy was not apparently to drive down price through competition, but as a means to ensure product quality and delivery reliability (Womack et al, 1990). Therefore dual sourcing could be seen as a policy to minimise the risks to production, but which also limits supplier power. However, it would appear that due to the investment and development costs associated with modular supply, OEMs have largely adopted one supplier per module. This is supported by the OEM in our research and by the allocation of modules to single suppliers in the SMART project. This single sourced relationship has led to increased interdependency between the supplier and the OEM, resulting from the 'single market – single source' scenario (Frigant and Lung, 2002). This situation has led some to speculate that an increase in supplier involvement, which modular supply represents, has the potential to increase the economic power of the suppliers (Van Hoek and Weken, 1998).

Millington et al (1998) when discussing automotive Local Assembly Units (LAU's) have agreed that the level of dependency does increase between the OEM and the supplier, but has outlined the mediating effects of the considerable costs of termination to both sides. Therefore, the relationship would appear to change as much higher levels of mutual dependency exist between the OEM and the module supplier. However, how power is positioned in the relationship would appear to be difficult to assess as both sides have a lot to lose from the relationship disintegrating.

In conclusion, this section has highlighted that modularity has become established as a concept within the automotive sector and major operational benefits for the OEM are forthcoming, particularly as a result of outsourcing module design and assembly to the supply chain. This transference suggests a changing role for suppliers where additional capabilities and supply chain management tasks are evident, in addition to changes in the proximity to, and the relationship with, the OEM. It is largely the effects of these factors and their resulting implications which this paper is going to analyse within the context of the transition of local component suppliers to 0.5 tier suppliers. It can be inferred that at a 'global' level some organisations may possess the required modular

design and assembly knowledge, but it will be at the 'local' level where key challenges will be faced by component suppliers as they develop their operations to become cockpit module suppliers to specific OEMs. The aim of this research is therefore to examine the issues and subsequent implications that are forthcoming from this local transition and which do not appear to have been examined in sufficient detail elsewhere.

## 5. Methodology

The research is based on the principles of exploratory research as defined by Voss et al (2002), which was developed from the earlier work of Handfield and Melnyk (1998). In this instance, an exploratory study was the preferred approach as it allowed the problem to be better comprehended as few studies have been conducted in this area (Sekaran, 2003).

In order to facilitate this approach, it was decided to interview senior managers from within organisations which had made this transition. It is estimated that there are approximately 7 cockpit module suppliers operational within the UK. These organisations were approached and 2 agreed to engage with the research. These organisations were acceptable to the objectives of the study as they were both automotive component manufacturers, with no previous local experience of producing cockpit modules and who had recently started supplying cockpit modules to an OEM (the OEM was the same in both cases). These organisations were:

- (1) MS1 -A cockpit module supplier to the OEM, which had evolved from a local manufacturing unit supplying Internal Plastic (IP) mouldings to the OEM.
- (2) MS2 -A cockpit module supplier to the OEM, which had evolved from a local manufacturing unit supplying HVAC units to the OEM.

Whilst, the focus of this research is concerned with the transition of local component suppliers to module suppliers, it is appropriate to consider the OEM context into which both respondent organisations supply modules. Therefore, the OEM, to whom both organisations supply modules, was approached and an interview and guided observation was arranged with the Director of Engineering. This data was not analysed in conjunction with the data collected from the suppliers, but was used to provide research context and to produce the OEM cockpit production and supply grid in the next section.

Whilst, this number of organisations may be relatively small, it is similar to Doran's (2005) work which looked at a modular supply chain and analysed 3 organisations within it. A process of 'purposive sampling' (Silverman, 2000), was utilised to select individuals from within each organisation on the basis that they were of interest to the study as a result of the position they held (Executive Directors and Functional Managers who had direct responsibility for cockpit modular strategies in each organisation). In total 7 interviews were conducted with staff across the three organisations.

Data was collected via semi-structured interviews utilising a question schedule which was largely informed by the literature and covered the following key areas: '*motivations for modular development*', '*the specific modular role*', '*operational changes and challenges*', and '*proximity related issues*'. The questions schedules were issued to the respondents prior to the interview occurring. The interviews were recorded to allow later transcription and each lasted approximately 90 minutes. The transcribed data was coded and analysed to identify key concepts (Easterby-Smith et al, 2003) which outlined the issues these organisations were facing as they made the transition to module supplier. In addition to the interview data the researchers undertook guided observations of the production lines in each company to aid data verification and to highlight any additional issues for discussion.

## 6. Findings

### 6.1 Production Systems, Supplier Roles and Supplier Location

Prior to the discussion of the findings relating to supplier issues and implication it is useful to situate the various cockpit manufacture and supply positions which exist within the OEM. The analytical framework suggested by Takeishi and Fujimoto (2001) has been developed to form the grid (Figure 2), which allows the various cockpit manufacturing and supply positions within this particular OEM to be understood. The arrow indicates the cockpit assembly progression path.

The OEM is currently utilising three separate cockpit assembly scenarios:

*A – on older models the cockpit does not exist as a module, the cockpit is assembled progressively within the vehicle on the OEM's final assembly line from components supplied by a large number of component suppliers.*

*B – on newer models the cockpit exists as a 'module' due to the modular concept being incorporated into the design phase and this is assembled off-site by MS1 and delivered (on a synchronous basis ) to the OEM for fitting into the vehicle.*

*C* – on the latest model the cockpit exists as a ‘module’ due to the modular concept being incorporated into the design phase and this is assembled on-site by MS2 and transported 5 metres to the OEM’s final assembly line for fitting into the vehicle.

The grid not only clarifies the various cockpit assembly and supply scenarios, but the distinction between cells 3 and 4 is worthy of further discussion with respect to the two case-study cockpit module suppliers. MS1 was awarded the cockpit module for a new model in 2002, where they had to build this outside (off-site) of the OEM plant and supply the completed modules on a synchronous basis. This arrangement required that MS1 invest in a new building closer to the OEM plant, purely for cockpit production and a fleet of vehicles to facilitate synchronous deliveries. The OEM’s response when questioned on this issue, stressed the decision taken to go off-site was largely dictated by lack of internal space restrictions at that time and agreed that the cost of logistics for this type of operation “is huge”. The OEM had apparently learned from the experience and the next cockpit module (awarded to MS2 in 2004) is built by MS2 employees on site at the OEM and fed directly into the assembly line, the change largely due to the cost implications of offsite assembly.

This issue raises obvious questions about the optimal location/configuration for the assembly of the cockpit module by suppliers. The literature largely outlines examples of off-site assembly, Camuffo (2001), Welsh (2001). However a key example of on-site assembly has been outlined by Collins et al (1997) who described two versions of the on-site approach; *integrated*, categorised by integrated on-site ‘hole in the wall’ relationships’ where the supplier assembles the modules on sub-lines and the fitting is left to the OEM on the main line (e.g. Skoda Octavia Plant) and *modular consortia* where the supplier assembles the module and fits it directly to the vehicle on the OEM’s main line (e.g. VW Resende Plant).

The optimal solution from an operations viewpoint must be to move to least an integrated approach as outlined above. This reduces the costs associated with suppliers assembling modules largely as a result of the negation of infrastructure and transport costs.

However, as some commentators have outlined this approach and more controversial solutions such as the module consortia model may fall foul of local unions (Welch, 2001) (Collins et al, 1997) and this may be inhibiting the widespread development of this practice. Later in the paper, we will review the experiences of both module suppliers with respect to their particular mode of operation.

### *6.2 Motivations for Local Component Suppliers Becoming Cockpit Module Suppliers*

The key motivations for the case study organisations to become module suppliers were considered two fold. Firstly, *business development*, resulting from repositioning themselves as cockpit module suppliers within the European automotive industry. Both case study companies had a parent organisation who was a global supplier of cockpits and other modules (front-end modules etc) to the automotive industry and whose intention it was to develop their modular capabilities within Europe. Business repositioning through developing modular supplier status has been recognised as a key motivation for development within the component supplier sector (Baldwin & Clark, 1997). In particular, MS2, as a result of proving their cockpit module supply capabilities in the UK, have been made the OEMs ‘preferred’ supplier for cockpit modules worldwide. This in turn will allow the company to develop its modular design and production capabilities further as a result of this longer term commitment from the OEM.

Secondly, *business growth*, forthcoming from the increase in revenue as a result of becoming a module supplier, thereby, being able to produce a new product with a much higher value than their existing products. MS1 are a good example of this effect, where prior to becoming a cockpit module supplier their turnover was £60 million/year from the production of Instrument Panels (IP) and other moulded plastic components. This increased to £160 million/year as a consequence of becoming a cockpit module supplier, where the average price per module was £800, compared with £95 for their IP products. However, the profit margins made on these revenue increases has been questioned by Sako & Wharburton (1999) who believe profitability will lag as a result of ‘margin dilution’ on bought in parts. This did not appear as an issue raised by the module suppliers in our research, but this is to be expected as all the organisations involved were sensitive to discussing cost data.

### *6.3 Issues and Implications for Local Component Suppliers Becoming Cockpit Module Suppliers*

The issues resulting from this transition are discussed under the following thematic headings: *Developing Local Expertise, Supplier Management, Investment & Risk and Proximity*.

#### *6.3.1 Developing ‘Local’ Expertise*

When an organisation has inspirations to become a cockpit supplier it has to develop and embed a range of new knowledge and skills at a ‘local’ level to achieve this capability. The scope of the new knowledge which the module

supplier is expected to develop is obviously affected by the type of module supplier role the OEM requires them to adopt. The OEM in this research had adopted the position of 'modulariser' (Sako & Murray, 1999) with respect to the cockpit for their new models, where production, design and technical expertise is expected to be provided by the suppliers, although the OEM was still involved in key design and supplier decisions, i.e. the 'imposing' of suppliers for critical or valuable components – as discussed in the next section.

The module suppliers had both relied upon their parent organisations expertise for the design of the cockpit module and negotiations on such issues with the OEM. As a result of this situation the major challenge for both organisations was not to develop design expertise but to develop 'local' knowledge in product engineering, from a systems, technology and assembly viewpoint. However and equally as important, supporting operations knowledge and capabilities (quality, project management, and logistics) had to be developed in parallel as in affect the operational responsibility is transferred from the OEM to the module supplier.

In this case, both suppliers were cockpit component suppliers prior to becoming module suppliers and both outlined the problems in developing the required capabilities at the rate expected by the OEM. The capabilities of some first tier organisations to effectively adopt the role of module developer and supplier has been questioned by some OEMs and this concern is seen in some locations (Japan) to be one of the factors restricting the outsourcing of module development and supply (Camuffo, 2000).

### 6.3.2 Supplier Management

The 0.5 tier role presents an enhanced level of supplier management duties and responsibilities for the module supplier due to the increase in the number of module components which now come under their control and for which suppliers have to be managed. However, the most significant and problematic aspects of the new supply relationships would appear to be as a consequence of the OEM having an 'imposed' parts policy. Imposed parts is a term to describe the situation where the OEM dictates which supplier (normally first tier) will supply the cockpit module supplier with particular parts. Graziadio & Zilbovicus (2003) have outlined a similar situation in their work, but have not discussed the implications of this practice. In our research, the imposed parts were largely high value or system critical items such as HVAC, radio, and electrical harnesses. The module suppliers believed this policy was largely as a result of the ability of the OEM to get a better price for these items due to their global bargaining power.

To illustrate this situation, MS1 had 23 of its 39 component suppliers imposed by the OEM. This situation was considered in some cases to lead to issues of 'recognition', whereby some suppliers would not initially recognise the authority or customer status of the module supplier. An ongoing consequence in both organisations of this arrangement was having to build relationships with 'imposed' suppliers who were direct competitors in some other aspects of their business. This situation caused tensions in the relationship and as a result design and other confidential information was difficult to obtain.

A final observation relating to the impact of modular operations upon the supply chain and its management is worthy of discussion. Doran has stated that a symptom of the modular approach is the '*transfer of a high percentage of value-added activity to first-tier suppliers from the OEM and the subsequent cascading of value-creation activity between each of the key value adding elements of a modular supply chain*' (Doran, 2004, p. 103). In this research, this concept has only partially been realised, in that the assembly of the cockpit has been transferred from the OEM to the module supplier. However, the secondary cascading to the lower tiers of the supply chain that Doran predicted has not occurred. It is suggested that this is as a result of:

(1) The module supplier organisations within this study, whilst having management and operational links to their company's local manufacturing facilities, i.e. the IP facility in the case of MS1 and the HVAC facility in the case of MS2, were largely autonomous module assembly units. This ensured that the focus and scope of their operations were on cockpit assembly and therefore the focus on the core modular activities existed within the unit from its conception. This situation where 'autonomous' business organisations are being created from within local component suppliers to supply module to OEMs ultimately limits the amount of cascading through the modular supply chain.

(2) The existing key 1<sup>st</sup> and 2<sup>nd</sup> tier suppliers' function in the supply chain largely remained unchanged, as a result of the imposed parts policy of the OEM, as they continued to supply the same components, albeit to a different customer.

### 6.3.3 Investment & Risk

The localised migration from cockpit module component supplier to cockpit module supplier is one that appears to be limited to large global organisations with the financial resources and the relevant expertise. In essence the

principal costs are effectively transferred to the module supplier. The costs associated with the migration to becoming a cockpit module supplier were considered large and included elements such as tooling, development costs (infrastructure, systems, technology, and people) and in the situation of MS1 a new factory to house the assembly of the module. MS2 outlined how the development costs were not shared with the OEM and had to be “amortised” into the price of the product and additionally that tooling was only paid for by the OEM once production started.

The issue concerning the amortisation of the development costs into the price of the module perhaps demonstrates the complex financial arrangements associated with modular development and supply. The cost of each module may be higher as a result of the higher capital borrowing costs of the module supplier (Sako, 2003), than it would have been if the OEM had kept it in-house. However, the OEM has benefited in the short term by not having to finance the development costs of the module.

In addition to the level of investment associated with the migration to module supplier status, Executives in both companies were concerned about the risk forthcoming from a potential change in the OEM’s modular strategy and the switching of cockpit business to another supplier. However, the fear of supplier switching, at least on existing models, would at present appear to be unfounded due to the investment and development costs associated with implementing modular supply and as a result OEMs have largely adopted one supplier per module. This is supported by the decisions of the OEM in this research and by the allocation of modules to single suppliers in other projects, i.e. the SMART project.

#### 6.3.4 Proximity (On-site/Off-site Operation)

The two cockpit module supplier organisations, whilst both producing cockpit modules, for different models, did so in different locations; MS1, off-site in a purpose built plant and MS2, on-site at the OEM on a sub assembly line adjacent to the final assembly line. The key differences between off-site and on-site modular operations will now be outlined and discussed.

*Reaction Time* – MS2 as a result of the limited storage capability between themselves and the OEM’s final assembly line have less time to react to quality problems than the equivalent off-site operation. MS2 has only 4 minutes between the module leaving their line on an AGV until it is fitted into the vehicle, which left them with limited time to fix any process defects. MS1 has, as a result of being off-site, approximately a twenty minute window to react to quality issues.

*Environment* – On-site operation is considered by MS2 management to be a very different environment when compared with working in their own facility. A number of operators transferred from the local HVAC facility to the module unit within the OEM, but did not like the ‘high pressure’ environment and asked to be transferred back. This has led to product quality problems as temporary agency staff, which account for 45% of the direct operators on-site, have had to be brought in at short notice. An additional impact of on-site operation was that management believed the responsibilities of staff was greater than the comparable roles in the local MS2 HVAC facility and as a result managers were working a ‘level above’ their normal position.

*Autonomy* – Operating on-site was considered to bring with it a reduction in autonomy, due to the obvious increase in accessibility and opportunities for OEM monitoring. MS2 management believed that as they are on-site they are required to look at, and resolve, every issue, where if they were off-site they believed the OEM’s staff would rectify the problem themselves and not inform the off-site operation. In addition, they felt that any problems they were encountering became widely known very quickly to the OEM. MS1 had experienced a higher level of autonomy than their on-site counterparts, in that they were able to control their own destiny, in terms of being able to set up and use their own systems and were largely able to be autonomous in their operations.

The four key issues outlined above relating to the migration to cockpit module supply status have been grouped together within a ‘Migration Matrix’ (Table 1) which thematically compares the key issues forthcoming from this transition. This resource will be useful from both a research and managerial perspective. Researchers will find it a useful resource to aid their investigations into similar organisations that have made the transition from component to module supplier. This would help ascertain if the issues and implications forthcoming from this study are representative of the experiences of other cockpit module suppliers who supply to different OEMs. In addition, managers of organisations wishing to progress up the automotive supply chains will find the issues and implications useful for reflection when undertaking decision making.

## 7. Conclusion

This paper has explored the challenges and issues which local component suppliers face as they make the transition from automotive component manufacturers to cockpit module suppliers. A number of findings have emerged and

these were discussed under four thematic groupings. A number of these have increased and progressed our knowledge of the issues associated with operating as a cockpit module supplier, which have either not been outlined in previous work or covered in such depth.

The notion of developing '*local expertise*' is seen to be crucial as a wide range of skills and expertise are required and this needs to be developed and embedded at the local level to ensure long term success as a competent and capable module supplier. *Supply chain management* is important with respect to communications and trust. Developing and nurturing the relationship is crucial and existing OEM practices and policies may be restrictive for a module supplier. The reconfiguration of the cockpit module supply chain, where first tier supplies are elevated to 0.5 tier status has presented a clear problem for supply chain management and relations. In particular the 'imposed parts' policy can lead to competitive tensions developing in the supply chain. This policy has made the management of the modular supply chain more difficult for the module supplier and ultimately begs the question, were the module suppliers in this research actually allowed to operate as 0.5 tier suppliers? This aspect is an interesting one as the imposed parts policy potentially limits the power of the module supplier, perhaps at a time when it could be argued their power was growing as a result of developing their knowledge and capabilities in this area. Whilst, the issue of an OEM selecting module component suppliers has been previously outlined by Graziadio & Zilbovicus (2003), the implications of this practice have not been previously identified and discussed.

A significant issue that emerged from this research is that of the *financial risk* associated with a supplier making the transition from component supplier to module supplier. Costs associated with the migration such as tooling and capability developments were seen to be very large and as a result migration was considered a high risk strategy. The research has exposed the nervousness of both module suppliers with respect to the investment levels expected and the possible transient nature of OEM's modular strategies. It is further suggested that the combined effects of capability development requirements, high investment levels coupled with supplier nervousness regarding OEMs long term modular intentions will act as a market entry barrier for smaller organisations wishing to become cockpit module suppliers. In addition, this research also concurs with earlier work by Sako and Warburton (1999) which outlined that the majority of cockpit module business was awarded to organisations that possess plastic moulding capabilities, i.e. (MS1) or have access to it through company parentage (MS2).

The findings relating to supplier *proximity*, i.e. on-site/off-site operations centred around three aspects; *reaction time* which is significantly shorter for on-site operations, thereby potentially causing problems for defect correction; the physical *environment* that on-site represents which is perceived as being a much more stressful environment. In addition, as a result of the claustrophobic nature of on-site operations, the level of organisational *autonomy* is considered to be much lower than in the counterpart off-site operation.

However, on-site operations do present a clear benefit over off-site assembly from the OEM's perspective. This research has highlighted the policy u-turn of the OEM in this regards where all new model cockpit modules will be assembled on-site at the OEM by the module supplier's employees (MS2 were the first organisation to do this). The OEM's Engineering Director when interviewed on the issue of proximity, although not covered in this paper, suggested that the cost of logistics for off-site operation "is huge". This issue is interesting as it highlights the financial benefits to the OEM of on-site cockpit modular assembly; whilst at the same time has indicated the disadvantages and problems for the on-site supplier relative to their off-site counterpart.

As product and operational responsibility is fully, or partially, transferred to the 0.5 tier organisations, there is also the prospect that OEM knowledge and capabilities, in the form of their existing employees, will migrate to these organisations. This is likely as the demand for their individual capabilities will be reduced within the OEM. Early signs of this occurring were evident in one of the organisations who had recruited two purchasing experts in cockpit modules from the OEM to help manage the expanded logistical function.

A migration matrix and a cockpit production and supply grid have been developed from the research findings, where the former identifies the key issues associated with the suppliers' transition from non-modular to modular supply and the latter which helps to identify and map the shift within an OEM from non-modular to modular production. It is argued the migration matrix captures many of the key issues and challenges faced by automotive suppliers in their quest for modular supply status.

The limitation of this research, which is normally evident in other exploratory studies, is the small number of organisations involved. In addition, the fact both organisations supplied modules to the same OEM does not allow the findings to be validated or compared against another OEM context. However, the single OEM context does provide additional support for some of the findings (e.g. the implications of the OEM imposed supplier policy). The results of this work have shown that further research is needed in this area. Therefore, the next logical step is to undertake research which both deepens and broadens our knowledge of modularity in the automotive sector.

Research which deepens our knowledge would focus on a number of key areas which have been identified in this exploratory study, e.g. proximity related supplier operational issues and supply chain tensions.

This would help ascertain if the issues and implications forthcoming from this study are representative of the experiences of other cockpit module suppliers who supply to different OEMs. Future research objectives should also be broadened to cover generic modular strategies and identify the attitudes regarding modularity as a manufacturing concept within the automotive sector and identify the perceptions and viewpoints of OEMs who do, and do not, engage in outsourcing cockpit modules.

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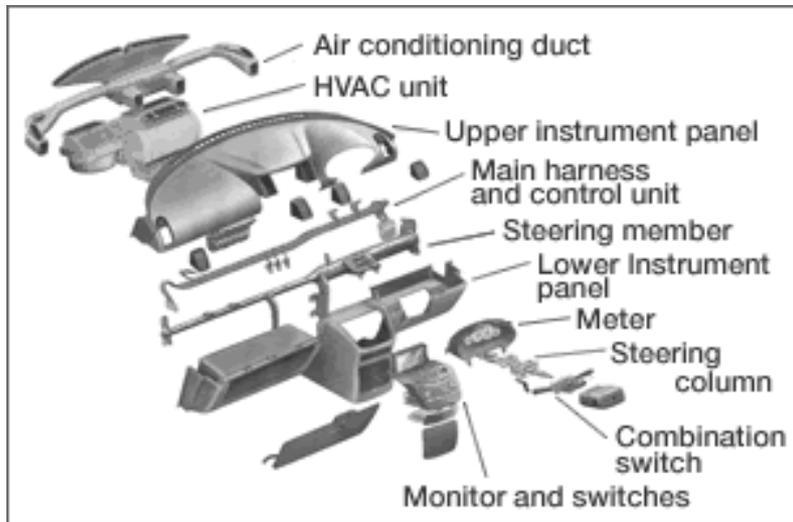


Figure 1. Example of Cockpit Module

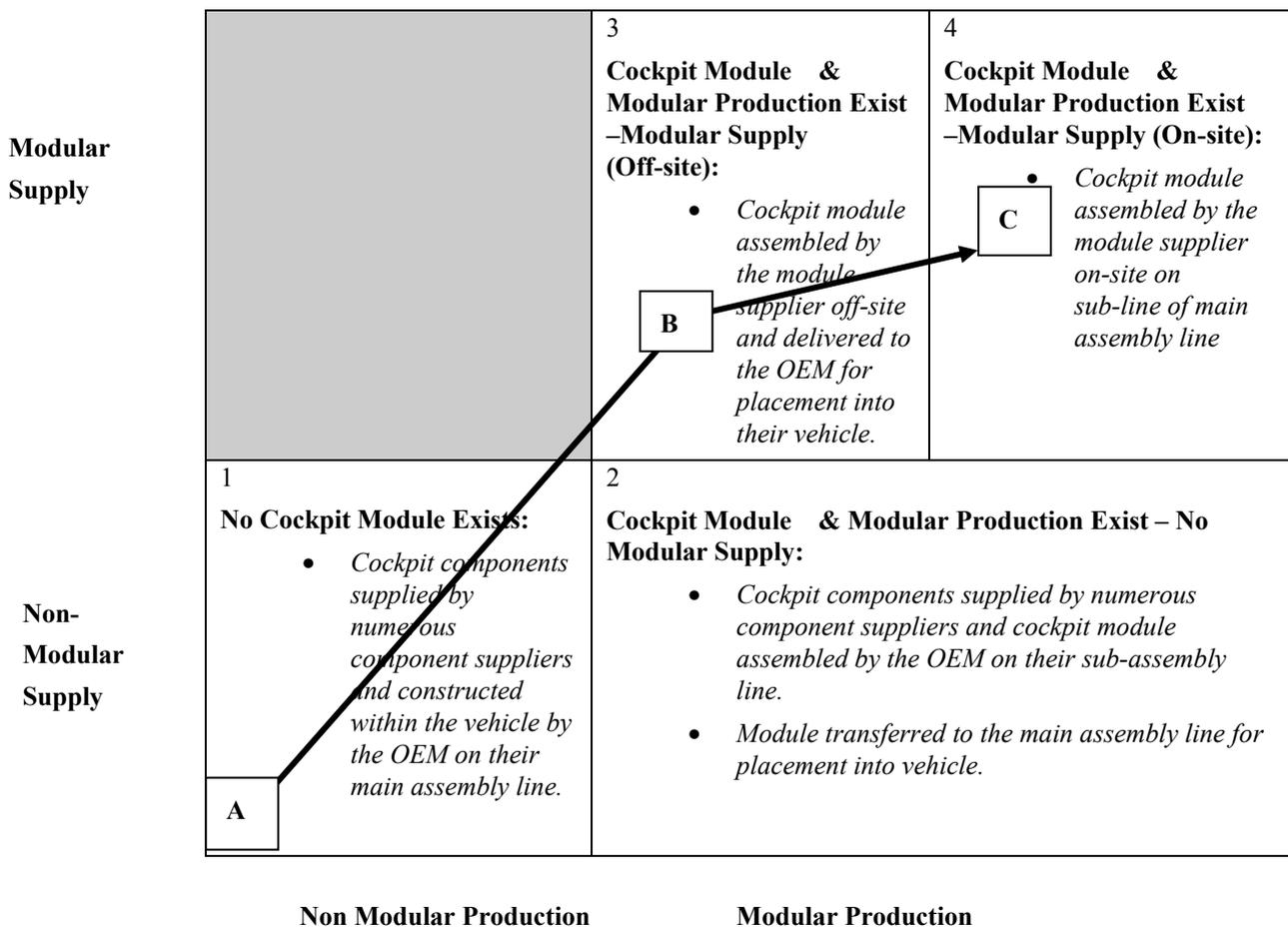


Figure 2. Cockpit Production and Supply Grid

Table 1. Migration Matrix

	<b>Location Constraints</b>	<b>Financial Risk</b>	<b>Capabilities</b>	<b>Supply Chain Management</b>
<b>Cockpit Component Supplier (CCS)</b>	<p><b>Medium</b></p> <p><i>Location can be local, national or International</i></p> <p><i>Constrained by product lead-times and supply status.</i></p>	<p><b>Low</b></p> <p><i>As a result of two key factors:</i></p> <ul style="list-style-type: none"> <li>Existing Supplier of a relatively small number of components.</li> <li>Expertise technology and infrastructure already exist within organisations</li> </ul> <p><i>However, business growth may be constrained to finding g new markets &amp; customers for existing products. May be affected by OEM's choice of module supplier</i></p>	<p><b>Existing and Limited</b></p> <p><i>The organisation will currently possess the limited capabilities to produce the cockpit components they currently supply.</i></p>	<p><b>Moderate</b></p> <p><i>Resulting from relatively small number of existing component supplier to coordinate and manage.</i></p>
<b>Cockpit Module Supplier (CMS)</b>	<p><b>High</b></p> <p><i>Location normally in close proximity to OEM plant.</i></p> <p><i>Constrained by size/weight of module and supply status of cockpit, normally synchronous.</i></p> <p><i>Onsite operation presents new challenges:</i></p> <ul style="list-style-type: none"> <li>Reduced Reaction time.</li> <li>Changing Environment</li> <li>Reduction in Autonomy</li> </ul>	<p><b>High</b></p> <p><i>Resulting from:</i></p> <ul style="list-style-type: none"> <li>The high levels of investment required in people, technology and infrastructure to enable module development and production</li> <li>The uncertainty of OEM commitment to the modular concept</li> <li>The risk of losing module business due to inability to meet new demands</li> <li>Risk to component business as a result of focus diversion.</li> </ul> <p><i>However, large potential for business growth</i></p>	<p><b>New and Extensive</b></p> <p><i>Resulting from extension of role from product supplier to module developer and supplier.</i></p> <p><i>Additional capabilities include:</i></p> <ul style="list-style-type: none"> <li>Cockpit systems knowledge and technology</li> <li>Cockpit assembly</li> <li>Logistics/supply</li> <li>Quality assurance</li> <li>Project management</li> </ul>	<p><b>Complex</b></p> <p><i>As a result of:</i></p> <ul style="list-style-type: none"> <li>The increase in the supplier management task</li> <li>The possible tensions in the supply chain caused by issues of compression</li> <li>Possibility of OEM imposed parts.</li> </ul>

# Effects of FDI on China Based on the Fuzzy Mathematics

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## **Abstract**

The international direct investment theory is one of domains which develop quickly in the international economics after the Second World War. Comparing with that obviously, the research of influencing factors about FDI (Foreign Direct Investment) develops very slowly. For a long time, FDI was thought to exert very important function to the economical increase of the host country, but in recent years, some negative influences occur. Base on some scholars' theoretical analysis, in this article, we utilize the method of fuzzy mathematics to comprehensively analyze the influencing factors of FDI on the host country, and translate the result into the data which can be directly compared to directly evaluate FDI.

**Keywords:** FDI, Fuzzy, Effect, Evaluation

## **1. Theoretical summarization of the effect of FDI**

There is still no the last word about the influence of FDI to the economy of the host country. Though both the recent international trade theory and the economic growth theory lean to emphasize the positive influence of FDI to the host country, but there are not sufficient experimental researches can offer direct theoretical references for that sort of positive influence. After 1992, FDI begun to enter China cosmically, and the stage that China introduced foreign capital has turned into the deep development, and at the same time, some original contradictions and problems in the introduction of foreign investment have become more acute and complex.

Most scholars studied this problem from the technical view. The attraction to FBI is the effective method to promote the economic development of the host country, which can directly enhance the output of the host country, but can indirectly influence the output level of the host country through the technical spillage effect (Narula and Marin, 2003). But the technical transformation is decided by the absorption ability of domestic enterprises to large extents. The data of the English making industry showed that when domestic enterprises had similar production level with foreign companies, this sort of transformation was the most effective (Driffield and Taylor, 2002). Xutao (2003) supposed that FDI had different structure with domestic capital, and established an endogenesis growth model based on that, and also obtained that FDI had obvious promotion function for the technical advancement of China. Wang, Zhipeng and Li, Zinai (2004) established the quasi-endogenesis growth model considering the FDI spillover effect, and the result indicated that the long-term economic growth of the host country was decided by the ration of FDI and the domestic capital, and various regions must span certain human capital doorsill to obtain benefits from FDI. Many researches showed that the operators with deficient enough abilities were the important reason which induced the slow absorption of new technology (Lall, 2001). Furthermore, the technical spillage also occurred through the cooperation of transnational company with college or other research institutions (Santangelo, 2005).

However, other scholars deeply discussed the disadvantageous influences of FDI to the enterprise of the host country. Van Pottelsberghe and Lichtenberg (2001) indicated that FDI lacked the technical spillage effect. Baoqun and Lai, Mingyong (2002) studied the relation of FDI and China total factor productivity and capital output rate, and the result showed that the direct effect of FDI was obvious, but the technical spillage effect was little. Zhang, Jiangang (2006) thought that the requirement of technical monopolization and economy of the motivation of foreign traders' direct investment activity decided that foreign traders would not transfer technology to the enterprise of China. Many foreign traders set up various obstacles in the investment article, and achieved the long-term possession to the China market through the technical predominance. According to the "Solow residual", Hu, Lifa (2003) empirical analyzed the technical contribution of foreign capital in the economic growth of China, and thought that the technical contribution proportion of FDI to the economic growth of China was very limited.

Through the comparison to the recent researches about FDI, we can see that scholars generally studied the cause and

effect relation of FDI and economic growth and discussed the influence of FDI to the regional economy of the host country. Starting from the view that the government introduces the foreign investment, this article mainly utilizes the method of fuzzy mathematics to discuss the effects of FDI to the host region.

## **2. Empirical analysis of the effect of FDI to China**

### *2.1 Active function of overseas direct investment to economic growth*

#### 2.1.1 Promoting the export growth and structure upgrade of China

In 2006, the trade amount of foreign capital enterprise achieved 937.548 billion Yuan from January to November, with year on year increase of 25.49%, and accounted for 58.24% of the national total trade amount, where, the export amount of foreign capital enterprise was 509.617 billion Yuan, with year on year increase of 27.90%, and account for 58.24% of the national total export amount, and enhanced 0.3 percent compared to the same period of the last year. As viewed from the structure, the draught effect of the export of high-tech products of foreign capital enterprise to the national export growth continually ascended. The export amount of high-tech products was 223.378 billion Yuan with year on year increase of 30.53%, and accounted for 87.99% of the national export amount of high-tech products (Document of the Ministry of Commerce of China, 2007, Issue No.25), which showed that the foreign capital enterprises drove the growth of China export and immitted energies for the optimization and update for the industrial structure. For example, the explanation of FDI by UN in "The Investment Report of 1992" was that the direct function of FDI to the technical advancement of the host country consisted in enhance the factor productivity through the technical spillover, changing the product structure, especial the structure of the export product, and forming a chain of "foreign capital- technical spillover- industrial structure update".

#### 2.1.2 Increasing domestic employment opportunity of China

The introduction of foreign capital can increase the demand of domestic labor force and extend the employment opportunities. Up to the late of 2006, the direct employment amount in foreign capital enterprises was about 28 millions, which accounted for above 10% of national urban non-agricultural labor population. Sha, Wenbing and Tao, Aiping (2007) applied the co-integration theory and relative theories and utilized the annual data from 1979 to 2005 to study the relation between FDI and employment growth of China, and the result indicated that the long-term balance relation existed between foreign traders' direct investment and employment amount of China. When the foreign traders' direct investment increased 1%, it would bring the increase of 0.13% of employment amount of China for a long term (Sha, 2007, p.112-117). Furthermore, the employment opportunities created by the foreign direct investment enterprises exerted important function to release the social employment pressure of China.

#### 2.1.3 Participating in the formation of domestic capital and abating the deficiency of domestic construction capital

China is a big developing country, and the deficiency of construction capital has very obvious restriction the economic development, and the foreign direct investment has been the important approach to finance for many regions. The FDI of 2004, 2005 and 2006 successively exceeded 60 billion dollars, and this amount achieved 63 billion dollars in 2006. From 2003 to 2006, the actual use sum of direct investment of foreign traders stably increased by the speed of annual 4.6%. Through the combination of FDI with existing otiose production factors, new production ability would be formed, which can further promote the development of the economy of China.

#### 2.1.4 Introducing foreign advanced technology and management experiences

The establishment of foreign capital enterprise can introduce foreign advanced technology for China, fill up some domestic technical blankness, and save precious time and large of scientific research charges, which can actively quicken the update step of China technical advancement and industry. For example, in the auto industry, the auto product technical level of China has entered the level of 1980s from 1950s in a few years. On the other hand, the foreign capital enterprises operate and manage according to the international traditions, which can bring a series of advanced management experience and train a passel of new management talents. The absorption and utilization of FDI have been the important and the most effective source that China obtains advanced technology and management experiences.

### *2.2 Disadvantageous influences of FDI*

The rise and development of transnational companies are the most conspicuous change in international economic activities in recent fifty years. Proceeding from the motivation occupying the overseas market and obtaining profits, transnational companies invest abroad and establish subsidiary companies, implement activities of production change according to the principle of specialization division, and this type of international trade is controlled by the parent company which keeps the monopolized predominance of the capital, technical research and development, and sales, and transfers large of production stages which need using common labor force or heavy-laden pollution abatement to the developing country which has cheap labor costs and loose environment protection limitation.

Therefore, the production and management of transnational company are not certainly propitious to the economic development of the host country.

2.2.1 The tendency of “exclusive foreign capital” and “large-scale” of foreign investment will increase the risk of industrial monopolization.

First, the opportunity that existing enterprises of China introduce new capital and technology through the mode of joint venture or cooperation obviously reduces. Second, the foreign capital enterprise is easier to be controlled or influenced by the transnational company outside China, and the difference between enterprises and the local social in the aspects of culture and value view may induce some social contradictions and conflicts and influence governmental policy direction and exertion effect. Third, the association of transnational company China economy is closer and closer, and the establishment and adjustment of production management decision also influence the economy of China and the industrial development with that, and accordingly the uncertainty of economic development and stability would increase. Fourth, because the transnational companies possess strong predominance of capital, technology and brand, they can easily form high industrial concentration in some important industrial domains, and accordingly the probability that few foreign capital enterprises develop industrial monopolization increases (Zhao, 2005, 2 December, 2005).

2.2.2 Weakening the technical research and development impetus of domestic enterprises

The foreign capital enterprises can reduce the developmental space of domestic enterprises. At present, the independent degree of local economy in many regions to the foreign capital continually increases, and by right of various predominance, foreign capital enterprises produce large “extrusion effect” to the same industrial domestic enterprises. And the domestic enterprises give up the market and brand, and gradually become one manufacturing factory in the global industrial chain of foreign capital enterprises, which self-innovation and self-development abilities are weakening. Furthermore, because domestic enterprises of China would face large risk in the process of enhancing their own technical abilities, they are always inclined to purchase existing technology and give up the investment to the research and investment, and accordingly restrict the development of their own technical abilities in the market competition.

2.2.3 Bringing negative influences to the environment of China

Many foreign companies established factory in China, because the environmental standard of China is very low and they can save much pollution abatement cost, which brings large hidden troubles for the depravation of China environment, and many pollution may exist ten years and even hundred years, at the same time, the pollution also turns into the living cost of China inhabitants, and many people even can not continual normal living, especial for those diseased crowds, the pollution pricks up the economic burden and may entail offspring.

### 3. Establishing the fuzzy mathematical evaluation model

#### 3.1 The fuzzy mathematical theory

Supposed that there are two limited universe of discourse,  $U = \{u_1, u_2, \dots, u_n\}$  and  $V = \{v_1, v_2, \dots, v_n\}$ , where, U and V represent two sets, and supposed that U represents the set composed by the evaluation factors and V represents the set composed by evaluation results. Through the fuzzy transformation,

$$X * R = Y \quad (1)$$

Where, X is the fuzzy subset in U, which represents the evaluation factor and Y is the fuzzy subset in V, which represents the evaluation result, and R is the matrix.

#### 3.2 The comprehensive evaluation to overseas funded enterprises

The comprehensive evaluation to the foreign capital enterprises mainly considers the factors which are seen in Table 1.

The factors in Table 1 compose the universe of discourse,  $U = \{u_1, u_2, u_3, u_4, u_5, u_6, u_7\}$ . To the evaluation result, we only consider excellent, good, common and bad degrees, which compose the evaluation result universe of discourse  $V = \{\text{excellent, good, common, bad}\}$ .

To the development of the industry of the enterprise, we can confirm it through experts' direct evaluation to the factor or the hypo-factor ( $u_i$ ). For example, to the evaluation to the development of the industry of the enterprise, the coefficient of “excellent” is  $v_{11}$ , the coefficient of “good” is  $v_{12}$ , the coefficient of “common” is  $v_{13}$ , and the coefficient of “bad” is  $v_{14}$ . In the same way, we can obtain the evaluation of other factors,

$v_{i1}, v_{i2}, v_{i3}, v_{i4}$  ( $i=2,3,4,5,6,7$  respectively correspond with  $u_2, u_3, u_4, u_5, u_6, u_7$ ), and the limitation condition is  $v_{i1} + v_{i2} + v_{i3} + v_{i4} = 1, i=1,2,3,4,5,6,7$ . According to above results, we can obtain the fuzzy transformation matrix.

$$R = \begin{pmatrix} v_{11} & v_{12} & v_{13} & v_{14} \\ v_{21} & v_{22} & v_{23} & v_{24} \\ v_{31} & v_{32} & v_{33} & v_{34} \\ v_{41} & v_{42} & v_{43} & v_{44} \\ v_{51} & v_{52} & v_{53} & v_{54} \\ v_{61} & v_{62} & v_{63} & v_{64} \\ v_{71} & v_{72} & v_{73} & v_{74} \end{pmatrix} \quad (2)$$

Under the condition without any weight,

$$V = U * R. \quad (3)$$

When we evaluate the foreign capital enterprise, we mainly consider the development of the industry of the enterprise, the capital strength of the enterprise, and the technical innovation ability of the enterprise, in the next place, we consider other aspects, and then we distribute weights to these seven factors, i.e.  $A = (a_1, a_2, a_3, a_4, a_5, a_6, a_7)$ . So the final evaluation result is

$$V = A * R. \quad (4)$$

### 3.3 The example

Supposed that the evaluated objective is the transnational company of certain country this is just going to invest Chengdu, and the evaluation people who are selected from economic expert, environmental expert, human resource managers and common crowd, and the evaluation mode is to directly evaluate above seven evaluation factors according to four grades. The evaluation results are seen in Table 2.

According to the evaluation result, the matrix is

$$R = \begin{pmatrix} 0.6 & 0.3 & 0.2 & 0.2 \\ 0.4 & 0.3 & 0.2 & 0.1 \\ 0.5 & 0.2 & 0.1 & 0.2 \\ 0.2 & 0.4 & 0.3 & 0.1 \\ 0.1 & 0.2 & 0.3 & 0.1 \\ 0.7 & 0.1 & 0.1 & 0.1 \\ 0.5 & 0.3 & 0.1 & 0.1 \end{pmatrix}.$$

Under the condition of weight distribution, suppose that  $A = (0.2, 0.2, 0.2, 0.1, 0.1, 0.1, 0.1)$ , and finally we can obtain the comprehensive evaluation to the enterprise.

$$V = A * R = (0.2, 0.2, 0.2, 0.1, 0.1, 0.1, 0.1) * \begin{pmatrix} 0.6 & 0.3 & 0.2 & 0.2 \\ 0.4 & 0.3 & 0.2 & 0.1 \\ 0.5 & 0.2 & 0.1 & 0.2 \\ 0.2 & 0.4 & 0.3 & 0.1 \\ 0.1 & 0.2 & 0.3 & 0.1 \\ 0.7 & 0.1 & 0.1 & 0.1 \\ 0.5 & 0.3 & 0.1 & 0.1 \end{pmatrix}$$

According to the maximum and minimum algorithm, we can obtain

$$V = (0.2, 0.2, 0.2, 0.2).$$

After normalization processing, we can obtain

$$V = (0.45, 0.26, 0.18, 0.14).$$

The result of comprehensive evaluation shows that the degree of "excellent" is 45%, the degree of "good" is 26%, the degree of "common" is 18%, and the degree of "bad" is 14%. According to the decision principle of maximum

subjection, this enterprise belongs to “excellent”.

#### 4. Conclusions

Through quantizing the uncertainty values by the fuzzy mathematics, in this article, we introduce different benefit groups to comprehensively evaluate FDI entering into the host country from different views, and this method breaks away from single past economic view, evaluate the real value of FDI objectively, and can help the policy decision maker to deeply judge and evaluate FDI.

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Table 1. Evaluation factors

	Factor	Element
Enterprise	Industrial situation	$u_1$
	Capital strength	$u_2$
	Technical innovation ability	$u_3$
	Concern to the social welfare	$u_4$
	Effects on the environment	$u_5$
Manager	Management level	$u_6$
	Manager’s moral level	$u_7$

Table 2. Experts’ evaluation results

	Factor	Element	Evaluation result			
			excellent	good	common	bad
Enterprise	Industrial situation	$u_1$	0.6	0.3	0.2	0.1
	Capital strength	$u_2$	0.4	0.3	0.2	0.1
	Technical innovation ability	$u_3$	0.5	0.2	0.1	0.2
	Concern to the social welfare	$u_4$	0.2	0.4	0.3	0.1
	Effects on the environment	$u_5$	0.1	0.2	0.3	0.4
Manager	Management level	$u_6$	0.7	0.1	0.1	0.1
	Manager’s moral level	$u_7$	0.5	0.3	0.1	0.1

# Research on the Issue of the Distribution of Household Electrical Appliance Retail Chain Enterprises in China

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## Abstract

The household electrical appliance retail chain enterprises in china develop rapidly, whilst the basic logistics facilities lagged behind. The slow development of logistics distribution blocks the further development of household electrical appliance sale and chain management. Therefore, effective measures shall be taken, according to the current situation of the development of logistics distribution for household electrical appliance retail chain management, so as to improve logistics distribution system so that the rapid growth of large household retail chain enterprises can be endowed with logistics system guarantee.

**Keywords:** Household electrical appliance logistics, Distribution center, Talents in logistics

The magnificent characteristic and advantage of chain management is scale effect, while the scale effect cannot be achieved without the high-efficient operation of distribution center. At present, the household electrical appliance retail chain enterprises in china are developing rapidly. However, the construction of logistics distribution system is still at its primary stage. Therefore, the distribution modes and operation levels lag far behind, which lays a huge block for the further development of household electrical appliance retail chain enterprises.

## 1. Problems existing in the logistics distribution of large household electrical appliance retail chain enterprises in China

### 1.1 *The location-choosing and construction of distribution center are not standard and the basic facilities are backward*

First of all, the location-choosing of distribution center is not scientific. When choosing locations for distribution center, because household retail chain enterprise lack awareness of the significance of location-choosing and lack talents in the logistics management, they just simply consider the rent of the storage and seldom analyze according to the distribution costs, distribution efficiency and service quality. The remote location of the storage places and the poor traffic condition will influence the distribution efficiency of each vehicle.

Secondly, the construction of distribution centers of many household electrical appliance retail chain enterprises is not standard. Many distribution centers do not have adequate parking lots and standard stevedoring platforms. The random parking and stevedoring is not good for improving "in-and-out storage" efficiency and is easy to cause cargo damage and cargo discrepancy. The stevedoring, handling, piling and selecting of cargo in the storages of the distribution centers are basically done by labors, which will easily bring about human-damage to the commodities as well as low efficiency.

The construction scale of distribution center is not calculated scientifically according to the flow of commodities, which will result in waste of the distribution center or failure in holding commodities as demanded. The "web notes" are not arranged uniformly and can not realize the advantage of scale management.

### 1.2 *The preparation of distribution vehicles is not scientific and the arrangement of distribution labor is not reasonable.*

The distribution of household retail chain enterprises mostly adapts carrier mode. The amount of household electrical appliance fluctuates greatly. In order to assure the smooth distribution of commodities, enterprises prepare distribution vehicles according to that needed in hot seasons, resulting in low average use rate of vehicles.

At present, the labor dispatch of household electrical appliance centers is done by persons. The labor dispatch of distribution is finished according to the experience of labor dispatching personnel, the transportation requirement of labor dispatching region and the carrying capacities of vehicles, which will easily result in low storage rate of vehicles and irrational distribution route.

### 1.3 *The block of information flow results in the backwardness of logistics.*

The electronic, modernized and information degree of the logistics system household electrical appliance retail

chain enterprises is rather low, which severely restricts the high-efficient operation of logistics system. For the block of information flow, the chain retail industry lacks effective management and control over logistics transportation, which is mainly shown as follows: there is not exact management over commodity loading, vehicle scheduling and transportation route; the commodity distribution information among the chain slops lack mutual coordination, resulting in high cost of logistics distribution. From the angle of supply chain, most of household electrical appliance retail chain enterprises do not do well in the communication with suppliers and in the exertion of the extension function of logistics information.

#### *1.4 The importance attached to logistics operation is not enough and the logistics system is not directed by supply chain theory.*

The importance attached to logistics operation by most of household electrical appliance retail chain enterprises is not enough. Those enterprises just consider logistics department as an auxiliary department to cooperate and support purchase and sale. Inside the enterprises, the logistics, purchase, sale and after-sale service are not organized through procedures or arranged uniformly; Outside the enterprises, the suppliers, users, and logistics resources are not integrated effectively. The enterprises do not take initiative to integrate the supply chain for household electrical appliance so as to make plans for logistics from the strategic perspective of supply chain management, which brings no good for cutting down logistics costs and improving the operation efficiency of logistics system.

#### *1.5 The lack for professional talents in logistics.*

Staff engaged in logistics distribution shall possess certain knowledge in logistics and practicing experience. However, in China, the education on the cultivation of talents in logistics distribution lags behind. Perfect logistics education system and talent training system have not yet been established, resulting in lack of professionals in logistics. Especially, the society is straitened for compound high-class professionals who master both the operation techniques of modern logistics distribution and the management of logistics distribution, which restricts the further development of the logistics distribution of household electrical appliance in China.

## **2. The measures for improving the distribution system of household electrical appliance retail enterprises**

According to the characteristics and development condition of logistics distribution in household electrical appliance retail chain management, effective measures shall be adopted to improve logistics distribution system so that large household electrical appliance retail chain enterprises can be provided with guarantee of logistics system.

#### *2.1 The location-choosing of distribution centers shall be scientific and the construction shall be standardized.*

First of all, the location and scale of the distribution center shall be determined scientifically. The location of distribution center will exert direct influence on the distribution speed and circulation expenses. What is more, it is closely connected with the service level and service quality of the distribution center. On the condition of warranting certain customer service level, the basic standard for choosing the location of the distribution center is to transport the commodities to the target place at the minimum logistics costs. The location-choosing of distribution center shall take into account the distribution of transportation amount, transportation condition, promised service time, storage cost and distribution fee, and etc.

When deciding the scale of distribution center, the overall demand amount shall be ascertained first according to the demand amount of each sale shops. Various material storage shall be divided reasonably and the occupation areas of each storage shall be fixed so as to determine the overall area of the distribution center. When making decisions on the scale of distribution center, we should take into account the development needs of branches and make comparative long-term planning so that the distribution center of each branch has correspondent distribution economy scale.

Secondly, the construction of distribution center shall be standardized. The mechanical and automotive level of the distribution center shall be improved. In the process of logistics, the stevedoring and handling activities are conducted at the distribution center. The frequency of stevedoring and handling activities is far higher than other logistics activities. Hence, those activities become a key part in raising logistics speed. What is more, the stevedoring and handling activities will consume much labor. The cost of stevedoring and handling accounts for a large part in logistics costs. Therefore, those activities lay high requirements on the construction of the distribution center. The distribution center of household electrical appliance retail chain enterprises shall have operation platform and adequate parking lots. Besides, the transportation condition around the distribution center shall be in good order. The distribution center shall gradually develop towards the machine operation. Stevedoring and handling shall accelerate in adopting computer management soft wares for managing vehicle dispatch and scheduling so as to cut the editing time for vehicle dispatch time, to arrange the distribution regions and routes more reasonably and to raise

the use rate of vehicles.

### *2.2 To optimize and adjust the transportation power reasonably*

The transportation power shall be reasonably optimized and adjusted according to the characteristic of household electrical appliance sale, that is “fluctuation”. The preparation of transportation power shall be flexible and adjustable. Under the premise of guaranteeing the in time delivery of goods in hot seasons and the basic profits of the carriers, the transportation expenses incurred in the distribution shall be cut down.

First of all, enterprises shall reasonably control the routine transportation power and ensure that all the routine vehicles prepared could warrant the smooth distribution of goods sold daily. Before the coming of scale peak, enterprises can inform carriers in advance to provide temporary transportation power.

Secondly, enterprises should integrate and improve the structure of carriers. In order to secure the flexibility of the preparation of transportation power, the enterprise must seek cooperation with carriers who are strong in recourse integration. Besides, the enterprises shall enhance the legal restriction of the entrustment contract of carriage and the guarantee of transportations power. The enterprises shall also, in the form of contract, make advance agreement with carriers for the temporary transportation power in not seasons.

Thirdly, enterprises can adopt the form of regional contract. For distribution center, regional contract can simplify the work of scheduling and labor dispatch and raise the rationality of the scheduling of vehicles. For the carriers, because they are just in charge of small and regular regions, they are clear about the traffic condition of the regions that they are in charge of and are familiar with the housing distribution of the regions, which are good for making plans scientifically for the scheduling of vehicles.

At last, enterprises shall strengthen training, reasonably arrange, and improve the goods delivery capacity of vehicles temporarily provided. Through trainings on business and service techniques, enterprises can ensure that the newly employed goods delivers know well service techniques and business knowledge so that the customer satisfaction rate of the distribution service and goods delivery success rate can be raised.

Besides the transportation skill and equipments, the reasonable arrangement of distribution is also important in determining the transportation efficiency of distribution. The direction and scheduling of distribution shall be scientific and reasonable and conform to the high-efficiency requirements of logistics system on distribution. The connection of distribution transportation shall be smooth. The distribution center shall, according to the scale information, make plans for arranging vehicles and delivers and reasonably arrange distribution ways.

### *2.3 To actively adopt advances logistics information system*

The information logistics distribution is represented as follows: the database and code are used in the collection of logistics information; electronic equipments and computers are used in the processing of logistics information; the transfer of logistics information is standardized and is timely; and digital devices are used in storing logistics information. Trough the adoption of advanced logistics information system, a modern management platform is set up so as to push the management of relationship with clients, to improve distribution scheduling, to dynamically manage storage, and to realize on line transaction dealing. The modern management platform can also be used in the management of goods, the scale analysis, and costs checking. By this way, the logistics, capital flow and information flow are integrated and the information process of logistics is advanced and the smoothness, speed, exactness and efficiency of information flow are raised. At the same time, the construction of modern logistics information system shall be combined with the re-construction of logistics procedure so as to cut down the procedure distance and time and to raise the efficiency of logistics distribution from the root.

### *2.4 To integrate logistics system with supply chain thoughts*

It has become a trend that under the help of information technology to integrate the upper and lower resources of household electrical appliance industry, to cut down the overall costs of the supply chain of the entire household electrical appliance industry, and to set up household electrical appliance supply chain system with the circulation enterprises as the core depending on the upper and lower enterprises and combining information flow, capital flow and logistics. First of all, starting from the interior enterprise, the interior logistics recourses can be integrated through the distribution center. The purchase, sale and logistics shall be considered as a whole and the overall costs of the interior logistics operation of enterprises shall be cut down. Secondly, the logistics operation of the enterprises shall be analyzed from the angle of entire supply chain. According to the inter-relationships among suppliers, retailers, and logistics servicemen, supply chain thoughts shall be adopted to integrate and manage logistics recourses and business so as to achieve the goal of cutting down the overall costs of the supply chain logistics.

The adoption of effective management strategies on supply chain can remarkably cut down the overall costs of supply chain logistics and the storage level on the supply chain, enhance information share level, improve mutual

communication, maintain the consistency of operations among strategic partners and bring about huge competition advantage so as to realize the improvement of the performances of enterprises on the supply chain.

### *2.5 Endeavour to cultivate talents in the management of logistics*

The household electrical appliance retail chain enterprise shall conduct careful analysis on the condition of logistics talents and adopt proper methods to optimize talents allocation. First of all, they should analyze where is straitened for logistics talents and use different methods to meet the demands of different posts. For common posts, they should, through perfecting regulation and training system, ensure that the new-employed workers can master the operation requirements of the posts after being trained within rather short time. For important posts, enterprises can make sure of the recruitment resources to search for proper employee in the market.

Secondly, enterprises shall set up proper training system for logistics managers who are fit for their own enterprises. The training on managers must be dynamic and focus on quality rather than the static personnel charge of mechanical mode. Through talents cultivation modes, such as tutor system inside enterprises, concentrated training system, enterprise college system and “order talents from university”, the development of distribution business will be secured with adequate talents.

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# ICT to Enhance Administrative Performance: A Case Study from Malaysia

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## Abstract

Malaysia has achieved considerable steps in the use of ICT in administration since mid 80s. The vision of the Malaysian e-Government initiative which was formulated and launched in 1997 is to transform the public sector service delivery through the use of IT and multimedia. Since its start, there are eight projects implemented under the e-Government initiative flagship. This paper presents work done in one of these projects: e-Procurement (locally known as e-Perolehan) project. The aim of e-Perolehan project is to facilitate and improve government procurement besides to improve the quality of services provided within the Government-to-Business (G2B) setting. The paper briefly discusses how information and communication technologies were deployed to enhance the online procurement system in Malaysia.

**Keywords:** Electronic Government (e-Government), Information and Communications Technology (ICT), Electronic Procurement (e-Procurement)

## 1. Introduction

In the fast globalizing world economy of today, governments the world over are recognizing the importance of Information and Communications Technology (ICT) in development. An increasing number of Electronic Government (E-Government) initiatives are being employed to improve the delivery of public services to the people, and to tap the potential synergy from the interaction between new technologies, an educated population and an enabling environment for the attainment of knowledge-based economies (Ramlah et al., 2007, Murali et al., 2007; Lawson-Body & Miller, 2006; Akman et al., 2005; Ebrahim & Irani, 2005; Carter & Belanger, 2004; Ndou, 2004; Donnelly & McGruirk, 2003; Gupta & Jana, 2003; Heeks, R. 1998). The waves of E-Government are rising through public organizations and public administration across the world. More and more governments are using ICT especially Internet or web-based network, to provide services between government agencies and citizens, businesses, employees and other non-governmental agencies (Zaharah, 2007; Ndou, 2004; Donnelly & McGruirk, 2003; Fang, 2002).

The Malaysian government has envisioned a technologically advanced society and implicitly, a technologically enabled government through its Vision 2020 (Hazman et al., 2006; Maniam, 2005). The move towards a digital government is progressing slowly along the government-to-government (G2G) route and also along the government-to-citizen (G2C) and government-to-business (G2B) path. Alongside with the launching of the Multimedia Super Corridor (MSC) in 1996, the government has lined up several flagship e-Government projects namely project Management System, Human Resource Management Information System, e-Procurement and General Office Environment intended to transform the government from the paper-based, unintegrated islands of agencies and departments to an integrated and networked government.

This paper presents a case study on e-Perolehan in Malaysia, as part of the overall e-Government initiative launched in the country. The next section presents an overview of the e-Government landscape in Malaysia. Section three

presents a case study on the e-Perolehan initiatives and the last section present the pertinent challenges and issues within the e-Perolehan framework.

## 2. E-Government Landscape in Malaysia

The public sector in Malaysia is going through period of rapid change. The government's leading role in spearheading the surge forward into the information rich digital age has compelled the public sector to lead the way (MAMPU, 2003; 1997a; 1997b). The government of Malaysia launched Electronic Government with the aspiration to employ multimedia technologies to re-invent the way the government operates. E-Government will improve both how the government operates internally as well as how it delivers services to the people of Malaysia (Maniam et al., 2007). The E-Government implementation seeks to improve the convenience, accessibility and quality of interactions with citizens and businesses; simultaneously it will improve information flows and processes within government to improve the speed and quality of policy development, coordination and enforcement (Reddick, 2004; Moon, 2002; Layne & Lee, 2001).

The objectives of electronic government are to reinvent government and to catalyze MSC. Reinventing government would address the following areas:

- (1) Improving connectivity between all parties that deals with government be it public, inter government agencies, private companies, and foreign country interrelationship. This gives better access to government.
- (2) High quality services are expected to be assured.
- (3) Better processes or systems are also crucial in terms of improving the government services.
- (4) Create grater transparency and governance.
- (5) Empowering government officers in the administration as well as the implementation level.

The vision of E-Government is a vision for people in government, business and citizenry working together for the benefit of Malaysia and all of its citizens. The vision calls for reinventing government using multimedia and IT to improve productivity. It also seeks to create a collaborative environment that fosters the ongoing development of Malaysia's multimedia industry. There are eight projects launched to date under the E-Government Flagship since it was started in 1999. All this projects will use ICT and multimedia technologies to transform the way the government operates, coordination and enforcement. Table 1 summarizes the projects and its characteristics.

## 3. E-Perolehan Implementation

E-Perolehan is the new procurement system allows the Government ministries to electronically select items to be procured from the desktop, initiate an electronic approval process and also create, submit and receive purchase orders, delivery orders and other related documents electronically. Objectives of e-Perolehan are (Ratha, 2007):

- (1) To ensure best value for money for Government procurement
- (2) To ensure suppliers receive faster and more accurate payment
- (3) To ensure accountability and transparency in all Government procurement
- (4) To increase collaboration between the business sector and the Government

E-Perolehan deals with the Government to Business (G2B) relationship. On the supplier's side, e-Perolehan allows them to present their products on the World Wide Web (www), receive, manage and process purchase orders and receive payments from government agencies via the Internet. The supplier's product catalogue, which can be viewed from any desktop with a web browser. The supplier is able to submit quotations, obtain tender document and submit tender bid through e-Perolehan. E-Perolehan allows suppliers to register or renew their registration with the Ministry of Finance through the Internet. Suppliers are able to submit application, check application status and pay registration fees through e-Perolehan.

E-Perolehan will be the single point of registration for the suppliers. All approvals of the application for registration remain with the Registration Department of Ministry of Finance. Services available in the supplier registration module include the following ([www.commercedc.com.my](http://www.commercedc.com.my)):

- (1) Supplier registration can be done online via the Internet using the e-Perolehan website
- (2) E-Perolehan routes all successful supplier applications for online approval by the relevant authority upon full submission of completed documents.
- (3) E-Perolehan facilitates generation of certificate for registered and successful supplier.
- (4) The supplier registration module supports online renewal of registration by the suppliers.
- (5) The supplier registration allows online application for registration of additional category or "bidang".

(6) E-Perolehan supports online suspension or termination of the supplier registration.

### 3.1E-Perolehan Business Model

The business model that is used for the implementation of e-Perolehan is an end-to-end model (MAMPU, 1997a). Procurement requires a complete integration of services from the buyer to the supplier and vice-versa. To ensure the success and consistency of procurement services, the responding organization shall provide an end-to-end solution. In this model, there are three distinct communities, namely the supplier community, the buyer community, and the procurement service provider. Figure 1 illustrates the three core entities involved in Malaysia's e-Perolehan initiative.

#### Supplier Community:

The supplier community consists of suppliers who have registered with the MOF to provide supplies and services to the government. There are about 120 000 registered suppliers (Commerce Dot Com, 2007) supplying goods under four categories, that is, Central Contract, Direct Purchase, Quotation and Tender purchase. These suppliers bear the responsibility to coordinate with the procurement service provider and register onto the new system with the Government Procurement Management Division, within Ministry of Finance. All suppliers are required to provide and update the necessary information regarding the items that they supply online.

#### Buyer Community

The government is the buyer community. The Malaysian government spent about RM 20 553 million on procurement in the year 2006 and has increased the amount to RM 23 151 million in for the year 2007 (www.mof.gov.my, 2007). The cost of processing and managing this process is extremely high with increasing expectation from the supplier side for the government to be more efficient. It is the responsibility of the buyer that is government to have the necessary information in place to be able to accept and respond to the supplier electronically in the process of procurement.

#### Procurement Service Provider:

The procurement service provider (Commerce. Com Sdn. Bhd.) provides the electronic concept solution which enables the full transaction of the procurement process between the buyer and the seller (Zaharah, 2007). The end-to-end model requires the service provider to provide a total solution to both the supplier and the buyer community. This includes application, hardware and software if necessary and more importantly the capability to exchange business documents between the communities e.g. Purchase Orders, Request for Quotation, and Request for Tender Document etc. The security and confidentiality of this document shall be ensured so as not to compromise the confidence of both communities. The service provider shall also adhere to all necessary government procurement policies and legal requirements. However, Commerce.Com can provide advice and give suggestions to the government if necessary with the aim of improving the current processes in order to enhance the efficiency and to lower the cost of operation for the government. Currently, Commerce.Com is involved in 2 modules for e-Perolehan:

- (1) Module 1 – Registration of the suppliers on-line with Ministry of Finance
- (2) Module 2 – Transactions – Central Contract, Direct Purchase, Quotation and Tender purchase.

### 3.2E-Perolehan Benefits

The e-Perolehan initiative is expected to provide significant benefits to both the buyer (government) and supplier communities. The findings of our interview with an official of the Ministry of Finance (project manager for the government) suggest the following benefits of e-Perolehan for the government:

- (1) Offers more effective and efficient procurement process in line with the country's transformation to the knowledge based economy (K-Economy). E-Perolehan is a vehicle for the government to leapfrog into the new economy and promote the widespread adoption of e-Business in the country.
- (2) Lowers operational cost for the government over time. The government will be able to reduce administration and operational costs through the usage of e-Perolehan as business processes are reduced and streamlined.
- (3) Better and up to date choice of products and services. A government buyer would have immediate access to a wide variety of products and services available to them via e-Perolehan, which will make them a better informed buyer.
- (4) Latest product information and pricing available on-line. E-Perolehan will always be up to date with the latest information that will help the buyer to make a more accurate procurement decision.
- (5) A more skilled and knowledgeable workforce. Through its usage, e-Perolehan will indirectly promote a higher rate of IT literate workforce, both in the government and private sectors.

(6) Better management of purchases and payments. With e-Perolehan, the government buyer would be able to track or audit the procurement processes or transactions that have been made.

(7) Will benefit from improved purchasing control, scale economies and greater accuracy in the ordering and billing process. Off-contract and uncontrolled purchases that drive up product cost and reduce negotiation leverage will be minimized. It also prevents corruption by eliminating gate keepers and reduces abuse of discretion and other opportunities for corruption (UNDP 2006). Besides that, information such as status of back orders and delivery status will be up-to-date and available electronically. This will help the government agencies in planning and budgeting process. The government ministries will also still maintain the freedom and responsiveness of decentralized purchasing, given the relevant information on the products and specification.

The potential benefits to the supplier community involved in e-Perolehan include the following:

- (1) Suppliers become much more accessible to a government buyer, whenever and wherever the supplier is.
- (2) E-Perolehan enables the supplier's transition into e-Business, providing an entry point for e-Business capability.
- (3) Suppliers will be able to adopt and grasp the e-Business concept more rapidly, due to the usage of e-Perolehan
- (4) Advertising of goods and services is much cheaper and faster, and yet reaches a much broader base of buyers.
- (5) With the Internet platform, suppliers would virtually have a borderless advertising channel at a very low cost.
- (6) Simplified processes and less manual work reduces administrative and operational costs. Through e-Perolehan, almost all the business operations will be automated, thus not only leading to lower operational costs, but as well as faster turnaround time to the buyer.
- (7) Suppliers would be able to receive payments faster through electronic payment. Supported by a highly secured network infrastructure, suppliers would be able to receive payments for goods and services in a shorter period.
- (8) Improved business planning and forecasting due to a more efficient and predictable procurement process. Due to the fact that e-Perolehan automates business processes and improves work efficiency, suppliers would be able to anticipate the procurement processes more accurately.
- (9) Through the e-Perolehan system, the suppliers are able to use a single electronic catalogue for all government ministries while extending a global reach electronically to existing and new customers on the service ([www.eperolehan.com](http://www.eperolehan.com)). Suppliers shall also benefit from improved information accuracy, increased productivity and reduced operational cost with the electronic retrieval and submission of quotation and tender information. Efficient processing on both supplier and buyer community will also translate to faster payment turnaround time.

#### **4. Issues and Challenges**

It has been eight years since Phase 1 of the e-Perolehan initiative has been launched. Although there are close to 120 000 government linked suppliers, only approximately 50 000 suppliers are e-Perolehan enabled. Although 50 000 suppliers have the capability to participate in e-Perolehan, only 6 000 suppliers are active users of the system. The rest are classified as inactive or casual participants of the system. The following points highlight the key issues inherent within Malaysia's e-Perolehan initiative that prevents the government and the service provider from maximizing the value potential of the system:

##### **Cost :**

There are costs involved before a supplier becomes e-Perolehan enabled. Specifically, suppliers have to bear the cost of purchasing a smartcard for transaction, pay for training, and also any software renewal cost that occurs. These payments are directed towards Commerce.com. Given that the majority of the suppliers within the traditional category belong to the small-medium size operations scale, it is only natural that they are not keen in becoming players within e-Perolehan, given the costs involved, to become e-Perolehan enabled.

##### **Infrastructure and Skills:**

As mentioned the majority of the supplier community fall within the small-medium size industry grouping. Traditionally, this sector has not been well versed with use of state of the art information systems. Issues such as lack of bandwidth support, poor computing and information systems architecture in general, prevents the majority of the suppliers from playing a more active part in e-Perolehan.

##### **Business Focus/Change Management:**

The majority of the suppliers are not keen to do business with the federal government, given the e-Perolehan requirement. Suppliers prefer to do business with local and state government as they can use traditional methods for selling tier products. Furthermore e-Perolehan still has not gone into tender and quotation compared to direct purchase and central contract which is small in volume. This issue is also in line with the need for better change

management to convert the mindset of traditional sellers to embrace change and use technology in the procurement process in general.

System Constraints:

The feedback we received from our interviews also suggests that the system in its current incarnation is not robust on several aspects. For examples, a supplier registered with the system, can only upload product information for ten different product areas, for free. Additional charges will; be incurred if more product lines are listed within the system. In short, for a company that has a wide product line, the additional cost involved to market the product via the system, might not be attractive.

Government Policy:

Although the Federal government of Malaysia encourages suppliers to become e-Perolehan enabled, the government can decide if it is willing to transact with a non e-Perolehan company, as long as the company is registered with Ministry of Finance. Stated differently, although in theory the supplier community must become part of the e-Perolehan system, in practice, this requirement has not been made mandatory as yet.

Despite the lackluster response by the majority of the seller community, close to 6 000 suppliers, as mentioned, have fully embraced and are active participants of the system. This situation is predominantly true for suppliers that visualize e-procurement as an opportunity and given the fact that the government could make it mandatory for large scale suppliers to use the system actively.

## **5. Discussion and Recommendation**

One of the main challenges for an e-Procurement project is the establishment of an appropriate and context tailored strategy. Every project or initiative needs to be rooted in a very careful, analytical and dynamic strategy. This seems to be a very difficult task, requiring a focus on many aspects and processes, a holistic vision, long-term focus and objectives. Many public institutions limit their activities to a simple transfer of their information and services online without taking into consideration the re-engineering process needed to grasp the full benefits. The government must have a clear strategy to overcome the barriers to change. Part of the strategy is to engage in a rigorous assessment of the current situation, the reality on the ground and the inventory of projects, articulate costs, impacts and benefits of programme as well as continuously monitor and evaluate the project upgrading. Borrowing a lesson from the private sector, e-Procurement must be customer-driven and service oriented. This means that a vision of e-Procurement implies providing greater access to information as well as better, more equal services and procedures for public and businesses.

The e-Perolehan initiative in Malaysia is pretty much at an infant stage, albeit significant time, money, and efforts already invested into the project. To ensure the true potential and benefits of e-procurement is realized by all parties involved, emulating success stories from e-procurement initiative such as in West Australia and in Andhra Pradesh, is a must for the Malaysian government. For a start, significant change to the mindset of the traditional suppliers is required. This can be done via active and continuous promotion and education of e-Perolehan and the benefits it brings to the supplier community, and also to the government. In addition, the service providers, namely, Commerce.com should reconsider reducing the cost of training and purchasing of the smart cards, particularly for the small scale suppliers. Lastly, the Federal government should craft out policies that are favorable and non-conflicting with the policy objectives and implementation plan inherent within the e-Perolehan initiative.

## **6. Conclusion**

The findings from our case study in Malaysia suggest that the government should take a more proactive role in promoting e-Perolehan in Malaysia. This includes among others, making sure that the government's policy on procurement avoids any contradiction with the e-Perolehan implementation plan. In addition, issues such as regulating the cost for training and purchase of the relevant equipment should also be within the control of the government to ensure the small scale suppliers can be enticed to become active participants of the system. In terms of the sellers (suppliers) two kinds of e-Perolehan adopters currently exist. First is the aggressive adopters who are involved fully (6 000 suppliers). These suppliers seem to be benefiting from e-Perolehan and are trying to achieve competitive advantage by using IT in their procurement process. Nevertheless, there are the conservative adopters (the laggards) – are taking 'wait and see' approach, before they are willing to actively become part of the system. On balance, the general consensus amongst both the buyer and seller communities is that e-procurement will become an important management tool to enhance the performance of supply chain especially in the public sector. In this regard, we expect that between the next three to five years, more suppliers will grab the opportunity and benefit fully from the e-Perolehan initiative in Malaysia.

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Table 1. Main Projects under the E-Government Flagship

Projects	Characteristics
Generic Office Environment (GOE)	provides a new paradigm of working in a collaborative environment where government agencies communicate, interact and share information
Electronic Procurement (EP)	Links the government and suppliers in an online environment. Government agencies as buyers procure goods/services by browsing catalogues advertised by suppliers. Aimed at best value for money, timely and accurate payment
Project Monitoring System (PMS)	Provides a new mechanism for monitoring implementation of development projects, incorporating operational and managerial functions, and knowledge repository
Human Resource Management Information System (HRMIS)	Provides a single interface for government employees to perform HRD functions effectively and efficiently in an integrated environment.
Electronic Services (e-Services)	Enables direct, online transactions between the public, the government and large service providers via electronic means
Electronic Labour Exchange (ELX)	A one-stop-centre for labor market information, accessible to government agencies, the business sector and the citizens.
E-Syariah	Introduces administrative reforms that upgrade the quality of services in Syariah courts. To enhance the Islamic Affairs Department’s effectiveness- better monitoring and coordination of its agencies and 102 Syariah courts.

Source: MDeC (www.mdc.com.my)

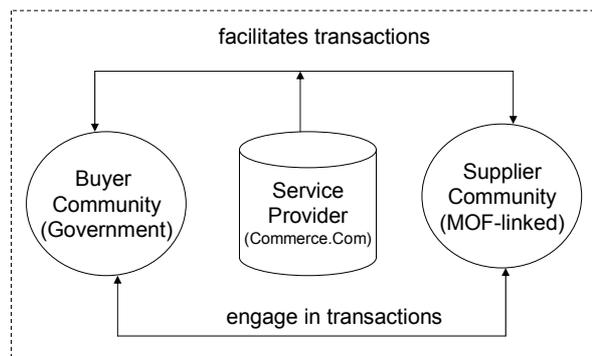


Figure 1. e-Perolehan Model

# The Empirical Study on the Market Volatility of Chinese Open-end Funds Based on GARCH Model

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## Abstract

In this article, we investigated the volatility of Chinese open-end funds market by using Zhongxin open-end funds index. According to the characteristics of different GARCH models, we empirically studied GARCH, EGARCH and GARCH\_M model. The result indicated that GARCH (1, 1) model and GARCH\_M (1, 1) model could better fit the characteristics of the index return rate. At the same time, the result of empirical study showed that the volatility-clustering and conditional heteroscedasticity of the return sequence of open-end funds were significant, open-end funds market in China had a strong motive of speculation, exterior impact had sustainable influences to the market fluctuation, the volatility of fund market was notable asymmetry, and the return of fund had obvious risk premium effect.

**Keywords:** Open-end funds, GARCH model, Volatility

## 1. Introduction

With the reform and development of China capital market, the open-end funds of China have acquired rapid development. Since the first open-end fund, "Hua'an Innovation", was established in 21 Sep, 2001, there were 307 open-end funds until 30 Jun, 2007, which occupied 88.78% of the total funds equity and indicated that the open-end funds had been the mainstream of the funds market. Since the first edition Basel Agreement was established in 1996, the volatility of the financial assets has been largely noted by investors, administration department and academe. With the continual development of China open-end funds market, it is more and more necessary to study its volatility.

In recent two years, many domestic scholars studied the volatility of the close-end funds market. Niu Fanglei and Lu Xiaoguang (2005) selected the SSE Fund Index as the research objective, and implemented empirical analysis to the closed-end funds by ARCH model group, and the result showed that the return of the SSE Fund Index put up the characters of non-normality and conditional heteroscedasticity, and the GARCH (1, 1) model has good fitting effect to the fluctuation of the funds index. Guo Xiaoting (2006) took three fund indexes including Zhongxin Fund Index as samples and empirically studied the fluctuation characters of clustering and asymmetry, and the result indicated that the volatility of the fund market possessed characters of clustering and leverage effect and had not obvious risk premium effect. But few relative domestic scholars studied the volatility of the open-end fund market, and the limitation of these researches was that they only studied one fund and didn't research the total market volatility of open-end funds.

Starting from the view of the total open-end fund market, through repeat experiments and comparisons, we selected proper model to implement fitting and tried to find out the total market volatility of the open-end funds.

## 2. Explanation of the model

Many financial time sequences such as the square differences of stock price, inflatable rate, interest rate and foreign exchange rate usually change with the time, but traditional mathematical economic model can not depict this character. In 1982, Engle put forward the ARCH (Auto Regressive Conditional Heteroscedasticity) Model could better depict the change of difference when he studied the problem of British inflation. In 1986, Bollerslev introduced the lagged item of the residual difference into the difference equation of the ARCH model, and got the generalized ARCH model, i.e. the GARCH model. The concrete form of the GARCH (1, 1) is

$$y_t = \beta' x_t + \varepsilon_t$$

$$\varepsilon_t | \Psi_{t-1} \sim N(0, h_t)$$

$$h_t = \omega + \alpha \varepsilon_{t-1}^2 + \beta h_{t-1}.$$

Where,  $\Psi_{t-1}$  is the information set in the former t-1 terms,  $\omega > 0, \alpha \geq 0, \beta \geq 0$  ensures the conditional difference  $h_t > 0$ ,  $\alpha + \beta < 1$  ensures the stability of the process.

All parameters of the GARCH module have the non-negative limitation, which increases the difficulty of the

estimation. In 1990, Nelson put forward the exponential GARCH model (i.e. EGARCH model) which loosened the non-negative limitation to the parameter, and other conditions didn't change, the conditional difference equation of

$$\text{EGARCH}(1, 1) \text{ was } \ln h_t = \omega + \alpha \frac{|\varepsilon_{t-1}|}{\sqrt{h_{t-1}}} + \gamma \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} + \beta \ln h_{t-1}.$$

Where,  $\gamma \neq 0$  indicates the asymmetry of the information, and when  $\gamma < 0$ , the leverage effect should be significant.

Another model which is extensively applied model is the GARCH\_M model, which introduces conditional difference into the mean equation. When other conditions don't change, the mean equation is  $y_t = \beta' x_t + \delta \sqrt{h_t} + \varepsilon_t$ .

Where,  $y_t$  represents the expectative income,  $h_t$  represents expectative risk. And this model can reflect the relation between the income and the risk.

### 3. Empirical analysis

#### 3.1 Data explanation

The adoptive data in this article is the Zhongxin open-end fund index, which is the index computed according to net values of all stock-type and bond-type open-end funds. The data time is from 2 Jan, 2003 to 21 Nov, 2006. All data come from the website of Zhongxin Index Web.

The daily return of the fund index is denoted by the first order difference of the logarithm of the fund index in neighbor business days, i.e.  $R_t = \ln(P_t) - \ln(P_{t-1})$ . Where,  $R_t$  represents the return of fund index in t'th day,  $P_t$  represents the fund index in t'th day. We apply the EVIEWS5.0 to implement data processing.

#### 3.2 Depictive statistics of the sample sequence

Implement basic statistical analysis to the return sequence  $\{R_t\}$  of open-end funds index, and we can obtain the histogram and the relative statistics of the sequence distribution (Figure 1) and the tendency of the return rate (Figure 2).

From Figure 1, the Skewness of the return sequence,  $S=0.378513$ , the Kurtosis,  $K=7.074750$ , and comparing with standard normal distribution ( $S=0, K=3$ ), it presents obvious right skewness and the character of "high kurtosis and fat skewness". The test value of Jarque-Bera is 670.6060, which is far bigger than 5.99, the critical value on 5% of the notable level, so the return sequence doesn't obey the normal distribution.

From Figure 2, the fluctuation with big extents closely follows the large fluctuation of the return sequence, and the fluctuation with small extents closely follows the small fluctuation of the return sequence, i.e. the fluctuation of the time sequence has the character of clustering.

Implement ADF (Augmented Dickey-Fuller) test to the return sequence. The sequence fluctuates around the mean value, and the trend doesn't exist, so we can select the regression model without time tendency to test the sequence. The t statistics of ADF test is -30.25583, which is obviously smaller than the MacKinnon critical value on 1% of the notable level, -3.439531, so this sequence has no unit root, and this sequence is stable.

#### 3.3 Establishment of the model

##### 3.3.1 Analysis of modeling

First, we implement modeling analysis to the return. From Figure 3, the pertinence of the index return is weak, so we can think it has no pertinence, so it is inapplicable to adopt the ARMA (p, q) model. We consider adopt the following regression analysis to the return sequence.

$$R_t = c + \varepsilon_t \quad (1)$$

Further implement the ARCH test to the residual difference of the regression equation (1) by means of the Lagrange Multiplier Method, and the test result of ARCH (1) effect is seen in Table 1.

In Table 1, the F statistics in the first row is not exactly distributed and they can be references, and the LM Obs\*R-squared values and the concomitant probabilities of the test are in the second row. The concomitant probability of the ARCH (1) effect test,  $p=0.000004$ , which is far smaller than the notable level, 0.05, so the ARCH (1) effect exists in the residual sequence. In the same testing method, when  $q > 10$ , the test is still notable, which indicates the high order ARCH (q) effect exists in the residual sequence, and it is applicable to fit by the GARCH type models.

##### 3.3.2 Establishment of the model

From above analysis, we can see that the heteroscedasticity and the GARCH effect exist in the return sequence of

open-end fund index, so we can select GARCH (p, q) model to estimate and predict the fluctuation. We use three models, GARCH (1, 1), EGARCH (1, 1) and GARCH\_M (1, 1), to implement modeling for the return sequence of open-end fund index.

From Table 2, in the mean equation, the estimation of the constant is outside the confidence limit. But according to Nelson's research result (1990), it doesn't influence the estimation of the model. In the conditional difference equation, GARCH (1, 1), and GARCH\_M (1, 1) can better explain the data. In the EGARCH (1, 1) model, the corresponding value of  $p$  to the coefficient  $\gamma$  is 0.3467, which is bigger than its corresponding critical value, 0.05, so we can not reject the dummy hypothesis,  $H_0: \gamma=0$ . The EGARCH model can not better explain this sequence.

After use GARCH (1, 1), and GARCH\_M (1, 1) to express the difference equation, we implement ARCH (1, 1) effect test to its residual difference, and the ARCH (1) effect test result of the model residual sequence is listed in Table 3.

The concomitance probability of the test statistics,  $p$ , is far bigger than the notable level of 0.05, so on the reliability of 95%, we can think the residual difference of GARCH (1, 1) model doesn't possess the ARCH effect.

In the same way, we implement the ARCH (1) effect test the residual difference of GARCH\_M (1, 1) model, and the result shows there is no ARCH effect.

### 3.4 Analysis of the empirical result

(1) According to Zhou Zhefang and Li Zinai's research result (2000), the kurtosis coefficient (K) of Shanghai stock market and Shenzhen stock market is about 6.89, but this value of US stock market is about 3.8, and comparing with mature stock market, China stock market has strong color of gamble. From Figure 1, the kurtosis coefficient of China open-end fund market is about 7.07, which is close with the kurtosis coefficient of China stock market. That indicates that the open-end fund market of China has strong color of gamble, and investors' investments to the open-end funds are not long-term investments.

(2) The return sequence of fund index doesn't obey the normal distribution, which distribution presents the character of high kurtosis and fat skewness, and has obvious fluctuation clustering and conditional heteroscedasticity.

(3) The GARCH (1, 1) model and GARCH\_M (1, 1) model can better fit the return sequence of open-end fund index. From Table 2, we can see that both the value of AIC and the value of SC of the GARCH (1, 1) model and GARCH\_M (1, 1) model are less than -6, and the maximum logarithm likelihood function value is very big, which indicates they have better precisions.

(4) The EGARCH (1, 1) model fits very badly, and the coefficient  $\gamma$  is not notably different to 0, which indicates that the open-end fund market has not obvious fluctuation asymmetry, i.e. the price falling information has larger influences to the market fluctuation than the price rising information. That also proves that China institutions and individual investors are not more sensitive to the negative price change than the positive price change, and their investment concepts are not mature, which will easily induce the false high market price and form bubbles.

(5) In the GARCH (1, 1),  $\alpha + \beta < 1$ , which proves that the model is stable and we can implement various tests to the model. At the same time, it also can be used to measure the durative of the influence to the return from concussion.  $\alpha + \beta = 0.9669$ , and the value is very big, which indicates that the reactive function of China open-end fund market volatility to the concussion is a relatively slow speed attenuation. The exterior concussion will influence the return of open-end fund market in a long durative term.

(6) In the GARCH (1, 1), the estimation value of the coefficient  $\delta$  is 0.292597, which is notably positive, and that indicates the positive pertinence exists between the return and the market volatility, and investors have some certain requirements of compensation to the market risk. This value represents the estimation of relative evadable risk coefficient. Chou's research (1988) showed that in some mature stock markets such as US and England, investors' evadable risk coefficient is in 2~6. So, China investors' evadable risk coefficient is in the very low level and their behaviors possesses very large character of gamble.

## 4. Conclusions

(1) The open-end fund market of China has strong color of gamble, and investors' investments to the open-end funds are not long-term investments.

(2) The return sequence of fund index doesn't obey the normal distribution, which distribution presents the character of high kurtosis and fat skewness, and has obvious fluctuation clustering and conditional heteroscedasticity. The GARCH (1, 1) model and GARCH\_M (1, 1) model can better fit the return sequence of open-end fund index.

(3) The volatility of open-end fund index has no obvious character of asymmetry, so the EGARCH model is not

applicable to used to fit this time sequence.

(4) The exterior concussion will influence the volatility of open-end fund market in a long durative term.

(5) The positive pertinence exists between the return and the market volatility, and investors have some certain requirements of compensation to the market risk but the investor evadable risk coefficient of China is in the very low level.

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Table 1. The test result of ARCH (1) effect of residual sequence

<i>F</i> -statistic	21.60002	Probability	0.000004
Obs*R-squared	21.15699	Probability	0.000004

Table 2. Model fitting of return sequence of open-end funds index

		GARCH(1,1)	EGARCH(1,1)	GARCH_M(1,1)
Mean equation	$c$	0.000358 [0.0973]	0.000387 [0.1016]	-0.001663 [0.0843]
	$\delta$	-	-	0.292597 [0.0380]
Conditional difference equation	$\omega$	2.27E-06 [0.0000]	-0.568048 [0.0000]	2.18E-06 [0.0000]
	$\alpha$	0.087887 [0.0000]	0.195284 [0.0000]	0.092188 [0.0000]
	$\gamma$	-	0.013714 [0.3467]	-
	$\beta$	0.878987 [0.0000]	0.956548 [0.0000]	0.876105 [0.0000]
Value of AIC		-6.961704	-6.963215	-6.965030
Value of SC		-6.941031	-6.937374	-6.939188
Maximum logarithm likelihood function value		3265.558	3267.266	3268.116

Note: The values in [] are the values of P.

Table 3. The test result of residual sequence ARCH(1) effect of GARCH(1,1)

<i>F</i> -statistic	0.522862	<i>Probability</i>	0.469805
Obs*R-squared	0.523688	<i>Probability</i>	0.469273

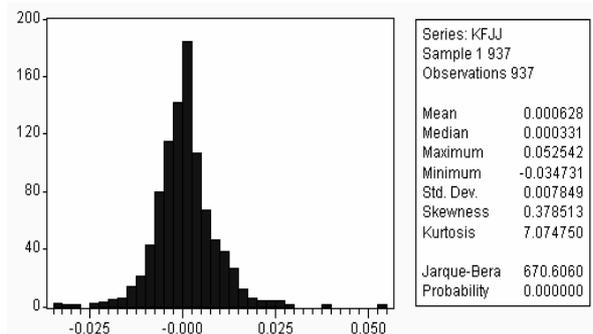


Figure 1. Histogram of the Return Sequence of Open-end Funds Index

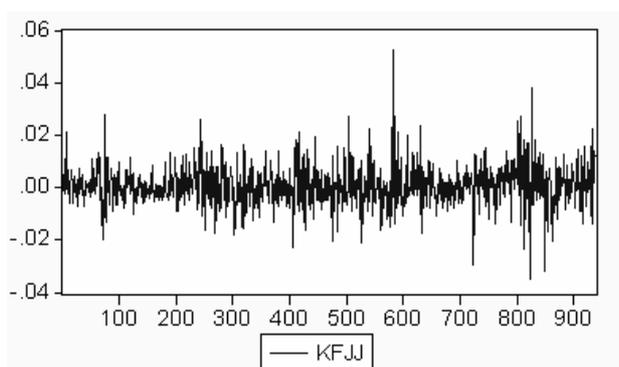


Figure 2. Tendency of the Return of Open-end Funds Index

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
		1 0.006	0.006	0.0394	0.843
		2 0.009	0.009	0.1105	0.946
		3 0.026	0.026	0.7690	0.857
		4 -0.026	-0.027	1.4158	0.841
		5 -0.012	-0.012	1.5588	0.906
		6 -0.035	-0.035	2.7007	0.845
		7 0.013	0.015	2.8699	0.897
		8 0.005	0.005	2.8907	0.941
		9 0.044	0.045	4.7208	0.858
		10 0.049	0.046	7.0158	0.724
		11 0.077	0.076	12.617	0.319
		12 -0.012	-0.016	12.750	0.387
		13 0.017	0.017	13.036	0.445
		14 0.062	0.062	16.653	0.275
		15 0.030	0.039	17.522	0.289
		16 -0.007	-0.006	17.571	0.350
		17 -0.077	-0.078	23.314	0.139
		18 0.024	0.021	23.874	0.159
		19 -0.055	-0.055	26.748	0.111
		20 0.014	0.013	26.931	0.137
		21 -0.060	-0.073	30.382	0.085

Figure 3. Relation of the Return Sequence of Open-end Funds Index

# Collapsing and Reconstructing of Building Language

## Reflection on Development and Actuality of the Traditional European Architecture in Qingdao City

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### Abstract

Buildings have their own ways of expressing themselves and this kind of expression needs to be put in a certain proper occasion. And this essay aims to find the way how to express a building more perfectly after master the modern construction technologies by reflecting on the Catholic churches and the nearby building blocks in Qingdao City.

**Keywords:** Traditional European building, Building process, Building language

The Traditional European Architecture in Qingdao City and the nearby building blocks around them in Qingdao are witnesses of the history of this city. More than 100 years ago, the western colonizers arrive and what followed was nothing but the bitterness of Chinese people and the so called western civilization. However, these things provide a specific real first-hand material for us today. This kind of building is quite different from our traditional building systems which are unchangeable after so many years, therefore, leaves a great influence on the sculption, function, structure, material, building as well as the management of the buildings for us today. Thinking back one hundred years ago, how great impact it may brought to us when the Catholic churches were set up on the harbor of Qingdao. Now, when we have enough economic strength and technology basis to support our city constructions, let us take a look back and watch this building blocks again to see if we can also master the language of the building when we master the modern building technologies.

### 1. The development process of Qingdao's traditional European architecture

Warner young scholars in Germany, "German architectural art in China," a book written in the preface of such a paragraph, "The Europe of the Asian style of the city still have eclecticism and modernism, Art Deco and performance, and is the best Code of the construction, which is building the same period a direct reflection of Germany, we can see all kinds of popular tendencies in Germany in the form, but on the other hand, there are also some highly personalized, and the trend to be the first to walk in the building, Qingdao is the only place to see. "Qingdao foreign buildings mainly concentrated in the mountains, the Hong Kong Road, Taiping Kok, Ba Taiwan, and other places. Major construction including the Governor House, Catholic, spent stone floor, Ocean University, and other buildings.

#### *1.1 Qingdao before the liberation of the colonial era to urban construction stages and its two construction peaks*

##### 1.1.1 construction phase

- (1) 1897 -1914 the Germany Occupation
- (2) 1914-1922, the Japanese Occupation
- (3) 1922-1929 rule in Northern Government
- (4) 1929-1938, the national government rule
- (5) 1938-1945, the Japanese Occupation
- (6) 1945-1949, the period of Kuomintang rule

##### 1.2.2 Two peaks of the building

- (1) From 1900 the initial planning to the expansion plan in 1910, all quoted European urban planning experience and advanced technology, with the colonizers own words, the difference of Qingdao with all the colonial cities is that The facilities in accordance with the principle of the same generation to do is urgent. "Therefore Qingdao is a good example of reflection of the contemporary city in Europe. And during this period mainly German-style oriented. In the southern slope of Signal Hill the sophisticated entitled "The Provincial Commander floor," Rough Road Park in Hubei Germany plastic Australian Police Department, Zhejiang Road, the majestic Cathedral, as well as Jiangsu Road solemn Christian churches, which are all typical German style architectures.

(2) In the 1930s, architects from all countries gathered in Qingdao, creating another construction climax after 1910 in the history of Qingdao. Its representatives are Badawan Village. There are Russian type, German, Japanese, American and Danish-style, Greek, Spanish-style, Switzerland, and other 24 countries-style architecture, which has been described as a "million construction of the Expo." Qingdao City Badawan building not only colorful, and can be said to be set epitomize European architectural art. The famous architects Horie in Japan read Badawan courtyard of the many, not without deep feeling, said: "On the one hand, the construction of Qingdao is a continuation of tradition, declared at the same time, the advent of a new era, in a sense it can be said Architecture is a bumper harvest of the times."

*1.2 The reason why this stage will express the statements of Qingdao's construction is that this can compare the contemporary architecture in Europe in the development of Qingdao is how reflected.*

Qingdao's Europe buildings will be put into the history of the development of modern architecture in which to compare the architectural language of the development and changes.

Qingdao, the first of the modern urban planning is the significance of the study in Germany in 1859, the East Asian tours. Then in 1869 and 1870 in Qingdao on the geographical environment transport, resources and carried out a detailed analysis and inspection, to be occupied in 1897 in Qingdao in 1900 to start preliminary planning and construction works long as 41 years. So the start of city construction of Qingdao is a typical modern city with the beginning of significance. The model of complete Western cities construction. From the mid-19th century to the mid-20th century, during this period of time, precisely is thought crucial period of modern Western architecture, and Western architectural language in the trend of the times is in the development and changes.

#### 1.2.1 An Eclecticism Building

From the stage 19th century to the 20th century, this is a period when China's feudal dynasty by day weakening farming civilization and the collapse of the Western powers began to colonial expansion, industrial civilization is full of exuberant vitality of modern Western economic / thinking / culture of a period of great development. With industrial social development, the need for a variety of construction to meet a variety of requirements. Eclecticism is the construction representative during this period, they do not stress fixed a popular architectural style. Arbitrary imitate the history of various architectural styles, the combination of various types of construction or free form, without a certain set of the French, only emphasizes balance, pay attention to pure beauty of form. And so the Greek, Roman, Byzantine, medieval, Renaissance and Oriental-style building in the city offered Ran mixed situation. Germany is also the same period of the case, in which many old buildings in Qingdao also have reflected.

During this period the development of industrial to bring new construction materials. In the 19th century reinforced concrete structures, steel and cement applied to a leap in housing construction changes. Along with the development of mathematics and mechanics, the late 19th century to master the general structure of the inherent laws established by the need for practical engineering theory and the calculation method of forming the structure of science. The characteristic of this modern architecture, Qingdao Catholic Church is an example. Catholic Church for the internal structure of reinforced concrete structures. But in the external form is entirely built on the traditional European architecture. Catholic Church from the top of the reinforced concrete pouring flattened, rather than the traditional church an elevation of the dome. This seems to span today is not a problem, but 100 years ago, it is a masterpiece of technology. But its external front, and strong special song embodies the characteristics of architecture, building up the overall line, tip against the sky, and gives us a heavy burden to get rid of the feeling of all the earth, and thick brick walls and narrow small window, a semi-circular arch volumes and decorative layer singled out the door frames and tall towers, while the construction of a Roman-style characteristics.

The original Japanese students teaching building of Ocean University, are the Japanese architect's work of Germany for imitation. Seem to confound truth to the point, if no one will tell many people will think that this is a German architect's construction from the hands. In 1896 the building of the headquarters of the Bank of Japan, Japan marked the rise of modern architects, and architects to mean that Japan can ease the use of Western architectural language. The teaching building is a good example. Overall, the construction eclecticism is still conservative thought, was not in accordance with the emergence of new materials and new construction techniques to create corresponding to the new architectural forms.

#### 1.2.2 The seeds of modern architecture.

Qingdao Governor's residence was built in 1905 as a "German architectural art in China," the highest representative of the German architectural style typical William times with youth camp style approach of combining model, a variety of creative architectural art inclusive language and cultural ideas. In the Governor's residence a small protected steel frame structure, is now a studio. It is the use of steel - glass structure. From the 1851 World Expo in London for the construction of the factory started production of glass and iron components for building materials,

the use of prefabricated construction methods into large-scale exhibition adequate light construction. To the 1914 workshop to turbine - a milestone in the history of modern architecture, the first truly modern architectural development process. This can be seen steel - glass structure of the value of very important, it was the birth of modern architecture in the process of solidification of a moment, and this moment in the construction of Europe from the center of China. You can feel the beat of that era designers explore new thinking and the architectural forms of courage. At the same time, modern industrial development also requires corresponding to the architectural forms, in order to meet the needs of industrial production, the construction time to build the station, the locomotive plant to meet modern industrial production facilities. Founded in 1903 in Qingdao Brewery cassette appearance, without any decorative rectangular windows, large-span flat roofs, can be demonstrated some characteristics of modern architecture.

### 1.2.3 Modern Architecture

Since modernism from the 1930s to the rapid spread of the rest of the world regions, the middle of the 20th century has finally become the dominant modern architecture trend. Le • Modern Architecture Kebuxixie is the main advocate; in 1923 he published his famous work "to the new building," the book is a residential "living machines." A new five building characteristics in 1926: 1. Housing bottom of the adoption of a separate pillar 2. Roof garden, 3. Free plane; 4. Long horizontal window 5. Free Facade. Huiquan Bay in the East China Sea the hotel in 1936 built, reinforced concrete structure six buildings, local Layer 7. Plane with a free room used for the wrong stack layout, and 88 of the rooms can be direct to see the sea. Facade design level of scattered, light blue for the external walls, from the far to see like warships. Praised as an important modern architecture representative. We can see from this, Qingdao traditional architecture is the development of a fully synchronized, and the times, from the building to a modern architectural eclecticism over this process, can be found conclusive evidence.

### 1.3 The mutual process of adaptation of traditional European architecture and the local culture.

European architects in the construction of housing at the same time try to adapt to China's architectural traditions. For example, the "China school boy" for the Chinese people and run by the "Flower Hospital" on the use of the traditional Chinese courtyard style. Germany typical construction truss structure to support cross-cutting wood, a solid role, the Governor's residence early, navy hotels have adopted this method of decoration, and in the late architects know that this is in China's construction committing taboo, it has disappeared from the scene of the. At the same time, housing design maintain consistency in style, which is reflected in many construction using Hongwa, yellow walls, and change the roof, tiles style changeable. Construction of decorative detail was obviously popular European continent by the "new art movement" edify, architectural modeling novel and uniquely, to be generally green, with the surrounding architecture and the environment, resulting in the building of a harmonious artistic effect.

## 2. The analyzed for status of Qingdao's traditional European architecture today, the Old City of Qingdao traditional European architecture and planning ideas with the changes of the times is a change quietly.

From the overlook above, most trees hidden under the traditional Continental modeling of different groups have been gradually building some modern architecture by segmentation. These are mostly from Qingdao Lau Fau Shan quality granite stone vault, the overlying red Tongwa traditional architecture from every point of view, are quite ornamental. The tip of the Gothic, Denmark-ramps items, Greek columns, the Rome's are so beautiful. However, when we entered them, the traditional architecture of the atmosphere created by the gradual isolation and destruction. Renovation of traditional architecture of uneven and some of the original building has changed. New construction and a far cry from the original architectural style, is not coordinated. Therefore, the traditional European architecture Qingdao causes of the current situation analysis and reflection, it is very necessary.

### 2.1 The expression of present building language which was taking the old city centered by Zhongshan Road as an example

The old city centered by Zhongshan Road was planed by Germany designer in 1900 which comprises a great deal of Germanic style building blocks. And these buildings were built just in the eclecticism period of European building. And these Catholic churches in Qingdao city are the representative works of this building block. The Catholic Church first built in 1932 was called St. Emil Church which was designed by German stylist Arthur Bialucha according to Gothic and Roman architecture style. It was finished in 1934 and then became the highest building at that time. Despite the fact that its interior part was constructed with reinforced concretes, its exterior part was built in a traditional European way with its beautiful sculptures and elegant decorations. The top of the tower flies into the sky while its roof is covered by red tiles. Generally speaking, the church looks huge, elegant, simple yet sophisticated. At that time, the first thing people saw on the boat sailed from the front sea was nothing but the aerial tower top.

At that time, the bud of modern architecture had emerged. (Modern architecture emerged at the end of nineteenth century and flourished in the first fifty to sixty years of twenty century.) However China was in the area of war chaos. The traditional social system had been broken and new system had not been established, not even to talk about the theoretic basis of modern architecture and design language. German great architecture designer Ludwig Mies van der Rohe (1886-1969), one of the founders of western modern architecture, brought forward the idea of "less is more" which could be realized by the materials of steel and glass. In his eyes, steel and glass are new materials; they could be a new architectural language when they combined with the new structure. On the other hand, Ludwig Mies van der Rohe preferred to purify the form of the architecture and to abandon all the redundant structure without function. Only the geometric structure of lines, right angles, rectangles and cuboids left, therefore we may see Seagram Building with steel frame and glass walls as well as today's Parkson. (Seagram Building, jeans, coke, rock music represented American after-war culture of twentieth century)

And nowadays, in a proper position of the Qingdao Trestle, you will see that the skyscrapers, representing the modern and high technology stands quietly in the opposite of the Catholic church which represents the highest building achievement in the middle ages. But compared with the hugeness of modern skyscrapers, the Catholic Church seems so small and low. Do we really enter the modern time? Are we by-standers, destroyers, or followers? Or are we the real master of the building who have really mastered the building languages based on the modern industries.

The languages of the building have become a chaos.

The Catholic Church is high and sublime, but when we walk to the dormitory building on the other side of it, this kind of feeling disappears. This building seems so humble and so the language expressed by this building is quite unfit with the things expressed by the Catholic Church. And on the other hand, the skyscrapers on the opposite of the church seem so huge and high. Therefore, the harmonious building environment is destroyed. We can also see that the lamp boxes hung in front of the nearby shops are also quite unfit with these ancient buildings. A city without its past is a superficial hollow city. When people talking about Shanghai, they will think about the Bund and when they talk about The Bund they will think about all kinds of life there. These all because the city has some memorable things. But unfortunately, what embarrasses us is that on today's Zhongshan Road, there are only rows upon rows of shops and peddlers of fish. And the finding of a traditional formal coffee bar is by no means an easy work. This is a kind of lose and the degradation of the culture.

## *2.2 The function of building language in architecture*

Nowadays, building language appears as a more abundant mode. Classical language, modern language and future language mix with the multi-cultural impact. One of the serious problems we are facing today is the polarization, collapse and reconstruction of the building language. Just as the case in point, what is wrong does not lie in the buildings themselves because all these building are built under standard designs. Why do we lose the inner meanings of the buildings even when we have mastered the modern building technologies? On one hand, we can not create our own building language, but on the other hand, what is more worse is that we are destroying the few remaining historical buildings. The master of the building technologies does not mean that we can have a good use of its language. This group of buildings in Qingdao city, whether it was built 100 years ago or is newly built, is all built under the western model. The former is pure while the later is built without adding any Chinese elements, but what is the reason why it seems so unharmonious when these two are put together?

As we all know, the foremost value of architectural art lies on its relationship with cultural integrity. It is the reflection of one culture circumstance with quality of integrity, inevitability and eternity. Auguste Rodin (*Grace of Cultural Monument* by Mo Xiao) ever said that all France was included in our churches like the whole Greece was comprised in the Parthenon. Architecture and architecture group convey a kind of culture, a spirit and an attitude through their forms and functions. The field of architecture influences the people and their lives all the time. When walking on the old streets of Qingdao City, which was paved by stone, people will feel that time flow back. Walking upstairs, getting across the floors, people may enjoy the beautiful scene of blue sky and sea. When sitting in front of the Catholic Church, touching the massive stone walls, people will have a great aesthetic feeling. The tall phoenix trees and elegant villas shape the temperament of Qingdao City, which is harmonious and great. Maybe many people do not understand European culture, but the beauty that these outstanding architecture shows may beyond the barrier of different culture. Architecture uses its own language convey the character. It bears the fruit of common wisdom of human beings.

## **Conclusion**

The building are built and used by the people and so it carries the thinking and feelings of the designers. When walking on the old streets of Qingdao, people can see the special building treatment in a common wall, an ordinary

chimney and a corner, which comprises the understanding of architect in simplicity. Therefore, the language of the building is by no means of an isolated and closed system. On the contrary, it has a close relationship with the politics, economy, philosophy, drawing, music, literature, climate as well as the geography. The bad use of it always leads to the loss of languages inside it. The master of building technologies does not mean the master and good use of the building languages. Now, let us have a look at Japan. From 1896, with the finish of Japanese Bank Headquarter which symbols the rise of modern Japanese architects, it takes them more than 100 years and three generations' hard working to turn the western building language into their own language. And this process is by no means a plain road but accompanied by many kinds of mistakes and crooked roads. Therefore, the master and change of the building languages is a process which needs the hard working of some people.

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# Haldiram's: India's Entrepreneurial Answer to the McDonald's and the Pizza Huts

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## Abstract

Western companies are opening up their factories and offices in India in an unprecedented manner and thus creating a need to study the organization and management of their Indian counterparts. The emergence of India as an economic power over the recent years has created a need to understand the way business is carried out in that part of the world. Also important is to realize how businesses are founded and structured in India. Many Indian companies were family businesses to start with and even today some of the biggest companies listed on Indian stock exchange continue to be owned partly by the families. This research work attempts to study a typical Indian family run business, its inception, its aspirations, the challenges faced in the context of an emerging economy and the possible roadways to map the future. With this aim in mind a classic case of Haldiram's is presented here and analyzed with a two pronged objective of presenting it in research conference and to be used as a case study for discussion in class room environment. This work is based on an interview with Mr. Pankaj Agrawal, Director, Haldiram's.

**Keywords:** Emerging markets, India, Entrepreneurship

## 1. Introduction

The emergence of India as an economic power over the recent years has created a need to understand the way business is carried out in that part of the world. Also important is to realize how businesses are founded and structured in India. Many Indian companies were family businesses to start with and even today some of the biggest companies listed on Indian stock exchange continue to be owned partly by the families. Reliance Industries, Tata, Birla, SRF, Bajaj, Dabur, Wadia, Godrej, Kirloskar, and Haldiram's etc are primarily family run businesses. Western companies are opening up their factories and offices in India in an unprecedented manner and thus creating a need to study the organization and management of their Indian counterparts. The interest in studying Indian businesses is also recent (Gupta, 2005; Sharma, 2000 & Veliyath, 2004) and there is a great scope and need to research into this field.

### 1.1 Research Question

This research work attempts to study a typical Indian family run business, its inception, its aspirations, the challenges faced in the context of an emerging economy and the possible roadways to map the future.

With this aim in mind a classic case of Haldiram's is presented here and analyzed with a two pronged objective of presenting it in research conference and to be used as a case study for discussion in class room environment. This work is based on an interview with Mr. Pankaj Agrawal, Director, Haldiram's.

### 1.2 Empirical Context

Haldiram's is a multi-cuisine Indian fast food restaurant. They are the leaders in terms of Indian fast food concept. They are one of India's largest snacks and sweet manufacturers too. Haldiram's was the only company, which emerged in the way it did. They have their establishment in many parts of India viz Delhi, Gurgaon, Nagpur etc. Its products are exported to several countries worldwide including United Kingdom, USA, Canada, Australia, Srilanka, Singapore, Malaysia, South Africa, Indonesia, Qatar, Hongkong, Japan, Kenya, North Korea, Nigeria, Mauritius, Zambia and Bahrain.

Indian fast food is totally unorganized. There are no Indian fast food chains with which one can say that they are Haldiram's competitor. It's totally unorganized.

Haldiram's family is not from a restaurant background. They have learnt from the customers. The customers have taught them how to manage the restaurants. They didn't have any restaurant; they don't have any professional

degree or anything relating to the restaurant business. So it's all learning at the grass root how to manage it and they have learnt from the customers.

They are quite fast in serving to the customers. They don't take too much of time. They haven't done any study but as they can see that they don't take more than 3 to 4 minutes in serving the customers in any area after he reaches the service counter.

## **2. Background**

Pankaj Agarwal is the fourth generation of the Haldiram's family business. His great grandfather founded in 1940s. Pankaj did his schooling partly from Delhi and Mussorie and completed his undergraduate studies in commerce discipline from Hansraj college, Delhi. He then went on to get his MBA, at Business School, Laussane, Switzerland. After coming back to India, he joined his family business. He is currently the Director of Haldiram Manufacturing Company Limited (HMCL).

Pankaj intends to learn everything on his own. He is interested to see each and every product, how is it manufactured, what is the taste, what are the ingredients.

According to Pankaj, his strength lies in understanding the people he is working with and in understanding the needs of the customers in terms of taste preferences. He assesses the strengths and weaknesses of his company on continuous basis and has a clear vision for Haldiram's. He says, "there is no chef on whom I can depend on who will control the quality of our products and since, it's a manual work, there are chances of getting the quality upside down. So, you have to have the knowledge otherwise they can fool you."

Before implementing anything Pankaj first discusses it with his father as his father has a wealth of experience and practical knowledge. He has been in this business for more than 40 years.

### *2.1 History of Haldiram's*

In the beginning, it was only one company Haldiram's. That was in the 1940s when it started. As the time moved on, Pankaj's great grandfather's sons and their brothers, they spread all across India. They started using the brand name Haldiram's.

This particular dynamism which came about in the food business for Haldiram's, happened during early 1990s in terms of professionalizing the business and expanding it. Pankaj's father was responsible for that. Their family moved to Delhi in 1983 from Bikaner where they originally belong to. After moving to Delhi, Pankaj's father started a small shop in Chandni Chowk area of old Delhi. The brand name got famous very soon because of the quality of snacks made. In 1992, they set up their first manufacturing unit in Mathura Road, Delhi and that is the time from when they started marketing their products because earlier they used to sell only at their shop. Wholesalers or shopkeepers used to come and they used to buy from there, but they didn't have any sales force or any marketing network. So, in 1992 they launched a proper package.

1983 to 1992 was the first phase which was essentially at Chandni Chowk shop, nothing more than that. That was the time when Haldiram's got settled in Delhi and their brand name got publicized.

They started marketing when they began their manufacturing unit in 1992 at Mathura Road. It was from 1996 or 1997 that they started their exports. So, it's only about fifteen years that the brand name has actually taken off in terms of becoming national.

### *2.2 Haldiram's Marketing Mix*

For namkeen, it was decided earlier that they have to market this product as a branded product and sell it all over the world because at that time in 1992, no branded namkeen as such was there anywhere in the country. So, they were the first one to start branded namkeen thereby exploring and developing the market. Their namkeen packaging is a separate company, but the sweets are manufactured at each outlet.

Haldirma's used to make chole-bhature and they had 50 to 60 different kinds of products. They soon discovered that customers are not interested in all the products. There are some key products for which the customers come to their place. A customer won't come especially to eat Pizzas or burgers to their place. They will go to McDonald's or Pizza Hut. So, they had to focus on their strengths in terms of the products for which the customers from very far off place came to their restaurant.

Haldiram's have their expertise in dosas, ice-creams, Indian sweets and North Indian snacks which include samosas, pao bhaji, chole bhature and namkeen etc. This will continue to be the dominant positioning of Haldiram's.

When they started their manufacturing unit in 1992 at Mathura road, they started only with the showroom. They didn't have restaurant at that time and somewhere around 1994 to 1996, Pankaj's father started the fast food concept

but only with very limited products. Now, the result is that fast food is growing more than the sweets and snacks. Their brand name got even more popular because of the fast food concept. Mathura road outlet proved to be the turning point in Haldiram's business history.

According to Pankaj, Haldiram's don't have any defined vision as such. They just want to serve the best to the customers. That's the only vision.

The production capacity of namkeen in Mathura road is limited because of the space constraint. So, they started production in Gurgaon about a few years ago. They planned to shift all of their namkeen manufacturing to Gurgaon from Mathura Road.

### *2.3 Systems Viewpoint*

Haldiram's entry into the fast food restaurant business was merely a coincidence. They didn't focus on it in order to start a fast food restaurant in 1996-97. Their main expertise is in Indian sweets, namkeens, etc.

The other units are Mathura road, Lajpat Nagar and Chandni Chowk. They are all old units. The people have got used to working in particular fashion. So, it will be difficult for them to change.

Haldiram's have not conducted any study to improve their existing systems. They are not a very old company with set systems in place. It is still a very small company according to international standards, it's a family owned company with almost none external intervention. So, professionalism is still missing. Everything is happening on traditional basis. There is no system as such.

Pankaj is responsible for the Gurgaon project. They are implementing all the systems there which they could not implement fully at the Mathura Road facility. These systems include purchasing systems, maintenance system, quality systems, financial and production systems etc. This focus on system is because of their perceived weakness in this area. They have some internal weaknesses that they want to overcome. They could do it in Gurgaon as it was a green field project. A little bit of experimentation is involved to get the best results. If those things are successful here then they can duplicate the same in other units because those units as well.

They are not bringing any professional input yet to try and help with this system creation part because their job is more labor intensive and they know their people better than any external agency. Also they have to do it in their own way. They cannot hire any food technologist because that way they will be disclosing their recipes.

At present in Gurgaon they are looking more into:

- (1) Controlling their costs,
- (2) Focus and study more on customer's demands

### **3. Haldiram's quest to become a global brand name**

Pankaj thinks that the Indian fast food has not become global because of the characteristics of the product like Rajkachauri, as one have to have ten different kinds of inputs to add to make a Rajkachauri. For example, curd and then there are two or three different kinds of spices. There are also a couple of ingredients which don't have a long shelf life. The other reason could be the fact that none of the Indian companies have invested into packaging in order to increase the shelf life of a fast food product. In contrast; the western products like burgers, pizzas, chips etc are available in the western markets in a frozen form and has a good shelf life. There is no problem for the western companies to send their products from America to India. They package it, freeze it and send it across due to frozen technology and frozen supply chain.

Haldiram's can be positioned as an Indian fast food restaurant. It's not a western fast food restaurant and does not compete with Pizza Hut or Dominos or even McDonald's.

There is a big market, world over in terms of Haldiram's products to become a potential global brand name. Everyday they get e-mails from businesses in many countries which are interested in opening up fast food restaurant and asking for obtaining franchisees.

#### *3.1 Challenges faced by Haldiram's*

A major problem they face in day to day working in food industry is that the customer's in India prefer everything fresh, they are not very much interested in packaged food even today, apart from namkeens. Like the perishable sweets, if you keep a box packaged like you packaged it yesterday and it says shelf life of 20 days. He will again question that I want it fresh, give me fresh sweets, pack it in front of me.

So, that is a challenge, which is driving Haldiram's to develop improved packaging. They have a fully equipped laboratory, chemists etc. They haven't hired any food technologist to develop their packaging. They are doing everything in house.

### 3.2 Competitors

South Indians entrepreneurs can come into north with only South Indian food. So, their positioning and Haldiram's positioning is different. If a customer specifically wants to have a south Indian meal then he/ she might go to a South Indian restaurant. But if each and every member of the family wants to have something different then Haldiram's is definitely their first choice.

Today, Lehar, Pepsi and Frito Lay are the main competitors of Haldiram's in the namkeen and snacks segment and apart from that there is no major competitor as such because the share of branded namkeen in India is not very big as a comparison of total sales of namkeen in the country. It is 20% or 30% at maximum of total namkeen sales all over India. If one goes to any city or village in India one will find dozens of local manufacturers who sell loose namkeen. So, it's very difficult to compete with them in terms of pricing. Quality wise, they cannot compete with Haldirma's but from the cost perspective it is difficult for Haldirma's to compete with them with their whole supply chain cost, distribution cost, retailer margins etc. it is very difficult to compete with them. In smaller cities and villages the customers want good quality but they cannot afford it. They want something of cheaper price. Out there, Haldiram's have a limited market share. According to Pankaj, namkeen is more than 90% of their total turnover and the fast food segment is only about 10%.

In namkeen segment, Haldiram's are still the leader. Pepsi is not near them in the country, but as and when they diversify from namkeen to other kind of snacks like potato chips or extruded snacks, Pepsi has more know how and knowledge about it because they have been into that business for a long period. So, in that area it will be very difficult for Haldirma's to compete with them in terms of technology and in terms of marketing.

They don't think that they have to fight with Pepsi. They have to create their own market because otherwise if from the first stage, they have it in mind that they have to fight with Pepsi then they would need a kind of marketing and advertising budgets. Then, they would need to be that strong that they could fight with Pepsi because they have fifty to sixty different products. Haldiram's are not going to do lot of advertisement. They have their own distributors. They will be distributing through them and it will be a very low-key kind of promotion simply because they don't have budgets.

Haldiram's strategy is not to engage in a direct fight with Pepsi but build one of their own markets and that's the only way they can possibly capture a niche segment of the broader market. This is more of a guerrilla warfare technique. It will be a slow process but that will be the right one because if one goes out straight and fight with Pepsi then it's very difficult to survive, asserts Pankaj.

### 3.3 Franchise opportunities

As stated earlier, Haldiram's are developing their own internal systems. Until and unless, they are strong in-house, they would not like to expand. Unlike their competitors Haldiram's don't want to dish out a lot of franchisees and expand very fast. They would rather like to grow steadily but at the same time have everything in control.

They are definitely thinking of giving their franchisees. They are not franchising across the board for all htier products, they would rather limit their variety. So, they will be focusing only on their core products like Indian chat, papri chat, golgappas, Indian snacks like chole-bhature, pao-bhaji, tikkis. They want to give out franchisees for that along with the sweets. They want to promote both of these products together in a branded format.

Haldiram's don't want to go far from Delhi so in order to have maintain control and face the initial problems more effectively. May be they can even take it in another way that they buy a place, they invest everything and they manage it in the way of franchisee. Like today, they manage each and every outlet personally. They go visit that place but that model they can take it in the form of franchisee, how to deal with the franchisee so that they can learn from it and at the same time, they don't affect their brand name also because that will be done everything in house. So, at anytime they can change the model. There is a vast scope in Delhi. They don't have any outlets in west and east Delhi. They are looking to start in Delhi to see how things turn up, customers reaction, turnover of the franchisee, costs etc.

### 3.4 The concept of frozen technology

Companies conduct studies for frozen pizzas, frozen burger but not for frozen samosas because of the low volumes involved.

In America, one can easily get frozen samosas or frozen parathas. That technology is already implemented there but in India since the infrastructure is not so good for frozen products, the whole cold chain is apparently missing or incomplete. Generally shops in India do not have a frozen refrigerator. So, for frozen products India will take time.

There are some Indian products, which could respond to that kind of freezing concept. Frozen samosas, frozen tikkisa offer a good starting point for the frozen technology.

This is the main reason why export market is the first market for this kind of frozen products or ready to eat vegetables. Whether, it's frozen or whether it's under normal conditions, export market is the first market. Indian market will take time.

Haldiram's would have to struggle to try and establish the Haldiram's brand name or the foreign companies may think in terms of Haldiram's becoming a sources to them and they use their brand name and sell it to the rest of the world. Pankaj agrees to this that they are open for tie-ups with big international companies which can buy frozen samosas and sell in their local markets as long as they are making money in that.

At present Haldiram's are researching the technology; the way it is done and then they are going to experiment it by freezing the products and discover the shelf life of the Indian products when frozen. They will also have to compare the taste between the frozen samosas and the fresh ones and find out whether it is acceptable to the public or not. To start with they will start the frozen concept in one of their outlets.

According to Pankaj, apart from food, there is no business that Haldiram's are looking to enter. It is only food that's their main expertise. If they go into manufacturing of anything, like televisions, there is no point doing that as it's not their core expertise. Anyway manufacturer of color TV are any way not making money. Haldiram's will not enter into that area which has got huge competition as possibilities of making profits is limited.

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# The Character and Improvement of the Financial Management for China Middle and Small Private Enterprises

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## Abstract

The actuality of middle and small private enterprises is that “slow birth, little growth, quick death and short life”. As viewed from the character of the financial management, they usually have the financial objective with short views and low effectiveness, which is represented from ten aspects. To improve the problems existing in the financial management of middle and small private enterprises, the following aspects including scientific and normative management thinking and management mode, the regulation and system of the financial management, the corporate governance structure and owner structure, the accounting system and professional team, the objective and guarantee model and operation mechanism of the financial management should be strengthened.

**Keywords:** Middle and small private enterprises, Financial character, Management mode, Management regulation

## 1. Actuality and financial character of middle and small private enterprises

The actuality of most middle and small private enterprises can be generalized by one word, i.e. “slow birth, little growth, quick death and short life” (Gu, 2006). According to relative data, the alteration of the private enterprises registered in 1989-2006 in Zhejiang shown that their average life was only 7 years (Zhao, 2006). In 1999, China had 31.6 millions individual industrial and commercial households, but up to 2004, this number declined to 23.5 millions, and 1.35 millions households were reduced every year (Zhu, 2006).

This actuality is generally induced by two problems including revenue and financing. Some analysis thought that in the aspect of financing, the financing of middle and small enterprises is less than 10% of the total social level, and in the aspect of revenue, differing with the “super national treatment” of foreign enterprises and the “national treatment” of state-owned enterprises, the private enterprise can only enjoy “inferior national treatment” (Gu, 2006). According to author’s observation and researches about middle and small enterprises, the author thought that reasons inducing the actuality of middle and small enterprises mainly include two aspects, one is the factors of exterior environment (including national industrial economic policies, financial policies and market actuality) (Wei, 2006), and the other is the interior factors in the enterprise which can be divided into two situations, i.e. the originality of the enterprise and the non-systematization of the enterprise financial management. This article mainly analyzes form the later situation.

The originality or system character of middle and small enterprises means the enterprise has not a perfect system layout when it is established, which is mainly represents in that the organizational character includes that the management and administration right of the enterprise is highly centralized, the management character includes that the capital is hard up and the financial layout is lacked, the administration includes the non-systematization and the absence of management objective and concept, the operation character includes that overfull dependent on family management and short-term behavior, the accounting character includes the emphasis of cash income and expenses and bad basic work, and in this aspect, three problems mainly exist, i.e. simple accounting, false information and rough regulations.

The non-systematization of financial management of middle and small enterprises means that the financial managements of most middle and small enterprises are not engaged according to the basic regulation of enterprise finance, and they have strong characters of spontaneity and individuation. For example, family financing mode, family financial management mode, centralized management mode, the management mode taking cashier as the center, the financial management and control mode taking the tax reducing as the objective, the financial classification management mode according to different information (reports) objective and so on. This non-systematization state of the financial management is decided by the character of the private enterprise.

The private character decides that the production and management mode of general middle and small private enterprises is to take the profit as the only start. And when it is reflected on the enterprise objective, it is the maximum of the profit, and when it is reflected on the financial objective, it emphasizes that the absolute income of

the enterprise exceeds the relative income, emphasizes the actual income exceeds the account income, and emphasizes the absolute charge control exceeds the relative charge control. That is to say, middle and small enterprises emphasize the short-term income and actual profit on the management mode, and mainly control the charge payout which mainly includes the direct relation between payout and earning. Based on that, enterprise emphasizes the corresponding relation of simpleness and income and expenses on the accounting, emphasizes the realism and secret on the financial management, and emphasizes the short-term behavior and “interior control” on the enterprise operation. Therefore, the hoggish financial objective with short view is the financial character of middle and small private enterprises.

This character induces the interior limited factor of “slow birth” and the self reason of “little growth” for middle and small enterprises. The short-viewed financial object and low effective financial behavior certainly induce that enterprise can not implement corresponding investments and investment programming, but the capital investment is just to pursue long-term income, so this short-viewed financial behavior can not make the fund favorably translate into the capital (even if this sort of translation is actualized, there still exist many non-financial operational factors), and naturally induce most payout of the enterprise can not be transformed to the purposeful and long-term investment payout emphasizing future profit, and make middle and small enterprises can not become more large enterprise though the mode of capital accumulation, and can not obtain exterior strong support through normal mode of capital accumulation, which is “slow birth”. In the same way, just because common middle and small enterprises are difficult to succeed in the capital investment or capital payout, they can not grow up quickly and even can not enter into the layer of technical innovation and independent innovation, which is “little growth”.

In most situations, this character is one of main reasons of “quick death” for middle and small enterprises, and it is the inevitable result of “short life”. The short-viewed and low effective finance management makes enterprise can not easily face or avoid the risk of management. And the management mode of “cash (capital) taking out” makes the financial information inordinate, and makes the enterprise performance operate in the low level, which can not form the ability to oppugn risk, face transformation, assume responsibility and independent innovation, and the result is that the enterprise is thinner and thinner, weaker and weaker, and forms the bad circulation process of “feebleness accumulation and weakness collection”, and encounters “sudden death” as “a last straw” because of outside forces or interior factors or other unanticipated reasons at many moments.

To sum up, many problems exist in the financial management of middle and small enterprises, which have been the bottleneck of the normal and quick development for middle and small enterprises.

## **2. Ten specific representations of the financial character of middle and small private enterprises**

According to the observation and research to middle and small enterprises, the characters of main problems existing in the finance of these enterprises can be briefly generalized as the following aspects.

(1) Emphasize income and ignore responsibility. To obtain income leave no stone unturned is the objective of every enterprise, which is gives no cause for more criticism. But the problem is that under many situations, middle and small enterprises have not associated the income obtainment with corresponding responsibilities, and have not associated the income obtainment with corresponding method, which induces the problems of the income without responsibilities and the income rationality. The result is that enterprises will always get into the trust crisis and the management crisis.

(2) Emphasize payout management and ignore accounting treatment. Because of the actuality of difficult management income source, enterprises especially emphasize the management to the payout. It should be admitted that middle and small enterprises create or derive many payout management method with classic meanings, and the payout efficiency is higher. But on the other hand, considering the environment of management and survival and the bad self management concept, enterprises always don't care about the accounting treatment of the payout, which accordingly induces the distemperedness, faultiness and asymmetry of the financial information and management content, and disturbs the normal development of the enterprise.

(3) Emphasize management and ignore financial accounting. Because the financial management is restricted by the ownership structure, enterprises have specific idea taking the profit as the objective management. But just because of that, the financial management of the enterprise becomes the tool of planning and making profits, and the emphasis how to achieve the management rationalization by the accounting method and system. One simple example is that in many middle and small enterprises, the treatment of charge and cost can not be implemented according to the regulation, but adopt the principle of “demand”, and the result is one word, i.e. chaos.

(4) Emphasize circulation and ignore deposit. If only the enterprise gets the cash income, it is the maximum object of the management. And if only the enterprise can reduce the money payout, even can delay the time of the payout, it is regarded as a sort of strategy or successes. Under the direction of this sort of management idea, the formed

capitals of the enterprise are always not emphasized or utilized enough, accordingly the concept of capital management is weakened, and the recognition of the cash circulation to the enterprise can not be well realized.

(5) Emphasize cashier and ignore accountant. Because of the special attention to the cash income and expenses and the unilateral understand to the income, owners generally don't set up financial post according to the normal financial regulations, but deploy employees according to the advantaged mode convenient for them. Under this mode, the cash becomes the key in the financial management, and the accountant is only the set, explanation, or complement of the cashier, so there is no cashier's function and responsibility and the financial management and supervision. It can be understood that common individual managers adopt this sort of mode, but if the enterprise operating in the corporate mode also adopt this sort of mode, it is the actual state of "abnormal management" or "abnormal survival", so it is natural that enterprises are difficult to be managed and operated normally.

(6) Emphasize loan and ignore return. The so-called "loan" is to try for and obtain the loan leave no stone unturned. But after obtaining or occupying the capital, some enterprises delay to return the loan leave no stone unturned. Though the policy doorsill and procedure of the loan are excessive, but more reasons come from the managers' qualities and concepts. Because the management can not be obviously improved or managers think about other things, they have no choice but to try to delay the loan when the loan is at term, which induces the deficiency and crisis of the enterprise credit.

(7) Emphasize present and ignore middle and long term. The management mode existing in the middle and small enterprises which takes the empirical decision and temporary treatment as the priority makes the behavior of the enterprise always stay in the present, which has bad information degree and weak conduction ability, ignores the developmental rule and trend of things, induces enterprises live up to scientific decision and exact judgment, and easily induce the financial short-viewed behavior and low effective operation. So the deficiency of financial programming and objective is the chronic illness of the enterprise financial management all along.

(8) Emphasize output and ignore investment. To operate, enterprises must invest large of capitals, but they always ignore the efficiency of the output. They only emphasize relative policy supports, exterior supports and corporate cooperation, but ignore the technical alteration and investment of enterprises themselves. To the operation of the assets, some enterprises rather repair the equipment every day than consider the technical alteration and the increase of investment, so the efficiency of the output can be imaged.

(9) Emphasize obedience and ignore honesty. The owner makes the decision, and the function of the financial personnel is only use of an emperor and demonstration, which is the first requirement that many enterprises select financial accountant. Because the occupation and income is the problem that almost every enterprise financial personnel can not avoid, so his "honest words" to the owner is few, even he would work against the regulation but only obey the owner of the enterprise. The accountant's honesty has been evolved to the loyalty of the accountant.

(10) Emphasize use and ignore cultivation. It mainly aims at the use of enterprise financial personnel. Emphasizing the construction of the management and marketing team and ignoring the function and cultivation of financial personnel is another prominent phenomenon in the management of middle and small enterprises.

### **3. Improvement of financial management for middle and small private enterprises**

There are many discussions about the enhancement and improvement of financial management for middle and small enterprises, so this article will not give unnecessary details. This article thought that for the enterprise mechanism and the financial mechanism, the improvements of following five aspects should be strengthened.

(1) The science and standard of enterprise financial management are decided by the governance structure, owner composing and management thinking of the enterprise. So the key problems to improve the financial management for middle and small enterprise include three aspects. First, the setup of the enterprise should be rebuilt, and the "one boss" should be changed to "numerous bosses", and the "one's management" should be changed to "managing together". Second, the thinking of financial management should jump out the concept of "mine", and gradually evolve from small private enterprise to big private enterprise, especially when the enterprise acquire advancement, the owner or boss of the enterprise should change his concept that the finance is not the safe-deposit box or the income and expenses valve, but the transmission shaft and driver of the operation and development for the enterprise, and in this way, the financial management of middle and small enterprises can be changed and gradually enhanced and perfected. Third, the level and efficiency of enterprise financial management lie on the character and objective of the enterprise. Generally speaking, the private degree (socialization degree) decides the management mode and management performance of the enterprise. The enterprise objective directly decides the enterprise financial objective, financial mode and financial mechanism. From that meaning, the governance structure of middle and small enterprises is the very urgent problem.

(2) The security and reliability of enterprise financial management lie on the standard of corporate system and the mechanism design of the enterprise. The management of system and regulation is more scientific and effective than the management of individual purpose, and the operation according to the corporate design is more reasonable and safe than few people's charge. The problem of executive force is the serious problem existing in middle and small enterprises, but in fact, the problem of executive force is just the problem whether the regulation can be executed or whether the mechanism can be operated. The management according to individual purpose may be efficient in short-term or in the local place, but at more moments, it is the root of various problems. Therefore, to regulate the corporate behavior and management, and strengthen the mechanism function decides whether the financial management function of middle and small enterprises can be perfected and whether the corporate value can be maximized. The security and reliability of financial management don't lie on the degree of boss direct control, but on whether the system is be standardized and strictly implemented.

(3) The success and failure of corporate financial management lie on whether the corporate owner can jump out original "corporate character", especially whether the corporate owner can change the private degree of the enterprise. The life and death of middle and small enterprises is the problem people always talks about. But there is an exception, i.e. the puzzle of "Refining Individual Households" In Guangdong. Up to the late of 2006, there were almost 2.46 millions individual industrial and commercial households, which was in the first place in China. Since 1999, the quantity of individual industrial and commercial households increased 0.86 millions households in seven years, but at the same term, the quantity of individual commercial household reduced 6 millions households (Wei, 2007). Where is the answer? The answer is the difference of private degree. Complete individual private ownership is the lowest private ownership, which is represented as the individual or family management. But the social private ownership is the corporate regulation and mechanism design of private enterprise, i.e. the enterprise goes the road of social and modern management, and adopts the actual corporate management mode to replace the individual or family corporate management mode. The corporate financial management is just the management based on the corporate character in a larger range. Excessive private ownership is the reason to block the enterprise advancement and the optimization and efficiency of corporate financial management.

(4) The basic work of corporate financial management rests with healthy accounting system of middle and small enterprises and the financial management team with occupational spirit. First, in middle and small enterprises, the adoptive principle part of corporate system should be confirmed. Second, the content of middle and small enterprises should be simple, easily understandable and conveniently operational. And the accounting subject and the accounting report should be set up according to the character of the accounting business for middle and small enterprises. Third, the accounting system of middle and small enterprises should accord with the principle of wariness to avoid the false profit and actual loss. Fourth, the enterprise system of middle and small enterprises should try to keep consistent with the tax law to reduce the ratepaying adjustment at the end of accounting and enhance the work quality of accounting. Fifth, the corporate supervising system of middle and small enterprises should be perfected. Sixth, the arrangement and design of the accounting system for middle and small enterprises should accord with the principle of cost efficiency, and select the scheme with maximum system profits. In fact, all above aspects are a team problem of corporate accounting management and personnel. So to emphasize the team construction and personnel management of financial accounting is the key to help middle and small enterprises walk out the financial corner.

(5) The optimization of corporate financial management lies on the constitution and normal operation of financial management objective mode, which is mainly represented in "four realizations". The first one is to realize the concept update of corporate financial management behavior, i.e. modern financing concept, which should change traditional concepts of keeping accounts, casting accounts and reporting accounts, canonize the concepts of financing, making wealth, using wealth and assembling wealth, establish the financial management thinking mode of cost efficiency, risk income, input and output, and value system, and actualize the new concept of people-oriented financing, diversiform capital financing and risk management financing. The second one is to realize the scientific objective of corporate financial management behavior, i.e. the sustainable objective, which takes the normal development of corporate finance as the basic objective, takes the optimization of yield as the first object and takes the maximization of economic benefit as the permanent objective. The third one is to realize the modernization of corporate management method, which takes the cost benefit as the core, takes the scale control and risk prevention as the rule, takes the advanced management method such as "zero base budget" as the priority, and implement the scientific financial management method combining with financial accounting, cost accounting and management accounting. The fourth one is to realize the system systematization of corporate financial management behavior, i.e. strengthening the construction of financial regulation according to actual situation and management demand, and utilizing the system to regulate and supervise the individual or organizational financial accounting behaviors.

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# An Analysis of the Construction of Total Risk Management Mechanism for Enterprises' Accounts Receivable

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## Abstract

The accounts receivable that exist in enterprises' operational activities will slow down the turnover of capitals and cause risks of bad debts, what will block the normal circulation of cashes and restrain enterprises' healthy and orderly development. Therefore, it is vital for Chinese enterprises to emphasize on the risk management and risk defense of accounts receivable. By theoretical analysis, this paper makes comprehensive and systematic analysis on the problems that exist in the risk management of accounts receivable and the relevant reasons. For the problems, this paper puts forward a brand-new idea of total risk management and discusses this idea in detail. So, this paper may serve as a valuable reference for Chinese enterprises' risk management of accounts receivable.

**Keywords:** Accounts receivable, Credit, Risk

## 1. Introduction

Accounts receivable are cash that should be received but not yet at present by companies that sale products or services to others. The appearance of accounts receivable issue is a must under present modern accounting system with the accrual basis. According to the accrual basis, enterprises do not take the received cash as accounting basis. As enterprises have transferred the ownership of products or provided the services, and they have had the right of taking payments, it is the real turnover that enters that account. The essence of accounts receivable determines its difference from other cash assets. Accounts receivable is an important part in financial management (Eugene & Louis, 1999). On one hand, accounts receivable can help enterprises to expedite product sale, speed up corporate operation, grasp market, and gain profits quickly. But on the other hand, accounts receivable are not cash at all. The holding costs are inevitable and the bad debts are possible. Concerning this issue, many scholars at home and abroad have already made relatively fundamental researches. For example, Yongsheng Gan has studied the establishment of enterprises' credit policy by Satoris-Hill Credit Policy Decision Model (Yongsheng Gan, 1998). Wujun Diao and Guoqiang Xiong have researched enterprises' credit policy's increment analysis decision method (Wujun Diao, 2002). Songling Yang and Xibo Zhao have made empirical studies on credit management in medium and small-sized enterprises (Songling Yang, 2003). All these researches have served as stable foundations for studying the risk management of accounts receivable from different angles. This paper will advance several personal opinions on the total risk management of enterprises' accounts receivable.

## 2. Reasons for the poor risk management of accounts receivable

The existence of accounts receivable is a must in market economy. Many Chinese enterprises can not manage the accounts receivable properly. The balance of accounts receivable is high in general. And the total accounts receivable are increasing annually. As a result, enterprises' operation may confront with a shortage of capitals and a risk of bad debt. Reasons are as follow.

### 2.1 Lack of risk consciousness

Under the market economy condition, enterprises' products, supply, and sale are completely determined by the market. The changeable market makes enterprises face up with greater risks. As enterprises enter certain local market firstly, they may choose to sign short-term and account sale contracts with customers before they research the credit of customers and make correct risk evaluation in order to attract more customers and grasp more market shares. As a result, although enterprises can obtain high accounting profits, they neglect the problem of accounts receivable. These accounts receivable can not be taken back. After a period of time, they may become bad debts for enterprises. Moreover, some enterprises may sign contracts or agreements that are not in accord with the Law of Contract in order to extend sales. Under this condition, enterprises may suffer from economic loss, because they can not gain legal protection if there is a contract dispute.

### 2.2 Imperfect management system

Some enterprises that fail to manage the accounts receivable effectively do not make up relevant regulations or do not follow related rules. No strict rules to supervise the sale, the delivery, and the payment. Vouchers and receipts

are not complete. The financial branch fails to cooperate with the operational branch in time, what leads to the disjoint of operations and accounting. As a result, problems appear but not noticed in time. Some enterprises could not cope with the higher accounts receivable and leave them alone. Therefore, these accounts receivable can not be turned into cash for a long time.

### *2.3 Imperfect inner encouragement mechanism*

Some enterprises merely associate employees' salaries with sales in order to motivate salesmen's enthusiasm. However, they neglect the possibilities of bad debts and do not take the accounts receivable into the evaluation system. Therefore, for the sake of personal interests, salesmen care for nothing but sales. Then, the accounts receivable are rising. Unfortunately, enterprises do not take effective measures to encourage their employees to solve these accounts receivable. More and more accounts receivable are appearing, what becomes a heavy burden for enterprises.

## **3. Results of improper risk management of accounts receivable**

The results of improper risk management of accounts receivable include these conditions as follow.

### *3.1 Decrease enterprises' profitability*

Because of the accounts receivable, the logistics can not match the flow of capitals in enterprises. Although sales are completed, enterprises do not receive payments. However, these accounts receivable may bring about excessive costs for enterprises, such as taxes. If the accounts receivable concern two accounting years, enterprises have to use flowing capitals for dividend of stockholders. As a result, amounts of flowing capitals may be occupied, what will harm the capitals' turnover in enterprises, which will correspondingly conceal the real operational situations of enterprises, affecting enterprises' production plans and sales plans. Enterprises fail to realize their supposed goals.

### *3.2 Aggrandize enterprises' business fruits*

In China, enterprises adopt the accrual basis in accounting. All current account sales belong to current income. Therefore, the increase of accounting profits does not mean practical cash flow. The existence of a great number of accounts receivable contributes to the rise of accounting sales, which aggrandize enterprises' business fruits in a sense, increasing enterprises' costs of risks.

### *3.3 Cause financial crisis directly*

Although account sales can bring about more profits for enterprises, they can not lead to a real rise of cash flow. On the contrary, enterprises have to take limited flowing cash to pay for sorts of taxes and expenses, which expedites the outflow of cash. Enterprises keep in enlarging their sales by account sales, which leads to constantly increasing accounts receivable. Once the accounts receivable appear, purchasers can employ bargainers' capitals and do not necessarily pay any interests in their credit term. Purchasers will possess more go-aheadism. If no restriction, purchasers will not repay for goods or services in advance and even not repay on time. If enterprises let accounts sales at random and do not take measures to solve these accounts, the accounts receivable will become bad debts. According to the law of taxation, no matter whether enterprises receive payments or not, only if enterprises confirm the income, they must hand in the income's turnover tax and the income tax, what will inevitably increase the outflow of cash. Because enterprises do not receive payments but have to hand in taxes, they may confront with financial crisis even if they are profitable. In China, many enterprises, including some listed companies that perform better, sometimes have to deal with the problem of capital shortage.

### *3.4 Mislead users of enterprises' financial statement*

The existence of accounts receivable may mislead users of enterprises' financial statement, making them fail to make correct evaluation on enterprises' assets and ability of payment and repayment. The accounts receivable, especially the one that has already become bad debt but not be treated as bad debt, will increase enterprises' assets virtually. The calculation of many indicators that are used to evaluate enterprises' ability of payment and repayment, such as current ratio, quick ratio, and asset-liability ratio, takes current asset, quick asset, and total asset of accounts receivable into consideration. The untruth of assets leads to the falsehood of enterprises' ability of payment and repayment. In other words, because of the poor cash-ability of accounts receivable, users of enterprises' financial statement may overrate enterprises' assets and ability of payment and repayment.

### *3.5 Affect enterprises' normal business period*

Business period refers to a process in which enterprises take the stock in, sale them, and take cash back. The length of business period is determined by the turnover of the stock and the turn over of accounts receivable. The business period is the sum of the two turnovers. The irrational existence of accounts receivable extends the business period and affect enterprises' capital circulation. Amounts of capitals are occupied by non-production ring. Enterprises may

confront with a shortage of capitals, what will affect the salaries of employees and the purchase of material, harming enterprises' normal production and operation.

### *3.6 Increase the possibility of errors in the management of accounts receivable*

If an enterprise has a large number of accounts receivable, it is hard to find out errors of these accounts in time. As a result, the enterprise may lose necessary contracts, agreements, and other materials related with accounts receivable. Besides, because the enterprise can not know the real condition of purchasers exactly, it is hard to take back all accounts receivable. The enterprise may suffer from a loss of asset.

## **4. A new mechanism for total risk management of accounts receivable**

In the risk management of accounts receivable, it is necessary to constitute a total risk management mechanism according to the characteristics of accounts receivable and the potential risks. The main points include:

### *4.1 Construct a scientific and effective credit evaluation mechanism*

Credit evaluation is the foundation of enterprises' accounts sales. Enterprises should determine the degree of risks in accounts receivable according to the customers' credit grades, and take it as the basis for account sale decision. Constructing a scientific and effective credit evaluation mechanism should possess two processes. Firstly, it is the credit research stage. Collect and process customers' credit-related materials directly or indirectly. Enterprises can contact with customers directly and obtain needed materials by inquiry, observation, and record. Besides, enterprises can collect materials by customers' financial statements, credit evaluation agencies' materials, and materials from banks, industrial and commercial administrative branches, taxation institutions, and consumers' association. Secondly, it is the analysis and evaluation stage. The main methods are qualitative evaluation and quantitative evaluation. The qualitative evaluation can be achieved by "five C" that refers to the five aspects used to assess customers' credit, namely character, capacity, capital, collateral, and condition. Quality means customers' credit. Capacity means customers' ability of repayment. Capital means customers' financial power and situation. Collateral means customers' assets that can be used as mortgage in order to obtain sufficient transaction credit. Condition means economic environment that may affect customers' ability of payment. Quantitative evaluation is to assess customers' credit by weighing and averaging a series of financial variables. The result is the customers' integrated credit score. Suppose the five financial variables are T1, T2, T3, T4, and T5. They stand for equity ratio, asset-liability ratio, rate of return, quick ratio, and rate of capital accumulation respectively. S stands for the weight of five variables. Then:

$$W = (T1 \times S1 + T2 \times S2 + T3 \times S3 + T4 \times S4 + T5 \times S5)$$

This method must be based on a reliable statistical model. Otherwise, there are lots of limits. By means of assessing customers' credit, enterprises can establish their credit policy correspondingly.

### *4.2 Construct a selective mechanism for credit line*

Accounts receivable occupy lots of capitals. It is necessary to establish the risk degree of accounts receivable and make it possible to assess the risk. As an enterprise invests in accounts receivable, it has to consider whether invest or not and how much the investment is. The former can be determined by credit research and assessment. The later should be determined by analyzing the credit and relevant favorable conditions and profits.

The investment in accounts receivable = the average accounts sales everyday \* the average deadline of accounts receivable

### *4.3 Construct reasonable credit policies*

Customers' credit and the risk degree of accounts receivable serve as basic standards for enterprises in making decisions on whether permit account sales or not. In order to guarantee the exactness of credit decision, it is a must to make up rational and effective credit policy. An enterprise should have relevant policies that suit for it. Once an enterprise provides customers commercial credit, it has to consider specific conditions for customers' payment, including credit term, discount term, and cash discount.

### *4.4 Construct an approval mechanism for account sale*

Enterprises should set up limitations respectively for salesmen approving account sales. If surpassing limitations, they should apply for higher managers. By this kind of leveled management system, employees at different levels are completely in charge of their acts. As salesmen sign sales contracts with customers, enterprises should arrange professional experts and sales managers to examine the contracts and the signing process. After the examination and the approval, enterprises can deliver goods according to contracts. No goods can be delivered if no contract.

#### 4.5 Construct a risk warning mechanism for accounts receivable

In order to ensure a timely take-back of accounts receivable, enterprises should construct a risk supervising and warning mechanism for accounts receivable that can supervise and examine the accounts receivable. Its main contents include:

##### 4.5.1 Check and analyze periodically

Enterprises should construct a check system for accounts receivable, by which enterprises can check every item of accounts receivable with customers, ensuring the trueness and exactness of accounts receivable. Insist on a periodical audit on accounts receivable. Enhance the inner control over the generation of accounts receivable and its check, management, and take-back. Find out errors and correct them timely. Avoid problems of appropriation, corruption, and outer circulation of capitals caused by loose management. Decrease risks and escape from bad debts. Analyze on the ages of accounts receivable. Compose an analysis table for the ages of accounts receivable and sort them according to the ages. Estimate the potential risk loss and evaluate the value of accounts receivable correctly.

##### 4.5.2 Enhance a settlement system for accounts receivable

Considering the different ages of accounts receivable and the different credits of customers, enterprises can adopt different measures to solve the accounts receivable, such as informing by mails, asking by calls, negotiating by face to face, and legal action. For customers who have the capability of repayment but delay the repayment purposely, enterprises can choose rational measures to solve the accounts receivable, such as persuading by rational explanations, gaining commiserations, and many other useful ways. Enterprises should set up a settlement responsibility system. The salesmen who have contributed to the generation of accounts receivable must shoulder the responsibility of taking them back. Enterprises can constitute assessment methods and indicators for the settlement of accounts receivable and make up specific encouragement-and-punishment rules to inspire salesmen to promote goods and take back capitals. Assess the expenses of taking accounts receivable back and the rate of successfully solving accounts receivable. Evaluate the difference between the increase of expenses of taking accounts receivable back and the decrease of loss of reducing accounts receivable and bad debts. The evaluation methods can take reference from the evaluation of credit standards and credit conditions.

## 5. Conclusion

In order to pursue high profits, enterprises usually enlarge sales by account sales that can help to increase income and profits. However, the more the accounts receivable, the higher the risks for enterprises are. The risk management of accounts receivable aims at achieving an optimal unity of the risks and profits of accounts receivable, realizing the maximization of total effect. To construct a risk management mechanism for accounts receivable and apply total risk management to accounts receivable can help enterprises decrease risks, guarantee the safety of business, expedite the turnover of capitals, improve the utility efficiency of capitals, and realize the benefit goals, with the precondition of ensuring certain profits. In a word, enterprises should take the management of accounts receivable as a long-term and systematic task. Enterprises must set up a modern marketing concept, enhance the construction, management, and supervision of credit system, and carry out all measures thoroughly, by which enterprises can control the accounts receivable under a rational level and gaining more profits.

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# Empowerment the IDEF0 Modeling Language

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## Abstract

In the present article we discuss, evaluate and improve the IDEF0 modeling language. In order to meet end user requirements, we suggest concrete improvements which empower the language to face real world problems such as: human errors, process delays, parallel processes and detail information description. The experimentation field comprised from a common production system. Improved IDEF0 seem to overcome several deficiencies and increase its modeling performance. Results showed that language deficiencies were clarified. Thus, the improvements made, constitute better modeling performance and the development of more reliable models.

**Keywords:** IDEF0, Human error, Process delays, Parallel processes

## 1. Introduction

The term Business Process (BP) is widely used among Business individuals and researchers. It includes an activity or set of activities that supplied with one or more kinds of inputs and transforms them into an output which adds value to the potential customer (Hammer and Champy, 1993). Each activity composites of components such as tasks, information, materials, operators and machines. Examples of a BP can be a production line, the functions within organizational departments, a decision making process and so on.

The study of BPs based on their analysis through the representation and description of their component information, which flows among activities. The study and analysis of BPs can be transacted through the consideration of certain Business Models (BM). BP organizational modeling implies the utilization of specific Business Process Modeling Languages (BPMLs), corresponding software tools for the graphical description of observed behavior of processes in a business system. The result of the modeling process is a well structured and well mapped business model, which represents, in depth, the actual process components and its course. Models enable end users to face the complex and dynamic nature of modern BPs. Models are very useful in the entire BP life cycle course supporting its identification, description, redesign and continual improvement.

A very popular BPML is the IDEF0 (Ross, 1985; Feldmann, 1998; Kalnis et al., 2000; Kalnis, 2004; Recker et al., 2006; Liu and Fang, 2006;). IDEF0 applies to all kinds of organizational systems independently of their size or complexity (Godwin et al, 1989).

BPML makes use of objects for the graphic description of information flow. These objects are called components. The type of information that contains a process component (e.g. document, file) is called component information and it is steered by BPML semantics. Semantics of a BPML refers to the logical identification, of a syntax component and the appropriate linkages among them. Thus, a model that imitates the real world system, according to the principles and methodology of BPML, is created.

A BP is decomposed in functions, where every function captures components and semantics. It is a set of one or more functions, integrated in diagrams. A model composed from a number of diagrams develops in hierarchical fashion. For the modeling task and the application of the BPMLs, we used specific software tools.

The selection of a BPML for the organization constitutes a strategic goal for the establishment of effective communication among people who take part in a BP, in order to assure the quality of its outputs. Thus, the evaluation and comparison of BPMLs constitutes an organizational need.

In the present article we cope with several concrete deficiencies of IDEF0. Furthermore, we recommend specific syntax components and semantics that are targeted to improve the selected BPML in order to cover more organizational needs.

To document our findings we used the modeling case of a real production system.

The purpose of this article is to reveal several deficiencies of IDEF0 during the modeling phase, to improve these deficiencies and increase the modeling performance of the IDEF0. Some of the revealed deficiencies are:

- (1) Errors. An error occurs after the influence of several factors resulting in an undesirable outcome. The error can be caused by an individual or a machine. Thus the errors can be categorized to human errors and machine faults.
- (2) According to (1) remark, we propose new design capabilities for the detection of errors.
- (3) Process delays. Process delays can be described as the several reasons that cause a delay to the process course.
- (4) Parallel processes. Processes that are flow together.
- (5) The transferred information. It concerns the exact descriptions of data or objects related to functions.

Scientific literature identifies a few attempts to assess IDEF0 and present its shortcomings (Tsironis et al 2007). However, a particular problem in this context is the lack of research regarding what is to be considered good design (Mendling, 2007). For instance several aspects or characteristics of BPML evaluation can be read at (Godwin, et al., 1989; Hernandez-Matias et al., 2006; Jansen-Vullers and Netjes, 2006; Janssen et al., 1997; Kalnis et al., 1998; Killich et al., 1999; Kudrass et al., 1996; Shen et al., 2004; Wang et al., 2006).

However, in all studies the need for a thorough evaluation of BPML tools is emphasized. In all articles it is reported that this need arises from the specific weaknesses in the resulting models, which create several problems within organizations (e.g. miscommunication among people and/or departments). Moreover, this need is empowered by the fact that BP modeling is a continuous and time demanding procedure, which has no pre-defined outcome (Tsalgaidou, 1998).

In some of the previously cited articles, the authors assign the need for improvements in BPMLs in order to describe BPs completely. In others authors, noticed the need for a better synergy between BPMLs and the corresponding software tools.

Janssen et al., (1997) and Wang et al., (2006) compared BMPLs. They argue that there is no BPML able to completely satisfy end user' needs. They noted that there are significant deficiencies in languages and that they can be if syntax components and semantics can be simply exchanged with one another. Similarly Jansen-Vullers and Netjes (2006) work underlines the incompleteness in specific capabilities of business simulation tools.

The static nature of IDEF0 and the absence of an adequate dynamic representation of the process is also reported by Godwin et al., (1989). Shen et al., (2004) compared IDEF0, IDEF3 and DFD (Data Flow Diagram). They present the deficiencies of each language. Particularly for IDEF0, one of the main drawbacks they report is the absence of time representation in a process. The absence of time representation for the description of a BP is supported by Killich et al., (1999). The need for a new innovative and complete BPM tool was reported in Hernandez-Matias et al., (2006).

Apart from reported in the literature findings, the need for better BPMLs created during the modeling steps on two real world's BPs in Tsironis et al, (2007). They detected a communication gap among end users or departments when trying to interpret BP diagrams. Furthermore, they observed that the available syntax components confused modelers and end users. The objectives were not obvious. What seemed to be the exact outputs of the process and of which type (e.g. document, a component which is using to update the database) was not clear. The former observation was also noted in Shen et al., (2004).

All the above articles identify the need for a thorough research on the modeling performance of IDEF0. On the other hand, there is a lack on discussing the modeling of factors such as the variable nature of BPs due to the inclusion of human operators for example.

Another aspect that enforces the need of this research is the cost enclosed during poor designed BP models. Mendling (2007) reports that the costs of errors increase exponentially over the development life cycle it is of paramount importance to discover errors as early as possible.

As an experimentation field we select a traditional production process. Specifically we used IDEF0 to model the machine part production process as it described in SADT, (year). For the modeling phase we used Workflow Modeler software (ref). After the creation of IDEF0 model and diagrams we transformed the process by the insertion of errors, delays and parallel processes.

The remainder of the article is organized as follows. In section that follows we present the basics of IDEF0 and tool used herein. In the following section we describe the application field based on which we applied our proposed improvements. The following section we discuss the proposed syntax components and methodology approaches for the IDEF0 language. Finally we conclude with some remarks on our findings concerning its applicability and the quality of results.

## 2. IDEF0

The IDEF0 language is an updated version of the Structured Analysis and Design Technique (SADT) (Marca and McGowan, 1988) proposed by D. Ross in 1976 for structured analysis of systems. It is accepted in the USA as a federal standard (IDEF0, 1993).

IDEF0 is a BPML used to model decisions, actions, and activities of an organization or system (IDEF0, 1993). The resulting model expresses knowledge about how a system, process, or organization works (Wang et al., 2006).

IDEF0 describes the specific steps of a process course and the relationships developed. It also records the information flows, resulting from these relationships.

Finally, IDEF0 model includes a set of syntax components essential for BP integration. The syntax components include boxes, arrows and diagrams. Boxes represent functions, defined as activities, processes or transformations. Arrows represent data or objects related to functions. The format also provides the basis for model configuration management (IDEF0, 1993).

For the application of IDEF0 on modeling tasks we choose Workflow modeler (Meta Software, 2003) due to its ease of use and its ability to provide the whole set of syntax components of IDEF0 language. Workflow modeler is a standalone software due to its features. It supports modeling capabilities based on IDEF0, IDEF3 and IDEF1X BPMLs. It is also supports exporting the model to Workflow Simulator, a very useful module for simulation purposes of the model.

During the modeling stage we faced several differences that the software has with the basic notion of IDEF0 language. These can be summarized to the following:

- (1) The software demands only one input arrow.
- (2) Mechanism arrows that originate from the output of a specific process does not allow to the diagram
- (3) Tunneled arrows are not recognizable
- (4) By default in Workflow Modeler there is an attention point to the synchronization of feedback procedures.

## 3. Case study: model representation

We adapt a model taken from Marca and McGowan (1988). This model describes the manufacturing process of a specific part in a machine workshop. The model consists of six diagrams. Inputs in the model constitute raw materials, mechanical parts and the appropriate information that enclosed in the process (i.e Job completion request, quality standard manual). Process output is the outgoing part. An overview of the manufacturing process is presenting in A0 diagram (figure 1).

In the specific manufacturing process (figure 1) are implemented three basic operations, which can be seen in A0 diagram. The first operation includes information assignments about what specific tasks should implement and how. This operation involves the insertion of plans, activities order and time duration and sequences. In the output is generated the appropriate manufacturing time and specific plans that are sending to the main manufacturing process.

The second operation represents the main manufacturing process of each part. In this operation perform activities and tasks such as: machine preparation, part processing, and tool selection. Process inputs include raw materials, machines and tools, while outputs include finished and unfinished job.

The third operation represents the control of the final products produced in the second operation. The assessment of the work done until this point and the measurement of final product's dimensions are performed in this operation. If the final product does not meet the standards then it will forward back to the appropriate process stage.

These three operations are visualizing in A1, A2 and A3 diagrams respectively and every one of them disaggregated in child diagrams which demonstrate the course of sub-operations.

## 4. Improvements

In the paragraphs that follows we present modeling attempts for the cases of errors and delays. Our attempts lie, basically, in the insertion of new syntax components and semantics to the IDEF0 language. We propose the use of specific logical operators in order to model errors and delays within the BP. The following table 1 summarizes and

describes the proposed logical operators. A lengthy analysis and explanation on the use of logical operators can be found in the forthcoming paragraphs.

#### 4.1 Errors

An error can occur when any factor affects the process course. The outcome of error affection is always an undesirable or unexpected result. Errors can be predictable or not. Consequently the time that an error occurs can be deterministic or stochastic.

When the error generated by individual's interference then is called human error. Human error's occurrence time cannot be predicted. On the contrary machine errors is sometimes predictable and depends on its life cycle.

One of the disadvantages that burdens IDEF0, is the lack of modeling notations in any type of errors. This happens because the existence of IDEF0 based only to the description of the process course and not to the identification or prediction of errors. Furthermore, is not obvious to any kind of end user the effects that an error might have. In the present section we are trying to enhance and empower IDEF0 with proposed modeling notations in order to cope with possible errors in the process.

Modeling of errors can be achieved by inserting as modeling notation specific logical operators. Logical operators, used in some BPMLs for connecting several Functions and Events. We, herein, propose the use of logical operators in order to describe and represent several aspects of activities (e.g. human errors) as continuity and try with this way to visualize them. Logical operators used for instance to EPC language. We were modeling the process with the use of "AND" operator and "XOR" operator. The "AND" is used for parallel execution of Functions. The "OR" is used for decisions, when one or more choices are possible. The "XOR" is used for decisions, when only one of several choices is possible. Logical operators can be used as a general modeling notation and not only for the identification of errors.

The use of logical operators in the output of the process enables the modeler to present the possible directions when a possible error can occur. In other words the modeler design new output directions in the face of an error. For instance logical operator "XOR" can be locate in process output and provide three discreet options, desirable or undesirable result and no result.

In figure 2 we present an example that helps to be comprehensive our modeling rationale.

Figure 2 presents the A3 diagram of our case. Logical operators "AND" and "XOR" inducted to model all the possible aspects of the process. In activity A31, for instance, there are two aspects in the output Seal and Assess Job. The "AND" operator can be used in order the two aspects can go along. Assess job task, might have 3 aspects on the output: Good, wrong or no assessment. Logical operator "XOR" can cover those three aspects.

#### 4.2 Delays

Process delays can occur either after the affection of an error or after a mismanagement of an activity. The insertion of the appropriate logical operator can resolve this problem. We propose a logical operator which means that if the corresponding arrow is activated a process delay will occur. In other words the delays operator is an optical signal which points the possibility of an unwanted event.

Activity A235 (figure 3) can be described as follows (Marca and McGowan, 1988): Place bins to easily load raw materials and catch scrap. Take into account material properties and the direction of cuts to determine where scrap will be thrown. The activity has two possible outcomes: correct or erroneous placement of bins. In order to cover those two aspects we place the "XOR" operator at the outcome of the activity. Observe that when an erroneous placement takes place then the process might have a delay of the fulfillment of its objectives.

#### 4.3 Parallel processes

Two arrows generating from two activities might further join in one. That could be an indication that the first two activities might act in parallel. Parallel processes are not visible to an IDEF0 diagram. Parallel processes are those that progress at the same time. They can begin together but not finished at the same time or they could start at different times and ending together or one of them can start before the other and ends after the other and so on. The main characteristic of parallel processes is that in order for a new process to start they must have been finished.

The case of parallel processes handled by the insertion of a specific logical operator which is named as "parallel operator". This parallel process logical operator characterizes the arrows which join from the leading processes come from parallel processes. The non parallel processes operator identifies that from two arrows the predecessor is the one that arrives first. That is that the event with the smaller finishing time will first pass from the operator and the other one will queuing.

Figure 4(a) sets off the concept of modeling the parallel and non-parallel processes in IDEF0. Activities A233, A234 and A235 are parallel processes and this fact is indicated with the appropriate logical operator.

On the opposite, figure 4(b) visualizes a confusion point in IDEF0. Activities A241 and A242 although they seem to act in parallel they are not and that is why the non-parallel operator placed in the appropriate point on the diagram.

## 5. Proposed design capabilities

In the present paragraph we describe a proposed way of the development of an internal control procedure which enables the BPML to conduct control for errors.

As it is mentioned before errors is very possible to appear in a production process, sometimes depending on known reasons and sometimes on unknown. In the current stage we propose the development of an internal error control procedure in every diagram of the IDEF0 model. This procedure based on a three step notion: Control, Execution and Control-Decision.

We can design a BPML that can develop diagrams with embodied abilities of sending information on the appropriate activities that should be accomplished in order to have a standard based process.

The first step controls the status of the process and reports about the necessary actions should be done for the fulfillment of the process. Afterwards it sends information to the diagram boxes through control arrows on the way that should be acted. Usually control step comprises of one box.

Second step concerns the development of the child diagram based on the standards that have been instituted. This step based on more than one boxes. Box output constitutes the input for the following one.

Third and final step controls and verifies that the pre-set standards were met. If control action identifies an error then a feedback procedure supplies the first step's control action. The main difference between first and last control action is that in the first check what and how things should perform, while in the last check if standards had been met and deciding what else missing that should have been done.

As it is known any IDEF0 diagram comprises from three until six boxes. If the completion of the three steps requires more than six boxes then new child diagrams should form. However, the new child diagram should underlie the notions of the IDEF0 language.

The proposed rational, described earlier, can be seen in figure 5. For instance from A1 box first step, Control, is conducted. From A1 box the green arrows provide with the appropriate description of what exactly should be done at the later stages of the process. The A2 box represents the second step, Execution, of the overall process. A2 box receive information on the way it should acts in order to fulfill process requirements and standards. The third step, Control-Decision, consists of the boxes A3 and A4. In the final stage the produced product is controlled in A3 box, which decided whether it should rejects and returns to A2 box or continue to A4 box in order to comes out of the system. This is the reason why A2 box sends the blueprints in order to help the process on the control and decisions should make.

### 5.1 Number of arrow components

The number of elements that are enclosed in an arrow can be varied across the diagram components. It would be very helpful for the end user to see the number of arrow components during the modeling phase. Many times it is possible that the number or input components in an activity to differ from the output ones. This could be happened if the activity selects some components and sending them in a lower activity.

Workflow modeler provides the option to denote the number of components carrying by the arrows. This option represent with the "sz" symbol on the starting point of the arrow.

Figure 6 depicts the way that we propose the formation and the appearance of the carrying information on the arrows. For instance let's assume that the carrying information of the arrow "tool crib" concerns six parts. The activity A22 "pick tool" will select three of them that should be used for processing, according to the information provided by activity A21 "evaluate job progress". Consequently, activity's A22 output arrow will tagged by the index 'sz=3', meaning that its size is equal to three parts (figure 6).

However, it would be more helpful, the number of components to appear at the starting and ending points of the arrow. Due to the big length of IDEF0 arrows that frequently have. The information about the number of components could be useful for arrows that are represent parts, process elements or tools. Finally, the use of enclosed number of components should constitute a very useful piece of information concerning production, time, and cost, which are very useful elements during simulation phase.

## 6. Discussion

Top down hierarchical design fashion, ICOM and component semantics are the most strong points of IDEF0 language. These three design components lead to the establishment of good communication infrastructure among design components and within diagrams of the IDEF0 model. However, the design of complex and tight diagrams is one of its critical disadvantages.

During practicing with IDEF0, we noticed several shortcomings, from the human involvement point of view. Our first thoughts fluctuate upon questions such as: What happens if a human error takes place? Is it designable? Is it predictable? Can the model inform the modeler somehow?

Furthermore, some additional questions that can not be solved with the current version of IDEF0 occupied our minds and created unsolved problems. These questions were: What happens if a justified or unjustified delay occurs in the process? How it can be modeled, or how it can alert the modeler of the possible occurrence?

The answers of these questions along with some additional interference on the parallel processes and enhancements of information annotations of the exact arrow carrying information discussed and investigated herein.

As evidenced in the former paragraphs of the article, the proposed work solve many practical real world problems.

Results shown that the developed version of IDEF0 performs better and helps the modeler to produce comprehend and easy to read diagrams. The produced diagrams reveal cases where the decision maker has to predict them with the use of additional tools and methodologies.

The objective of the article is to enhance the IDEF0 in order to increase modeling power and model BPs more thoroughly and exhaustively. The produced models cover all the cases and events and finally all the unwanted situations that governing BPs because of their uncertainty nature. Uncertainty lies on the participation of human, machines and external factors within the BP.

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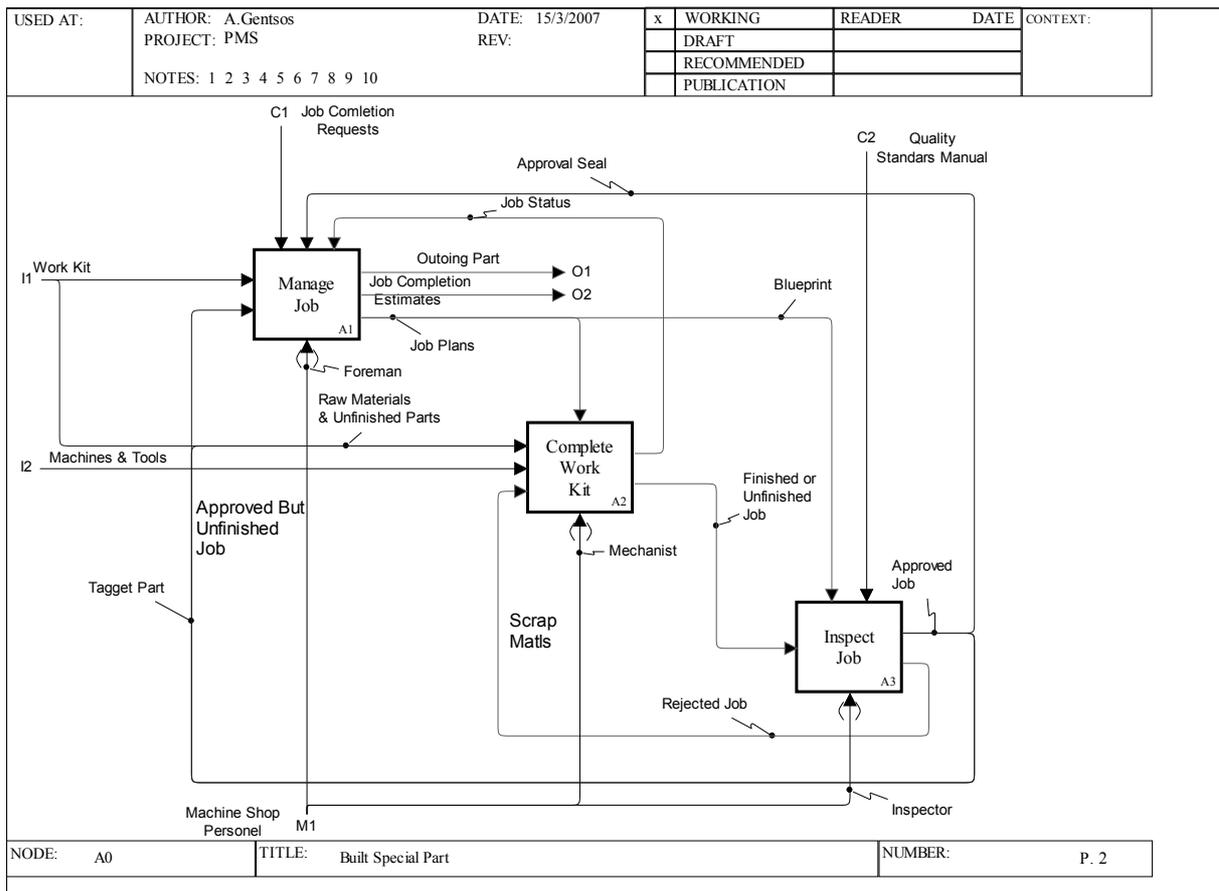


Figure 1. The A0 diagram of the model

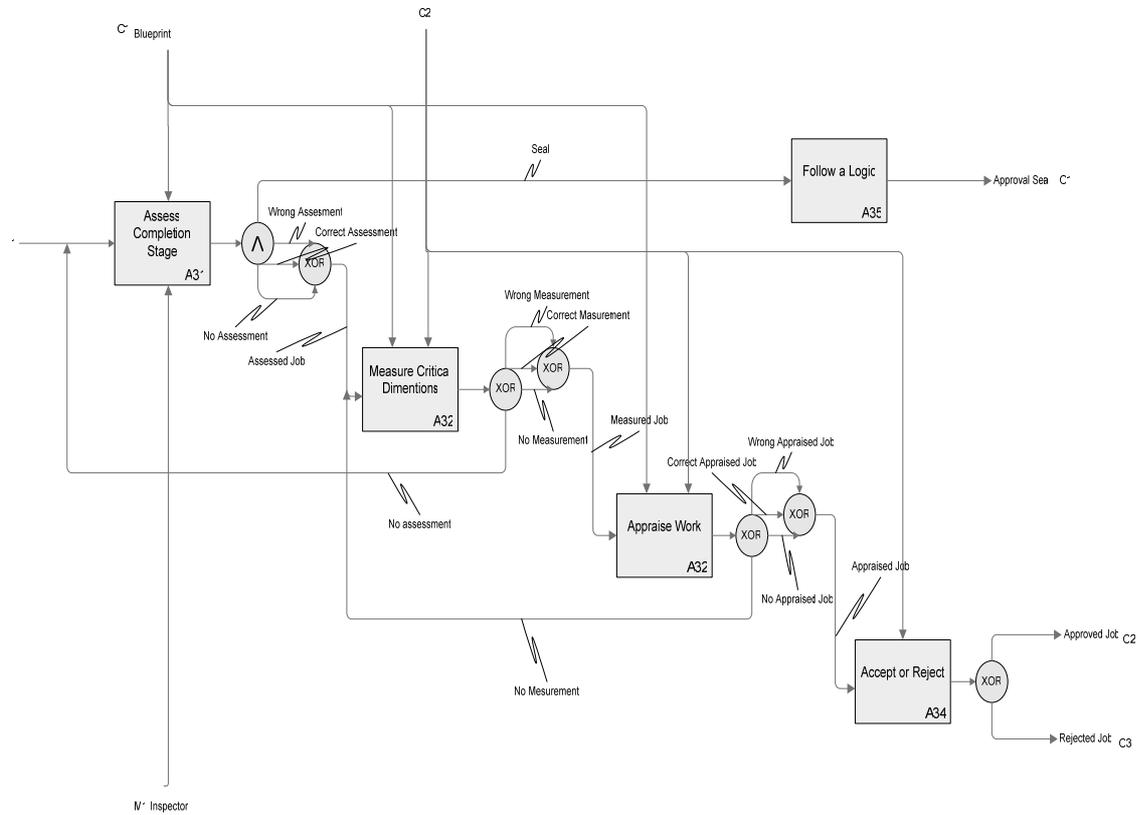


Figure 2. Transformation of A3 diagram

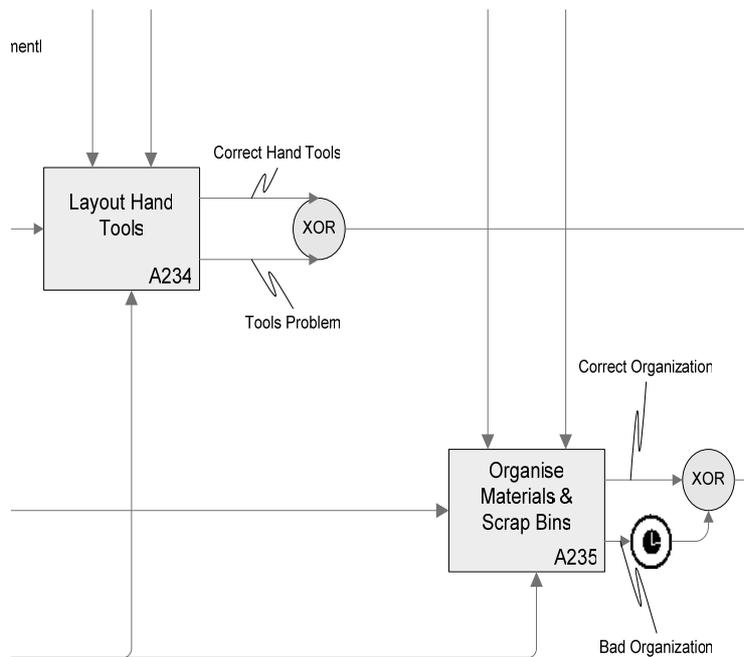


Figure 3. Part of the A23 diagram, depicted the delays operator

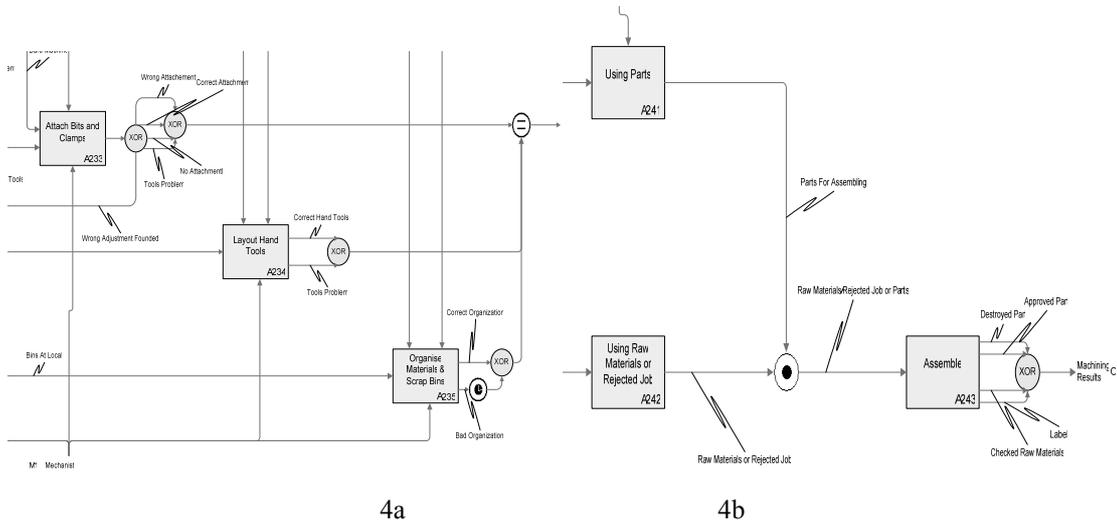


Figure 4. Parts of A24 and A23 diagrams presenting the discrimination of parallel and non-parallel processes

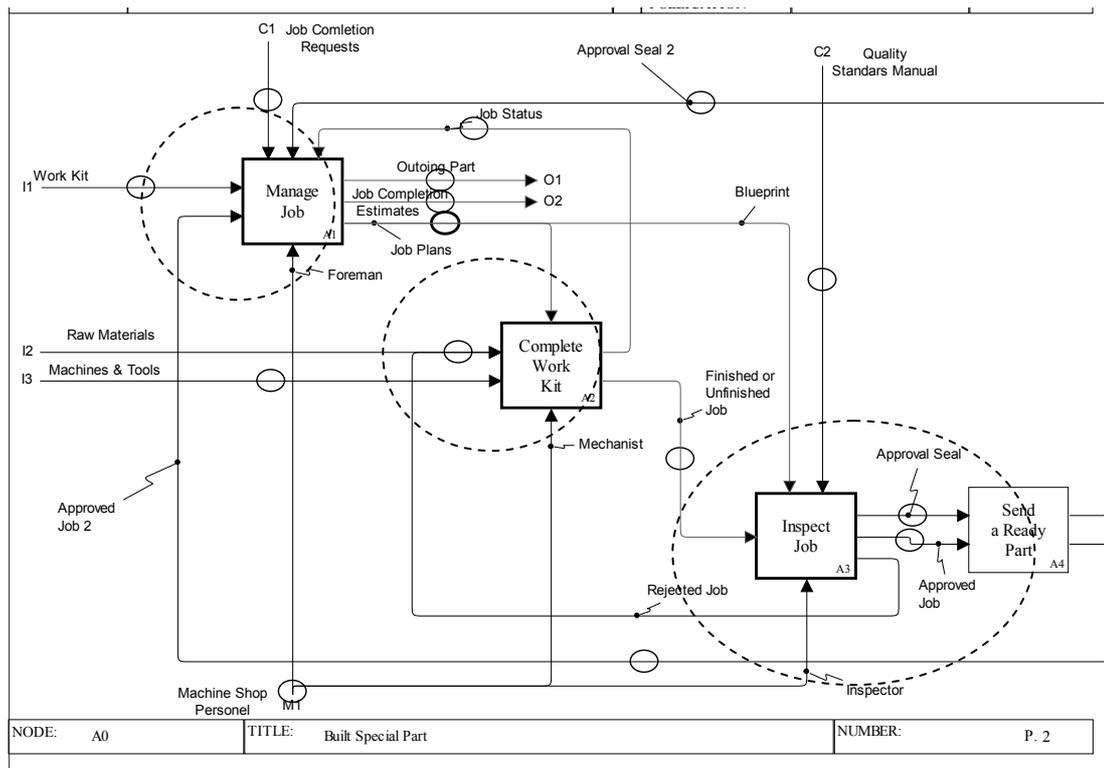


Figure 5. The A0 diagram remarks the 3 design stages

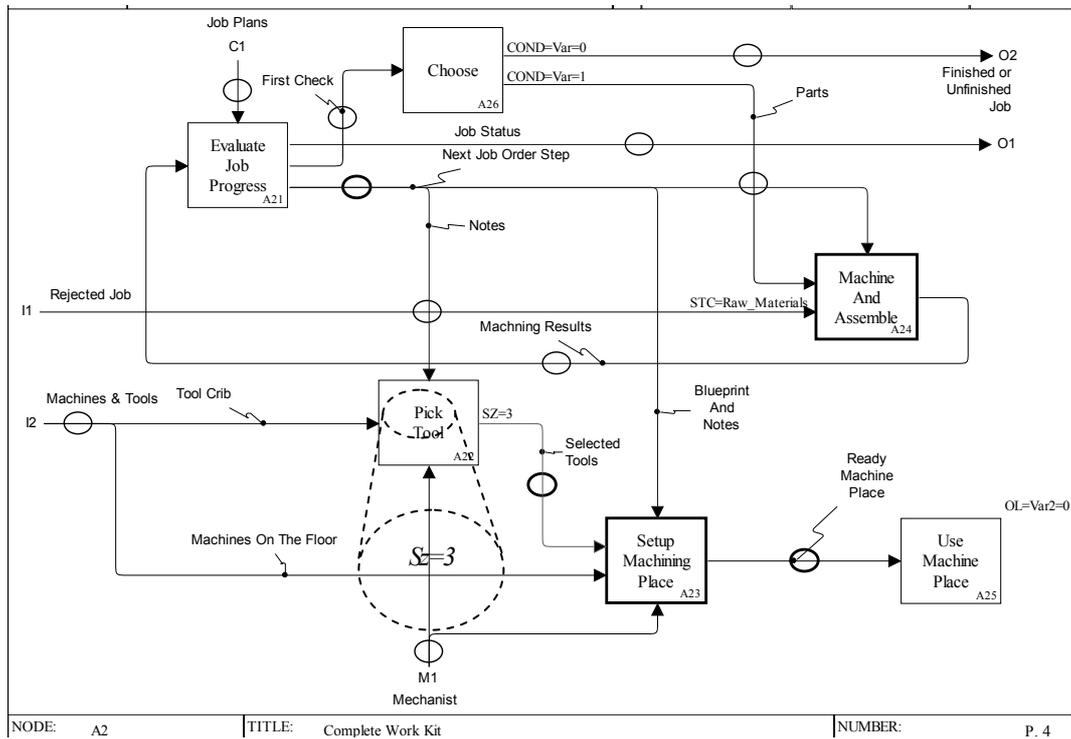


Figure 6. The A2 diagram depicts the appearance of the carrying information on the arrows

Table 1. The proposed logical operators and their notion

Logical Operator	Label	Description
	AND	Both of preceding and following arrows, triggered.
	XOR	One of the preceding or following arrows will trigger.
	DELAY	If the particular arrow triggered, then the process will concern under delay.
	PARALLEL	The arrows that gathered to the operator came from parallel processes.
	NON-PARALLEL	The information that comes from the arrow that reach the operator first is admitted to pass first.

# The Practical Analysis on Participators of Current Chinese POF

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## **Abstract**

Current Chinese POF industry is still short of comprehensive legislation. Thus, the cooperative relationship between participants involved in account management model POF and trust plan model POF is quite unsteady and risky before the promulgation of new PBL. Furthermore, the conflict between Chinese Company Law and the new PBL had restrained the scope of development of limited partnership POF. A more systematic legal platform is to be established urgently.

**Keywords:** Privately offered fund, POF, Analysis, Custodians, Partnership

At present, privately offered fund (POF) industry in PRC is still short of comprehensive statute law, even if the industry has experienced a phenomenal growth in recent years. Due to the deficiency of legislation, fund manager's administrative behaviors and investment plans can't get appropriate supervised. Consequently, the private offered fund industry may face an imbalanced development under certain circumstance. On the one hand, a number of investors will benefit from investing on the well-organized and responsible POF. On the other hand, a number of amateurish and irresponsible POF will harm both their investors' interests and Chinese financial framework. Nonetheless, a series of effective law and rules which aimed at establishing a transparent and comprehensive system of regulation to support the sustained development of POF can't be legislated in a fairly short time, especially in PRC. Therefore, the establishment of a steady, efficient and restricted cooperative foundation between POF managers, custodians and investors is a duly acceptable solution to sustain a continuous growth of current Chinese POF industry. Nowadays, domestic supervisory institutions should enhance the mutual dependence and restriction between POF managers, custodians and investors in order to control the risk and protect investors' interests while the whole legal platform has not been perfectly constituted.

## **1. Legal background of Chinese POF**

There is no comprehensive statute that governs the regulation of investment funds in Japan, but there are a wide array of laws and rules for various aspects of the funds industry including organization, fund raising and management (Makoto Igarashi, 2006). The same situation is currently happening in China, whereas the difference is that a variety of aspects of Chinese funds industry are short of corresponding laws and rules. Presently, there are only a few enacted law and rules dealing with POF industry more or less in PRC. The Securities Investment Funds Law (SIFL) was promulgated by the National People's Congress (NPC) on 28 October 2003. And the SIFL has commenced operation from 1 June 2004. The law has specifically paved the way for the introduction of further regulations that will facilitate the introduction of new and innovative investment products, as well as the offer of funds by way of private placement (Effie Vasilopoulos and Felicity Wong, 2004). However, the supervision of POF is not involved in the SIFL as in which article 2 declares that this law is only applicable to the public offering funds. The scope of SIFL is restricted to the regulation of funds investing in listed stocks or bonds and other securities specified by the China Securities Regulatory Commission (Effie Vasilopoulos, Felicity Wong, 2004). Nonetheless, we can not conclude that current diversiform domestic POF is illegal in PRC in respect that the SIFL has not provided any official systematic and institutional regulation (Huang Tao, 2007). Such an investment instrument can still be operated in PRC legally at present because it is not prohibited by any statute law. Notwithstanding, we could no doubt confirm that the deficiency of specific legal regulation especially in the aspect of funds administration and management in POF industry is incontestable. Besides, the new Partnership Business Law enacted on 1<sup>st</sup> June 2007 has made strong impact on domestic POF industry and will be discussed below.

## **2. General information of domestic POF industry**

As estimated, the gross amount of POF invested on Chinese stock market is over a thousand billion CNY in the year 2007. Additionally, it is around 8% of the whole domestic capital market value (Huang Tao, 2007). Besides, it is still in the process of highly rapid developing. The so-called POF in PRC used to be classified into 2 categories when POF was introduced to domestic capital market as an investment instrument. The first category is consisted of security broker collective asset management plan, trust and investment companies' trust business and investment companies' own capital management. Almost all these sorts of funds are operating with governmental background.

The other category is mostly made up of the small-scale private placements. These POF always provide collective financial services to other investors by signing authorized financial property management contract in the name of consultation or advisory company, financing service studio and even individuals. Obviously, such funds have hardly any affiliation with governmental capital or background. In the year 2005 and 2006, the great mass of investors invested on either the two sorts of POF had gained enormous profits under the phenomenal domestic stock market circumstance. The huge risk has been hiding out behind the rapidly expanding market background, and has emerged inch by inch since 2007 which is the year of security market adjustment. For the moment, credit is still the foundation of the existence of Chinese POF (He Lu, 2007), especially the second sort of POF. From the fund placement to the management, there are clearly no adequate legal regulation and rules to monitor or restrict the funds managers, custodians, and investors, as well as their behaviors. Additionally, more and more dissimilar financial institutions and experienced financial practitioners have been engaged in POF business to provide the collective investment services as the performance of domestic security market is predicted to be upgrade in the future. The qualification, capability, credit and morality of both these new and existing participants are extremely difficult to regulate appropriately through legal instruments presently. Under certain circumstance, some particular techniques can be introduced to the current Chinese POF industry for the sake of protecting investor interests. Firstly, only qualified investors can be permitted to invest their money on POF financial products. It is actually an extraordinary elementary requirement for private placement investment globally. Literally, it was born to serve the specific investors with nice financial condition. Take United States for example: according to the US Investment Company Legislation of 1940, individual investors can invest on private placement financial products only when holding security assets more than 5 million US dollars, and the latest 2 years' annual income exceeding 200,000 US dollars. In PRC, over 80% of POF assets are from individual investors (Qin Rui, 2007). Most of the individuals are lack of financial knowledge, and even less educated. Furthermore, a majority of Chinese investors can not endure too much loss because the low-level of domestic average personal and household income. The remarkable mismatches between risk preference of investors and substantial risk of the current POF in the market always bring about instabilities to the entire industry. The present annual personal GDP of medium-sized Chinese cities is approximately 4000 US dollars. Besides that, the domestic general public offering funds require the minimum investment limit of 1000 Chinese Yuan. Consequently, with referring to the American standardization and current Chinese economic situation, a minimum investment limit of 1,000,000 Chinese Yuan while investing on POF is a reasonable hypothesis.

Another unintelligible practice among the current Chinese POF industry is that plenty of so-called "POF" are advertising through the media for raising funds. Obviously, only public offering funds can raise funds from public with advertisement since these funds have the obligation of information disclosure. Without the consideration of information disclosure, POF should not be allowed to attract investors with mass media, especially in Chinese capital market which is full of irrational investors. Therefore, certain POF only issuing to finite investors and partners with special capital asset requirement ought to be prohibited from advertising while the corresponding supervision system for both POF and Public offering funds have not been perfectly built in PRC yet.

Take the US and UK for example, the investment targets of the POF in the two countries include listed and non-listed stocks, bond, futures, option, warrant, foreign exchange, gold & silver, real estate, IT software industry and venture capital investments for Small and Medium-sized Enterprises, etc (Ba Shusong, 2007). By the reason of Chinese derivative financial market is quite immature and undeveloped, nowadays, domestic POF primarily spend their money on purchasing the stock of listed companies from A-share market. A few of other POF are focusing on real estate, energy, metal and other rapidly developing industry engaging in equity business. Apparently, duration of POF investment is usually longer than the one of other financial products. Investors' funds can not be redeemed anytime when investing on POF because the POF is not functioned the same way as public offering funds with highly broad capital source. However, a majority of Chinese investors simply concentrate on the capital gains when investing on domestic stock market. Moreover, a great deal of investors always eager for quick success and instant benefit. Thus, these investors often bring pressure to bear on the funds managers to make profit in a fairly short period after they have invested in the certain POF if the stock market or domestic financial market has performed well during that period. Some of them even claim their funds back if the performance of the POF on which they have invested is not as perfect as they desire within an extraordinary short period. Moreover, the definition of POF investors and funds managers is not explicit enough in PRC. The difference between them is generally difficult to be identified because the investment strategy of funds managers or custodians may usually be modified under the pressure of some significant investors in order to meet these investors' interests. Occasionally, some investors may even require the managers to invest in their favorable ways. For instance, domestic POF managers had to select a couple of blue chips and put them in their investment portfolios during the year 2005 and 2006 when most of the blue chips in A-share market performed extremely well and drove up the whole domestic stock market much rapidly.

Not surprisingly, investors from private enterprises but not state-owned enterprises are the most favorable collaborator for POF funds managers in PRC. What are funds managers and custodians concerned with is that the power rent-seeking which is a specific phenomenon existed widely in Chinese capital market for long may follow the cooperation with state-owned enterprises and intervene in their market manipulation. To solve these problems, a formal contract included a series of essential clauses to grant funds managers or custodians their necessary rights can be signed before the deal of investment is done. First of all, the investment time limit specified above should be contained in the contract to prevent the investors from redeeming their funds excessively soon. Furthermore, the exact way how investors can increase their capital and redeem their funds also must be contained in the contract or investment agreement. Besides that, the right and obligation of both funds investors and managers or custodians should be listed explicitly in the contract. These problems mentioned above also exist in relation to the dominating form of domestic POF. Because limited partnership POF is the leading model of POF in America, general partner and limited partner are primarily taking part in American POF industry at present. General partners are basically in charge of business activity and daily management affairs. On the contrary, limited partners are merely providing the funds but not participating in the funds management. A precise definition of dissimilar participants' authorities would restrict their behaviors and benefit the funds managers or custodians' market manipulation. The details of Chinese POF models will be discussed later.

### **3. the relationship between participators of different Chinese POF**

Based on US Investment Company Act, the main funds established in America are the venture capital, hedge funds, investor clubs, private equity investment and some structural investment tools. The most significant forms of all these are venture capital and hedge funds (Ba Shusong, 2007). Different from US, Chinese POF used to operate primarily in two different models which are account management model and trust plan model before the promulgation of the new Chinese Partnership Business Law. In the account management model, investors usually open an account with a stock broker in the name of themselves firstly. Then the funds managers will act on behalf of the investors to manage their accounts. If the net value of investment has lost more than a certain percentage, say 10%, investors is permitted to end the clientage unilaterally. Oppositely, the profit exceeding 10% will be distributed at a promissory ratio. Most of petty POF are operating in this model, and main investors are from funds custodians' relative or friends. Because such type of POF is short of legal safeguard, both investors and custodians could not appeal to court if their benefits had been infringed. On the contrary, a great number of POF with huge amount of capital may raise funds and invest collectively in the way of trust plan. Hence, it is a fairly regular POF model at present. These two sorts of POF exist widely in the current domestic financial market. The present supervision of these POF should focus on the qualification and marketing channels to cut down the social influence of the investment risk by establishing a qualification management system of POF managers or custodians. However, the popular limited partnership POF in other countries is not quite prevailing in PRC because the risk of institutional investors investing on POF is extremely too high. Before the new Partnership Business Law (PBL) was promulgated, institutional investors interested in POF could only invest their money on POF as general partners shouldering unlimited joint and several liabilities. Nevertheless, after 1<sup>st</sup> June 2007 when new PBL was enacted, fund, commercial bank, and other financial institutions can legally participate in POF as limited partners shouldering limited liabilities. Additionally, funds managers or custodians can inject only a few capitals into the POF acting as general partners in charge of daily management of the funds and earn management fee according to the partnership agreement.

After the promulgation of new PBL, a number of new limited partnership POF have emerged in China. The first real limited partnership POF named South China Sea development and business start-up Limited Joint Enterprise was established on 28<sup>th</sup> June 2007 in Shenzhen. Later, the first Shanghai limited partnership POF named Rosefinch Investment was established on 2<sup>nd</sup> July 2007. After this, the first Beijing limited partnership POF called Redstone international venture capital fund primarily engaging in equity investment business was registered with Beijing administration for industry and commerce Caoyang branch officially on 16<sup>th</sup> January 2008. Compared with other sorts of POF in Chinese financial market, limited partnership POF performed much more actively and flexibly. They can not only investing in secondary market, but also involved in private placement, strategic allotment, private equity investment, etc.

Some of illogical phenomena in the capital market had improved quite a lot indeed after legislation of the new PBL. For instance, the chaotic personnel flow of funds managers in fund industry has been decreased since the foundation of cooperative relationship of the limited partnership POF is much more stable. The limited partnership is also a significant solution to the capital insufficiency of domestic real estate industry. Before the new PBL has been enacted, domestic POF could only cooperate with Chinese real estate enterprises as a general partner. Those real estate developer enterprises could take charge of the whole project in which investing the land and merely a few

capital. POF involved in real estate businesses have to bear a much too high risk because the great amount of invested capitals are not marching the right and profit gained from the businesses. Thus, a lot of POF used to sign complementary agreements with real estate developers to ensure the profit previously. Nonetheless, Ministry of commerce of PRC had emphasized that both domestic and foreign investors in real estate industry could not sign any forms of agreement to guarantee a fixed monetary return to any participators. Accordingly, the agreement mentioned hereinbefore is definitely greatly risky. However, for domestic POF, these sorts of risk can be eliminated through running business in the way of limited partnership POF after the promulgation of new PBL.

Nevertheless, a few issues still existed in terms of funds participators after the legislation of new PBL. Article 3 of the new PBL declares that solely state-owned companies, state-owned enterprises, listed companies, public institutions and social groups are not permitted to act as the general partner. Obviously, such an article was intended to protect these state-owned assets and listed companies from the joint and several liabilities to lower the risk. In the meanwhile, this specific restriction also had limited the capability of leverage financing of these state-owned assets and listed companies. Furthermore, the new PBL is conflict with the Company Law of PRC in terms of the identity of legal person participating in POF business. According to the new PBL, the legal person and other organizations are allowed to behave as a general partner investing in partnership enterprises. On the contrary, companies are not permitted to invest in partnership enterprises as a general partner referring to the Company Law. Consequently, the rules of the qualification of other funds management companies, security companies and venture capital companies participating in limited partnership POF as a general partner is to be legislated as early as possible. Under current legal circumstance when a conflict between the new PBL and the Company Law is occurring, the government could make a difference between different companies and industries by promulgating a provisional or transitional law to lead the capital in some underdeveloped regions or specific industries with insufficient funds. For instance, funds management companies, security companies and venture capital companies mentioned above could be permitted to deal with certain limited partnership POF primarily investing in city basal facilities construction, biomedical industry, and domestic aviation industry as general partners. By issue such a policy, underdeveloped areas could gain much more funds to solve the problem of backward infrastructure construction. The imbalance development between cities of different areas could be improved. Additionally, less risky industries supported by domestic government such as aviation also could attempt a new capital resource. Furthermore, such a policy could be an experiment for the future reform of the general partner qualification of limited partnership POF.

In conclusion, present Chinese domestic POF industry is still short of corresponding legislation. The supervision of the fund set up, marketing and sales, and fund management is lack of legitimate support. All the participants in present domestic POF desiring legal safeguard and monitor might not be able to appeal to court if their rights had been infringed due to the insufficiency of relevant supervisory legislation. The cooperative relationship between these participants involved in account management model and trust plan model is quite unsteady and risky before the new PBL was enacted since the identity of these POF had not been acknowledged officially by domestic statute law. Nonetheless, the limited partnership POF prevalent recently after the promulgation of new PBL is much more beneficial to both the custodians to be master of relevant funds and investors to control their investment risks. Notwithstanding, the conflict between Chinese Company Law and the new PBL restrain solely state-owned companies, state-owned enterprises, listed companies, public institutions and social groups from participating in limited partnership POF as general partners in order to protect them from the risk of unlimited joint and several liabilities. Therefore, a complementary rules or regulations much be enacted as early as possible. To sum up, the investors, fund partners and custodians involved in current Chinese POF business are cooperating without any tremendous disasters in spite of lots of shortcomings existing in the industry. Nevertheless, a systematic and comprehensive legal platform for Chinese POF industry is to be established urgently.

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# Market Multiplication, Direct Marketing and the Marketing Mode of the Health Food Industry

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## Abstract

The market multiplication theory includes the multiplication of market, time and benefit, and the direct marketing is based on this theory. Health food industry can adopt the mode of direct marketing, because the industry possesses characters of low production cost, high circulation cost and lots of users. The marketing mode, product promoting method and employee salary system of Amway Company which manages businesses including the health food production can be references for the direct marketing enterprises in the health food industry.

**Keywords:** Multiplication, Direct marketing, Health food industry, Marketing mode

With the development of social economy and the improvement of living level, human consumption concept and health concept have been changed largely. Customers' consciousnesses of self-health are increasingly strong, and their demands for the health food are higher and higher, which offers an important chance for the development of the health food industry. The health food market of China is a market with large developmental potential. But the problems such as the low level competition, the emphasis of advertisement and the bad industrial reputation seriously restrict the healthy development of the industry.

The health food industry generally adopts the sales mode of channel distribution, which operates through two advertisement operation modes including manufacturer advertisement extension and regional packaging extension, and has serious problems of sales management and channel efficiency. With the changes of exterior marketing environment including gradual improvement of national policies, gradual maturations of the media and the public, the subdivision of the market and gradual sense of customers' behaviors, the traditional marketing mode in the health food industry is facing serious menace and challenge. The change of competitive structure also makes the validity of the present marketing mode of the health food industry become worse and worse, so to obtain long-term development, enterprises must quest for new developmental mode. Therefore, the direct marketing based on the market multiplication theory many be a good marketing mode.

## 1. Analysis of the market multiplication theory

The multiplication theory mainly studies the problem that how the factors of people, thing and matter multiply under the situation of geometric series, and when it is applied to the market, a new branch, the market multiplication theory is formed.

The market multiplication theory studies that how to rapidly enlarge the product market through the geometric series theory in the process of product distribution, and how to change the traditional all levels retail system into a new marketing system taking the human relation as the network base. The market multiplication can be divided into three multiplications from three aspects.

### 1.1 The multiplication of the market

The direct marketing market is established based on the geometric series principle of the multiplication theory. Supposed that one direct marketing company develops its direct distributors, and the first class develops  $m$  direct distributors which respectively develop  $m$  second direct distributors, and in this way, up to the  $n$ 'th class, there are  $m^n$  direct distributors together. For example, the first class distributor of the company develops 5 direct distributors which respectively develop 5 second class direct distributors, so up to the eighth class, the company will possess  $5^8=390625$  direct distributors, and up to the eleventh class, there will be  $5^{11}=48828125$  direct distributors, and these numerous direct distributors themselves are a large potential consumption market of the corporate product. We can express this situation through the pyramid network in Figure 1.

In the actual multiplication process, various parts are different in the time, even some stage may be interrupted, the

developmental speed of the direct distributor is not as quick as the theoretic computation, and the development among various levels direct distributors may be not balanceable, but the multiplication of the market can be surely actualized in virtue of the market multiplication theory.

### 1.2 The multiplication of the time

The direct marketing can multiply time, which is not the increase of time absolutely, and it means the time which completes same works is fully induced comparing with other methods, and this is a sort of reverse multiplication.

Supposed that the company propagandizes its products to  $m$  customers, and if  $n$  flacks adopt the one to one mode to introduce the product and the drumbeating to one customer needs  $t$  minutes, so the work needs  $t_1=mt/60$  hours, i.e.  $mt/480$  days (8 hours in a day). And if customers can propagandize each other and the drumbeating time is  $t$  minutes, so it needs  $nt$  minutes for that  $n$  customers propagandize to  $n$  customers simultaneously, and up the  $\lceil \log_n^m \rceil + 1$  (or  $\log_n^m$ , if  $\log_n^m \in Z$ ). Here,  $\lceil \cdot \rceil$  is the symbol to take integer, for example  $\lceil a.b \rceil = a$ , the drumbeating will exceed  $m$  customers, and the time to complete this work is  $t_2 = (\lceil \log_n^m \rceil + 1) \bullet nt$  (or  $\log_n^m \bullet nt$ ) minutes, i.e.  $(\lceil \log_n^m \rceil + 1) \bullet nt/60$  (or  $\log_n^m \bullet nt/60$ ) hours. Now, if  $m=3000$ ,  $n=5$  and  $t=20$ , so we can obtain  $t_1=25$  days and  $t_2=6.67$  hours. From that, we can see that under same workload, the multiplication of the time can fully reduce the work time, and only 6.67 hours can complete the workload that adopts the one to one mode and needs 25 days. Because the company uses the time of all levels direct distributors, and it saves the work time of employees, and this sort of high efficiency operation can make the company occupy the market and rapidly spread the product in time.

### 1.3 The multiplication of the benefit

The multiplication of the benefit includes the multiplication of company benefit and the multiplication of direct distributor benefit. One of main objectives of the company is to continually extend the market of the product, increase turnover and bring larger benefits for the company in virtue of the effective marketing measure. The multiplication of the company benefit means that under the changeless sales profit margin, the company multiplies its profits by means of the market multiplication and brings the multiplication of the profit. The direct distributor benefit is multiplied by means of the number of "pyramid network" or the multiplication of the sale. The increase of the lower class direct distributor or its performance can induce the increase of the upper class direct distributor's sale proportion, performance encouragement or the corresponding rewards according to the regulation of the company reward system, so various class direct distributors imbued with enthusiasms driving by the benefits, and this sort of developmental speed of "snowball" is quicker and quicker, and corresponding economical benefits increase more quickly by degrees.

Supposed that the year sales profit margin of the company is changeless, so there are two situations, one is that the sale base of the company is large, and it is  $b_1 = b, b > 0$  in the first year, the increase rate of the year sale is  $r$ , so the sale in the  $n$ 'th year is  $b_n = b(1+r)^{n-1}$ , the total sale in  $n$  years is  $s_{bn} = \frac{b(1+r)^n - b}{r}$  ( $b > 0, n = 1, 2, \dots, \max n$ ), and the other is that the sale base of the company is small, but the performance can be multiplied, the sale in the first year is  $a_1 = a (a_1 \neq 1)$ , the sale in the second year is  $a^2, \dots$ , so the sale in the  $n$ 'th year is  $a_n = a^n$ , and if  $a_1 = 1$ , so  $a_n = q^{n-1}$ , and the total sale in  $n$  years is

$$s_{an} = \begin{cases} \frac{a(1-a^n)}{1-a}, & a \neq 1 \quad (n=1, 2, \dots, \max n). \\ \frac{(1-q^n)}{1-q}, & a_1 = 1 \end{cases}$$

To clearly describe above principle, we suppose that  $b=200$  ( $b_1$  is far bigger than  $a_1$  here),  $r=10\%$  and  $a_1=2$ , so  $b_n = 200 \bullet 1.1^{n-1}$ ,  $s_{bn} = 200 \bullet 1.1^n - 200/0.1$ ,  $a = 2^n$  and  $s_{an} = 2^{n+1} - 2$ . From  $n=1, 2, \dots, \max n$ , we can get the table 1.

From Table 1, we can see that when  $n=1$ ,  $b_n$  is 200 times than  $a_n$ , and when  $n=10$ ,  $a_n$  firstly exceeds  $b_n$ , and when  $n=11$ ,  $s_{an} > s_{bn}$ . Under above two situations, the values of  $a_n, b_n, s_{an}$  and  $s_{bn}$  change with the change of  $n$ . But even if the initial value of  $b_n$  is far bigger than  $a_n$ , but when  $n$  is enough big, so  $a_n > b_n$  and  $s_{an} > s_{bn}$  can be realized. Just because of the function of multiplication, even the feeble company entering into the market later can finally share the market and even exceed former strong competitors.

## 2. The direct marketing is the marketing mode suiting the health food industry

The health food industry is one of the industries which grow fast, and it is also a big industry that China should further cultivate. At present, most enterprises of health food adopt the sales mode that use the channel distribution through advertisement spread, but after China came on a series of restrictive policy about the advertisement of the medicine and health food industry, the advertisement throw of this industry is seriously influenced, and with the increase of parts of false advertisements, customers reduce their trusts to the advertisement, which induce the product competitiveness depending on the advertisement marketing decrease. The actual situation is that the advertisement charges of many enterprises increase every year, but the distribution is continually decreasing, and the trust crisis of the whole industry makes the market demand decline (Arnold, 2001).

The direct marketing is to sell product or service to the customer face to face, and the sales place usually at customers or others' home and work place or other places which are different to the permanent retail shops. The direct marketing is based on the market multiplication theory. Generally, the product suiting to the direct marketing has two characters, one is the proportion of the production cost in the product price is very small, i.e. the cost of the channel circulation is very high, the other is that this sort of product can be used by every family or everyone. Because of the usual character of this sort of product, it can form continual chain consumption behavior and accordingly form the market of the direct marketing industry. Actual situation and researches indicate that the health food industry accords with above two characters. In addition, one notable character of the health food is that the demand flexibility of the purchase behavior based on the consciousness and purchase power is very large, and easy to be influenced by the atmosphere of the whole industry, and the homogeneity conflict of product function is very serious (Philip, 2002). So the health food industry can utilize the market multiplication theory to establish the direct marketing mode.

### 2.1 As viewed from product

The efficacy of the health food adapts to the common people, and the individual who emphasizes healthy condition and has economical ability more favors the health product. With the enhancement of the living level, the trend of public subdivision and product diversification of the health product is more and more obvious, which more possesses the usual character of product consumption and makes customers form continual chain consumption behavior. In addition, with the comprehensive of the consumption behavior, the method which only depends on the advertisement has obviously lose its force, and even for those health food brands with low known degree, the direct marketing can make them enter in to the market and save a great deal of advertisement charges.

### 2.2 As viewed from cost

Otherwise, the proportion of the production cost in the product price is very small, and the cost is mainly formed in the process of channel circulation. The distribution of this sort of product can utilize the marketing among people, exert the multiplication of the product distribution and explain clearly the character, advantages, benefit, purpose, usage and dosage of the product to stimulate the purchase, and this method can fully save the circulation cost and be more effective than simplex TV advertisement or planer advertisement (W.K. Chiang, 2003, p.12-20).

### 2.3 As viewed from channel

For the traditional sales mode, common consumables sold to the customers must pass the dealer and retail shop. The purchase of direct marketing product can implement through telephone and E-mail, and the service is more convenient and quick. Under some situations, the marketing personnel will actively connect with the customer, and especially in the busy society, this sort of service has become more popular. The emphasis of the direct marketing mode for the health food is to sell product through the mode from person to person, and this sort of direct marketing mode can continually operate without the influences of time, place and environment, and save the circulation time and cost of the product (Zhang, 2005, p.86-87). The sort of communication and sales channel among people can bring the multiplication of time and benefit.

### 2.4 As viewed from sales promotion

Most health foods use TV, papers or magazines to make customers know the product and produce the interest and desire to purchase it, but to really achieve the trade, the sales promotion of the terminal is very important. The direct marketing mode spreads the product by the people, which possesses the promotion character of one to one, and the multi-level direct marketing can produce the multiplication of the market, i.e. the pyramid sales network.

## 3. The direct marketing mode of Amway: case analysis of the health food industry

The Amway Company entered into the China backland in 1992, and firstly obtained the legal management right after passing "Administration of Direct Selling Regulations", and after that its development is very quick. In 2002, the health food brand, Amway Nutrilife, became the sales champion in China health food industry with the sale of 3 billion Yuan, and turned into the leader of few direct marketing enterprises. The special direct marketing mode,

product extension mode and employee salary system of Amway can use for references for the development of numerous health food enterprises.

### 3.1 Multi-level direct marketing mode

After 1998, Amway adopted the multi-level marketing mode of “shop+ direct distributor”, i.e. the distribution mode that sets up many supermarket or counter shop, all commodities mark a price and are directly sold to the customer, at the same time, engage the direct distributors extend the product and offer complete and detailed commodity information and circumspect sales methods of before service and after service. The product circulation chain of this sort of direct marketing mode is composed by two types of main group, the customer group and the direct distributor group (S. Balasubramanian, 1998, p.181-195). Its model is seen in Figure 2.

From the figure, we can see following aspects.

- (1) The product distribution can be divided into two levels distribution, and its mode is “factory- customer I-customer II”. The customer I is the direct distributor, and every direct distributor is the user of the product, so the direct distributors are a very big consumption group. The customer II is various levels director distributors’ final customers.
- (2) The customers of the distribution centers (shops) set up in China include two sorts. One is the common customer. The other is the direct distributor. And every direct distributor group corresponds with one customer group.
- (3) The ownership and the entity of the product don’t pass various levels direct distributors, but it is directly transferred from the direct distributor of the shop to the customer, which is seen in Figure 2. The direct distributor exerts the function of the company flack, agent and developing next level direct distributor.
- (4) The upper direct distributor develops several next level direct distributors, which forms the distribution channel of “chain” and makes the product radiate larger scale (Li, 2005, p.103-107). The direct distributors enter in the sales team in turn, and it will form a multi-level relation of the former and later or the upper and lower (which are seen in Figure 2). In Figure 2, from the most upper direct distributor, every direct distributor can develop his next level direct distributor (the number can be multiplied), and these lower direct distributors form the direct distributor group 2. In this way, the lowest level forms the direct distributor  $n$ . The quantity of every next level direct distributor can be several times than the upper level direct distributor, and accordingly the multiplication mode of multi-level direct distributor is formed. According to the statistics, the marketing team of Amway has increased from less than 70 thousands persons in 2002 to 180 thousands persons in 2006 (the data is from the web site of “<http://www.emkt.com.cn>”).

### 3.2 Product spread

The new product extension of Amway is very quick. That mainly depends on two methods. One is the exertion of traditional advertisement offensive. The other is the participation of various level direct distributors. The advertisement charge of Amway in 2001 was 70 millions Yuan, and in 2002 this number broke through 80 millions Yuan, and up to 2005, the advertisement budget of Amway had achieved 0.25 billions Yuan, and Amway retained heavyweight star to advertise (the data is form the web site of “<http://www.c2cmlm.com>”). Otherwise, the Amway Company advocates the use the product itself, and the direct distributors are the customer first, and then propagandize their experiences through public praise to their friends, which can achieve the multiplication effects of the drumbeating. At the same time, the company requests every direct distributor must have the courage to set out him and know well the performance demonstration and price comparison of the product. After the direct distributor grasps above basic sales skills, the upper direct distributor continually demonstrate the product quality, using method and product performance to the lower direct distributor or the customer, and accordingly the new product is quickly extended through the multiplication of the time.

### 3.3 Encouragement system

The encourage system of Amway is the direct distributor system which takes the distribution performance as the core, and the reward system more encourage active distribution and implement more encouragement measures to encourage the direct distributor to develop performance. The better product distribution performance will get higher deduction, and the direct distributor will get more rewards. When considering the reward, Amway will compute according to the whole team. For common direct distributor, his income is mainly composed by two parts. One is his product distribution performance, and he can get the income according to certain deduction. The other is the team product distribution performance deduction he develops, which is the work reward because he develops the market and cultivate the fresh man. Therefore, every upper direct distributor will try to develop lower direct distributor group and create bigger team product distribution performance, and in this way, the geometric series distribution performance increase is formed, and under the changeless of distribution profit margin, both the direct distributor and the company can obtain the multiplication of the benefit. Figure 3 is the distribution growth of the health food of

Amway “Nutrilife” in recent years. The Figure reflects the sale of the Amway “Nutrilife” presents the geometric series increase trend.

The example of Amway indicates that the market multiplication theory has extensive application foreground. In actual economical life, the example of the market, time and benefit are all multiplied according to the market multiplication theory is very few, but this example identifies the theory can achieve very ideal effects. Through the analysis of the problems of distribution management and channel efficiency existing in the traditional marketing mode such as advertisement drumbeating, we think the direct marketing based on the market multiplication theory can bring many useful references for the health food industry in the hot water.

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Table 1. The multiplication of the benefit

$n$	$b_n$	$a_n$
1	200	2
⋮	⋮	⋮
8	390	256
9	429	512
⋮	⋮	⋮
$s_n$	$s_{b10}=3187$	$s_{a10}=2046$
	$s_{b11}=3706$	$s_{a11}=4094$

Note: The values in the table are rounded to be integers.

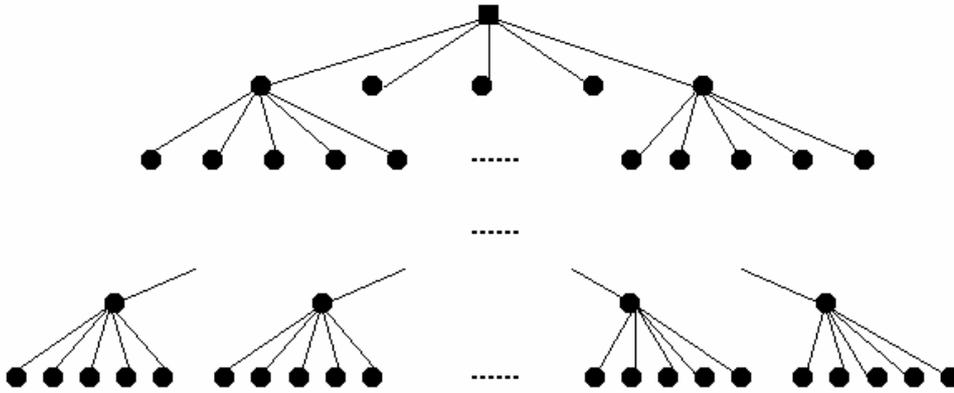


Figure 1. The Multiplication Pyramid Network of the Market

Note: “■” represents the direct marketing company, and “●” represents the direct distributor.

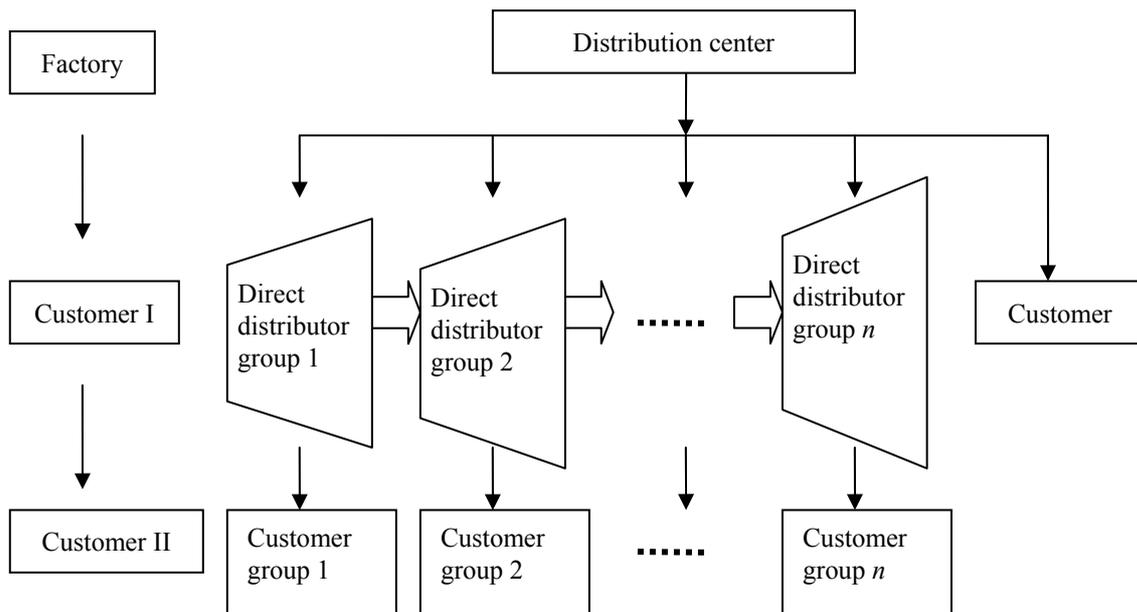


Figure 2. The Multi-level Direct Marketing Model of Amway

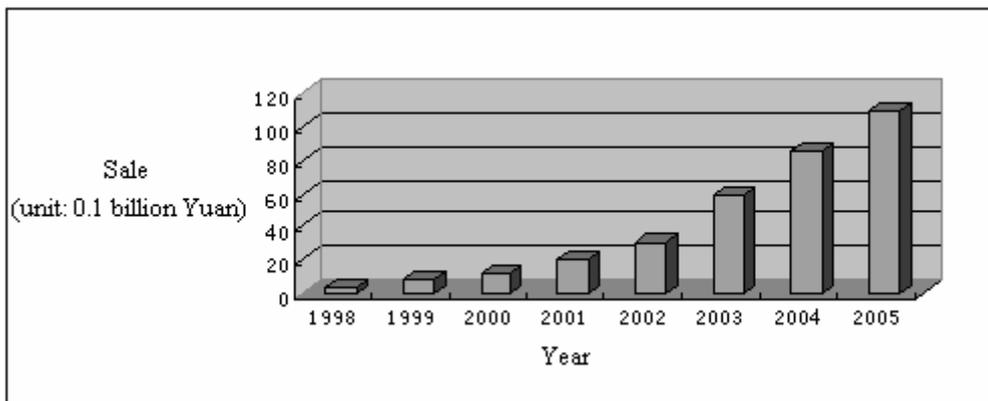


Figure 3. Year Sale Growth of Amway Nutrilife

# The Influence of Military Strategies on Business Planning

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## Abstract

The parallels between war and business planning are numerous. The important distinctions between war and business planning involve the ultimate ends of a given conflict. War involves physical destruction and death. When a business conducts operations, economic utility is generated and employees, stakeholders and society on the whole derive some benefit. The nature of competition is generally regulated by law and if disputes arise among rivals, either market place conditions or legal systems will make a binding decision over corporate life and death, victory or defeat. Introducing the analogies of either war or sports into the business environment is complex and may arouse emotions and an ethos that is contrary to the culture of commerce. As multinational businesses expand their reach they can be engines of wealth generation and peace. However, if global corporations adopt a martial ideology, then the hopes for human progress and cultural evolution will be dashed.

**Keywords:** Strategy, Global Business, Strategic Planning, Management, International Trade, Competitiveness, Business Policy, Military Planning

## 1. War planning

The fundamental objective of a war plan is the imposition of the victor's terms and conditions on the opponent, also defined as total victory. Military historians can cite exclusions to this prior definition; however, the purpose of this paper is not centered on arcane military history debates. With few exceptions, modern military conflict results in the deaths of the belligerents' armed forces and civilians as well as the physical destruction of property and economic assets. Additionally, war plans are usually carefully planned in advance of a conflict but are rarely executed exactly as projected during the engagement. The arrangements are generally redeveloped in lieu of alterations during a war.

An example of grand strategy conflict was the Pacific campaign waged between Japan and America from 1941 - 1945. Prior to engaging America and Great Britain in 1941, the Japanese created a detailed stratagem. It was designed to suddenly destroy the offensive capabilities of both the Americans (the Pacific fleet at Pearl Harbor) and the British (key military bases in Singapore and Hong Kong), the rapid seizure of economic resources and territories in Southeast Asia (present day Malaysia and Indonesia) and the Western Pacific (the Philippines, Guam, Wake and Midway Islands). The Japanese planned to achieve these objectives within six months of the start of hostilities. The ultimate goal of the Japanese was to rampage in Southeast Asia and the Pacific and then propose a peace settlement with a demoralized America and Britain to gain international recognition of the Empire of Japan as a superpower.

America anticipated war with Japan since the late 1800's and crafted and periodically revised a variety of offensive strategies culminating in "War Plan Orange." It served as the United State's Pacific war plan until the defeat of Japan in September, 1945. Fundamentally, Plan Orange called for a decisive naval engagement with the Japanese off the coast of the Philippines and then a naval blockade of the Japanese home islands to force Japan's surrender. Events (successful air and naval campaigns) and new technology (the submarine, aircraft carrier and atomic bomb) and other tactical considerations altered Plan Orange; however, its strategic goal of imposing America's will on Japan was achieved (Miller, 1991).

Many military historians, and contemporary business students, view the Chinese military strategist, Sun Tzu (ca. 500 B.C.E.) as the developer of "the Bible" of strategy. Wong, Maher, and Lee (1998) confirmed that Sun Tzu's principles are divided into basically of two components: 1) knowing oneself and 2) knowing the enemy. Although Sun Tzu recommended that war be avoided if all possible, he provided warriors with the principles of strategy if war erupted. Many of Tzu's teachings have laid the foundation for today's theory of strategic management.

Sun Tzu's strategy consisted of five elements: Tao, weather, terrain, leadership, and systems. These elements are presently thought of in terms of external and internal environmental analysis in present-day strategic management. Sun Tzu believed that close management and monitoring of the five factors would build a strong organization (pp. 22-23).

Sun Tzu's five elements constitute the basic components that comprise any war plan. The fundamentals of war

planning include an assessment of one's capabilities and gathering intelligence on the enemy to determine their strengths, weaknesses, capabilities and intentions. However, the most important goal of any war plan is victory over the adversary. War involves deploying as many factors necessary to achieve triumph including the sacrifice of human lives and consuming as many physical (oil, metals, food) and economic (production plans, currency controls, etc.) assets as required to accomplish the objective.

Finally, war involves great risk. One side, such as Japan, can decide to initiate a conflict to achieve results, However if the instigator is unsuccessful it may lose control over its destiny, physical territory and be subject to physical occupation by the victor.

The current literature and business sections of many bookstores are filled with tracts touting the adaptations of military strategy and other analogies to guide businesses. Tsang (2000) for example points out how the military doctrine of C3I (command, control, communication and information) should be used as the basis for corporations to manage crises. He studied three contamination cases faced by Perrier, Vita Soy and Coca-Cola, as examples of how large corporations used C3I to effectively deal with a clear and present danger.

James (1985) enthusiastically embraces the corporate use of military doctrine. Reflecting the spirit of the times, he promoted the exploration of a deterrence strategy "because if properly devised and executed, deterrent strategies offer the highest return and...preserve intact the company's security, sovereignty and power"(p. 60). James entire presentation is laced with Cold War terms. He sounds like the President's national security advisor when he proclaims that the four key elements of a successful corporate deterrence strategy are: credibility, capability, communication and rationality. After reading James, one can almost imagine a McDonald's executive putting all of its stores on "red alert" status and scrambling its franchises to be prepared to launch a preemptive soft serve ice cream sale on Wendy's.

Besides the military comparisons, numerous other sources are cited proclaiming the discovery of the most decisive business planning technique. One unusual source is from the home kitchen. In *Isabella Beeton: Management Lessons From the Kitchen*, Wensley (2004) states that Mrs. Beeton's classic "Book of Household Management" written in 1896 provides significant guidelines for contemporary business. "Mrs. Beeton's approach can be summarized in three principles, which would certainly feature in most practical management texts: - setting an example and giving clear guidance to the staff - controlling the finances - applying the benefits of order and method in all management activities" (p. 67).

Hee (2007) takes lessons from a classic Indian epic the Bhagavad Gita, to derive management strategies. The Bhagavad Gita stresses "self-control focusing on discipline in perseverance, detachment from fruits of labour, and devotion to duty. The key components in business management are the 5Cs: capital, capability, connections, communication, and commitment" (p. 84).

While the analogies between war and business planning may superficially appear transferable, Talbot (2003) argues against not only the overt comparisons but describes the subtle damage that a military lexicon may have on businesses. He states that post industrial business are less rigid and command control oriented requiring less hierarchical structures and more independent, creative employees. Furthermore, present day leaders should have softer leadership styles because followers are less likely to tolerate orders barked at them. Even the use of martial language "remains seductive and damaging, as it subconsciously appeals to the inherent and timeless aggressive human instincts aimed at confrontation which are hidden beyond a thin veneer of civilized behaviour and convention" (p. 9).

The reverse analogy (business terminology used by the military) would also seem to be inappropriate. Frequently the military utilizes corporate terms to sanitize the reality of warfare. For example, many military briefings use the term "collateral damage" to mean civilians were killed and residential buildings were destroyed. Nuclear and chemical/biological weapons are expressed as weapons of mass destruction. A close friend of the writer who works in the Pentagon described an aircraft crash as "a negative interface with the environment." When warfare is reduced to a corporate like discussion of the return on investment the true cost of conflict is minimized or completely missed. True warriors wish to avoid war. Arm chair generals considering combat viewed in corporate terms may be tempted to venture into conflict believing that if the "investment" does not deliver sufficient returns, one can just "write it off" like a bad stock investment.

## **2. Business planning**

After considering the above military and literary guides to developing strategy the reader may become cynical about looking at alternative realities for strategic guidance. Hellriegel, Jackson and Slocum (2005) define strategy as "the major courses of action (choices) selected and implemented to achieve one or more goals" (p. 182). This concise definition serves as introduction to a variety of strategic planning options that have emerged over the past several

decades.

In *The Art and Process of Strategy Development and Deployment* (2005) nine strategic models are offered that seemingly gather the best approaches the civilian world offers. They are: 1) The Harvard Business Model defines strategy as a pattern of purposes and policies defining the company and its business; 2) Strategic Planning Systems is a system approach that makes it possible for managers to make, implement and control decisions across the organization; 3) Strategic Management is the bridge between the organization and its stakeholders; 4) Portfolio Methods analyze the prevailing market conditions for the specific business category; 5) Competitive Analysis studies the forces that shape an industry from a profitability perspective; 6) Strategic Issues Management focuses attention on the recognition and resolution of strategic issues; 7) Strategic Negotiations view strategy as the partial resolution of organizational issues through a highly political process; 8) The Framework for Innovation emphasizes the development of innovative strategies that promote creativity and entrepreneurship at a local level; and 9) Logical Incrementalism focuses on appropriately balancing an overall direction for the organization with centralized decision-making (pp. 12 – 16).

The nine strategies outlined above reveal a great deal about the process to devise a strategy. However, the question remains regardless of the method one uses to produce a strategy what makes one notable? Huffman (2001) takes a different approach to evaluating strategy creation. He argues that a shift needs to occur away from teaching and practicing of the process of strategic planning to one centered on the criteria for evaluating them and emphasizing the importance of tactics in implementation.

Huffman drives a stake into the heart of the discussion regarding which strategic planning analogy, methodology or process consistently produces a winning formula. His assertion that learners and professionals should use historical lessons not as recipes but rather as opportunities to recognize brilliant thinking makes great sense and merits immediate attention. In today's "me too but cheaper" culture of commerce, it is believed that grafting or imitating a successful strategy is a prescription for success. The difficulty in imitating is deciding what should be copied. Many motorcycle manufactures have tried to imitate the Harley – Davidson motorcycle. Most have focused on copying the physical product, including the sound of the motor. However, the unique characteristics of Harley – Davidson products cannot be captured in three dimensional objects. Harley's appeal is in its mystique of rugged independence and shared owner/driver identity. Like the Harley, corporate strategy must define a matchless plan and process to implement and sustain competitive advantage.

### **3. Comparisons and contrasts**

The determination by a firm as to how it assesses its competitive position relative to the industry it competes in, its competition, forces in the industry and future trends are generic considerations for both military and civilian applications. When comparing war and business planning, several similarities are evident. Plans are devised to achieve victory. The definition of victory may be relative. In the military, triumph may mean imposing one nation-state's will on another, the physical seizure of certain foreign assets, deterring attack or mounting an active defense to secure the borders of a nation/state. In the business world, success may be the acquisition of a competitor, seizure of a targeted market, prevention of market share loss or the defense of proprietary technology. One of the most valuable assets that the military and businesses covet is intelligence of their opponents.

War inevitably involves taking lives, the destruction of property and environmental degradation and expending extremely expensive equipment. Most enlightened generals urge their leaders to avoid the horrors of war, risk of defeat and destruction and to seek other means to accomplish national goals.

The nature of free enterprise is taking risk. Boards of directors, greedy stockholders and other forces push corporate leaders into jeopardy. Enterprises can engage in high risk competition for the benefit of their "citizens" (stakeholders) and community at large without the massive physical dislocation caused by armed conflict. When a company "loses" to a major competitor the landscape is not littered with death, destruction and degradation. Although employees may need to find other employment, stockholders may lose their investment capital and communities experience the negative effects of job and tax losses, all parties live to try again. It is vital that business students, corporate leaders and military theorists recognize the natural borders of one another's "areas of operations." Using a mistaken strategic analogy is equivalent to hiring an attorney to provide medical services.

### **4. Essential internal and external environmental factors**

Hellriegel et al. (2005) define strategic planning as the process of diagnosing the organization's external and internal environments, deciding on a vision and mission, developing overall goals, creating and selecting general strategies to be pursued and allocating resources to achieve the organization's goals. Many scholars have made pronouncements on what are critical internal and external environmental forces. Hellriegel et al. place the environmental analysis as the second and third steps of their strategic planning model, after the creation of the vision, mission and values.

They note that a variety of variables affect the evaluation of a firm's organic assets and liabilities including competitors, new entrants, customers, suppliers and substitution possibilities.

Hellriegel et al state that the rivalry among existing competitors varies depending on how management views its rivals. The threat of new entrants is generally in reaction to high profits earned by an established firm (ex. Rolex) or rapid growth in the industry (ex. Red Bull high energy drink). The bargaining power of customers relies on their ability to pit one company against another (Home Depot vs. Loews) to force prices down, increase higher quality (Toyota vs. General Motors), or obtain more products/services by for the same price (bundling packages including inclusive vacations, value meals and etc.).

The bargaining power of suppliers enlarges when they can raise or protect market share, boost prices or eradicate some features without worrying about the loss of customers (ex. Microsoft's new operating system Vista). The threat of substitute products or services depends on consumers' willingness to alter their buying habits for example changing traditional land line telephone service to cellular phone service.

Hellriegel et al. method of assessing an entity's strengths and weaknesses is to identify the company's core competencies and select which one/s need to be improved. An organization's core competencies "are the strengths that make an organization distinctive and competitive by providing goods or services that have a unique value to its customers" (p. 195). Core competencies sort out into three general categories: superior technological capability, reliable processes, and close relationships with external shareholders. Among the diagnosis factors includes market share, technology capacity, human resources, new product development, fiscal viability, managerial suitability and brand reputation. Hellriegel's internal and external analysis process is a sophisticated update of Sun Tzu's theorem of never fearing the outcome of 1,000 battles if one knows themselves and their opponents.

The authors of two classic strategic management textbooks offer variations of important micro and macro forces. Pearce and Robinson (2007) segment the environment into two components, remote and operating. The firm's external environment consists of economic, social, political, technological and ecological factors. Those forces that directly impact the enterprise (internal or operating environment) include the industry in which it competes, its competitive position, customer profiles, suppliers, creditors and the labor market.

Hill and Jones (2007) affirm that the purpose of the external analysis is to identify strategic opportunities and threats in an organization's operating environment and how they will affect the entity's mission. An internal analysis serves to locate the strengths and weaknesses of the firm.

The authors of all three textbooks mentioned above allude to Porter's Five Force Model of industry competition. The five forces are the threat of new entrants, the bargaining power of buyers, the bargaining power of suppliers, the threat of substitutes and the intensity of the rivalry of industry competitors. Analyzing these five forces according to Porter is an essential tool to assessing the impact that environmental forces have on the business.

Porter's Five Force Model is not an unassailable strategic planning instrument. McManus and Botten (2006) maintain that if an industry's structure completely decided how all of the firms in that sector conducted business there would be no differentiation. For example, since all competitors in the ketchup industry use fundamentally the same ingredients everyone in the business should follow the same pricing strategy. Alternatively if all companies in ketchup commerce have the same unit cost profitability the variation between these adversaries could be attributed to random events. In reality, all competition is not equal. Competitors differ in how they are organized, structured and present their products. The differentiation includes marketing practices, fiscal and operating conditions and operating techniques. Such distinctions may also be attributed to variations in market intelligence.

A crucial capability for both military and civilian planning is access to market information or put in the military parlance, intelligence. As noted by McManus and Botten (2006) an organization can diligently and precisely follow one of the many chic strategic planning models that are available and still fail because it did not conduct "strategic surveillance." It should monitor a broad range of events inside and outside the corporation that are likely to impact the implementation of its strategy.

However, predicting the future is thought to be the realm of mystics. However, Hines (2006) a futurist, states that most business analysts have little experience or formal training in strategic foresight. Hines lists six phases to crafting strategic foresight. They are framing, scanning, forecasting, visioning, planning and acting. McManus and Botten (2006) offer six steps to guide corporate surveillance activities. 1) Sensitization to challenge the firm's existing assumptions about particular competitors; 2) Benchmarking to compare the firm with its competitors; 3) Legitimization to justify certain proposals and persuade the firm's leaders of the feasibility and desirability of a chosen course of action; 4) Inspiration to solve problems in this process by identifying what other firms had done in similar circumstances; 5) Planning by gathering information about others to assist the formal planning process and 6) Decision-making to aid the operational and tactical decision-making by managers.

Another vital micro factor that determines the success or failure of a strategy is the quality of the organization's chief executive officer. Hellriegel et al. (2005) define transformational leaders as having the ability to "inspire others with their vision, often promote this vision over opposition, and demonstrate confidence in themselves and their views" (p. 434). Transformational leadership is more than being a big picture dreamer. A transformational leader creates a vision of what the enterprise or cause can be and attracts others to the mission.

Levicki (2003) maintains that an organization can fail despite have a superb strategy and brilliant implementation steps. The reasons include the leadership a) selects the wrong strategy, b) implements the chosen strategy poorly and c) leaders ignore the strategy to concentrate on tactics. Southwest Airlines' brilliant triumph in executing its low cost business model would be inconceivable without the transformational leadership of former CEO Herb Kelleher. Southwest's model is straightforward in concept; however, leading and consistently executing Southwest's mission and shaping its culture were as crucial to its success as General Norman Schwarzkopf's leadership during Desert Shield/Storm. Both Kelleher and Schwarzkopf were icons of their organizations' missions. When one considers Kelleher's and Schwarzkopf's opponents, who by most accounts were more powerful, it is amazing that both succeeded against such formidable foes. However, their leadership, personal strength of character, strategy selection, nearly flawless tactical execution and most importantly, mastery of strategic surveillance gave them the decisive edge for recording victories.

## 5. Discussion

The parallels between war and business planning are numerous and well documented. The chief similarities between business and war planning include: a) understanding the nature of conflict; b) comprehension of the opponent's intentions; c) knowledge of one's capabilities and deficits as well as the challenger's; d) awareness of the battle ground; e) ability to shaping a coherent and executable strategy; f) mastery of logistics; g) belief in the righteousness of one's cause; h) intimate connection with one's suppliers, customers and staff and i) conviction to win the battle.

The important distinctions between war and business planning involve the ultimate ends of a given conflict. War involves physical destruction and death. Businesses thankfully never have to calculate their "wars" in terms of lives lost or wounded. The great Coke/Pepsi war never results in the physical destruction of bottling plants, employees, or illegal espionage. In fact, Pepsi reported to Coke an effort to sell Coke's formula to Pepsi by a Coke employee. When a business conducts operations, economic utility is generated and employees, stakeholders and society on the whole derive some benefit. The nature of competition is generally regulated by law and if disputes arise among rivals, either market place conditions or legal systems will make a binding decision over corporate life and death, victory or defeat.

As noted above, introducing the analogies of either war or sports into the business environment is complex and may arouse emotions and an ethos that is contrary to the culture of commerce. As multinational businesses expand their reach they can be engines of wealth generation and peace. If on the other hand, global corporations adopt a martial ideology, then the hopes for human progress and cultural evolution will be dashed.

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# Research of the Management to Promote Enterprise Knowledge Sharing

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## **Abstract**

Knowledge is the essential source of enterprise competitive predominance. As viewed from the explicit knowledge and tacit knowledge, it is demonstrated that the information technology is the effective method to promote explicit knowledge sharing and the human communication is the effective management practice to promote tacit knowledge sharing.

**Keywords:** Explicit knowledge, Tacit knowledge, Knowledge sharing

The source of enterprise competitive predominance is the focal problem concerned by the academe all along. From “enterprise resource basic viewpoint” to “core competitive ability”, and up to “enterprise knowledge basic viewpoint”, as the essential source of enterprise competitive predominance, knowledge has gradually turned into scholars’ consensuses.

Knowledge mainly includes two types, explicit knowledge and tacit knowledge. The explicit knowledge is the knowledge which can be clearly expressed by language, letter, data, chart and formula, which possesses characteristics of standardization and systematization, and is easy to communicate and share, and generally includes product appearance, document, data base, instruction, consensuses, computer program and other forms. The tacit knowledge is the knowledge with high individualization, which possesses the character that is difficult to be standardized, and always roots in the behavior itself and is not easy to share with others, and generally exists through individual experience, team privity, technical knack, organizational culture and other forms. Thinking mode, belief, viewpoint and value view also belong to tacit knowledge. The core of knowledge management is to create a sort of mechanism and platform which can make tacit knowledge interact with explicit knowledge.

Because explicit knowledge and tacit knowledge respectively possesses different characters, so enterprise should respectively adopt different measures to promote enterprise knowledge sharing.

## **1. The management practice to promote explicit knowledge sharing**

The explicit knowledge possesses characteristics of standardization and systematization, and the rapid development of information technology makes knowledge collection, sharing and application become more rapid and high effective. Through analysis and induction, the application of information technology in the explicit knowledge sharing mainly includes following forms.

(1) Interior network. Interior network is the network in the interior of the enterprise based on the information technology. It can connect the units with employees in the organizational interior and promote the sharing and flow of knowledge. Many large enterprises have established their own interior networks.

(2) Knowledge database. Knowledge database is the “repertory” of knowledge and information which stores in the enterprise by means of text or multimedia, and employees can input or export knowledge from the database. For example, the Notes database of Woodhouse Company not only collects various experiences, selective technical schemes and various sorts of knowledge used to support decisions, but also classifies thousands upon thousands information and knowledge through mode identification, optimal arithmetic and artificial intelligence, and offers decision supports and effectively combines with the expert system at the same time. Employees can get optimal operation method, expert advices, basic standard research, exertion assistant and performance measurement at any moment.

(3) Electric forum. Electric forum is the dummy space which employees can ask and answer on the interior network, and it can effectively promote the communication and knowledge transfer among employees. For example, through the “ask and answer” in the AT&T technical forum, employees can write questions what they don’t know or data they need, and leaders sometimes also write some questions, and experts will put forward solutions aiming at all problems, and in order to fully inspire the learning efficiency of the community, 30% of problems will be answered by other members first.

(4) Knowledge map. Knowledge map is the repertory catalog of enterprise knowledge, which tells employees the knowledge projects and their distribution positions in the organization so that employees can locate the knowledge resource what they need by following up a clue. For example, the knowledge map of the Microsoft Company fully utilizes the digital technology and establishes good index system. The user can search through key words, topic and contrast, and get knowledge and employee data at any time and place through the network.

(5) E-mail. The E-mail can realize the real-time communication among employees and enhance the efficiency of communication.

## **2. The management practice to promote tacit knowledge sharing**

Comparing with explicit knowledge, the tacit knowledge more depends on the communication among individuals. The spread of the tacit knowledge is decided by space distance, knowledge distance, cultural distance and absorption ability. The closer space distance, smaller knowledge difference and more communication are helpful to share the tacit knowledge.

(1) Conference and forum. Through performing conferences and forums with various topics periodically, enterprise can realize knowledge sharing through formal and informal individual communications in the conference or forum. More communications will produce more talking and stimulate employees' sixth senses, intuitions, thinker modes, beliefs, experiences and other tacit knowledge, and make for the speed of "exteriority" and "socialization".

(2) Cross-functional team. The cross-functional team is generally composed by employees from different departments, and it is a sort of organizational form independently existing for completing certain project or plan. For example, the mini-copycat of Cannon Company, here, members in the project group can fully communicate and air their own views, and some good originalities and fresh inspirations will finally form products through high degree communications, sane arguments, furious discussions and mutual enjoyments.

(3) Educational training. The educational training is propitious to widen the transmitted channel of knowledge. Through taking part in the training project together, managers from different departments in the enterprise can develop formal and informal communications and establish close human relation network. The research of training project in Xerox Company shows that most skills learned by technical commissaries who take part in the training are not from formal training tutorial, but from some activities outside the relative domains, such as the participation to solve the actual problems and informal discussions with colleagues. In fact, when technical commissaries drink coffee, have lunch and solve difficult problems, their experiences told each other have very important meanings for their individual learning.

(4) Practice community. The practice community means the team of knowledge communication and sharing composed voluntarily by those employees with special specialties or works. The knowledge transfer process in the practice community can be looked as a fine circulation of "communication- trust- learning- sharing". For example, except for some directors, most members is voluntary to take part in the practice community of Xerox Company, and members of the community are from various units, and they have diversiform backgrounds, and the knowledge leader is produced according to the actual problem by community members, and the high degree trust and communication exist among members, and though members are good at utilizing information technology, they will communicate usually face to face, and whatever the knowledge they have learned themselves or knowledge from exterior, they will share with community members to the sky.

## **3. Advices to promote enterprise knowledge sharing**

Because of the character differences between explicit knowledge and tacit knowledge, their transfer modes are different. However, that doesn't mean the insulation of these two modes. On the one hand, the electrical spread needs powerful complement of human communication. The communication among persons can establish fine relations with mutual trusts face to face, and drive the spread of explicit knowledge through information technology. On the other hand, the electrical spread offers guide for the transfer of the tacit knowledge. Through the information knowledge loads explicit knowledge, but it can indicate the owner of the tacit knowledge as a guider. Inquirers can find the potential owner of the tacit knowledge through database, electrical forum and other information system, and then obtain the tacit knowledge what they need through individual communications face to face. To really realize knowledge sharing, enterprises must exactly treat the relation between the electrical spread and human communication. Just as the explicit knowledge and tacit knowledge compose the knowledge integration together and they supplement each other, the information technology which promotes the spread of explicit knowledge and the human communication which promotes the spread of tacit knowledge also supplement each other. Of course, because the enterprise characters, scales and competitive modes are not same, their knowledge transfer modes will be different.

(1) For the enterprise in the mature industry, the emphasis of knowledge transfer is the repeat use of “standard knowledge”. Once the knowledge turns into the information-based form, i.e. the knowledge is stored in the knowledge repertory by the letter form, so the enterprise needs not modify when it use the knowledge every time and can acquire profits in the scale that enterprise repeatedly use knowledge. Therefore, the enterprise in the mature industry should emphasize the construction of knowledge base. Of course, conference and forum, employee training and cross-functional team are same important to the knowledge transfer for all types of enterprise.

(2) For the enterprises in the budding industry, aiming at the demand of special customer, their products and services can not achieve standardization, and the project manager must consult experts’ opinions to deepen the understand to the essential of the problem, and the employees what they need are experts who possess high degree of originality and can solve problems, and discussions, brain storm and repeating consultation are especially important. Because the knowledge in the budding term is not standardized, the knowledge base is difficult to be established, and because the look and search of “expert knowledge” are usually needed, the function of “knowledge map” is very important.

(3) For the enterprises in the growth industry, their products and services aim at popular demands, and the knowledge is not like the standardization of mutual industry and the speciality of budding industry, and only continual innovation can win by the quality and function of difference. Therefore, these sorts of enterprise need the knowledge groups who are willing to share knowledge and are good at integrate originalities. For the construction of network, more interactions, more communications, more volunteers, more specializations and more favors should be presented, which can not only share information, but can share knowledge and creation activity, i.e. it can not only make for the transfer of explicit knowledge, but be propitious to the transfer of tacit knowledge, and this sort of information system is called as “knowledge community”. The knowledge community is the knowledge sharing team composed by employees voluntarily or spontaneously (or half-voluntarily or half-spontaneously). The operation of knowledge community is based on the knowledge base, for example, for the knowledge community of Xerox Company, community members can find their knowledge what they want through the knowledge base, and communicate each other on the community web, and also perform knowledge communication with close distance face to face periodically or at will. Thus it can be seen that the enterprises in the growth industry should emphasize the cultivation of knowledge community.

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# Importance of the Enterprise Risk Management Practice for Airline Management: ANP-based Approach

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## Abstract

Airlines are exposed to risk which may effect operations, customers, corporate value, security and safety. Risk can also be introduced to an enterprise through air transportation industry-based and organization-based changes each of which may also bring changes in the type of risk. These present and raising risks main reason of growing importance of enterprise risk management (ERM) implementation in the airlines. ERM becomes focus point in the successful airlines across the world. This interest should be airlines in the Turkey if they want to be in the hard airline market conditions. This study aims at the introducing to four aspects of ERM implementation: benefits, opportunities, risks and costs that call attention to the ERM implementation in the airlines as managerial approach at the Turkey. Airline manager's consideration will enhance and increase about importance of ERM by this study. Analytic Network Process (ANP) is used as a qualitative technique for ERM implementation decision at airline management

**Keywords:** Airline Management, Analytic Network Process, Enterprise Risk Management

## 1. Introduction

As the dynamics of the air transportation market, business environment and changes in regulatory requirements for airlines increase in their complexity, it becomes harder to plot the right course for continued success. The abilities to identify and to adapt to changes are key success factors for the leaders of tomorrow. In the light of this, airlines are driven more than ever by the desire to protect their reputation and manage their risks effectively. ERM is provides a framework for airline management to deal effectively with uncertainty and associated risk and opportunity, thereby enhancing its capacity to build value. ERM does not operate in isolation in a corporation, but rather is an enabler of the management process.

Deregulation of air markets, combined with some other factors, has contributed to the growth and also volatility of demand in aviation markets. Additionally, the existence of a more competitive environment has also changed the industry, airlines and airports need to be more efficient in order to survive in the market. The capacity is rapid change by volatility. In general terms, it is the average year-to-year variation in traffic. Greater volatility of traffic means greater risk. If the clientele for an airport is uncertain, so are the revenues. The exact relationship between traffic and revenues depends on the current agreements with airlines and other users. The overall effect is nevertheless clear. Greater risk means higher costs of capital, higher interest charges (R. de Neufville and J. Barber, 2001).

Air transportation is a key strategic asset in that it provides access to markets and thereby enables the economic development of nations and regions (Bruno and Clarke, 2003).The airline industry has been through more structural changes in the past decade than most. The airline industry faces a number of risks in today's climate. Airlines are operates in a very competitive environment. Airlines face substantial strategic, financial, operational and hazard risks.

Airlines are exposed to the risk of catastrophic loss. Airlines are operates to the highest standards of safety and security and are work closely with all the relevant authorities to ensure that customer safety is paramount at all times. The airline industry is characterized by low profit margins and high fixed costs. The air transport business is sensitive to both cyclical and seasonal changes. Competition in the sector is intense and the decline in average ticket prices has been considerable due to over-capacity and the changed market situation.

The Airline Risk Management Survey 2005 was launched with the aim of gaining a better understanding of the issues and trends within airline risk management and to establish some industry benchmarks against which airlines can measure and monitor their own performance. For research breaking new ground among the airlines, the response rate was positive [degrees] 51 airlines took part, accounting for 41% of the world's top 200 airlines by total revenue (Airline Business, 2006). The study shows that risk management has a high profile within airline businesses: not only do two-thirds of airlines have a company-wide risk management strategy, which, on average looks just over three years into the future, overall responsibility for risk is taken at boardroom level in 75% of airlines, with the chief executive's office making the decision whether to avoid, retain or transfer risk in 45% of airlines.

Mercer Management Consulting analyzed aviation industry risks for the 10-year period from April 1991 to April 2001. The primary risks facing the industry fall into four categories: hazard, strategic, financial and operational. Overall, failure to manage these risks resulted in the evaporation of \$46 billion in shareholder value. Interestingly, hazard events, including safety, liability and war, were the least likely to result in value loss. Strategic and financial risks were much more prevalent, accounting for nearly 75% of value loss events during the period (Zea, 1998).

The study is deal with solving “is ERM important to airline management and should ERM apply in the airline?” main problem. In this study, ERM effects are determined and listed in the 4 main categories as benefits, opportunities, costs and risks. They are ANP merits. ANP-based approach is selected to problem solving in this study. ANP is considered appropriate decision making tool for the ERM implementation decision. In recent years, there has been an increase in the use of ANP in multi-criteria decision-making problems. In the selection of a provider, the criteria are of both the types, subjective and objective. These criteria also have some interdependencies, which cannot be captured by the popular AHP method. Therefore, instead of using the commonly used AHP approach for solving such types of problems, I recommend the use of an ANP-based model for the decision making of ERM implementation in the air transportation. Prior case studies: Lufthansa, Continental, Delta, ANA, JetBlue, Finnair and SilverJet ERM practices are considered for the determination of ERM importance to airline management beside literature review and research. Also, many interviews are achieved with airline managers in Turkey.

The factors of ERM importance are not independent of each other, and moreover, there may even be a relationship among some factors. In this study, importance of ERM and its implementation decision is solved using the analytical network process (ANP), which allows measurement of dependency among ERM factors. At the same time, the ANP method is used in order to determine the factor weights of the dependency or independency and their effects on the selection of an alternative strategy.

I am determined that ANP literature is very narrow and limited about ERM field. So, this paper is contributed to ERM field by ANP-based approach.

This article divided into four sections. The following section presents importance of ERM to airline management. Brief review of ERM literature is given Section 2. Section 3 describes with research problem and the proposed ANP model application. Also, determined criteria are given in this section. The performed ANP model is explicitly given in this section. In this section, the results, their interpretation and the implementation of the decision are presented. The overall conclusion is given in the last section.

## **2. Background of Enterprise Risk Management**

There is a huge amount of published on ERM. Many ERM frameworks are currently being used. While they may vary in name, industry and region, they share a common theme: importance of ERM implementation in related industry or organizations. Here is a brief description of most popular ERM frameworks that it can be useful to understanding of ERM importance and given decision of ERM implementation.

Basel Committee on Banking Supervision, Joint Forum working group report, August 2003: This report, based on a survey of 31 financial institutions in 12 jurisdictions, identifies and describes two key trends in the management of risks in the banking, insurance, and securities sectors: (1) greater emphasis on the management of risk on an integrated firm-wide basis and (2) related efforts to “aggregate” risks through mathematical risk models. The report does not attempt to define best practice and offers only limited quantitative data about industry practice, preferring to make a series of more general, qualitative statements in this emerging area of risk management. However, it offers a timely characterization of industry trends and many hints on regulatory thinking, as well as clear introductions to some of the key conceptual tools surrounding risk integration and economic capital.

Managing Risk: Practical Lessons from Recent ‘Failures’ Of EU Insurers: William McDonnell, FSA Occasional Papers, December 2002: In this report a working group of supervisors from 15 European countries dissect recent experiences of failed insurance companies and ‘near misses’ across the life and non-life sectors since 1996. The report also assesses supervisory practices aimed at prevention and advance detection. It concludes that internal management problems appear to be the root cause of every failure or near failure; firms need to anticipate how risks can interact in complex ways, including causal links between different types of risk (for instance operational risks and underwriting risk or claims evaluation risk) and unexpected correlations (particularly between certain asset and underwriting risks); and that it is important to strike the right balance between prescriptive rules, principles, incentives and diagnostic tools.

Taming Uncertainty: Risk Management for the Entire Enterprise: PricewaterhouseCoopers/Economist Intelligence Unit, July 2002. This briefing looks at the trend towards a holistic approach to risk management in financial institutions. It summarizes three key ‘enablers’ for enterprise risk management: board-level support; management processes that make the whole enterprise aware of risk; and putting the right people and systems in place to make sure

risk-aware decisions can be taken. The briefing also sets out ten attributes of a world-class risk management culture, summarizes UBS's approach to ERM in new product approval, and offers a broad-brush framework for the ERM process.

Creating Value through Enterprise Risk Management – A Practical Approach for the Insurance Industry: Tillinghast-Towers-Perrin, 2001: This long and ambitious concept paper by consultants at Tillinghast-Towers-Perrin looks at how enterprise risk management can be defined for insurance firms and offers a detailed framework for implementing ERM. It discusses the differences between banking and insurance ERM and offers a guide to developing ERM in the insurance industry. It discusses many of the specific problematic such as risk mapping, prioritization techniques such as heat mapping, and compares the main risk modeling techniques. The paper also compares financial risk modeling techniques developed in the banking industry, such as value at risk, to insurance industry techniques such as probability of ruin. It offers a five-step process to ERM strategy building and concludes with some illustrative vignettes on ERM in practice. Also from TTP, note this [survey](#) from 2000 that helped benchmark corporate attitudes to enterprise risk management.

Integrated Risk Management: A Holistic Risk Management Approach for the Insurance Industry: working paper, Dr. Andreas Müller, Munich, 1999. This paper takes a look at holistic risk management from a reinsurance perspective. It argues that, ultimately, an integrated risk management strategy will enhance shareholder value at insurance joint-stock companies. The paper claims that the field of 'integrated risk management' opens up an opportunity for reinsurers to effectively position themselves in the market. It also argues that integrated risk management solutions are a fundamental pre-condition for the design of efficient insurance coverage – particularly as risks grow steadily more complex.

Survey on Enterprise Risk Management: Casualty Actuarial Society, 2001: This survey took the temperature of knowledge about enterprise risk management in the insurance industry. It found a lack of knowledge of important tools and concepts such as economic capital, Economic Value Added, Expected Policyholder Deficit, Extreme Value Theory, options pricing theory, Risk Adjusted Return on Capital, risk mapping and Value at Risk (even among those respondents who rate themselves as expert in or highly familiar with ERM).

How Safe is Safe Enough: An Introduction to Risk Management: is written by Angela Darlington et al., Staple Inn Actuarial Society, June 2001. This easy-to-read overview of problems and issues in holistic risk management is aimed primarily at actuaries, and offers a summary of the key themes and practices employed in risk management. A specific discussion of enterprise risk management (pages 26-32) defines ERM as 'the process of systematically and comprehensively identifying critical risks, quantifying their impacts, and implementing integrated risk management strategies to maximize enterprise value'. The paper includes a table that lays out the difference between traditional 'insurance-led' risk management and ERM, and concludes by asking how actuaries can add value to the ERM discussion.

"The Risk Manager of the Future: Scientist or Poet?" article is written by Eric Falkenstein, RMA Journal, February 2001. This very readable article offers a practical philosophy of enterprise-wide risk management for busy professionals and managers. The author concludes that the ideal risk manager of the future will need to understand risk analytics, possess keen skills in data integration and understand how risk measures relate to strategic and tactical business decisions. But such a risk manager will find it hard to keep their hands clean of 'dirty dealings' in institutional politics. The author is critical of "unfocused risk management" and says that "while RAROC applied everywhere is a good thing; it leaves a lot of ambiguity as to method, sort of like a manager telling his boxer to knock the other guy out". He reckons that in the future, 'quants' will be hired not on academic qualification but on their ability to explain complex risk measures to senior management.

### **3. Methodology and application of the proposed ANP Model**

In this study ANP serves as the decision analysis tool and we implemented it using Super Decisions, a sophisticated and user friendly software that implements ANP (Saaty, 2001a). ANP makes it possible to deal systematically with the interactions and dependencies among the factors in a decision system (Bayazit and Carpak, 2007).

Criteria of the research were based on the results of literature search and analysis of guidelines published by various organizations about ERM framework. Firstly, in this section, I mention the ANP methodology and considered criteria of the effecting to decision making of ERM implementation. The importance of ERM implementation decision to organization explained that dividing into four main groups such as benefits, opportunities, costs and risks. The reason of this division is shaping according to the BOCR approach in the ANP. Detailed and holistic assessment is made by these criteria about demonstration to importance of ERM. The criteria are illustrated in fig.-2. These criteria are used in application of the proposed ANP model.

The study's problem is very complicated since it is include "importance of ERM and ERM implementation decision

to airline management". Also interrelations exist to between determined factors in this decision. They are included many qualitative measures. For these reasons ANP is selected as methodology of this study. ANP model is defined 4 steps in this study. They are;

- (1) Definition of strategic criteria and determining of B, O, C R weighing
- (2) Determining criteria to BOCR and performing pair-wise comparisons
- (3) Determining alternatives and calculation of it's weighing
- (4) Providing of final priorities

The ANP-based framework seems to be suitable to identify the relative importance of different factors on ERM implementation, since there is feedback and dependence among them. In this part of study, we describe the ANP decision model we used.

**Step 1.** Definition of strategic criteria and determining of B, O, C, R weighing (BOCR weight development): The strategic criteria I used to determine the priorities of the BOCR merits are shown in Fig.-1. These weights are obtained by using the Rating approach of AHP (Saaty, 2001). The strategic criteria are costs of setting and implementation of ERM, setting and implementation time to ERM, and effects on achieving to organizational objectives. These are the main criteria needed when a company makes a decision about implementing ERM. They are weighting as following rating:

Costs of setting and implementation of ERM: 0.107

Setting and implementation time to ERM: 0.109

Effects on achieving to organizational objectives: 0.782

The four merits of: benefits, opportunities, costs, and risks were rated according to five intensities (very high, high, medium, very low, low) listed below along with their priorities. The BOCR priority calculations are summarized in Table-1 are used in the main top-level structure to synthesize results.

**Step 2.** Determining criteria to BOCR and performing pair-wise comparisons (Model construction): The overall objective of this ANP model is to evaluate the ultimate relative importance of different factors that impact the implementation of ERM. The factors that will be used to evaluate the alternatives were developed earlier in the paper. Two alternatives, "ERM is important to airlines and airlines should apply ERM" and "ERM is not important to airline and airlines should not apply ERM" are determined and will be evaluated according to these factors. There are four feedback networks—one for each of four general controlling factors (the merits of the decision): benefits, opportunities, costs, and risks. First, the factors listed above that affect ERM implementation are classified into benefits, opportunities, costs, and risks. Then they are grouped into clusters in the networks under their respective merits. The clusters in the all merits network are: strategic, operational and financial benefits. There is an alternatives cluster in every network. A graphical summary of the overall ANP model is shown in Fig.-2.

**Step 3.** Determining alternatives and calculation of its weighing (Formulating the interdependencies and performing pair-wise comparisons between clusters/factors): I then formulated interrelationships among all the factors. The question asked when formulating these relationships was: With respect to a specific factor, which of a pair of factors influences it more? To establish the interdependencies in the networks, pairwise comparisons among all the factors are conducted and these relationships are evaluated. The next step is to weigh the clusters.

All cluster each in model (B, O, C and R) connected with alternatives cluster. So, any factors are not connected the other factors in other clusters. The cluster matrix for the benefits network is derived making pairwise comparisons of the clusters. For example, the cluster of financial effects the cluster of operational (0, 25). The cluster of strategic affects the cluster of financial (0, 50). The cluster of alternatives is influenced by all the clusters.

**Step 4.** Providing of final priorities (Constructing supermatrix and obtaining the overall outcome): Table 2., 3. and 4. is illustrated of unweighted, weighted and limit supermatrix of the factors. Table 3 shows the pair-wise comparisons of the factors. The weighted supermatrix (Table-3) is obtained by weighting the blocks in the unweighted supermatrix by the corresponding priority from the cluster matrix. Table 4 shows limit matrix of model application results. The entries of the weighted supermatrix itself give the direct influence of any one factor on any other factor. The weighted supermatrix has some zeros indicating no interaction. Table 5 shows the stable and global priorities of all the factors. From it the priorities of all the factors and alternatives are extracted and normalized.

In the limit matrix, the columns are all the same. To determine the final local priorities the priorities of the factors for each cluster in the columns of the limit matrix are normalized to one.

As Saaty (2001b) suggested, I used additive synthesis to evaluate the alternatives in the final decision. In additive

synthesis, I have for example for Apply ERM benefits: 0.4196; opportunities: 0.2789; costs: 0.1716 and risks: 0.1298. Tables 6 and 7 give the necessary information to construct the overall synthesized results, which indicate “ERM is important to airline management and airlines should apply ERM” is chosen by the model, primarily with an overall priority of 0.767. Table-6. and 7 shows the final rating according to the global priorities and overall results of all the factors in the decision-making model. Table 7 shows that: Enterprise Risk Management is important for airline management, and ERM should be applying on airline business management.

#### 4. Conclusion

The paper is presented a method for applying ANP in “determination of ERM importance and decision-making of ERM implementation at airline management” problem. In this paper, I have developed a framework based on ANP to identify the degree of impact of factors affecting ERM implementation decision. I used the ANP for decision making with dependence and feedback based on four major factors as mapped to Saaty’s benefits, costs, opportunities, risk (BOCR) model. ANP is a new methodology that incorporates feedback and interdependent relationships among decision attributes and alternatives. It leads to fresh insights about issues.

Based on the model I found that in airlines, “importance of ERM and decision for implementing ERM” were 76.7% favorable as opposed to “ERM is not important and decision of not implementing ERM”. This article is contributed to the field of ERM research in two important ways. Firstly, there is given the conflicting results on importance of ERM implementation as its benefits, opportunities, costs and risks. I am provided additional evidence of regarding this problem by case studies: ERM implementation samples from airlines. Second, this analysis is provides a better understanding of the source of potential value from ERM by airline. Also, ANP based approach is used in field of ERM. The study results are showed that ERM is very important for airline management. Therefore, Airline managers should apply to ERM in their management system. ERM implementation helps for airline managers to discover their own abilities, to become better at controlling their future and becoming more self-assured. If airline managers are unwilling to take risks, they will never realized their potential for self-fulfillment and self-realization.

This research contributes to both ERM knowledge and ANP implementation in this field. From ERM perspective I propose an ANP-based framework for assessing the impact of different factors on ERM implementation. Since ANP is capable of dealing with all kinds of feedback and dependence when modeling a complex decision environment, I contend that the study results are more accurate. ANP deals with uncertainty and complexity and provides insights that other, more traditional methods could miss.

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Table 6. Final Ratings Table

Graphic	Ratings Alternatives	Total	Ideal	Normal	Ranking
	Benefits	0.8144	1.0000	0.4196	1
	Costs	0.3331	0.4090	0.1716	3
	Opportunities	0.5413	0.6646	0.2789	2
	Risks	0.2520	0.3094	0.1298	4

Table 7. Overall Results

Name	Graphic	Ideals	Normals	Raw
Do not Implementation of ERM		-0.302580	-0.232293	-0.193213
Implementation of ERM		1.000000	0.767707	0.638551

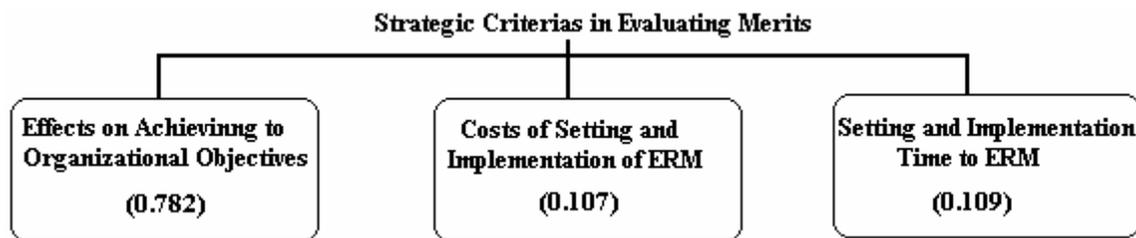


Figure 1. BOCR merit criteria

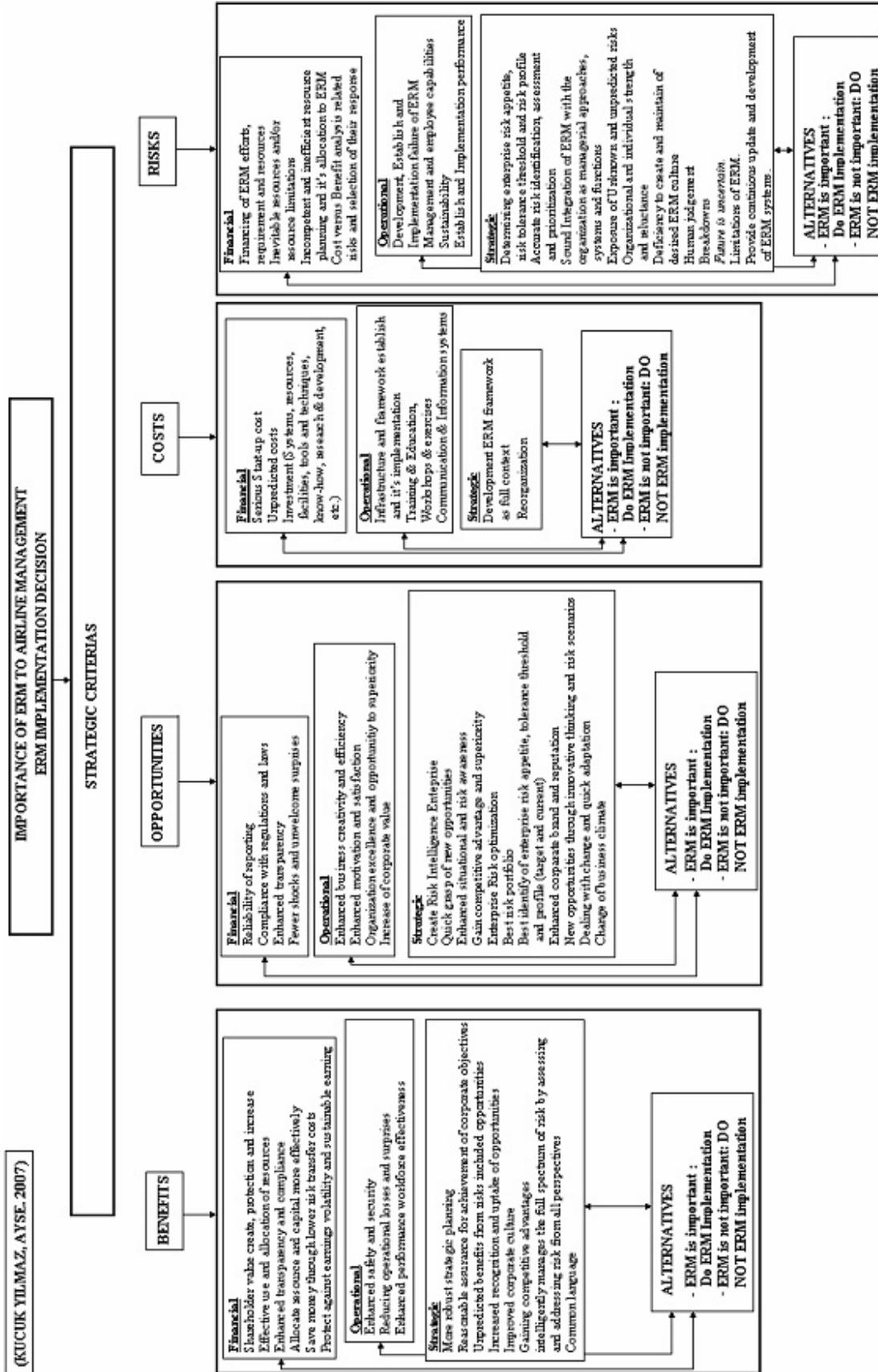


Figure 2. Proposed ANP Model (Kucuk Yilmaz, 2007)

# A New Mode of Acquisitioning Periodicals in Libraries of Universities ----- Oline Acquisition

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## **Abstract**

Acquisitioning periodicals online is a new mode for libraries. It has five procedures, namely information retrieving by net, choosing and booking, document delivery, confirming orders, and electric payment. Comparing with traditional acquisition of periodicals, the online acquisition of periodicals has many advantages, such as the tremendous information, the straightness, the high efficiency, and spanning time and space.

**Keywords:** Online acquisition, Periodical acquisition, Information of periodicals, Libraries of universities and colleges, New mode

The online acquisition of periodicals in China's libraries is a new mode appeared in recent years. In the traditional acquisition mode, librarians firstly collect the information of periodicals published by presses, then choose some periodicals and input the main items, such as the name, author, ISSN, price, that describe relevant periodicals into the computer system of libraries. Finally, librarians have to send the filled orders to presses. Today under the network environment, libraries' online acquisition of periodicals is guaranteed by technologies. Amounts of information on periodicals are provided by numerous presses online, what serve as the information source of online acquisition. Besides, the standardization and normalization of data of periodicals, and the share of information of periodicals have become important in periodicals' acquisition. Because of the online acquisition, the way of acquisition, and its content and scope have been changed a lot. It has important significance to study and analyze these changes, which can help to improve the quality and efficiency of libraries under the network environment.

Periodicals' online acquisition refers to the whole process in which librarians research, retrieve, download the periodicals' information from the net by computers, and order the needed periodicals according to the situation in their libraries, and pay for their orders.

## **1. The analysis on the present situation of acquisition in libraries**

For a long time, libraries of universities purchase periodicals by means of pre-ordering the directory of foreign and Chinese periodicals. In detail, firstly collect the directory of periodicals issued by the post, presses, and book companies. Then gather necessary information of readers and check the storage of libraries. Finally send the final orders to the presses. The pre-order-by-directory mode has lots of advantages, such as the rich information, the systematic process, the stable information resource, and so one. Therefore, it is the main way to purchase periodicals for libraries at present. However, it also has many shortcomings. Take two points for example.

### *1.1 In general, the ordered periodicals came to libraries one or two months later because of too many middle stages.*

According to the data in our library from 2002 to 2003, 50 percent of periodicals came to library in one or two months, 80 percent of periodicals in three or six months, and 10 percent about one year later. Many periodicals whose values are based on the timeliness became outdated when they came to the library, such as Journals of CET 4 (College English Test 4) and CET 6 (College English Test6), Journals of NCRE (National Computer Rank Examination), Journals of postgraduate entrance examination, and journals of registered employment examination. Because the important points for certain examination change annually, it is impossible for these kinds of journals being used frequently once the examination is over.

### *1.2 The information provided by the directory of periodicals is not complete.*

The information of periodicals provided by the Simple Directory of National Periodicals (Magazine) Pre- Ordered by the Post and the Combined Directory of National Periodicals Pre-Ordered not by the Post is not complete. Data show that periodicals in the two dictionaries account for two third of the total publication. In other words, 30 percent of periodicals do not experience the pre-ordering process before they enter the market. Libraries can not order these kinds of periodicals. In a sense, libraries suffer from this fact.

## **2. Combine the direct-order method and the pre-order method together**

Libraries can adopt both direct-order method and pre-order method to perfect their storage. For different periodicals,

libraries should take different order method.

For periodicals that focus on CET 4, CET 6, NCRE, postgraduate entrance examination, and registered certificate, libraries can order them directly. By this way, readers can get the periodicals in time, avoiding the waste of outlay of books (periodicals).

For periodicals of specialties, because of the less readers and circulation, they usually enter the market by local specialty publishing companies or presses. Librarians in universities can directly come to these companies and presses to choose books and periodicals based on their needs.

For periodicals that are hard to be found in market or urgent in need, librarians can contact with presses and publishing companies directly and renew their storages. One of the grave issues in the combination of pre-order and direct-order is the repetition-check. At present, most libraries of universities introduce the computer management system. Many publishing companies provide with MARC data for customers' acquisition of periodicals (such as the Beijing Baishitong Book Company, the Tianjin Branch of Combined Directory of National Periodicals Pre-Ordered not by the Post, and so on). Therefore, libraries should choose publishing companies who provide with MARC data, have rich periodicals and books, have better credits, and cooperate with them. By this way, libraries can realize the automatism of repetition-check.

### **3. Principles of periodicals' acquisition for libraries at the network times**

#### *3.1 Take the situations of libraries into consideration and use the outlay effectively.*

Under the condition of insufficient outlay, it is very important to use the limited outlay rationally and effectively based on situations of libraries. According to the storages and the target readers, libraries make up their purchase plans that can help the purchase focus on certain fields. By this way, the limit outlay will exert its maximum effect. Like our library in university of science and technology, we have to consider not only the teaching and the scientific research but also the nature and the specialties of the university as we make periodical purchase.

#### *3.2 Make best use of information in Internet.*

Internet provides us with rich useful information. We can get specific purchase information from the Internet, including the book stores, the presses, the publishing companies' names and addresses, reviews of periodicals, videos, CDs, journals with rewards, popular Journals, and directory of publishers, and so on. By analyzing the information, librarians should download, process, classify, and integrate them properly and timely. Especially in purchasing the digital documents, such as CDs and online journals, it is necessary to make up acquisition strategies based on the library's storage.

#### *3.3 Make the acquisition focus on the utility of periodicals and the feedback of readers by taking the advantages of network.*

Along with the development of Internet, most libraries realize the automatism of acquisition, what greatly reduce the work process of librarians. As the information of periodicals is input into the computer, the repetition-check is done at the same time. It makes libraries escape from repeat purchase and reduce expenses. Besides, the statistical work in purchase is also completed by computers. Therefore, librarians can spend more time energies in communicating and collecting information. The emphasis of work begins to focus on the utilities and the feedback of readers.

#### *3.4 Select periodicals carefully and improve the quality of storage.*

Because the information in Internet is too much and its qualities, features, and forms are different, it is necessary for librarians to build up certain communication system with the net. By communicating with the net technologists, librarians can find out useful information rapidly and use them effectively. Create a perfect acquisition procedure, what can help to avoid the unilateral, invalid, and lagged-behind purchase of specialty periodicals.

### **4. The operational procedure of online acquisition of periodicals**

#### *4.1 Select online book stores, presses, and book publishing companies.*

At present, there are amounts of online book stores (presses, etc.) at home and abroad. It is vital for the library to choose a right online store that provides with nice services, rich books, and competitive prices. According to present situation, the author suggests the Beijing Baishitong Book Company and the Tianjin Branch of Combined Directory of National Periodicals Pre-Ordered not by the Post. Beijing Baishitong Book Company adopts the B-B (business to business) business model, which chiefly provides with books for libraries online. The two suggested by the author have many advantages, such as the complete and timely data, the normalization and standardization, and the service. Beijing Baishitong Book Company and Tianjin Branch of Combined Directory of National Periodicals Pre-Ordered not by the Post send nearly 8000 book records for customers annually, what almost covers all periodicals published by more than 500 publishers in China. Besides, these records can be ordered according to customers' needs. As

customers receive these data, they can retrieve necessary information by names, authors, key words, presses, and ISSN. Apparently, they are specialized for serving libraries and their after-sale services are very good. Therefore, they are the best cooperators of libraries in periodicals' acquisition. In the aspect of assistant channel, Beijing Century Online Book Company is also an excellent option.

#### *4.2 Acquisition periodicals*

It is the most key and vital step for the whole online acquisition process, which includes these procedures as follow.

##### (1) Download data of periodicals

Enter the webpage of online book company and log in. Download data of periodicals published by this company and store in certain fixed folder in the hardware of computer.

##### (2) Transform data of periodicals

Decompress the data and transform them into the database of the library by the computer acquisition's children system.

##### (3) Select and order

Read the data by the children system and review them step by step. Choose the right periodicals for the library and input the ordered number into the computer. Store the data and complete the selection.

##### (4) Generate the digital order

Output the completed data of acquisition and store them into a fixed folder (usually in form of EXCEL). Then a digital order is generated.

##### (5) Send the digital order

Mail the digital order to the online book store (or online press or book company).

#### *4.3 Accept and check the periodicals and return unwanted ones*

After receiving the orders, the press or book company will inform the customer by E-mail or phone to confirm the order. As everything is OK, the company will collect periodicals according the order and deliver them. In general, the press or the book company will choose a transportation company to send the periodicals for the customer. As the library receives the delivered periodicals, librarians will check them by data stored in the computer. Once they find any error or any unwanted periodical, they will return them back to the press or the book company.

#### *4.4 Settlement*

The online purchase usually adopts the electric settlement, using digital currency to pay for the goods. The computer will calculate the charges automatically. And the purchaser will fill in the digital order, including the name, the E-mail address, the target address, the delivery way, and other details. In special, the target address and the delivery way must be selected together. Otherwise, the order can not be handed in. Then, the purchaser must choose the way of payment, such as credit card, bank transfer, or remittance by post. However, for most online companies in China, seldom really realize the online payment. Most companies are at the stage of "online order, and offline settlement".

### **5. Advantages of online acquisition of periodicals**

#### *5.1 Rich and detailed data of periodicals*

It is not necessary for the online press, namely the virtual book store, to allocate goods or prepare sufficient stocks. And its operation does not limited by capitals. It can issue the data of periodicals without any restriction. Therefore, the online book store usually can provide with rich data of periodicals. For example, the Amazon online book store (or press) in America collects 3.1 million kinds of periodicals published by 50 thousand presses, providing with millions of records of books. It is impossible for a traditional book store (or press) to reach such a scale.

The online company can provide with not only periodicals' names, authors, presses, prices, ISSN, and sizes, but also the covers, part of contents. By this way, purchaser can understand and master the features of periodicals to a great degree, which will benefit the acquisition of periodicals.

#### *5.2 High purchase ratio of periodicals*

In a traditional way, purchaser has to come to the company (or the post) by himself or herself to make purchase, which consumes not only time but also energy. The online purchase can help the purchaser to find the right periodicals for the library by different ways, such as sorts of high-effective and fast search engines. Besides, by means of filling in the digital order, the digital payment, and the auto settlement of computer, it can improve the efficiency of purchase greatly. The whole purchase process merely costs several hours. At the same time, the online

company (or press) can deliver or post the ordered periodicals in a short time, which greatly shortens the time period in communication. For example, the Amazon book store guarantees that the domestic readers in America can receive the periodicals in two days, and the foreign readers in one week.

The online purchase can help to obtain amounts of high-quality periodicals. Because the online book store can provide with numerous information, the purchaser can find out high-quality periodicals by compassion, which serves as a base for a better storage of the library. In contrast, the traditional purchase mode is close and limited, which affects the quality of periodicals in order to a great degree.

### 5.3 Trans-time service mode

The online book store is a virtual mode. Its operation does not be limited by space and time. Therefore, it is not necessary for the purchaser coming to the real book store to buy the ideal periodicals. It saves time, energy, and capitals. Besides, many unnecessary and complex procedures are simplified or reduced, which greatly improve the efficiency of purchase, reducing the costs of periodicals' circulation. Meanwhile, the online book store breaks the limits of geological space. Only if the purchaser has a online computer, he or she can purchase periodicals from anywhere at anytime. The purchaser can visit the book market in other regions online, which makes the acquisition of periodicals more convenient.

As a professional book purchaser in library, it is necessary to overcome the old long-term habit of selecting periodicals and books from the paper directory. A professional purchaser should renew his or her ideas and meet the new challenges, improving his or her knowledge management level and the consciousness of innovation from an angle of information development, trying to provide with the most excellent information services for readers by least costs.

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# Skill Inexistence and Knowledge Requirements of Technology Marketing and Management Programs in Emerging Thailand and Vietnam

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## **Abstract**

Higher education institutions constantly explore the teaching approaches, and adequate theoretical and cognitive contents designed for training practitioners. We gathered the practitioners' perceptions of the existence and importance of skills and knowledge, and understand how technological intensity influences the importance of skill and knowledge requirements in technology management educational programs. The future curriculum development of technology marketing, management and innovation studies for graduate program requires the integration of industrial inexistence gaps at both national and international contexts.

**Keywords:** Technology, Education, Skill, Knowledge, Developing Country.

## **1. Introduction**

The technological metamorphosis shapes the competitiveness and capital creation at national, industrial and corporate levels. Human resource development and technology development currently are the key indicators for Thailand's and Vietnam's competitiveness. However, the ineptitude collaboration among government bodies, academic institutions and private corporations is one of the reasons causing limited opportunity to develop and handle the rapid technological change (TDRI, 1998).

Thailand ranks and positions in the world landscape competitively (Garelli, 2006). Despite the fact that the efficiency of government and infrastructure has reduced, the contributed factors for the improvement are economic and business sector performances. In view of the infrastructure sub-factors, human quality, science, technology and education are the critical factors that boost up the competitiveness in the past three years (NESDB, 2004). Based on CIA (2006a), the country's literacy population is 92.6%, with 94.9% of male and 90.5% of female being able to read and write.

Since January 11<sup>th</sup> 2007, Vietnam has become the 150<sup>th</sup> member of the World Trade Organization, a milestone expected to launch an era of radical changes as the communist nation enters the global economics mainstream. This country, Southeast Asia's second most populous country after Indonesia, expects their new status will accelerate economic growth. Vietnam has since seen its foreign investment, development and industry germinating vigorously to be a member of world trading partner. This country has a lower literacy rate of 90.3% of total population with 93.9% of male and 86.9% of female, but the industrial growth rate is 17.2% in 2005, which higher than Thailand of 9.1% (CIA, 2006a; 2006b). Consequently, quality of people, science, technology and education are vital to improve Thailand's and Vietnam's capabilities to compete.

The role of academic institutions for the development of technology managers plays a considerable role by providing the tools, practical skills and techniques required to strengthen the analytical capability for solving technological problems (Reisman, 1994; Brady, Rush, Hobday, Davies, Probert & Banerjee, 1997). Executives with minimal or no technical background usually manage the company's technology and hence disenchant the stakeholders' expectations (Mallick & Chaudhury, 2000). Further study on the importance of scientist and

technologist employment also revealed the demand for higher education to be more industrial-oriented and technology-focused (Laosirihongthong & Virasa, 2004).

The identification of knowledge and skill requirements for managing technology is essential, especially from practitioners with technology and innovation management experiences. Hence the overall research objective of this study was to identify, from the practitioners' perspectives, the skills and knowledge of technology and innovation managerial education provided by higher education institutions in Thailand and Vietnam. We developed two research questions for this study. Firstly, the research looked at the requirements and inexistence of contextual knowledge, technology-focus knowledge, and decision and preference knowledge differences between the two countries. Secondly, the study addressed the requirements and inexistence of technology-related skills, general management skills and communicable skills differences between the two countries.

The motivation of this research aimed to provide information for training prospective technology manager and to avoid the mismatch between managers' academic knowledge and their actual practical knowledge. Moreover practitioners' views provide a clearer picture for identifying the needs that are relevant to the challenges in everyday operation and practice (Mallick & Chaudhury, 2000). Hence, this study identified the firms' technological intensity to reflect the skill and knowledge required for technology and innovation management from practitioners' perspectives. The result of this study could assist universities worldwide with the curriculum design and development, particularly to universities that conduct offshore programs in these countries. Moreover this study also supports one of the recent initiatives proposed by the International Association for Management of Technology (Van Wyk, 2004).

## **2. Theoretical Framework**

### *2.1 Management of Technology and Innovation Education*

The United States National Research Council described the management of technology as a link to engineering, science and management disciplines, and plans, develops and implements technological capabilities to shape and accomplish the strategic and operational objectives of an organization (NRC, 1987). Badawy (1998) discussed technology management and marketing as a field of study and a practice concerned with exploring and understanding technology. It is also a corporate resource that determines both the strategic and operational capabilities of the firm in designing and developing products and services for maximum customer satisfaction, corporate productivity, profitability, and competitiveness. Hosni (2003) provided more creative and futuristic aspects and described it as art of maintaining mature, nurturing the new and forecasting the future of technology.

The management of technology is multidisciplinary and has an effect on competitiveness of organization. Hence the evolution of understanding technology marketing is playing a vital role in managing technology. Managing technology includes managing the phenomena of technological breakthrough in addition to the technological resource in the organization, in order to maximize profits and to compete with the dominant competitors. The demand of technology management educational program has increased since 1997, particularly at the postgraduates level (Santo, 2001). Thus the general approach to the content and curriculum development embraces "a creative balance" between professors and practitioners (Mallick & Chaudhury, 2000). The program is usually not a discipline at its own and is usually incorporated to the Master of Business Administration, Master of Management related studies or Master of Engineering programs. However, these programs mainly emphasize on general business administration or engineering management rather than management of technology (Nambisan, 2004). Moreover, there is no consensus on the content of a technology management curriculum.

### *2.2 Knowledge and Skills Requirements*

Academics' and practitioners' perceived importance of knowledge and skill for management of technology graduate program in the United States suggested that strategic role of technology in business, implementation of new technology, transfer of technology within organization, new product development, and business strategy and competition are fundamental (Mallick & Chaudhury, 2000). The important skills required are the knowledge on integration of technology and business strategy, working across functional boundaries, effective written communication skills, achieving implementation and identification of new technological opportunity. The study has since enhanced the curriculum development for technology management education.

A later study by Nambisan & Wilemon (2003) focused on a global study of graduate management of technology programs in 53 countries. The study presented the industrial sector's role of supporting curriculum development. The factors included research trends, curriculum development, staffing, program implementation and program emphases. Majority of the students came with sciences and engineering backgrounds and attended the course on a part-time or full-time basis. The course consisted subjects on technology innovation, research and development together with information technology management. The study included information technology, as it might affect

the sustainable competitive advantage of organization and might stimulate the need of technology managers in industrial sector. The important issue is the implication of the dominant and the deficiency of management of technology to the academia, industrial sectors and the individuals who show great interests in the program.

Intarakumnerd, Chairatana & Tangchitpiboon (2002) studied the demand of technology training programs in Thailand. The study indicated the importance of technology to eco-industrial development, organization and national's competitive advantage. Moreover, information on technology training programs benefits the future social need for technology and innovation management. The study concluded with an implication on the necessity to develop a single discipline of technology management program for graduates, in order to support the rapid change of economic, social and education structure. Other studies indicated a mismatch between the delivery of management of technology programs by academia and the actual skill and knowledge required by practitioners or the industry (Mallick & Chaudhury, 2000; Nambisan & Wilemon, 2003). At the time of this research, we did not find any empirical study in Vietnam. Similar management of technology program is available in Vietnam institutions and some Thailand institutions deliver the program in Vietnam. Thus, we aimed to identify the required skill and knowledge for technology management graduate programs in Thailand and Vietnam and to identify the differences between these two countries.

### **3. Research Methodology**

The survey consisted questions of respondent's profiles, the degree of technology intensity in respondents' organizations, and skills and knowledge importance vis-à-vis skills and knowledge inexistence. The questionnaire also included the content of skill and knowledge requirements adopted from the study by Mallick & Chaudhury (2000). The questionnaires used a 6-point Likert Scale with no neutral value. This was to ensure that the respondents must have at least some tendency opinion. The pilot questionnaire pre-tested by five students who were studying in technology and innovation graduate programs. The purpose of this pre-test was to find the reliability (with Cronbach alpha value higher than 0.70) and the consistency of the questions. The data was then collected in Thailand and followed in Vietnam.

Table 1 shows the respondents' years of work experience, their position in the organization, the size of the organization and the number of employees in the organization. To circumvent any misunderstanding and any result error, the population targeted must have sufficient understanding on the managerial aspects of technology and innovation. Thus this study approached schools that offer technology management programs and in the manufacturing industry. All respondents were full-time technology practitioners from technology-based organizations and were part-time postgraduate students reading managerial programs in technology and innovation in Thailand and Vietnam. The response rates of 49% in Thailand and 50% in Vietnam were higher than the response rate of Mallick & Chaudhury (2000) study of 16%.

Majority of the respondents' organizations have more than 200 employees. About 50% of the respondents in Thailand have at least six years of experience in their industries and hold a position of department manager or head within their organizations. In Vietnam, nearly 90% of the respondents have similar years of experience and position in their organizations.

### **4. Findings and Discussion**

Table 2 and 3 present the factor analysis of the knowledge requirements and the skill requirements respectively. The factor analysis tests used principal component analysis extraction method and the rotation method was Varimax with Kaiser Normalization. The rotation converged in five iterations. The reliability of the constructs for skill requirements ranges between 75% and 87%, and for knowledge requirements between 84% and 92%.

Table 4 and 5 show the analysis of skills and knowledge required for technology and innovation management. We asked the respondents to rate the importance level and the personal inexistence of skills and knowledge contents. We used two-sample paired test to find the significant relationship between the importance and inexistence of required skill and knowledge.

In Thailand, the skills to identify new technological opportunity and the ability to apply theoretical knowledge perceive as vital but still deficient in the required skills. As with the general management, the gap exists for skills on working across functional boundaries, facilitating humans' relations, handling data gaps and conflicts, and managing complex and ambiguous situation. With communication skills, the effective written communication and producing clearly actionable results are significant. In Vietnam, the gap exists is lesser as compared to Thailand in view of the ability to manage technical professions, working across functional boundaries, gaining users' support, handling data gaps and conflicts, and managing complex and ambiguous situation.

The knowledge content gaps are wider. In Thailand, nearly all contextual knowledge and technology-focus

knowledge, and decision and preference knowledge are significant, except for the social issues and the timing of technological choice. Again, in Vietnam, the gap for knowledge content is less significant than in Thailand. Knowledge on ethical issues, social issues, legal aspects, influence of government policy, transfer of technology within or between organization, internal use of information technology, management research and general engineering functions are significant.

Table 6 reports a comparison of the skills and knowledge requirements between the two countries using independent sample t-test. Technology related skills and contextual knowledge requirements are more important in Vietnam than in Thailand. However, communication skills requirements are more vital in Thailand than in Vietnam.

## 5. Conclusions and Recommendations

The needs for developing countries to prepare trained technological managers are imperative. The research findings show a relative importance to improve and further develop management of technological programs, in view of the ongoing advancement of technology. The results also correspond with the study of Mallick & Chaudry (2000) in the United States on the skills and knowledge requirements.

The statistical results indicate that there is a significant difference between degree of importance and inexistence on skills and knowledge. The reliabilities of the factored constructs for skill requirements and knowledge requirements are relatively high. Respondents in both countries perceived the gap exists in required skills on working across functional boundaries, handling data gaps and conflicts, and managing complex and ambiguous situation. As for the knowledge content gaps, many issues related to the contextual knowledge, technology-focus knowledge, and decision and preference knowledge need to be address in designing a management of technology educational program. Most of the ranking gaps exist in the general management skills and knowledge content, especially in Thailand.

Though technology related skills and contextual knowledge requirements are more important in Vietnam than in Thailand, communication skills requirements are more vital in Thailand than in Vietnam. The findings of this research have strategic implications in future technology and innovation management curriculum development, particularly the graduate programs. The interaction and co-operation among professional institutes (i.e. IAMOT, PICMET), academicians, and practitioners to design and develop effective technological educational programs are vastly needed. Academia is to consider the practitioners' perceptions in order to develop an effective program, predominantly for a developing country like Thailand and Vietnam, when the pressure to compete internationally escalates.

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Table 1. Respondents profile

Profile	Description	Country		%
		Thailand	Vietnam	
	Samples	89 (70.6%)	37 (29.4%)	100.0
Organization size (# of employees)	200 or less	27 (30.3%)	14 (37.8%)	32.5
	> 200	62 (69.7%)	23 (62.2%)	67.5
Years of experience	< 2 years	13 (14.6%)	1 (2.7%)	11.1
	2 to 5 years	31 (34.8%)	3 (8.1%)	27.0
	6 to 10 years	23 (25.8%)	15 (40.5%)	30.2
	> 10 years	22 (24.7%)	18 (48.7%)	31.7
Position in organization	Director	1 (1.1%)	0 (0.0%)	0.8
	General manager	12 (13.5%)	4 (1.1%)	12.7
	Department manager	37 (41.6%)	22 (59.5%)	46.8
	Department head	39 (43.8%)	11 (29.7%)	39.7

Table 2. Rotated component matrix on skill requirements

Skill requirements	Component		
	1	2	3
<b>Technology-related Skills</b>			
Identification of new technological opportunity	0.8182		
Perform technological assessment/evaluation	0.7883		
Ability to apply theoretical knowledge	0.6741		
Integration of technology and business strategy	0.6724		
Ability to apply analytical techniques	0.6621		
Ability to manage technical professionals	0.5912		
<b>General Management Skills</b>			
Working across functional boundaries		0.7945	
Gaining users' support		0.7429	
Facility in humans relations		0.6538	
Management of risk and uncertainty		0.6500	
Handling data gaps and conflicts		0.6195	
Managing complex and ambiguous situation		0.6076	
Solving problems on a timely basis		0.5245	
<b>Communication Skills</b>			
Effective written communication skills			0.7445
Effective oral communication skills			0.6886
Achieving implementation			0.6240
Producing clearly actionable results			0.5806
% of Variance	23.1700	21.5600	15.3600
Cumulative %	23.1700	44.7400	60.0100
Reliability coefficient	0.8647	0.8692	0.7527
Means	4.6331	4.48501	4.9435

Table 3. Rotated component matrix on knowledge requirements

Knowledge requirements	Component		
	1	2	3
<b>Contextual Knowledge</b>			
Ethical issues	0.8800		
Social issues	0.8427		
Legal aspects	0.8200		
Environmental issues	0.7583		
Financing technical projects	0.6820		
Business strategy and competition	0.6052		
Influence of government policy	0.5436		
<b>Technology-focus Knowledge</b>			
Process of technological innovation		0.7151	
General business functions		0.6856	
Transfer of technology within organization		0.6689	
Implementation of new technology		0.6161	
Transfer of technology between organizations		0.5835	
Internal use of information technology		0.5781	
Management of research		0.5282	
New product development		0.5277	
<b>Decision and Preference Knowledge</b>			
Timing of technological choice			0.7967
Technology acquisition			0.7711
Selection of technological projects			0.7441
General engineering functions			0.7148
% of Variance	24.2840	22.2880	19.1260
Cumulative %	24.2840	46.5720	65.6980
Reliability coefficient	0.9165	0.8967	0.8351
Means	4.4030	4.5447	4.6680

Table 4. Skill as perceived by respondent

Skill requirements	Thailand			Vietnam		
	Importance	Inexistence	Gap	Importance	Inexistence	Gap
<b>Technology-related Skills</b>						
Identification of new technological opportunity	4.398	3.750	0.648*	4.939	3.939	1.000
Perform technological assessment/evaluation	4.416	3.730	0.685	4.970	3.909	1.061
Ability to apply theoretical knowledge	4.545	3.920	0.625*	4.333	4.212	0.121
Integration of technology and business strategy	4.416	3.562	0.854	5.182	3.848	1.333
Ability to apply analytical techniques	4.886	4.000	0.886	4.697	4.182	0.515
Ability to manage technical professionals	4.753	3.787	0.966	4.879	4.152	0.727*
<b>General Management Skills</b>						
Working across functional boundaries	5.011	4.663	0.348*	4.848	4.485	0.364*
Gaining users' support	5.011	4.562	0.449	4.818	4.212	0.606*
Facility in human relations	4.955	4.551	0.404*	5.000	4.394	0.606
Management of risk and uncertainty	4.580	3.545	1.034	5.212	4.152	1.061
Handling data gaps and conflicts	4.506	3.742	0.764*	4.970	4.152	0.818*
Managing complex and ambiguous situation	4.364	3.511	0.852*	4.727	4.061	0.667*
Solving problems on a timely basis	5.124	4.236	0.888	5.273	4.030	1.242
<b>Communication Skills</b>						
Effective written communication skills	4.708	4.045	0.663*	4.879	4.273	0.606
Effective oral communication skills	4.978	4.326	0.652	5.000	4.394	0.606
Achieving implementation	5.333	4.552	0.782	4.909	4.333	0.576
Producing clearly actionable results	4.886	4.261	0.625*	4.697	4.212	0.485

\*Statistically significant with  $p < 0.05$

Table 5. Knowledge content as perceived by respondents

Skill requirements	Thailand			Vietnam		
	Importance	Inexistence	Gap	Importance	Inexistence	Gap
<b>Contextual Knowledge</b>						
Ethical issues	3.989	3.551	0.438*	4.424	4.030	0.394*
Social issues	4.135	3.393	0.742	4.455	3.848	0.606*
Legal aspects	4.157	2.955	1.202*	4.758	3.727	1.030*
Environmental issues	4.281	3.528	0.753*	4.727	3.848	0.879
Financing technical projects	4.191	3.101	1.090*	4.606	3.879	0.727
Business strategy and competition	4.517	3.539	0.978*	5.121	4.152	0.970
Influence of government policy	4.528	3.573	0.955*	5.242	4.091	1.152*
<b>Technology-focus Knowledge</b>						
Process of technological innovation	4.149	3.191	0.958*	4.727	3.788	0.939
General business functions	4.652	3.798	0.854*	4.636	4.152	0.485
Transfer of technology within organization	4.759	3.701	1.057*	4.758	4.121	0.636*
Implementation of new technology	4.659	3.625	1.034*	4.879	4.091	0.788
Transfer of technology between organizations	4.393	3.247	1.146*	4.576	3.939	0.636*
Internal use of information technology	4.557	3.966	0.591*	5.000	4.061	0.939*
Management of research	4.034	3.067	0.966*	4.576	3.697	0.879*
New product development	4.382	3.213	1.169*	5.061	3.879	1.182
<b>Decision and Preference Knowledge</b>						
Timing of technological choice	4.674	4.011	0.663	4.424	3.909	0.515
Technology acquisition	4.770	3.782	0.989*	4.636	3.970	0.667
Selection of technological projects	4.864	3.864	1.000*	4.727	4.000	0.727
General engineering functions	4.506	3.618	0.888*	4.485	4.273	0.212*

\*Statistically significant with  $p < 0.05$

Table 6. Independent sample t-test

Skill & Knowledge	Thailand	Vietnam	t-value	Mean Comparisons
Technology-related Skills	0.1123(1.0652)	0.2792(0.7593)	-2.2794	v > t
General Management Skills	0.0804(1.0461)	0.1998(0.8564)	-1.4056	n. s.
Communication Skills	0.1525(0.9219)	0.3791(1.0962)	2.7256	v < t
Contextual Knowledge	0.1345(1.0310)	0.3402(0.8379)	-2.3892	v > t
Technology-focus Knowledge	0.0801(1.0824)	0.2027(0.7275)	-1.4020	n. s.
Decision and Preference Knowledge	0.0749(1.0557)	0.1894(0.8271)	1.3088	n. s.

n. s.: not significant

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