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The Asian Conference on the Social Sciences

Conference Proceedings 2012

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*Symphony Music in Shanghai with Special Focus on Shanghai Symphony Orchestra from
1879 to Present*

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Abstract:

Classical music, or symphony music to be specific, is probably the most prestigious European bourgeois arts, differs a great deal from traditional Chinese music and the Communist ideology in several aspects. Inevitably, the fact that symphony music is enjoying a great popularity in China makes one wonder how this situation came into being especially after the catastrophic Cultural Revolution during which the classic symphony music was severely banned. In order to understand this cultural phenomenon, we have to look into the history of symphony music in China. My research is based on the archival research of Shanghai Symphony Orchestra, which can be categorized into music sociology puts music into a broader social circumstance but also make reference to the music itself in due course. This paper will briefly introduce the research including theoretic framework and key points from each period of time.

Introduction

Classical music, or symphony music to be specific, is probably the most prestigious European bourgeois arts, differs a great deal from traditional Chinese music and the Communist ideology in several aspects. Inevitably, the fact that symphony music is enjoying a great popularity in China makes one wonder how this situation came into being especially after the catastrophic Cultural Revolution during which the classic symphony music was severely banned. In order to understand this cultural phenomenon, we have to look into the history of symphony music in China. The trajectory of this development can also be regarded as the process of China's modernization since it was always more than just music. As Yang (2007: 3) has contended that "East Asia's inculcation in the practices of Western classical music proceeded coincidentally with the project of modern nation building, often framed by Western nationalist ideologies." To learn about the history of symphony music in China, one has to, inevitably, look into the history of Shanghai Symphony Orchestra which was first established in 1879 known as Shanghai Public Band. Through all these years of development, it is what we see today as Shanghai Symphony Orchestra. I have divided my research into five parts according to different time periods, each processing significant historical events or major ideological trends of that time. It will make reference to the social context in China during each period of time. To narrow down the perspective, my research will be based primarily on Shanghai Symphony Orchestra archive and some supplementary documents from Shanghai Library and Shanghai Municipal Archive. Unlike musicology, my research which can be categorized into music sociology puts music into a broader social circumstance but also make reference to the music itself in due course. This paper will briefly introduce the research including theoretic framework and key points from each period of time.

Theoretical Framework

The key theory I am going to apply in my thesis is provided by Bourdieu. Western classical music as a form of cultural capital implies a great more symbolic meanings than the music per se. For cultural capital, as Bourdieu (1986) analyzed, exists in three different states. First, it is the ensemble of cultivated dispositions that are possessed by the individual through socialization and that constitute schemes of appreciation and understanding for cultural goods, distinct from material goods, have to be apprehended and understood in order to appropriate or consume them. Second,

cultural capital can exist in objectified forms referring to objects, such as books, works of art, and scientific instruments, which demand specialized cultural abilities to use. Third, cultural capital exists in an institutionalized form, like educational credential system. The latter two lead to discussion over unequal distribution of educational resources which will be argued later. Cultural capital is often regarded as a metaphoric term and much emphasis was put on its symbolic significance. And as Betensky (2000: 208) mentioned that “an important aspect of Bourdieu’s symbolic capital is that it is by definition convertible into material, ‘economic’ (in the most common sense of the term) capital, and his symbolic capitalist necessarily makes good in some extrasymbolic way”. While Bourdieu (1986:254, 1987:131) also admitted that cultural capital is not as stable or as universal a currency as is economic capital in that its accumulation can be undermined by criticism and suspicion. Bourdieu (1980: 209) wanted to construct a “science of practices” that will analyze “all practices” as “oriented towards the maximization of material or symbolic profit.”

In terms of the relation between taste and social class, Bourdieu’s argument can be found in his work *Distinction*. The classification of people is not forced in society but developed and came into being naturally through people’s daily behavior. While people in certain class would conduct cultural activities that make them identify the class they belong to and consume certain cultural products to distinguish themselves from people in other classes, thus leading to the differences in social structure. Bourdieu (1984: 167) has contended that “social identity is defined and asserted through difference”. As shown in *Distinction* (485): “A class is defined as much by its being-perceived as by its being, by its consumption----which need not be conspicuous in order to be symbolic----as much as by its position in the relations of production”. It means certain class of people will confirm their status of being in that particular class through consuming particular cultural products, which also contributes to the inclusion and exclusion of other people in society in that “aesthetic disposition is one dimension of a distant, self-assured relation to the world and to others which presupposes objective assurance and distance” (1984: 49). He also pointed out the concepts of cultural production and consumption. The former is “associated with the dominated fraction of the dominant class” and the latter infers that “certain goods tend to be favoured by the dominant fraction of the dominant class, and others by the dominated fraction of this class” (Hesmondhalgh, 2006: 214). Also, “choices always owe part of their value to the value of the chooser, and because, to a large extent, this value makes itself known and recognized through the manner of choosing” (1984: 84). Through consuming certain cultural products and performing specific cultural activities, people would have a stronger sense of belonging to their classes in society. Bourdieu combines social theory and data from surveys, interviews and photographs for the first time. His survey is to “determine how the cultivated disposition and cultural competence that are revealed in the nature of the cultural goods consumed” (Bourdieu, 1984: 5) because people are “only what they do, merely a by-product of their own cultural production” (1984: 15). “Tastes are the practical affirmation of an inevitable difference” (Bourdieu, 1984: 49) and one’s taste is related to both external and internal factors as he pointed out “on the one hand, the very close relationship

linking cultural practices (or the corresponding opinions) to educational capital (measured by qualifications) and, secondarily, to social origin (measured by father's occupation); and, on the other hand, the fact that, at equivalent levels of educational capital, the weight of social origin in the practice and preference-explaining system increases as one moves away from the most legitimate areas of culture" (Bourdieu, 1984: 5). We can say that "taste, then, is a visible 'style' people show by wearing, reading, using, owning or in other ways proclaiming their preference for specific things" (Kuipers, 2006: 360).

In regard to music sociology, I am going to apply the concept of "affordance" carried out by Tia Denora (2000, 2003). The ideology that revealed in her works is very much concerned with Bourdieu's theory presented in his work *Distinction* (1984), as she (2003:167) also pointed out later in her article that "Bourdieu's great contribution was to show how musical values were not 'pure' but were rather linked to the maintenance of social distinctions". Nevertheless, she went beyond Bourdieu's idea on cultural capital by focusing on the "inside" of action which is the "emotional, aesthetic, and affective preparation for action" (Acord and DeNora, 2008: 228) and also on how objects and interactions with objects lend themselves to, or afford uses (DeNora, 2000, 2003). Thus, the concept of affordance is put forward, concerning "how groups or individuals come to 'latch on' to particular aesthetic objects to connect their own situated action to wider cultural frameworks" (Acord and DeNora, 2008: 228) as culture, she pointed out, operates from inside out. Different from Bourdieu's argument emphasizing on the external issues of art and culture, DeNora tried to focus more on the art and culture per se and start from the very inside out.

The other theories I am going to apply involve cultural imperialism and globalization. Cultural imperialism is a relatively new idea, which has "emerged along with many other terms of radical criticism, in the 1960s and has endured to become part of the general intellectual currency of the second half of the twentieth century" and it can be viewed as "exalting and spreading of values and habits" (Tomlinson, 1991: 2-3). It stressed on the social and economic predominance of one nation over another, especially two cultures one of which is "conceived as 'how we live' threatened by the imposition of 'how they live'". (Tomlinson, 1991: 90) While the idea of globalization is not new, originated from the work of nineteenth- and early twentieth-century intellectuals, from Karl Marx and Saint-Simon to students of geopolitics such as MacKinder, it acquired academic importance until the 1960s and early 1970s, moreover, significantly intensified in the 1990s (Held and McGrew, 2002: 1-2)

As far as I am concerned globalization is just a concept a little more than the notion of Americanization or Westernization, and to be more exact, it is a new mode of Western imperialism which is "not a particularly useful term...it can be counterposed with a term that has considerably greater descriptive value and explanatory power: imperialism" (Petras and Yeltmeyer, 2001: 12). The tension between homogenization and heterogenization is the focal issue of today's global accounts. Homogenization is often argued as being Americanization or commoditization, however, it would also be

“exploited by nation-states in relation to their own minorities, by posing global commoditization (or capitalism, or some other such external enemy) as more real than the threat of its own hegemonic strategies” (Appadurai, 1996: 32). This perspective helps us to find out more about the micro globalization from the state-nation within, while this is a complex issue which will be discussed in great detail in the next chapter. What the homogenization fails to see is the indigenization process as various metropolises are brought into new societies which have begun to be studied systemically (Barber, 1987; Feld 1988; Hannerz, 1987, 1989; Ivy 1988; Nicoll 1989; Yoshimoto, 1989). The combination of Chinese traditional music and Western classical music is such a process. Also, Fabian (1991, Ch. 10) suggested an idea to “liquidate culture” as a more open and fluid process to explain cultural globalization. Logical as it may sound, globalization, nevertheless, is more than just cultural flows but also “entails constant efforts towards closure and fixing at all levels” (Meyer and Geschiere, 1999). The cultural globalization can be seen as flows but constantly blocked and mixed at various stages.

Globalization brought in the idea of denationalization----“erosion of the national state, but also its possible transformation into a transnational state” (Beck, 2000: 14) as the concept of boundaries being more and more blurred. And cultural transaction is no longer restricted geographically and ecologically, however, active resistance and complicated nationalism are constantly visible in the Third World countries. And it creates communities with “no sense of place” (Meyrouitz, 1985). The tendency brought forward the complex emotions of nationalism and patriotism as some intellectuals worry about and stand firmly by their own traditional culture in the midst of cultural imperialism cast upon them for quite a long time. However, some of the emotions lost their sense as they go to extremes to criticize the notions of things being westernized. The Cultural Revolution in China is thus a perfect example which reveals the twisted self-esteem and extreme patriotism in front of the powerful cultural imperialism. Less extreme forms can still be witnessed up till present day especially when we look at the situation of Western classical music in China.

Cultural imperialism involves the image of privileged cultural forms and lifestyles, mostly Western ones. And according to Bourdieu, people possessing this kind of privileged forms belong to the privileged class in society. As his research was mostly based within France and related to the French intelligentsia, the situation in the Third World requires second thought. What cultural imperialism brought along is not the tradition for people living in the Third World, and Bourdieu’s idea of heritages might not be appropriate here. It is interesting to note how the Third World reacted to this cultural imperialism. As a matter of fact, they were homogenized at various levels. For example, the situation in China was that: people who passed the imperial examinations and became a politician to serve the Emperor were those belonging to the upper class in society while musicians were generally looked down upon. However, it was a privileged thing to do when you attend a Western classical music concert and political aspirations are generally invisible among the new generations of Chinese youth and among the Chinese intelligentsia as well. Bourdieu’s (1984) theory

is still applicable to this situation but together with cultural imperialism, this situation is a more complicated one. And moreover, is the cultural forms brought by cultural imperialism that attracted the Chinese nowadays or is the Western culture per se? This is also a question worth consideration but lacking in Bourdieu's theory.

Bourdieu argued that the power of the habitus originates from the thoughtlessness of habit and habituation rather than consciously learned rules and principles and he kept emphasizing the "unconscious character of practical logic and the existence of dispositions as beyond consciousness" (Jenkins, 1992: 77). The issue of consciousness and unconsciousness is also a tricky one regarding to China's situation. As we are easily to find out in China's early history that wealthy businessmen or politicians in Shanghai moved into the foreign settlements to seek protection and optimum use of foreign privileges and also, they learn from those foreigners to get more involved in their communities. And some became ashamed of traditional Chinese cultures and lifestyles. There was an obvious purpose in this behaviour as to become more and more West which passed on to present day and we can call it consciousness. I have to admit this is another kind of habitus, to try all means to become westernized, that exists, yet few would admit it.

Also, Bourdieu's (1977) idea of the habitus can be retained as argued by Appadurai (1996: 56) in that "habitus now has to be painstakingly reinforced in the face of life-worlds that are frequently in flux" instead of in the context of stable social situation. Habitus can no longer be simply regarded as a constant and steady behaviour in front of the various flows and mixture of different cultures.

SSO in Shanghai from 1879 to Present day

I have divided the history of Shanghai Symphony Orchestra into five different periods of time and have read a considerable number of books and articles concerning the historical events in each one. I am about to finish my fieldwork by the end of next month in Shanghai which will last for five months. Each chapter or time period will be divided into two parts: the first one is concerning social context of Shanghai from political, economic and cultural aspects; the second part will focus on the development of Shanghai Symphony Orchestra and how it is related to the social context from the first part.

The first period is 1879 to 1918. The First Opium War which began in 1842 opened China's gate to the West and made five coastal cities their treaty ports, among which Shanghai was the most significant one. Shanghai was a privileged city for foreigners in the late 1800s and early 1900s. And its development since the mid-nineteenth century was "closely related to the increasing foreign presence in industry, trade and transport, and a strengthening of commercial links with the outside world" (Wu, 2007: 114) Shanghai, since then, became a city very different from the rest. "It was a city in China, but with an orchestra playing soft music in an English-style garden on summer

evenings it hardly seemed to be a city of China, at least not the willow-pattern China of the British imagination, or the China which had developed before its opening to the West in the nineteenth century.” (Bickers, 2003: 39) One of the key features that distinguishes Shanghai from the rest of the cities in China was that it was “divided into three territories (the French and International Settlements and the area of the Chinese Municipality), each endowed with an autonomous organ of power”. (Henriot, 1993) The British Settlement was established in 1845, American in 1848 and French in 1849. Later in 1863, British Settlement and American Settlement joined together and established the Municipal Council of the International Settlement. The Settlement was formally reserved for foreign residence initially, but Chinese refugees from the Taiping rebellion fled into it after 1855, and large numbers made it their home thereafter, attracted by the opportunities it presented or the refuge it offered. There were Cantonese compradors – middlemen for foreign firms – and entrepreneurs; overseas Chinese from Singapore and Malaya came to invest in the city’s modernizing retail centre. (Bickers, 2003: 52) Lives of the early foreign settlers in Shanghai were quite boring and they should entertain themselves. (Henriot, 2000) But some foreign troops would bring music bands and managers in theatres also started to organize singers and musicians for road shows. The amateur musicians in Shanghai would accompany for visiting musicians too. (Haan, 1993) In 1875, music life in Shanghai was mainly centred by the Music Society and Wind Instrument Society performing pageant in summer. (Lang, 1875) During 1878 to 1879, their musical instruments were passed on to a public band called Shanghai Public band, predecessor of Shanghai Symphony Orchestra today. In 1881, the band was taken over by the Municipal Council of the International Settlement, directed by the Town Band Committee. The musicians in this band were all Philippians. Because Philippines had been a colony of Spain for three hundred years, it was influenced greatly by the western culture and the Philippians were more familiar with classical music. On a performance in 1879, the band played opera music by G. Donizetti (1791-1848) and C. Lecocq (1832-1918) who were well-known in Europe then. (The North China Herald, 1879) The majority of the audiences were not Chinese, while Chinese people could hear the band play during the parade of Shanghai Volunteer Corps or other personal parties, they could also hire the band.

The second period is from 1919 to 1948. With the introduction of western ideas and the success of Japanese Meiji Restoration, Chinese people struggled to find ways of reformation aiming at saving the nation. May Fourth Movement in 1919 was of great importance in that it accelerated China’s modernization marking the age of new intellectual elite with Western-style education and way of living. In regard to Shanghai, with the strong connection and interaction with the West, to Shanghai came students returning from Japan and abroad as well as graduates of the modern schools that had sprung up throughout the country since the 1911 Revolution, thus, a new generation of politically active intellectuals had come to the force. (Dong, 2000: 156) And another thing that many cosmopolitan nationalists who lived for a time in Shanghai during this period had in common was admiration for a particular Western thinker. (Wasserstrom, 2009: 67) “Young progressive Chinese aped Western youth

not just in their choice of clothing but in their personal lives as well. Rebelling against arranged marriages, filial piety, old-fashioned family, and all the other conventions of traditional society, they experimented with the concept of “free love,” joined leftist organizations, handed out flyers promoting strikes and boycotts, and attended lectures by the likes of Bertrand Russell, John Dewey, or Margaret Sanger. In Shanghai, students and intellectuals could lead freewheeling bohemian lives.” (Dong, 2000: 151) All these ideological changes helped the spread and acceptance of Western classical music in China. In terms of the Shanghai Symphony Orchestra at that time, it was under the baton of Maestro Mario Paci that Municipal Orchestra and Band (renamed in 1922) had its major development. He spent his afterlife in Shanghai but was hardly known to today’s European music field. Born in Florence in 1878, he started playing piano when he was seven and won the first prize in International Franz Liszt Piano Competition in 1895. He went to Milan to further his piano study and started performance around the world after he graduated until the end of 1918 when he arrived in Shanghai and fell seriously ill. During his time in hospital, he found that Shanghai was a promising city to fulfil his music dream as a conductor. As a result, he accepted the offer by Municipal Council of the International Settlement and took over the Municipal Orchestra and Band. (Paci, 1942) In political realm, during this period of time, the strongest influences in Shanghai were the changes in its political landscape between 1937 and 1945, as Bickers (2004: 229) pointed out: “was the formal end of the tripartite division of the city”. Shanghai was always more than the foreign concessions, however, between 1937 and 1945 it entered “a new era of hostile environment due to the war and the Japanese occupation, which marked the end of the settlements and of the city’s international status” (Cornet, 2004: 257). However, it did not last long for the Japanese forces took control of the international settlement a few hours after the attack on Pearl Harbour in 1941 and generally led to the disappearance of the concessions.

For my fieldwork during this period of time, I have looked up to the Shun Pao. Shanghai Bookstore has photocopied and published every issue of the ‘Shun Pao’ from 1872. 4 to 1949.5, altogether 400 large books each with about 700 pages, which can be accessed from the Shanghai Library. Shanghai Bookstore Publishing House also published *Shun Pao Index (1919-1949)* in 2008 making detailed lists of every subject, article titles and where to find them. Thanks to the index, I found articles relating to Shanghai Symphony Orchestra and western classical music in Shanghai very efficiently and have briefly read them, and I have made a graphic illustration of the relation between frequency of relevant articles and year. A lot of ups and downs are witnessed in the graph representing the ideological struggle among Chinese intellectuals towards western classical music and Chinese traditional music.

The Shun Pao (now translated as Shen Bao) also known in English as Shanghai News, was a newspaper published from April 30, 1872 to May 27, 1949 in Shanghai, China. Founded by Ernest Major (1841-1908) a British businessman in 1872, it was one of the first modern Chinese newspapers. As Zhou (2006: 45) described: “Major differentiated himself from other foreign newspaper publishers in two areas. First,

from the outset, he made it clear that the new newspaper would be for Chinese readers, and thus that it would emphasize news and issues of interest to Chinese, not foreigners. Secondly, he put Chinese compradors in charge of running the business and let Chinese editors pick news items and write editorials. These two methods proved very effective. While the Chinese compradors used their knowledge of and connections with the local community to raise circulation and attract advertisements, they kept the price of the paper lower than that of its competitor. Simultaneously, Chinese editors did a better job of making *Shen Bao* appeal to Chinese readers' taste. Within one year, *Shen Bao* had put *Shanghai Xinbao* out of business and become the only Chinese newspaper in Shanghai until the appearance of *Xin Bao* in 1876 and *Hu Bao* in 1882.”

The third period is 1949 to 1965. The ideological influence from Soviet Union to China was great even in the 1930s as North (1963: 33) mentioned that many Chinese have looked toward Moscow ---- especially after the revolutionist Sun Yat-sen had turned to the West for help in building a republic and ended up being refused or ignored. After the establishment of PRC, the rationale was that since the best of Western (British and American) science, technology and culture had already been absorbed by the Russians, the “quickest and best way” was to take the essence directly from the Soviet Union. (Pepper, 1987) It was especially true when China was in the socialist bloc with Soviet Union during the cold war, which was a cultural conflict, a “battle for the minds,” or, in the words of Harriman, W. A., a U.S. ambassador in Moscow from 1943 to 1946, “a war of ideology and a fight unto the death,” (Ninkovich, 1981: 135) as much as it was generally considered as a political and systemic conflict. From the very beginning, both sides in this confrontation----the United States and the Soviet Union----tried to expand and consolidate their sphere of influence not just through diplomatic means and economic assistance, but also, more importantly, through cultural diplomacy. (Ninkovich, 1981, 1996 and Frankel, 1965) During this period of time, the intense relationship between the Party and the intellectuals should not be overlooked. It was also an ideological conflict between the Western thought and traditional Chinese values, as well as Marxism from Soviet Union. After 1949, the Party, on the one hand, “indoctrinated intellectuals in Marxism-Leninism-Maoism, which was imposed more comprehensively and intensively than Confucianism had been on the traditional literati” while on the other, “tried to stimulate the intellectuals to be productive in their professions”. (Goldman, 1987: 218) There were in the 1950s about 100,000 higher intellectuals, defined as professionals, scholars, and creative artists, most of whom Chou En-lai characterized as having a degree of bourgeois idealism and individualism. (JMJP, 1956) These contradictories can be regarded as the prelude of Cultural Revolution.

Shanghai Symphony Orchestra during this period of time was mainly served as a political propaganda tool for the Communist Party. The latest social slogans were found on the front page of concert programmes. For example, the 50th Concert of Shanghai People’s Government Symphony Orchestra: ‘Against US and Help North Korea to Protect our Country!’; and the 69th Concert of Shanghai People’s

Government Symphony Orchestra: ‘Support Government to Punish Counter-Revolutionary Criminals! Suppress Counter-Revolutionary Activities! Consolidate People’s Democratic Dictatorship!’ (SSO archive) Also, players from Shanghai Symphony Orchestra were sent to the factories, countryside to play for workers and peasants. As is shown in the Work Plan in 1959: “hold on to performances for workers, peasants and soldiers: 1. 240 estimated performances and four fifth of which should be held in factories, clubs, countryside, and armies and the rest in theatres...continue to reform scholars, raise their political and class awareness to join our Party...” (SSO)

The fourth period is 1966 to 1976, the ten-year Cultural Revolution. The infamous ten-year Cultural Revolution from 1966 to 1976 brought tremendous damage to Chinese society as a whole. It is also a brainstorm to Chinese people and has a strong ideological impact even till today. With the start of the Cultural Revolution, “musical attention turned more immediately to what we might call ‘praise songs’ for Chairman Mao and ‘rebel songs’ for Red Guard groups”. (Clark, 2008: 182) The choral versions of the classical style poems written by Mao Tse-tung received unprecedented attention in the Cultural Revolution. Composers had begun to produce song versions of the poetry in 1958, though initially in something of the manner of German lieder, for the solo voice. By the late 1960s, the preferred vehicle was the massed chorus. (Wang, 1991: 132-133) It was also an ideal means to circumvent and protect from the criticism of Western music by having such a lyricist. Western classical music did witness considerable but difficult development amidst the extremely unsettling social context. Debates were aroused over the ideological indication behind Western classical music and its role in socialist China whose trace can still be found in today’s China. Also, it should also be noted that the nightmare prosecution over Chinese musicians concerning Western classical music created great obstacles in its development.

To understand the activities of Shanghai Symphony Orchestra during Cultural Revolution, one has to understand the revolutionary opera, also known as the model opera planned and carried out by Jiang Qing, Chairman Mao’s wife. There were eight revolutionary operas, most of which combined traditional Peking Opera with symphony music and they are the only artistic forms allowed to perform in China during the ten years, which are *The Legend of the Red Lantern*, *Shajiabang*, *Taking Tiger Mountain by Strategy*, *The Harbour*, *Raid the White Tiger Regiment*, *The Red Detachment of Women*, *The White-Haired Girl*, *Ode to the Longjiang River*, *Azalea Mountain* and *The War in Plain*. In terms of Shanghai Symphony Orchestra during that time, no typical symphony concerts were allowed. They were made to contribute and accompany to those revolutionary operas, serving the policy of “making the past serve the present and foreign things serve China”. The three most popular ones are *The Legend of the Red Lantern*, *Shajiabang* and *Taking Tiger Mountain by Strategy*.

The last period is 1977 to present day. The reform and opening up policy ushered in a new era of cultural enlightenment and liberalization to modern China. Classical music

was accepted again by the government and the masses as well. Gradually, Chinese people came to believe that that Western music was “more scientific, more heroic, and because it was international, it came to be hailed as progressive” (Bezlova, 2004) which affects Chinese traditional music to a great extent. Classical music was used as a means of projecting a modern and progressive image of the cities in the 1990s. “To show how modern and trendy Shanghai was becoming, the city leaders commissioned a French architect to design an ultra-modern opera house made of glass and steel costing 157 million U.S. dollars and located just next to the Shanghai Communist Party headquarters.” (Bezlova, 2004)

The logo for 'iafor' is centered on the page. It consists of the lowercase letters 'iafor' in a light blue, sans-serif font. The text is surrounded by two large, overlapping, semi-transparent circular arcs. The upper arc is light blue and the lower arc is light red, both with a soft, feathered edge.

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Trade Openness, Exchange Rate, Gross Domestic Investment, and Growth in Indonesia

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Abstract:

This study examines the relationships among economic growth, domestic investment, real exchange rate, and trade openness in Indonesia. We carried out the unit root test, the Johansen co-integration test and then estimated the VEC model. The results suggest that there exists a long-run relationship among the variables. All the estimated coefficients of the long run equation have the correct positive signs and significant at least at 5 percent level. Specifically, a one percent increase in trade openness leads to about 26.5 percent increase in Indonesian real GDP in the long-run; a one percent increase in domestic investment will spur GDP by 1.8 percent, and a one percent depreciation of rupiah promotes GDP by about 6.4 percent in the long-run. The results of Granger causality test using VECM suggest that all the variables cause real GDP in the short-run. Both the trade openness and gross domestic investment cause growth unidirectionally in short-run, except for real exchange rate. The evidence suggests that trade openness, GDI and exchange rate are important determinants of economic growth. And therefore policy makers should seriously take these variables into account in their policy construct in order to sustain economic growth in Indonesia. Specifically, Indonesia should promote foreign trade, improve the domestic investment climate, and maintain exchange rate stability.

Introduction

For over three decades prior to 1997-98 Asian financial crisis, Indonesia, Malaysia, Singapore, and Thailand enjoyed high rates of economic growth. Specifically, the Indonesian economy grew, in real terms, at an average rate of more than 7 percent per annum between the 1967 to 1997 period. But the Indonesia's economy suffered from the 1997-1998 Asian financial crisis when its growth contracted by 13.1 percent in 1998. But the Indonesian economy began to recover from the crisis in 2000; by 2001 its real per capita GDP had reached 90 percent of the 1997 level and the poverty incidence had returned to the level as prevailed the late-1990s. By 2004, the poverty level was reduced from 17.8 percent to 16.6 percent and unemployment rate fell from 10.3 percent to 9.1 percent.

During the 2000-2005 period, the economic growth of most Asian countries recorded at an average of above 5 percent, while the Indonesian economy grew at average about 5.7 percent. The Indonesian economy experienced a better growth at 6.0 percent in 2008 but declined to 4.6 percent in 2009 due to the recent global economic crisis although it performed better than the other ASEAN economies such as Malaysia, Singapore, Thailand where their economic growth were negative at -1.7, -2.0 and -2.2 percent respectively. Indonesia is endowed with abundant natural resources such as minerals, agricultural products and oil and gas. The country has large reserves of coal, tin, nickel, iron, copper, gold, manganese, silver, along with tropical hardwood forests and other agricultural products such as rice, palm oil, cassava, corn, soybeans, rubber and timber. Indonesian's agricultural exports are in demand worldwide, especially the primary products such as tree crop exports including coffee, palm oil, rubber, cocoa and tea. In addition to agricultural products, Indonesia as an archipelagic country, is rich in marine resources such as shrimp, and fishery products have also become a major part of exports revenue. However, the country still heavily relied on non-oil exports as both agricultural products and minerals account about 31 percent share of Indonesia's exports.

In terms of trade performance, Indonesia performed relatively well until mid 1980s when the economy was heavily driven by export revenue of oil and gas, notably from the oil boom until the 1980s. But the fluctuations and dramatic decline in oil and gas prices have created problems for Indonesia's economy. At the end of 1981, the role of the oil and gas sector has gradually declined. Dramatic plunge in the global oil prices in the late 1982, followed by another sharp collapse in 1985-86 resulted in massive losses of exports earnings and depressed Indonesia's trade performance. Such situation forced the government to embark upon a new export strategy towards promoting non-oil exports of both manufactured and primary goods (plywood and palm oil). Altering export strategy could significantly upgrade the industrial performance and expand the export activities and therefore improve productivity growth, notably during 1987-96. Except in 1993, 1994 and 1996 where the exports grew at rate slightly below 10 percent, total exports earnings grew at an average rate of 13 percent per annum.

In the mid-1990s, however, the manufacturing exports had begun to play a key role in accelerating the country's growth. Manufactured exports growth has gone beyond that of oil, gas and agricultural goods. Exports performance in this sector grew from 10 percent in the mid-1980s to over 50 percent of total merchandise exports by 1994, raising their share in total exports. Some industries expanded in response to the impressive export performance of the country such as textiles, garments, and electronics. Indonesia's exports slowed down

immediately after the 1997 Asian crisis. The total exports earnings contracted by 6 percent in 1997 and 12.6 percent in 1998. Exports growth rates fell to an estimated level of -1 percent to -5.1 percent in 2009. Exports play a crucial role as source of growth for Indonesia. In 2001, the share of manufacturing exports to total exports for Indonesia was the lowest among the South- East Asian economies. In 2009, Indonesian exports accounted for 43 percent of GDP compared to other economies in the region such as 69 percent for Malaysia, 68 percent for Thailand, and 32 percent for the Philippines over the same period. This is as a result of lack of the domestic supply side rather than on demand side in the major markets. The country's exports heavily relied on the resource-based sector with neglected labor intensive Industries. Thus, it has left the country without well-established high-technology sector. In 2006 for example, Indonesia's exports of high technology goods recorded only 4.9 percent of the total exports share which was lower compared to Malaysia, Singapore, Thailand, China, and Korea (all with more than 5 percent). Poor infrastructure quality and a shortage of technical skills are among factors causing the sluggishness of Indonesia's trade performance over the last decades.

Thus, the main focus of this study is to determine whether trade openness, gross domestic investment, and exchange rate affect economic growth of Indonesia. Theoretically, all these variables are important determinants of growth of both developed as well as developing countries. In Indonesia, the relationship between these variables and economic growth has not been fully addressed yet. therefore the specific objectives are: to investigate the relationships among trade openness, gross domestic investment, exchange rate and economic growth, to examine the direction of causality between trade openness, gross domestic investment, exchange rate, and economic growth, and to suggest policy actions to improve the performance of Indonesia's economy.

Literature Review

There are a large number of literature discussing the linkage between trade openness and economic growth. It is argued that trade openness has a robust positive impact on growth on the notion that trade expansion leads to the increase in the exports sector, capacity utilization and positive externalities on the non-exports (Edwards, 1993). Chang et al. (2005) conclude that trade openness generates efficient allocation of resources through comparative advantage, allowing the transmission of knowledge and technological progress, and stimulates competition in both the national and international markets. Meanwhile Edwards (1992), argues that openness will boost the spread of technological knowledge from developed countries which will ultimately promote economic growth of a country. Fontagne and Freudenberg (2001) state that the benefit gained from international trade will create more efficiency and economies of scale for country's trade relations.

Romer (1990) provides evidence for the existence of a large positive impact of trade openness on growth. The evidence shows that trade openness may speed up growth through productivity differential in the exports sector that will generate positive externalities for the economy. The finding indicates that a one percent increase in the ratio of trade to the GDP may raise per capita income by 1.5 to 2 percent. The evidence from a study by Yanikkaya (2003) supports the hypothesis of the new growth theory where trade encourages growth through technology. The study was carried out based on 100 developed and developing countries. He concludes that the more a developing country trades with the United States the higher the economic growth of the country. It is not surprising to see the hypothesis that a country which is more open to trade tends to cause more rapid in growth has been widely accepted in the academic circles. Studies by Wacziarg and Welch (2001) and Dollar and Kray

(2004) find evidence of a positive relationship between openness and economic growth. Hogendorn (1996: 442) suggests that the developing countries which are more open to trade will have a more rapid growth and they will be more able to reach higher income level. The empirical study on the relationship between growth and trade done by Frankel and Romer (1999) shows that there are effects of the trade openness on economic growth. In a study conducted by Sachs and Warner (1995) to determine the effects of trade on growth using a binary variable across of 122 countries finds that the open economies will be better off due to higher growth rate compared to the closed economies. There have been disagreement about the relationship between trade openness and growth. Chang and Loayza (2005) find that the effects of trade on growth might not be identical across countries. It has a positive effect only on certain conditions such as the flexibility of labour markets in the country. Calderon, Loayza and Schmidt-Hebbel (2004) point out that the growth rate is zero when the country experiences low levels of per capita income and positive effect is shown only for countries with higher levels of per capita income.

It has been argued by many that the significant contribution of international trade through exports activity will stimulate economic growth of developing countries as exports have been considered as the principal channel through which trade openness affect the output level and eventually the economic growth as advocated by the exports-led growth hypothesis (ELG). Sjöholm (1997) considers international trade as the main factor that can strongly affect the economic growth since an increase in exports will lead to higher economic growth, but imports do not give a significant effect to growth. Afentou and Serletis (1991) examine the causal relationship between exports-output using the co-integration by employing data from 16 developed countries. Their findings suggest that there is no co-integration between exports and output except for Norway, Iceland, and the Netherlands; that there is a bidirectional causality for the U.S; while for Norway, Canada, and Japan causality is unidirectional running from output to exports.

Shirazi (2004) investigates the short-run and long-run relationships among real exports, real imports and economic growth for Pakistan for the period 1960-2003. He employs a co-integration technique and a VAR model and then applies multivariate Granger causality as proposed by Toda and Yamamoto (1995). The study shows the evidence of a long-run relationship among the three variables and that the causality is unidirectional running from exports to output. The results also indicate causality running from imports to output while it does not support any causality between imports and exports. Jordan and Eita (2007) evaluates the relationship between exports and GDP of Namibia for the period 1970 to 2005. In their study, Granger causality test and co-integration technique were applied to test the hypothesis of exports-led growth. Specifically, they develop a multivariate error-correction model to identify the existence of uni-directional or bi-directional causality between exports, GDP and GDP per capita, as well as between exports, imports and GDP per capita. The results reveal that all the variables are co-integrated. It also provides the evidence that exports Granger cause the GDP and GDP per capita, implying that the Exports promotion strategy has a positive influence on GDP growth. The results also depict that there is a bi-directional causality between exports and imports, there is no significant causality between imports and the GDP per capita.

In another study, Jordan and Eita (2009) test whether bi-directional causality exists between exports and economic growth in Botswana using quarterly data for the period 1996 to 2007. They employ a VAR model and apply the Granger causality test to examine the causal relationship between the GDP and economic growth. The evidence shows that there is a bi-

directional causality between exports and economic growth in Botswana. Islam, (1998) uses the Granger causality test based on the residuals of the error correction model to identify the causality between exports and growth in 15 South-East Asian countries for the period 1967-1991. The co-integration among the underlying series was also examined but cointegration was detected only for five out of these countries, namely Bangladesh, India, Nepal, Sri Lanka and Fiji. For the causality test only ten out of the 15 countries surveyed indicate that the exports are found to cause economic growth. Another study conducted by Al-Yousif (1997) using a multivariate model to investigate the relationship between exports and economic growth in four of the Arab Gulf countries: Saudi Arabia, Kuwait, UAE, and Oman, for the period 1973- 1993. There is a strong evidence that exports have a positive impact on economic growth in the four countries but there is no long-run relationship between exports and economic growth in these countries.

Many studies were conducted to determine the impact of imports on productivity in developing countries. The inclusion of imports as an important variable into the model will allow us to test the imports-led growth hypothesis. This hypothesis states that the imports of intermediate goods and capital goods can contribute to economic growth by enlarging the productivity. According to McKinnon (1964) and Findlay (1973), by allowing the country to open to imports such as the importation of high-quality goods and services, the productivity can expand to promote growth. Such imports can be enforced through successful exports promotion since exports may relieve the binding foreign exchange constraint that ultimately increases imports of capital goods and intermediate goods.

Imports encourage competitive pressure on domestic products which tends to promote productivity through absorbing new technologies from other countries, Yusuf (2000). Krugman & Helpman (1988) argue that in the case of developing countries, imports may be beneficial in terms of providing a massive products' variety for the domestic consumers. Coe and others (1997) find that imports of capital goods have a stronger effect on the total factor productivity growth. Several studies have shown that without including the imports into the model the causal relationship between exports and growth is merely a spurious link and thus may be misleading. Esfahani (1991), Riezman et al.(1996) and Thangavelu and Rajaguru (2004) argue that the omission of imports, as an explanatory variable, will overstate the relationship between exports and growth. They also highlighted that the finding of no co-integration between exports and GDP is because of the exclusion of imports. On the other hand, the inclusion of imports, as an additional appropriate variable in the model, will provide a better understanding of the effects of exports on the economic growth, particularly when exports, imports and economic growth of a country have the tendency to reinforce each other. Therefore, the inclusion of imports as a relevant variable in the study of exports-led growth is important. According to Rodrik (1999), imports play an important role in the long-run economic growth since the rapid growth of imports will significantly contribute to economic growth. Furthermore, by omitting important variable, such as imports in this case, will overstate the dynamic impact of exports on economic growth. Renelt (1992) suggests that total trade, instead of exports, is the appropriate independent variables included in his regression model. He provides the evidence that imports and total trade will similarly support growth.

There have been many empirical studies done to determine the relationship between the real exchange rate and economic performance of a country. The role of exchange rate in promoting economic growth through trade channel has been pointed out by many studies. It is also recognized that exports provide an accumulation of foreign exchange needed for the purchase of imports, that cannot be produced domestically, which in turn will contribute to

the economic growth. Krueger (1978) argues that a huge demand for foreign exchange will re-emerge unless trade openness is followed by a meaningful change in the nominal exchange rate. A study conducted by Edward (1993) suggests that the successful trade liberalization during 1970s to 1980s was due to a robust depreciated exchange rates. However, many countries maintain what is called as “a disequilibrium real exchange rate” which is an overvalued or undervalued of the domestic currency value. Resource rich countries often implement an overvalued domestic currency that is entailing constraints on the economic growth. Meanwhile a domestic currency depreciation has been a common feature of exports orientation strategy in developing countries. It seems that real exchange rate depreciations play an important role in the economic growth of developing countries that provide a growth-promoting effect, while appreciation hurts the economic growth. The study conducted by Musila and Newark (2003) find that there is a positive impact of devaluation on exports performance which in turn leads to a positive impact on growth. The empirical study conducted by Faria and Ledesma (2003) examines the Balassa-Samuelson effects on growth. by employing the Pesaran bounds testing for the period from 1960: Q1 to 1996: Q4. Their findings indicate that the devaluation of real exchange rate (RER) has a strong impact on the economic growth.

An undervalued real exchange rate causes an increase in international price competitiveness of domestic tradable goods which in turn spurs exports and finally promotes economic growth. Undervaluation of the real exchange rate enhances trade performance through an increase in exports due to an increase in external demand. Upadhaya and Dhakal (1997) conduct an empirical study to examine the relationship between the real exchange rate and GDP of six Asian countries for the period 1963–1993. He employs the ARDL (Autoregressive Distributed Lag) models. The finding indicates that these countries experience a positive growth in the long-run when the currencies are undervalued, except for Pakistan and Thailand. By contrast, an appreciation of real exchange rate is judged as negative exchange rate shock that can be harmful to trade performances since it slows down the aggregate demand which in turn adversely affects exports. In addition, the overvalued real exchange rate causes an increase in the domestic cost of producing tradable goods if there is no change in the relative prices for trading partners. It has been observed that the appreciation of the currency can impede economic growth. Dollar (1992) and Polterovich Popov (2002) argue that an overvalued currency is harmful for economic growth of developing countries. During the period 1950 and 1970, trade was considered unsuccessful due to a highly overvalued exchange rates. Easterly (1999) argues that a massive revaluation of currencies has an unfavourable effect on growth due to the well-known Balassa-Samuelson hypothesis which states that the rapid productivity growth comes faster in the traded goods sector than in the non-traded goods sectors (mainly service) as the prices of traded goods tend to fall more relative to non-traded goods. The slow rate of growth is due to its higher price of traded goods.

The Model

The literature suggests that there are a number of variables that influence economic growth. In this study, we postulate that GDP depends on trade openness, gross domestic investment, and exchange rate. The equation is expressed in log form as:

$$LGDP_t = \alpha_0 + \alpha_1 LOPEN_t + \alpha_2 LGDI_t + \alpha_3 LRER_t + \epsilon_t \quad (1)$$

where OPEN is the trade openness, GDI is the gross domestic investment, and RER is the real exchange rate, L is the natural logarithm, α_i ($i = 0, 1, 2, 3$) are the parameters to be

estimated which are assumed to be positive, ϵ_t is disturbance term, and subscripts t is the time period. A priori $\alpha_1 > 0$ indicating that an increase in trade openness will lead to an increase in GDP; $\alpha_2 > 0$ implies that an increase in GDI will positively affect GDP and $\alpha_3 > 0$ suggests that a change in RER will positively affect GDP. Equation (1) can be written in an error-correction form as

$$\begin{aligned} \begin{bmatrix} \Delta LGDP_t \\ \Delta LOPEN_t \\ \Delta LRER_t \\ \Delta LGDI_t \end{bmatrix} &= \begin{bmatrix} \alpha_0 \\ \beta_0 \\ \gamma_0 \\ \delta_0 \end{bmatrix} + \sum_{i=1}^m \begin{bmatrix} \alpha_{1i} & \alpha_{2i} & \alpha_{3i} & \alpha_{4i} \\ \beta_{1i} & \beta_{2i} & \beta_{3i} & \beta_{4i} \\ \gamma_{1i} & \gamma_{2i} & \gamma_{3i} & \gamma_{4i} \\ \delta_{1i} & \delta_{2i} & \delta_{3i} & \delta_{4i} \end{bmatrix} \begin{bmatrix} \Delta LGDP_{t-1} \\ \Delta LOPEN_{t-1} \\ \Delta LRER_{t-1} \\ \Delta LGDI_{t-1} \end{bmatrix} \\ &+ \begin{bmatrix} \alpha_1 \\ \beta_2 \\ \gamma_3 \\ \delta_4 \end{bmatrix} [ECT_{t-1}] + \begin{bmatrix} \mu_t \\ \epsilon_t \\ \varphi_t \\ \omega_t \end{bmatrix} \end{aligned} \quad (2)$$

where $u_t, \epsilon_t, \varphi_t, \omega_t$ are residuals in period t with zero-mean and constant variance, Δ is the first difference operator, $\alpha_i, \beta_i, \gamma_i, \delta_i$ (where $i = 1, 2, 3, 4$) are the short-run elasticity coefficients which measure the change an dependent variable as a result of one percent change in the respective explanatory variable. The lag lengths are m_1, m_2, m_3 and m_4 chosen on the basis of minimizing Akaike's. ECTs are the error-correction terms which are the stationary residuals generated from the long-run co-integrating regression of Johansen multivariate process representing disequilibrium position in period t . In other words, the error-correction terms represent the adjustment of variables towards to a long-run equilibrium value. The coefficients $\delta_4, \gamma_3, \beta_2, \alpha_1$ should be negative are the short-run parameters which indicate the short-run adjustment of the variables towards the long-run equilibrium value.

Sources of Data and Definition of Variables

The annual time series data from 1970 to 2009 used in this study were collected from various sources, notably from the World Development Indicators online and UNCTAD. The data derived from the World Development Indicators online are gross domestic product (GDP), exports and imports, gross fixed capital formation (GCF) representing gross domestic investment. The exchange rate data were obtained from IFS (International Financial Statistics). All the data are expressed in 2000 constant USD.

Estimation Techniques

Unit Root Test. When dealing with time series data, appropriate test are required to identify the characteristics of the series. First the unit root test is applied to examine whether a series contains a unit root. If unit roots are present in the series, the results of regression may be spurious. This test is to ensure that the pairs of the series do not have a tendency to drift too far apart and also to keep them moving together. However, the series probably drift apart in the short-run but it may move closely together in the long-run. In this study, we test the unit-root tests using the familiar Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) statistics.

Co-integration Test. Granger (1987) and Toda and Phillips (1993) have shown that when non-stationary series are detected, co-integration test is appropriate since differencing the variable merely removes any long-run information. Co-integration test is one of the important

preliminary tests conducted after the unit root test, especially when the series are non-stationary in level. Before proceeding with the co-integration test, an important consideration should be given to ensure that all the series are integrated in the same order (Engle and Granger (1987)).

If all the series are integrated with order one or I (1) then they are non-stationary in level. We then proceed to determine the long-run relationships among the series LGDP, LGDI, LRER and LOPEN by employing the Johansen-Julius co-integration test consisting of two likelihood ratio (LR) tests, namely the trace statistic and max-eigen statistic. However, for the small sample data, the likelihood ratio tests can be biased in finding the number of co-integration. Thus, to take into account of such problem Reinsel-Ahn (1988) suggests an adjustment for the degrees of freedom by replacing T in the equation above by $(T - nk)$ where T is the sample size, n is the number of variables included in the model and k is the number of lags.

Granger Causality Tests. Granger (1988) states that the existence of co-integration implies that there is a cause and effect relationship among the variables at least in one direction. We shall use the residuals of VECM model to test the direction of causality.

Results and Discussion

The results of unit root tests(not reported here) indicate that in all cases both the Augmented Dickey Fuller (ADF) test and Philips Person (PP) test cannot reject the null hypothesis of unit root. Thus, all variables LGDP, LGDI, LOPEN and LRER are non stationary in level.

Table 5.1. Co-integration Test Results of Johansen-Julius Approach

Null Hypothesis	Eigen value	Test Statistics			
		Trace		Maximum Eigen value	
		Statistic	5% CV	Statistic	5 % CV
$r = 0$	0.5365	57.7736* (52.1372) ^{a*}	40.1749	31.5292 (28.3763) ^{a*}	24.1592
$r \leq 1$	0.3671	26.2444* (23.6199) ^a	24.2759	18.7550 (16.8795) ^a	17.7973
$r \leq 2$	0.1656	7.48949 (6.7405) ^a	12.3209	7.4217 (6.6795) ^a	11.2248
$r \leq 3$	0.0017	0.0678 (0.0610) ^a	4.12990	0.0678 (0.0610) ^a	4.1299
The long-run equation :					
$\text{LGDP} = 26.4989\text{LOPEN} + 1.8057\text{LGDI} + 6.3865\text{LRER}$					
$(6.3823)^{b*} \quad (0.2943)^{b*} \quad (3.2449)^{b*}$					

Notes : * denotes rejection of the null hypothesis of no co-integration at 5 percent level of significance, ^a Adjusted trace and Maximum Eigen statistics as suggested by Reisel-Ahn (1988),

^b the values in parentheses are standard errors.

But the null hypothesis of non stationary on first difference are rejected for all variables at 1 percent level of significance which provide evidence that all variables are integrated of order one I(1).

The results of co-integration test are given Table 5.1. The unadjusted maximum eigen value and the trace statistics reveal that the variables included in the model are co-integrated at 5 percent significance level and there exist two co-integrating vectors. Then the maximum eigenvalue and the trace statistics are adjusted for its degree of freedom as suggested by Reinsel-Ahn (1988) and both statistics are still significant at 5 percent level but there exists only one long-run relationship among GDP, trade openness, GDI and exchange rate. The estimated long-run equation is given in Table 5.2. The estimated coefficients of all variables LOPEN, LGDI and LRER have correct positive signs as expected from theory and significant at 1 percent level. In particular, a one percent increase in trade openness, improve Indonesian real GDP by about 26.5 percent in the long-run; a one percent increase in domestic investment leads to an increase in GDP by 1.8 percent, while a depreciation of rupiah will spur GDP by about 6.4 percent in the long-run.

Table 5.2. The Results of Granger Causality Tests

Dependent Variables	Δ LGDP	Δ LOPEN	Δ LGDI	Δ LRER	T-statistics for ECT_{t-1}
Δ LGDP	-	14.4304** (0.0252)	16.8067* (0.0100)	14.1223** (0.0283)	-3.0367*
Δ LOPEN	4.8677 (0.5609)	-	1.9095 (0.9278)	2.6895 (0.8467)	0.1887
Δ LGDI	9.8634 (0.1305)	8.7706 (0.1869)	-	10.0477 (0.1227)	-2.3878*
Δ LRER	16.5597** (0.0110)	21.5439* (0.0015)	17.9052* (0.0065)	-	3.6662*

Notes: *, ** Indicate significance at the 1 percent, 5 percent respectively, Probabilities are in parentheses.

The results of the short-run causality in Table 5.2 indicate that economic growth are caused by the changes in trade openness, gross domestic investment and real exchange rate where they are significant at least at 5 percent. The results also show that the real exchange rate is caused by GDP, gross domestic investment and trade openness at least at 5 percent of level significance. Thus, there is a uni-directional causality from trade openness and GDI to GDP, but feedback occurs between trade openness and real exchange rate.

The variance decomposition analysis is a useful tool to quantify the fraction of forecast error variance of the dependent variables attributed to its own shock and shocks of other variables. Table 5.3 shows that in the first period, the variation in the LGDP is 100 percent explained by its own shock. But in the 10th horizon, the variations in economic growth (LGDP) is explained by trade openness at 35.7 %, real exchange rate at 25,7%, and gross domestic investment at 9.5%. In the 20th horizon, the variations in economic growth (LGDP) is

explained by trade openness at 41.3 %, real exchange rate at 22.29%, and gross domestic investment at 11.9%.

Table 5.3. Decomposition of Forecast Error Variance of LGDP

Period	LGDP	LOPEN	LGDI	LRER
1	100.0000	0.000000	0.000000	0.000000
2	61.94783	23.90939	5.551703	8.591077
4	56.75165	26.86047	3.795532	12.59235
6	39.81659	29.93727	4.546725	25.69941
8	33.46198	32.33514	5.935344	28.26754
10	28.92011	35.74251	9.561779	25.77560
12	26.44834	38.03580	11.35374	24.16212
14	25.83412	39.35205	11.78637	23.02746
16	26.54465	39.96931	12.46035	21.02570
18	26.31635	40.68068	11.96102	21.04196
20	24.34061	41.39642	11.97174	22.29123

Conclusion

The main objective of this study is to determine the short-run and long-run relationships among economic growth, domestic investment, real exchange rate and trade openness in Indonesia. The results suggest the existence of a long-run relationship among these variables. All the variables have contributed positively to the long term economic growth of Indonesia. The findings show that both the trade openness and gross domestic investment cause growth unidirectionally in short-run, except for real exchange rate. The variance decomposition analysis indicates that the variations in gross domestic product are explained by trade openness, followed by the real exchange rate while the domestic direct investment is not as important. The evidence suggests the importance of trade openness, real exchange rate, and gross domestic investment and therefore policy makers should consider these variables in their policy actions. Specifically, Indonesia should promote trade and financial liberalization.

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Friendliness in Asia and Europe: A Cross-Cultural Research Project

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Abstract:

Social skills include the ability to adapt to social settings and act accordingly to situations, which is considered useful. From the evolutionary perspective, the ability to adapt is very important because it is related to all factors of survival within a group. Friendship as a form of adaptation, can benefit all parties as food and shelter are shared to express care and concern for the well being of each individual (Buss, 2009). With that said, the extent of such behavior being expressed within friendship could be dependent on the culture that an individual has grown up with, for with different cultures come different perceptions of behaviors (Matsumoto, & Juang, 2008). Touching a little on personality, westerners generally ranked higher in Openness to Experience than Asians (especially East-Asians) do (Schmitt et al., 2007). Based on that, perhaps it can be said that due to differing personality and culture, westerners may more friendly, in terms of behavior, than Asians are. A friendship scale called SACRAL was developed by John Reisman (Janda, 2001) and used to measure the extent of friendship behavior. The survey has been administered to Singaporeans and Mainland Chinese. Participants from Philippines, Indonesia and West Europe will also be included in the research. It is hypothesized that western-influenced countries may score better than Asian-influenced countries on the friendship scale, with higher scores in the self-concept and rewardingness variables of the friendship scale, and that results will point to females having an overall higher score of friendliness as compared to males.

Introduction

Research regarding social relationships has been examined throughout the past three decades, particularly in the developmental field (Erwin, 1998; Kail & Cavanaugh, 2007; Rubin, Dwyer, Booth-LaForce, Kim, Burgess, & Rose-Krasnor, 2004). The human understanding of the importance of social relationship, such as being friendly with others, is established during childhood and has become one of the most important aspects in human social life at all times (Rubin & Menzer, 2010). Friendliness is categorized under social behavior, which is defined as warmth, welcomed, and positive attitudes toward others (Aaker, Benet-Martínez, & Garolera, 2001). Therefore, understanding the concept of friendliness might be necessary due to in-depth understanding of the core characteristics of social behavior in different societies.

The Concept of Friendliness

Social behavior

According to psychologist Allport, the study of social psychology uses scientific methods "to understand and explain how the thought, feeling and behavior of individuals are influenced by the actual, imagined or implied presence of other human beings" (cited from Hogg & Vaughan, 2005). Social behavior may then be inferred, as behavior of people that occur within a social setting. Rummel (1976) noted that social behavior refers to actions that are oriented towards other selves. With Matson (2009), social behavior is a combination of social skills and behavioral excesses.

In the examination of social skills, these are behaviors or abilities that a person has and uses to engage in contact with others at an interpersonal level (Hargie, Saunders, & Dickson, 1994). Friendliness is categorized as a part of these social skills and behavior (Aaker, Benet-Martínez, & Garolera, 2001). In a scale developed by Reisman (1983), he defined friendliness as consisting of Self-Concept, Accessibility, Rewardingness, and Alienation named SACRAL. By comparison, self-concept takes the biggest proportion in the social behavior, which is used to understand own self, while the other three components are considered as minor factors. However, it appears that all of the components are required to work reciprocally in order to form a positive social behavior, also known as *friendliness* (Ladd & Troop-Gordon, 2003; Railton, 1984). An extended discussion of SACRAL on friendship attitudes will be presented in the next part of the study.

Culture and cultural dimensions

Culture has been defined as a distinct identity of a group that differs from others, in which sets of information, values, beliefs, and behaviors are shared and transmitted across generations (Cooper & Denner, 1998; Chhokar, Brodbeck, & House, 2007; Kashima & Gelfand, 2011; Martin, 2002). According to Matsumoto (2000), one's culture may be capable of affecting personal work ethics, the development of one's view about others, and the style of communication or treatment towards other people in the social environment.

Matsumoto and Juang (2008) recommended that it would be easier to understand the word 'culture' by linking some excerpts from other topics of psychology, namely evolutionary psychology. In evolutionary psychology, sexual reproduction, eating, sleeping, and adapting to the different environmental surroundings are important factors leading towards survival (Buss, 2009). With the application of hierarchy systems and hunter-gatherer groups, it became inevitable for people to

develop skills for solving probable social problems, and these solutions may differ accordingly to the social settings (Matsumoto & Juang, 2008). Thus, these solutions can be said to form cultures, which explains how different problem-solving styles are learnt, and eventually, constitutes towards different work ethics (Matsumoto, 2000).

Current trend in the research on culture focuses on cross cultural comparisons with regards to individualistic and collectivistic cultures (Ang & Kuo, 2002; Hofstede, 1984; Kleinknecht, Dinnel, Kleinknecht, Hiruma & Harada, 1997; Matsumoto, Kudoh, & Takeuchi, 1996; Oyserman, Coon, & Kimmelmeier, 2002). According to Shenkar and Ronen (1987), the culture between Singapore, China, Indonesia, and Philippines share some similarities in certain aspects, but also differ in other ways; however they are supposedly different from European countries. East Asia like China and the South East Asia such as Indonesia, Philippines, and Singapore are regarded as collectivistic cultures (Oyserman & Lee, 2007; Schreier, Heinrichs, Alden, Rapee, Hofmann, et al., 2010; Weiten, 2008), although Philippines might not be so collectivist due to the strong influences of Western values (Pe-Pua & Protacio-Marcelino, 2000). On the other hand, European countries are described as individualistic cultures due to their autonomy, independence, and self-reliance (Green, Deschamps, & Páez, 2005) with low power distance (Matsumoto & Juang, 2008; Singelis, Triandis, Bhawuk, & Gelfand, 1995).

Friendliness and Culture

It was mentioned at the beginning that friendliness is akin to welcoming and positive attitudes towards others (Aaker, Banet-Martinez, & Garolera, 2001). However, being friendly is slightly different from being friends. According to Porter (2009) the difference between friendliness and friends, is that friendliness is considered as an attitude towards others that one can perform it to everybody, whereas friendship requires mutual relationship that implies expectation from one and another. As stated before, the intensity of friendliness in every culture is different. One example of a cultural difference on being friendly is greetings with cheek kiss practiced by Europeans however, not expressed by Asians in general (Bowe & Martin, 2007). Other researchers on friendliness and culture (Goodwin & Gilles, 2003; Hofstede, 1980; Jetten, Postmes, McAuliffe, 2002; Markus & Kitayama, 1991; Saville-Troike, 1978; Sharp, n. d.) have mentioned that countries with high score of collectivism, such as China, Indonesia, Philippines, and Singapore, are more likely to show strong support to in-group members (i.e., friends) but have less support towards out-group members (i.e., strangers). Such findings are suggestive of the presence of strong friendship ties with their own but not necessarily friendly with other people from other groups or culture.

Personality factors measured in the Big Five personality traits can also explain the differences in friendliness among cultures. Westerners generally scored higher than Asians in Openness to Experience (Schmitt et al., 2007). As described by Weiten (2008), Westerners, due to their flexibility, unconventional attitudes associated with individualistic culture would be friendlier than Asians, who are collectivistic in the social context. Based on this notion, the authors of the current paper have hypothesized that European countries (higher individualism) would score higher than Asian countries (higher collectivism) on the friendliness scale.

However there are limited studies that fully explore on friendliness and culture. Therefore, Reisman's studies (1983; 1989) were used as the main guidance for the development of the present study. In the earlier part, it was discussed that according to Reisman (1983, 1989), there are four types of factors that are required to construct the friendliness behavior, which known as self-concept,

accessibility, rewardingness, and alienation (SACRAL). The definitions of the subscales are as follows.

Self-concept

Self-concept refers to multidimensional construct to explain the self-identity (Bailey, n.d.; Byrne, 1984). Many studies have been established to measure the level of self-concept in the individualistic and collectivistic countries (Diener & Diener, 2009; Matsumoto & Juang, 2008; Oyserman et al., 2002; Suh, Diener, Oishi, & Triandis, 1998; Triandis, Bontempo, Villareal, Asai, & Lucca, 1988). Results from these researches show that individualistic countries have been found to have higher self-concept in social relationship compare to collectivistic countries (Hofstede, 1984; Schreier, Heinrichs, Alden, Rapee, Hofmann, et al., 2010; Triandis, Bontempo, Villareal, Asai, & Lucca, 1988; Watkins, et al., 1998).

In the cultural trade-off hypothesis, in a highly collectivistic society, people generalized higher self-liking (social worth) instead of self-competence (self-efficacy), whereas in individualistic society, it oversimplifies the opposite tendencies (Tafarodi & Swann, 1995, 1996). However, previous research offers little in the way of direct tests of the cultural trade-off hypothesis. As self-concept includes self-esteem, which is the personal judgment of own value (Zastrow & Kirst-Ashman, 2010), individualistic cultures were found to possess higher global self-esteem scores on average than collectivistic cultures, based on measures such as Rosenberg's (1965) Self-Esteem scale. Thus, collectivistic cultures might tend to form lower self-concept in the social behavior compare to European people. It is important to take note that the sense of self is not only influenced by the individualistic and collectivistic cultures, but other aspects like gender may also have an impact on the attitudes of individuals (Goodwin & Giles, 2003).

Accessibility and Rewardingness

When a person believes he/ she is a friendly person within the friendship status, this person provides emotional support to his/ her friends, such as attention, respect, and comfort with less or the absence of competition (Peterson, 2009; Stern, 1994). These types of support (also referred to as the 'giving behavior') are labeled as accessibility by (Reisman, 1983). Besides that, there is another factor in friendship, named as rewardingness, that is presented in a form of tangible rewards, such as money, rewards, compliments, gifts, and so on (Reisman, 1983).

With regards to cultural differences, accessibility is projected in idiocentrism and allocentrism, referring to the orthogonal relationship between one with another, and it is possessed by all the cultures in different proportions (Triandis & Suh, 2002). Idiocentrism is more often found in individualistic cultures, whereas allocentrism is found to be higher among collectivistic cultures (Chiao & Blizinsky, 2009; Oyserman et al., 2002; Rhee, Uleman, & Lee, 1996).

If accessibility covers emotional support, than rewardingness is what underlines material and physical supports. According to some researchers (Chatman and Barsade, 1995; Keller, 2004; Ziegahn, 2001), physical and/ or material rewarding is more often offered by individualistic cultures compared to collectivistic cultures. However, Gouveia and Ros (2000) argued that even though Europeans are individualistic, they are not egoistical and they do care and consider about others. Thus, it supports the findings of idiocentrism and allocentrism regarding of the proportion in each

countries (Triandis & Suh, 2002). Thus, it is interesting to know whether or not Europeans tend to have higher achievement in rewardingness compared to accessibility.

Alienation

According to Geanellos (2002) and Reisman (1983), measuring alienation is certainly important in order to understand the level of friendliness within one self. As people might know from the word “alienation”, it means separation or distance oneself from another (Ogilvy, 1992). The definition provided by Reisman (1983) is that it has to do with “personal beliefs about acceptance and rejection” while Urick (1977) described it as a notion that comprises of “feelings of powerlessness to affect one’s environment and being estranged from the values and norms of one’s society”. In most of the cultural studies show that alienation is often found among collectivistic cultures than individualistic cultures (Fujimoto, Härtel, & Panipucci, 2005), which one might due to the differences of understanding of human social life and enculturation (Miller, Birman, Zenk, Wang, Sorokin, & Connor, 2009; Sheng, 2007).

Friendliness and Gender

Some researches have shared similar results regarding to gender and individualism/ collectivism, in which females are more collectivistic, or interdependent, than males (Han, 2002; Triandis, 1994; Zuckerman, 1985). Collectivistic cultures have strong ties with being traditional (Hofstede, 2001), and it can be similarly applied to gender, meaning that if females are more collectivistic it is akin to saying that they are more rooted to the traditional values of the culture. Perhaps, this dues to the gender-role stereotypes, where males will usually be the leader of the house and they work to support family financially, while females are more submissive and conforming, caring for the family well-being instead (Berry; 1976; Kobayashi, 1994; Matsumoto & Juang, 2008; Shaffer, 2009).

In addition with regards to the accessibility concept of friendliness, Terry (2001) studied the similarities and differences between idiocentrism and allocentrism in social relationship context across gender. She found out that women scored significantly lower than men on idiocentrism (women = 3.59, men = 3.76) with significantly higher on allocentrism (women = 3.80, men = 3.66). Besides, many (Gabriel & Gardner, 1999; Rubel, 2004; van Vugt, de Cremer, & Janssen, 2007) have concluded that females are more interdependent and show more emotional support towards others, as compared to males.

Research Objective

The purpose of the current study is to examine the differences in the level of friendliness (based on the four subscales mentioned in Reisman’s SACRAL across cultural regions —includes Western Europe, Indonesia, Mainland China, Philippines, and Singapore, with regards to individualism/ collectivism, and to investigate gender differences across regions from a socio-cultural point of view. In line with the current study, the authors categorize China, Indonesia, Philippines, and Singapore as the collectivistic cultures and Western European countries as the individualistic cultures. Based on the literature provided, it is hypothesized that Western European countries (higher individualism)

will score higher than Asian countries (higher collectivism) on the friendliness scale, and that female participants will score higher in SACRAL than male participants.

Research Design

Participants

252 participants were recruited (49 Chinese, 41 Europeans, 52 Indonesians, 47 Philippines, 63 Singaporeans) who are either currently pursuing their tertiary studies or working. There were a total of 38% males and 62% females with the age range from 17 to 61 years ($M = 23.89$). The authors gathered the data with convenience sampling and snowballing methods. Participants were approached either through contacts of immediate friends (by email, short message service, or utilizing a function similar to posting on a 'bulletin board' at a social network site by the principal investigators), or referred to friends of friends.

Instruments

The SACRAL (acronym for self-concept, accessibility, rewardingness, and alienation), a friendship scale developed by John Reisman consisted of 40 items. It utilizes a four point Likert scale: 0 – Disagree very much; 1 – Somewhat disagree; 3 – Somewhat agree; and, 4 – Agree very much. According to the instructions provided by Reisman, all items except for 11, 13 to 18, 29 to 35, and 38 are to be reversed scored. With that step done, all items that scored a '1' are to be changed to '0'. Tabulation of scores was to be first tallied in accordance to 4 categories (Self-concept, Accessibility, Rewardingness, and Alienation), and then totaled up to create a percentile reference guide. A high score in each subscale (including Alienation) means higher levels of friendliness.

Both an online and written version of the questionnaires were provided for the participants. For the written version, the questionnaire and consent form were both printed and handed to participants that agreed to meet ups. For the online version, the questions were hosted on an online surveying site, SurveyMonkey, and it was indicated very clearly on the first page that participation in the questionnaire is voluntary, and that proceeding with the survey meant consent from the participants. The survey took about 10 to 15 minutes on average for each participant to complete.

Procedure

Two sampling methods: convenience sampling and snowball technique were used to gather the participants. Two consent forms were printed and attached to each written survey before these were distributed to the participants. A copy of the consent form was for the participants, while the other copy was for the investigators' use. In order to minimize any confusion with regards to the survey, very specific and clear-cut information was provided on the consent form. All consent forms carried the signatures of both the participant and principal investigator at present, in order to verify and confirm that participation in survey was decided solely by the participant and is purely voluntary. For maintaining confidentiality purposes, only demographics required from the participants like age, gender, and nationality were asked. The data was then tabulated and finalized (due to need for reverse scoring) in an excel sheet in order to facilitate exporting to SPSS for further data analysis.

Results

Two hundred fifty two participants were asked to fill up 40-item SACRAL questionnaire. Participants were required to report the answers according to their feelings about themselves and others in social context. Means and standard deviations of the Friendliness scale variable are shown in Table 1. A one-way analysis of variance (ANOVA) was used to compare the friendliness factors across the five countries. The Levene's test of homogeneity of variance conducted prior to the ANOVA indicated that the assumption of homogeneity of variance was significantly violated for the Self-concept and Accessibility variables ($p < .50$). Thus, the Welch and the Brown-Forsyth statistics were run to adjust F statistic, of which the Welch statistic was found to be more powerful and more conservative than the Brown-Forsyth (Meena, 2011). From the Welch statistic, the authors confirmed the significant differences in the Self-concept variable, $F(4, 119.032) = 7.038, p < .001$ and Accessibility variable, $F(4, 118.720) = 2.801, p < .05$ across the countries.

Based on total test scores, Philippines scored highest ($M = 84.26$) while Europe scored second lowest ($M = 75.46$). The one-way ANOVA was found to be significant for Self-concept, Accessibility, and Alienation; in which the Self-concept $F(4, 247) = 6.88, p < .001, \eta^2 = .1$; Accessibility $F(4, 247) = 32, p < .05, \eta^2 = .5$; and the Alienation $F(4, 247) = 4.32, p < .05, \eta^2 = .065$. A post hoc test was further computed. The Tukey HSD test confirmed the reported differences in personal feelings of Self-concept, Accessibility, Rewardingness, and Alienation for the five countries. Within group analysis showed that Self-concept for Philippines ($M = 22.17, 95\% \text{ CI } [20.37, 23.97]$) is compared to Singapore ($M = 15.17, 95\% \text{ CI } [13.12, 17.23]$), $p < .01$; the Accessibility for Philippines ($M = 21.62, 95\% \text{ CI } [19.79, 23.45]$) is higher with Singapore ($M = 18.32, 95\% \text{ CI } [16.73, 19.90]$), $p < .05$; and Alienation for Europe ($M = 17.78, 95\% \text{ CI } [15.39, 20.17]$) higher than Singapore ($M = 13.11, 95\% \text{ CI } [11.27, 14.96]$), $p < .05$.

Moreover, the 252 participants from the five different countries comprise of 95 males and 157 females. An independent sample t -test was run to examine the significant differences between genders in SACRAL. The independent sample t -test shows no significant differences in gender, $t(250) = 0.294, p > .05$ (two-tailed).

Table 1
 Descriptive statistics for SACRAL within five countries in ANOVA

	Countries	N	M	SD
Self – concept	SG	63	15.17	8.15
	CHINA	49	19.49	8.08
	INDO	52	20.73	6.18
	FILI	47	22.17	6.14
	EURO	41	19.24	8.77
Accessibility	SG	63	18.32	6.29
	CHINA	49	19.29	5.48
	INDO	52	19.17	5.63
	FILI	47	21.62	6.24

	EURO	41	17.17	7.41
Rewardingness	SG	63	20.30	8.47
	CHINA	49	20.45	6.12
	INDO	52	19.48	7.06
	FILI	47	23.17	6.68
	EURO	41	21.27	7.94
Alienation	SG	63	13.11	7.32
	CHINA	49	16.88	6.01
	INDO	52	17.25	6.70
	FILI	47	17.30	7.16
	EURO	41	17.78	7.58
Total Test (SACRAL)	SG	63	66.90	22.69
	CHINA	49	76.10	19.80
	INDO	52	76.63	19.20
	FILI	47	84.26	21.91
	EURO	41	75.46	25.36

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Discussion and Conclusion

The results from the study have rejected the first hypothesis that individualistic cultures will score higher than collectivistic cultures on friendliness scale. From the mean scores tabulated, Philippines (a collectivistic society) scored higher overall than Europe (an individualistic society). The scores suggested that the Filipino respondents have an individualistic streak, despite being in a collectivistic country. This individualistic streak could also be due to the country's history, where it was highly influenced by western culture (Pe-Pua & Protacio-Marcelino, 2000). In addition, it was pointed out previously that countries high in collectivism might show stronger support to in-group members and not so much towards out-group members, suggesting strong friendship ties but not necessarily very friendly towards others (Goodwin & Gilles, 2003; Hofstede, 1980; Jetten, Postmes, McAuliffe, 2002; Markus & Kitayama, 1991; Saville-Troike, 1978; Sharpiro, n. d.).

Other than tabulating and comparing the total scores of the friendliness scale, the authors also investigated the mean results for each subscale, as shown in Table 1. Comparatively, Rewardingness was not a significant subscale to test for friendliness, either in individualistic or collectivistic cultures. Material support were not thought to be as important as accessibility, and in addition, material items alone might not have enough effect to cause an individual to become unfriendly with

his/ her friends from same or different cluster of social economic statuses (Joseph & Strain, 2011; Reisman, 1979; Schell, 2010), as long as they can find other similar shared activities (Beard, 2011; Bergen, 1993; Frostad & Pijl, 2007). Nevertheless, there are researches that have revealed that the availability of rewardingness (e.g., materials and compliments) becomes more important for individuals who prioritize more on social status within their friendship (Frostad & Pijl, 2007; Jamieson, 2008) and/ or to form the friendship (Joseph & Strain, 2011).

Although the individual subscale results generally pointed that collectivistic cultures have lower level of self-concept compared to individualistic cultures (Feather, 1986; Lau, 1992; Stipeck, Weiner & Li, 1989), data on Filipinos samples scored higher and more significantly different in self-concept and accessibility, compare from the Western European samples. There are some available explanations to address this phenomenon. It may be possible that Filipinos, despite their country's cultural dimension, might possess high independency, stronger personal attribute responses, and a higher level of self-concept and accessibility (Oyserman & Lee, 2007). In addition, other than a high likelihood of being influenced by the western culture due to the country's history of colonialism; religiosity, which is highly linked to self-concept and accessibility, are said to be a strong characteristic of Filipinos (Arthur et al., 1999; Bagley & Mallick, 1997; Oyserman & Lee, 2008).

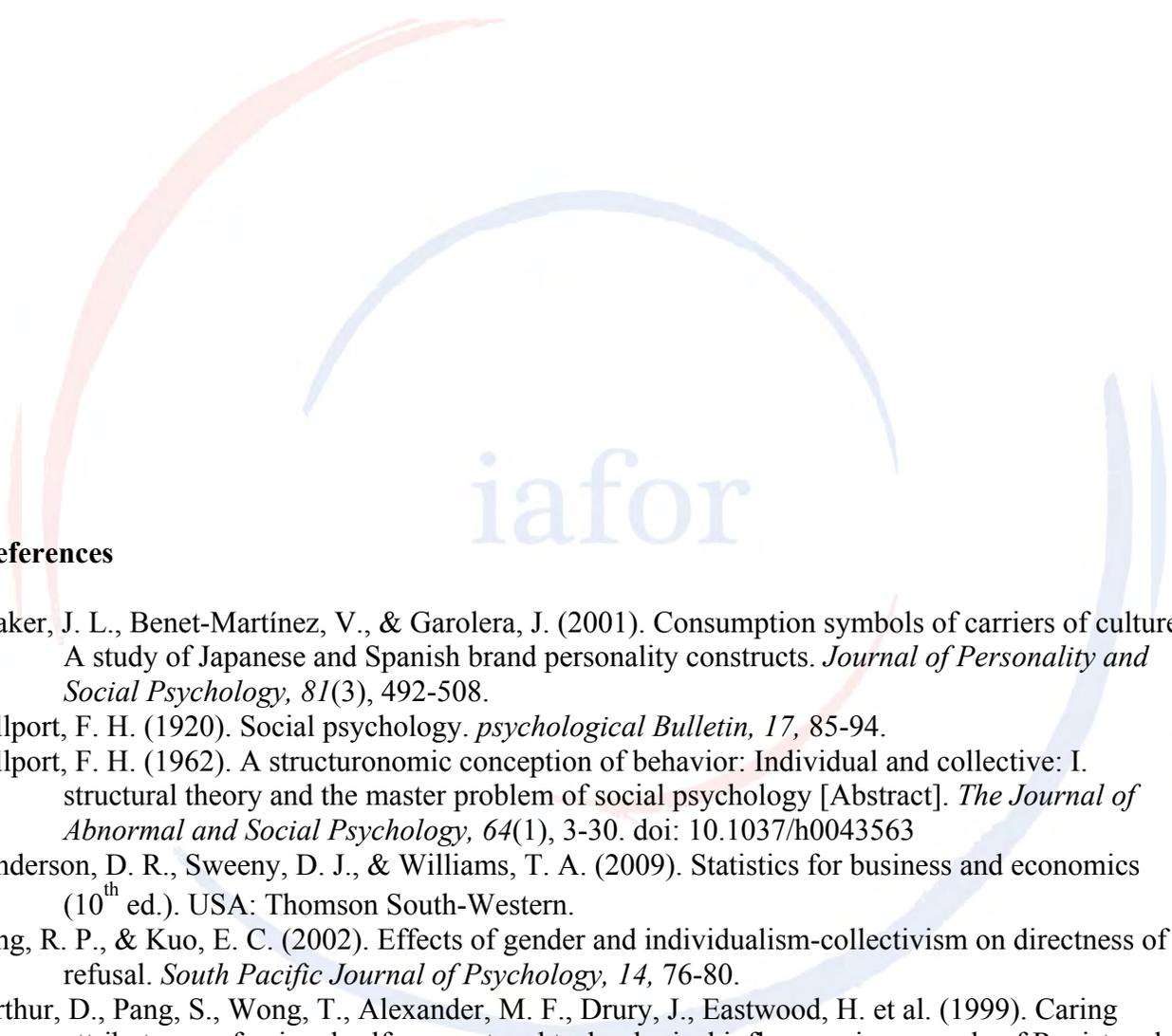
Besides, the collectivistic cultures in Asia seem stronger among the Chinese ethnicity than the other racial groups (Lau, 1992; Oyserman et al., 2002). The ethnicity of the Filipino participants may not be predominantly Chinese, thus the results showed comparatively more individualistic tendencies. The factor of alienation was found to be significantly important among European participants. According to Reisman, a high score in Alienation subscale denotes higher levels of friendliness. Europeans scored high in the Alienation subscale compared to the other countries. This could suggest that Europeans (Kashima et al., 1995), being more independent, autonomous, and having a higher Openness to Experience personality (Schmitt et al., 2007), are generally friendlier towards others. Another explanation is that people from individualistic cultures do not find it a necessity to be involved in any particular social groups (Kau & Jung, 2004), thus it might be possible to suggest that individualistic people are generally friendly towards people from any group.

Regarding friendliness and gender, there were no significant differences found in this study. This confirmed earlier findings that gender effects regarding perception of friendship, was "independent" from the influence of cultural dimensions (Verkuyten & Masson, 1996). All hypotheses were rejected due to the statistical findings and it has been supported by the further explanations of the cultural issues.

The researchers acknowledged the limitations that were exhibited in the present pilot study. One limitation was that there was no homogeneity in the sampling. For example, there was an imbalance amount of participants for each nationality, and the participants for Europeans were mostly from the western region of Europe. In addition, the sampling for gender (female $N = 157$, male $N = 95$) was also largely unequal, which may inadequately represent the gender grouping variables.

In conclusion, the present study appears to have provided some important insights toward the understanding of friendship across cultures. Besides, it also gives people a deeper understanding that cultural issues are integral component of social behavior that might not be examined using limited access of points of view. However, as only two cultural dimensions were used to measure the extent of friendliness amongst five regions, further studies should be conducted with the inclusion of other possible influencing factors, in order to enhance the understanding of social behavior across

countries and cultures.

The image contains a large, faint watermark of the 'iafor' logo in the center. The logo consists of the lowercase letters 'iafor' in a light blue, sans-serif font, positioned between two overlapping semi-circular arcs. The upper arc is light red and the lower arc is light blue. The watermark is centered on the page and partially overlaps the 'References' section.

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*Sustainability as an Environmental Discourse – Exploring Its Implications in Policy
Network*

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Abstract:

Adopting the cognitive approach to policy, public policy is not solely a product of problem-solving process, but one which also directs and frames the perception of the public on a certain issue. In the context of environmental politics, environmental issues involve social interpretation of human-nature interaction in our society. It is the core belief difference in policy actors that facilitates debates and discussions on approaches to tackling environmental issues. Environmental discourse is a reflection on the core belief adapted, and each discourse is a lens to understand the world while setting a path towards re-incorporating nature into society. Sustainability as one of these discourses is not just a jargon but a set of assumptions, judgments and contentions on human-nature interaction. In other words, sustainability is not a set of guidelines to follow or a method of tackling environmental problems, but a stance on restructuring the power structure in an industrialized economy. The discourse is driven by the ideology of encompassing environmental and social justice in economic growth. However, sustainability is not the sole discourse in policy networks: other discourses also play important roles in environmental politics. This paper aims to describe sustainability as a discourse, discuss the world-view encompassed in that discourse, and examine how policy actors with different beliefs react to environmental issues.

INTRODUCTION

In environmental politics, actions are driven by how the actors perceive the environment. Under this concept, discourse and belief becomes the centerpiece in understanding actor interaction and happenings. Under Hajer and Versteeg's (2005) definition, discourse refers to "an ensemble of ideas, concepts and categories through which meaning is given to social and physical phenomena, and is produced and reproduced through identifiable set of practices." In other words, it is the rhetorical tool that actors use to spread their perceptions through a framed context which reflects a specific belief. When applied to environmental politics, discourse reflects a particular understanding of environmental problems and how nature relates to human society. It is the understanding or, in other words, environmental belief that constructs the reality people perceive. Discourse also shapes what can and cannot be thought, delimits the range of policy options and serves as a precursor to policy outcomes (Hajer and Versteeg, 2005). Therefore, under different beliefs, one might perceive a particular happening as a problem and another might perceive the same happening as an opportunity. This corresponds with Hajer's (1997) notion that "Discourse itself is part of reality, and constitutes the discoursing subject."

When the perception of reality is constructed on discourse and beliefs, it directly influences people's action and the communication between groups. The advocacy coalition framework is based on this concept, and according to Sabatier and Weible (2007), is a framework developed to analyze policy process under the concepts of belief convergence, goal conflicts, and technical dispute. The framework aims to explain policy change and stability along extended time periods (Real-Dato, 2009). Public policy making can be perceived as competition between factions of aligned actors who shared a common core belief and act collectively to translate aspects of their belief system into the final product (Sabatier and Schlager, 2000).

ADVOCACY COALITION FRAMEWORK

The advocacy coalition framework is a model of the policy process developed to deal with goal conflicts, technical disputes and multiple actors (Hoppe and Peterse, 1993). It was developed to address several perceived deficiencies in traditional policy process analysis models. The shortcoming of precursing models include partitioning the implementation research in top-down and bottom-up approaches, neglecting the role of scientific and technical knowledge in the policy process, and over-simplifying the policy process with a stage heuristic model (Sabatier, 2007). The framework assumes that stakeholders and policy actors each hold on to their own beliefs and will naturally find ways to connect with each other in an unofficial manner. As the stakeholders' and actors' goal is to convert their belief into policy before others can do the same, they will seek allies who hold similar core beliefs to strengthen their influence. The alliance of stakeholders and policy actors is described in the framework as an advocacy coalition. These coalitions are composed of different individual and collective, and governmental and non-governmental actors who might represent different institutional affiliations and levels of government but who share a similar belief system and coordinate actions (Sotirov and Memmler, 2011). Unlike some other schools of thought on policy process models, the advocacy coalition assumes that normative beliefs must be empirically ascertained and does not exclude the possibility of altruistic behavior (Sabatier and Weible, 2007).

Belief System

Belief can be defined as the condition of holding a thing to be true or probable, and the same definition applies in environmental politics. A belief system is the key to the advocacy coalition framework, where actors' interaction is based on the convergence and divergence of beliefs. Following this logic, actors from different coalitions are likely to perceive the same information in very different ways, leading to conflict and/or distrust (Sabatier and Weible, 2007). The whole belief system involves three hierarchical levels: deep core belief, policy core belief, and secondary belief (Weible, Sabatier and McQueen, 2009). Deep core belief at the base level is the most stable and broad in geographical and contextual terms. It represents the fundamental normative and ontological propositions (Lertzman, Rayner and Wilson, 1996). At the next level, policy core belief is narrower in geographical and contextual terms compared to deep core belief, but remains rather stable and not quite susceptible to changes. Policy core belief refers to basic strategies and policy positions for achieving deep core belief (Lertzman, Rayner and Wilson, 1996). Secondary belief located at the surface level is substantively and geographically narrow, and is fairly susceptible to changes. It refers to an assemblage of instrumental decisions and informative searches necessary to implement the policy core belief (Lertzman, Rayner and Wilson, 1996). As a belief system is based on interpretations of reality, events in reality will have an impact on the belief coalition. The effect of events in the policy subsystem can be distinguished into two dimensions: geographic proximity and policy proximity (Nohrstedt and Weible, 2010). In this context, geographical proximity indicates whether an event is occurring inside or outside of the policy subsystem, whereas policy proximity indicates the closeness in issue relevance of an event to a policy subsystem (Nohrstedt and Weible, 2010). The greater the proximity, the more closely the event is related to the policy issue, in turn making a bigger impact on the associated policy subsystem. It is the events in reality that stir up the dynamics of coalitions and lead to possible changes in institutions. However, we do not see changes happening all the time, as perceptual filters in actors' belief systems tend to screen out dissonant information and reaffirm conforming information, which makes belief change quite difficult (Sabatier and Weible, 2007).

Mechanism for Change

The conceptual focus of the advocacy coalition framework is on the interactions of policy actors and exogenous factors that affect the constraints and opportunities of the actors over time (Sabatier and Weible, 2007). Members of an advocacy coalition refine and sometimes abandon the instruments they have chosen as the best means of achieving their goal (Lertzman, Rayner and Wilson, 1996). It is the dynamics of these advocacy coalitions in a particular policy community that leads to potential policy change. The more recent version of the advocacy coalition framework identifies four causal mechanisms that lead to policy changes: internal shock, external perturbations, policy-oriented learning, and negotiated agreement in professional forums (Sotirov and Memmler, 2011).

External perturbations are changes-in-the-system events that are external to the subsystem and open the path to policy change (Sotirov and Memmler, 2011). Significant perturbations include changes in socio-economic conditions, regime change, outputs from other subsystems, or disasters. External perturbations initiate alterations in factors external to the policy subsystem, which impacts the non-cognitive factors in

the policy subsystem (Albright, 2011). Internal shock, as the name suggests, points to events that arise within the subsystem. Natural or human-induced catastrophes that fall within the system can be described as internal shock (Sabatier and Weible, 2007). Policy-oriented learning refers to the relatively enduring alterations of thought or behavioral intentions that result from experience and/or new information that are concerned with the attainment or revision of policy objectives (Sabatier and Jenkins-Smith, 1999). In Sabatier's view, policy-oriented learning involves improving one's understanding of the important variables defined by one's belief system, refining one's understanding on the logical and causal relationships internal to a belief system, and identifying and responding to challenges to one's belief system (Bennett and Howlett, 1992). Policy-oriented learning can evolve into the fourth type of change - negotiated agreement in professional forums. Negotiated agreement refers to formalized discussion between individuals and organizations that hold competing views on the causal understanding and preferred policy alternatives of a policy problem, in effort to escape from a hurting stalemate (Albright, 2011).

All the mechanisms lead to policy change through redistribution of political and/or economic resources, skillful exploitation by a minority coalition and changes in the dominant coalition's belief system through learning (Albright, 2011). However, the basic argument for all paths to policy change is that deep core beliefs are almost insusceptible to change, and secondary beliefs are more prone to changes over time (Sotirov and Memmler, 2011). For this reason, policy-oriented learning as the only cognitive policy change affects only the secondary aspect in the belief system, which is mostly likely to trigger minor policy changes most of the time. On the other hand, Real-Dato (2009) argues that major policy change is mainly non-cognitive, involving changes in the power structure in the policy subsystem. Non-cognitive changes include external perturbations that alter the composition of the policy coalition and its power position, internal shocks affecting the policy subsystem, or negotiated agreement between participants in cases of harmful stalemate (Real-Dato, 2009). It leads to the hypothesis that major policy changes mostly revolve around changes in the power structure of the subsystem when the dominant coalition loses its dominance in the policy community. However, as coalitions are bonded by a common belief system, these basic values continue to dictate the dynamics of the coalition interaction in a policy subsystem.

ARGUMENTATIVE APPROACH AND DISCOURSE COALITIONS

The advocacy coalition framework and Hajer's argumentative approach both draw attention to the importance of ideas, arguments and debates within institutionalized settings as a force for change (Bulkeley, 2000). However, the argumentative approach looks at the normative and discursive dimension in the institutional process, where discourse is seen to contain rules that structure behavior by both enabling and constraining social action (Hajer, 1995). In the argumentative approach, discourse, rather than belief system, becomes the key in coalition formation. Hajer (1995) argued that the interactions of existing agents and institutions create a context through which interests and values are constantly defined and agents and institutions reshaped. In this setting, Hajer brought up the concept of 'story-line' as the means through which different elements of physical and social realities are united into a specific closed problem and given meaning (Bulkeley, 2000). In that sense, as storylines define the meaning in a context, the appearance of new storylines gives new meaning to the specific context, which in turn can lead to political changes through the change of meanings. In the argumentative approach, discourse coalitions are not necessarily based on shared interests and goals, but on shared terms and concepts through which meaning is assigned to social and physical processes and the nature of the

policy problem under consideration is constructed (Hajer, 1996). A discourse coalition adapts to a specific set of storylines; the actors adhere to and articulate such storylines, and act in concordance with the storylines (Bulkeley, 2000). This approach is different from the advocacy coalition framework in the perception of the actor's belief system. In the argumentative approach, a shared understanding of the policy problem does not necessarily mean that members of a discourse coalition share a similar worldview (Bulkeley, 2000). Unlike advocacy coalitions, where the actor's beliefs are predetermined and uniform across the coalition, the argumentative approach sees actors' beliefs as a product of the policy process, where they realize and adapt through the process. In this approach, as the storyline is fluid and context-based, actors may draw on different storylines in different institutional contexts and therefore move between discourse coalitions (Bulkeley, 2000). Conflict between coalitions here is perceived as an argumentative struggle in which actors not only try to impose their views on others but also attempt to position other actors in a specific way (Hajer, 1995). In other words, the policy process is conceived as a struggle for discursive supremacy, where coalitions try to secure support for their definition of the reality (Hajer, 1995).

Role of Discourse in Politics

In terms of the argumentative approach to policy, discourse does not equal discussion but refers to a set of concepts that structures the contributions of participants to a discussion (Howarth and Torfing, 2005). As language is inherently the main conveyer of discourse, one can look for discourse structure in narratives. Metaphor and storyline are narrative tools that can be used to identify discourse in discussions. The essence of metaphor is to understand and experience one kind of thing in terms of another (Howarth and Torfing, 2005). Metaphor replaces abstract ideas with things closer to daily experience and creates a common imagery of an abstract issue. Similarly, storyline is an essential political device that allows the overcoming of fragmentation and the achievement of discursive closure, and which works as a metaphor (Hajer, 1997). In this sense, storyline is often used in discursive discussion, as people tend to express fact in story form, which effectively reduces the discursive complexity of an argument. As storyline carries the property of metaphors, it allows actors to expand their own understanding and discursive competence of the phenomenon beyond their own discourse of expertise or experience (Hajer, 1997). Storyline is the main medium to convey discourse, and is also the medium through which actors try to impose their view of reality on others, suggest certain social positions and practices, and criticize alternative social arrangements (Howarth and Torfing, 2005). The impact of a discourse comes two ways, through discourse structuration, which occurs in the public realm, influencing the number of people using a particular discourse to conceptualize the world, and through discourse institutionalization at the institutional level, determining if the discourse is adapted into institutions and organizational practices (Howarth and Torfing, 2005). A discourse achieves dominant status when it dominates in both the public and the institutional realms. From that, discourse coalitions create, maintain, and embody social relations and rules (Bulkeley, 2000).

BELIEFS, DISCOURSE AND IDEOLOGIES

As mentioned in the above passage, discourse and beliefs, although seemingly similar, each associate to separate policy network formation process models. In the advocacy coalition framework, shared belief is the bond within coalitions and policy change is initiated through external events and cognitive learning. On the other hand, the argumentative approach sees shared understanding of an issue or a discourse as the linkage in the coalition, where change is caused by normative and discursive learning and ultimately

leads to changing interdependencies (Bulkeley, 2000). In environmental politics, discourse represents an ensemble of ideas, concepts and categories through which meaning is given to social and physical phenomena (Hajer and Versteeg, 2005). As discourse shapes one's worldview on reality, it shapes what can and cannot be thought in the context of a particular issue (Hajer and Versteeg, 2005). The concept of discourse in terms of environmental politics is largely similar to the concept of beliefs in the advocacy coalition framework. By definition, core belief and discourse in environmental politics both represent a lens through which the actor perceives the world and makes sense of happenings in the environment. Borrowing from Scott (1995), ideologies and arguments can be perceived to have a normative and a cognitive aspect in the institutional environment. The normative aspect deals with social values and norms that define goals and objectives and create a conception of rules (Scott, 1995). On the other hand, the cognitive aspect deals with belief system and cultural frame and to what extent these beliefs are adapted (Munir, 2002). Following Scott's definition, discourse frames the context of a discussion, limiting what is and what is not imagined in an issue, so it is normative in nature. Belief system as described in the advocacy coalition falls under the cognitive aspect of institutional arguments. Although both core belief and discourse share many similarities in terms of environmental politics, core belief points to one's cognitive preposition toward the environment and discourse is an externalized lens of belief reflecting one's worldview and how the worldview is framed and applied to reality. In other words, belief as the inner lens constitutes one's value, which is largely stable and independent from the external environment, whereas discourse as the externalized lens molds ones' understanding to the reality, and is applied in framing an issue. Based on this assumption, discourse originates from belief and the two should be fairly consistent. Policy network interaction under this assumption is still based on beliefs, where discourse acts as a normative frame to expose the public to a particular issue and in an effort to impose a similar belief on the public. Discourse also acts as a catalyst to encourage those who have a similar belief to act upon an issue. To explain changing views on issues, a deep-core belief is hypothesized to have layers. In the advocacy coalition framework, deep-core beliefs are broadest in geographical and contextual terms, however, they do have contextual interdependency. One can have a spectrum of context-dependent deep-core beliefs where each belief is applied to certain issues or circumstances. These beliefs are also hierarchical, where the ultimate goal and principle can override other deep-core beliefs in situations where the ultimate goal can be applied. In environmental politics, one's worldview on development and human-nature relations become the key deep-core beliefs.

Environmental Discourse

The environmental discourse model was first developed by John Dryzek (1997), and it describes the assumptions, judgments and contentions about human-nature interaction. The main focus of the interaction rests on changes and moving away from industrialist ideas in both the political-economic and social-industrial aspects. The political-economic aspect deals with political power-sharing and the relationship between the economy and the environment, whereas the social-industrial aspect touches on perceptions of societal growth and resources. These changes can be further distinguished as reformist-prosaic, taking on a conservative, gradual and mild approach to change, and radical-imaginative, taking on a progressive, rapid and thorough approach (Dryzek, 1997). These ideas constitute some of the core beliefs in environmental politics and also the basic building blocks of the discourse in Dryzek's model. Environmental discourse helps to explain why a certain policy is adopted and particular actions are taken.

Sustainable Development as a Discourse

Sustainable development as a discourse in Dryzek's model occupies the reformist-imaginative aspect of the spectrum. The position of the discourse suggests that sustainable development portrays a minor adjustment in the current social-industrial system while redefining the political-economic structure. The reformist side of the discourse is shown by inheriting the current capitalist-industrial society and subordination of nature under human use. The imaginative side of the discourse comes in pursuing a bottom-up approach in the political network, and perceives that environmental protection is not in direct conflict with the economy. In this sense, the power structure is shifted from state to local level, with different actors working together for the public good. Sustainable development in broad terms refers to embracing ecological protection, economic growth, social justice and intergenerational equity in our society, and it applies these values to a global and perpetual context (Dryzek, 1997). As the discourse only gives a general direction on which way our society should progress, there are many different interpretations of how to achieve a more sustainable society. However, the different interpretations all revolve around several central ideas embraced by the discourse framing sustainable development. The basic assumption of the discourse is interpreting both social and ecological fabric as nested and networked systems (Dryzek, 1997). In this networked social system prescribed by sustainable development, citizen participation in public discussions and decision making is the cornerstone, encouraging partnership between actors of all sorts which in effect dilutes the significance of state actors. In essence, the discourse promotes cooperation of all sorts, deconstructing traditional social hierarchy and leaving government with the role of setting up the framework and necessary regulations for this cooperation to work. Yet the hierarchy remains in nature-human relations where the sustainability of human society is prioritized over that of nature. As a discourse, the key metaphors used by sustainable development advocates include progress, better future and co-existence (Dryzek, 1997). These metaphors stress the idea that pursuing sustainable development can lead societal growth to better cope with the needs of the environment. However, these all-inclusive yet ambiguous principles give room to various interpretations of the discourse, leading to the absence of a clear meaning. Without a clear meaning, it is difficult to judge the progress of sustainability, leaving the discourse as an empty political slogan (Carter, 2001).

Ecological Modernization

Ecological modernization as a discourse follows similar lines to sustainable development, pursuing a reformist and imaginative-to-a-lesser-degree view of environmental movements. The main difference between ecological modernization and sustainable development lies in the social and economic aspects where ecological modernization stresses the importance of the business sector, seeing environmental conservation as profitable and placing less emphasis on global and intergenerational equity. Also, instead of cooperation between actors of all sorts, the discourse emphasizes the partnership between the government, businesses, reform-oriented environmentalists and scientists (Dryzek, 1997). In this context, the government remains influential but offers a change by involving some degree of multi-level governance in the political system, particularly the involvement of businesses and academics. The basic principle of ecological modernization is that pollution means inefficiency in the production system, and therefore that pollution reduction is profitable (Christoff, 2000). In other words, the discourse aims to restructure the capitalist political economy along more environmentally sound lines (Dryzek, 1997). When applied to the economy, unwanted environmental outcomes can be prevented through modifying

production and consumption decisions. However, the restructuring of the economy comes in two ways, technical fixes and social reforms, which split the discourse into two streams. The two streams of ecological modernization go from a weak form that focuses on technical fixes and institutional tools to a strong form that is more ecological and egalitarian (Gibbs, 2000). The weak version is attractive to policymakers as it involves minimal changes to the political structure and relates to the idea of a knowledge-based economy (Teräväinen, 2010). On the other hand, the strong version adopts a certain degree of social reforms such as incorporating changes in the institutional structure and the economic system. For example, in the case of reducing vehicle emissions, the weak version will focus on developing more fuel-efficient engines, whereas the strong version will also incorporate planning measures such as controlling urban sprawl and encouraging the use of public transit (Dryzek, 1997). This brings the strong version of ecological modernization into closer proximity with sustainable development in terms of their abiding principles.

Implications

As sustainable development lacks a unified meaning that different actors agree upon, there is an absence of solid benchmarks for progress, making the discourse difficult to apply in real-world scenarios. At times, sustainability becomes an empty slogan to ease public concern. In reality, countries that have been relatively successful in dealing with environmental issues have adapted to ecological modernization ideologies to some degree (Dryzek, 1997). This is because the practicability of the discourse comes in offering a road map for institutional bodies to follow by picking the low-hanging fruits first (Eckersley, 2004). Although in its weak form, the discourse focuses on technical fixes and ignores ecological and trans-boundary issues, it still opens a window for a deeper transformation toward greater sustainability. Using the energy sector as an example, the mainstream opinion is to steer away from the use of fossil fuels. From the viewpoint of traditional problem-solving discourse, replacing coal and oil with natural gas is an effective method in pollution control, yet this change largely neglects the global issue of climate change from greenhouse gas emissions. In terms of weak ecological modernization, nuclear power is an attractive alternative that eradicates both localized pollution and greenhouse gas emissions. The associated advocates would also see the development of nuclear technology as contributing to the knowledge-based economy. As for the strong form of ecological modernization, the associated advocates would not only look for technical solutions but also policy tools that enable power saving. The re-engineering of the electrical system to adopt the smart-grid, allowing domestic power generation to feed excess power back to the grid, would be an apparent option for strong ecological modernization advocates which would revolutionize producer-consumer relations in the energy sector. Sustainable development advocates would emphasize renewable energy sources on top of the options adopted by strong ecological modernization, turning away from fossil fuels and nuclear energy. Nuclear energy in the eyes of sustainable development advocates is no better than fossil fuels by turning pollution and emission problems into radioactive waste and meltdown risks that violate the principle of intergenerational equity. Nevertheless, adopting the weak form of ecological modernization allows the initial integration of environmental issues into the economy, then gradually transforming them into the strong form, allowing a mild change in the political system and reforming society toward greater sustainability. Gradual change following ecological modernization principles allows society to move in a more ecological direction even before reaching consensus on the definition of sustainable development.

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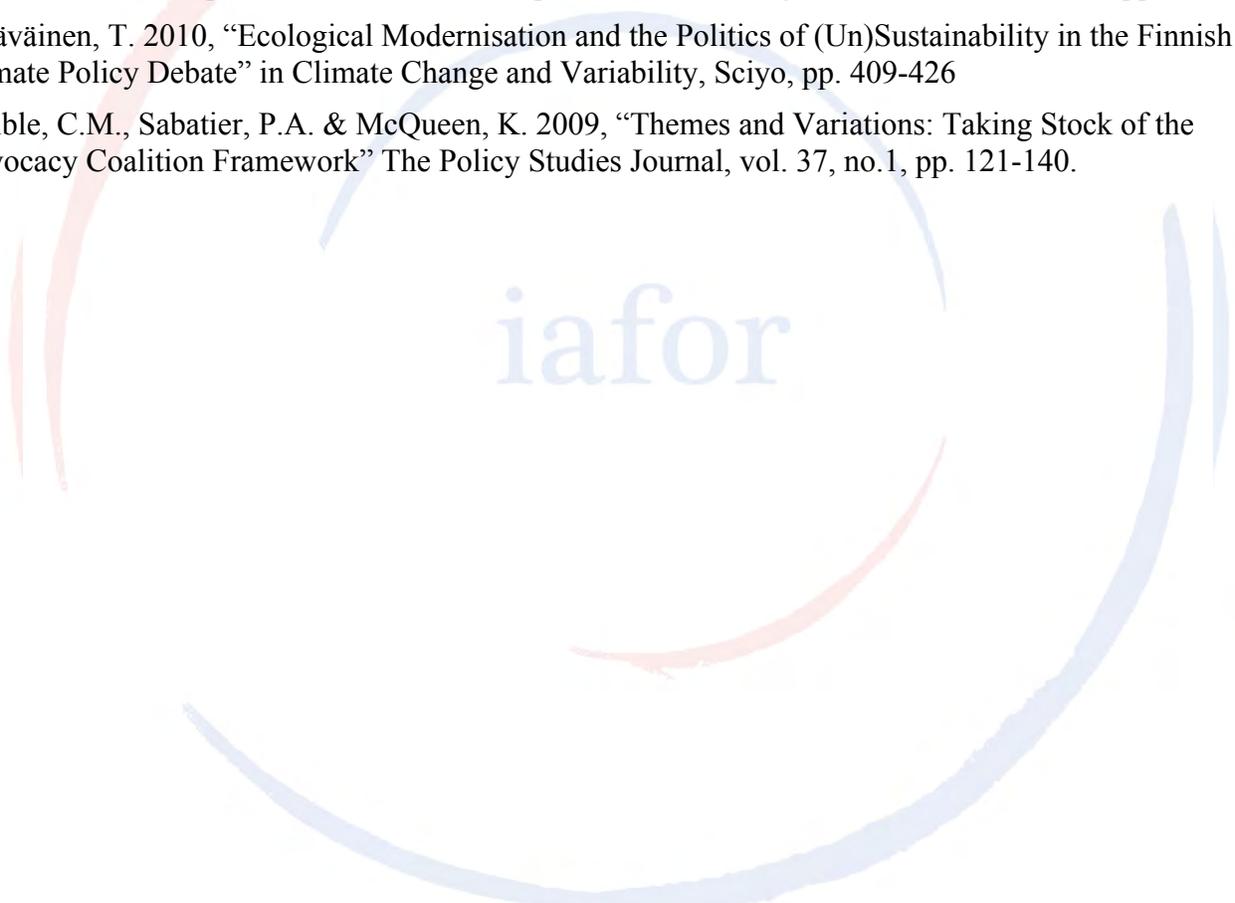
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The logo for the International Association for Public Choice (iafor) is centered on the page. It features the word "iafor" in a light blue, lowercase, sans-serif font. The text is enclosed within a circular graphic composed of several overlapping, curved lines in shades of blue and red, creating a sense of motion or a stylized globe.

Key Decision-Making Factors for Corporation and Industrial Cluster Collaboration- A Study of the Machinery Industry in Central Taiwan

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Abstract:

In the face of rapid changing business environment, companies are struggling to retain their sustained competitiveness and eagerly cooperating with other companies in order to accurately map the antecedents and outcomes of competition and innovation. This study focuses on the discussion of key decision-making factors and industrial cluster collaboration in middle of Taiwan's machinery industry as an in-depth research and survey. Middle of Taiwan has been headquarter of machinery industry and provides a unique and complete industrial supply-chain environment. Cluster collaborations of outsourcing, strategic alliances, and other types of emerging competitive alternatives are developed under the framework of bilateral cooperation. Therefore, creating a win-win situation or multilateral interest becomes an issue of impetus concerned by small-and-medium enterprises (SMEs) in Taiwan. This study explores company's decision-makings of cluster collaboration mainly based on Gigerenzer's (2001) interpretation of "fast-and-frugal Heuristic tree decision-making method" (or FAFHT), which uses a minimum number of question nodes and involves all available cues. This study also adopts the concept of "take-the-best" method to collect the most effective degree of decision factors as cues and further determines the validity of cues by calculating Mann-Whitney U value and running AHP (Analytic Hierarchy Process) method. This study finds that the decision-making factors include transaction cost, mutual trust, strategic cooperation, complementarity, knowledge sharing, experience of cooperation, business conception, delivery accuracy, quality assurance, and degree of cooperation. This study discovered that the major decision-making factors for selecting partners within industrial cluster collaboration are quality assurance and transaction cost, due to the emphasis of keeping long-term relationships.

Keywords: industrial cluster, cooperation factors, Fast and Frugal Heuristic tree, Mann-Whitney U test, AHP.

1. Introduction

In such a fast changing environment, high-tech industries, like the machinery tools and precision machinery industry are currently facing an environment of stiffer competition. Facing changes in technology and customers' varied demands, if machinery firms want to survive, develop and maintain competitive advantages, they must continuously improve in terms of technological adaptation. Due to the turbulent nature of the business environment, it is difficult to rely purely on a company's individual resources while maintaining a competitive edge in the market collaborating with the other companies through the engagement of collective competition and innovation. This study aims to investigate the key decision-making factors involved in industrial cluster collaboration within Taiwan's machinery industry. Nowadays Taiwan's machinery industry has a delicate and uniquely complete supply chain system. This is especially true in Taiwan's central region, since the greater Taichung area located therein is the foundation of the nation's whole machinery industry, with most companies in that area being SMEs. This state of affairs does, naturally, create a large number of output values as regards competition and cooperation.

2. Literature review

2.1 The Machinery Industry

Based on the definition of Taiwan Association of Machinery Industry (TAMI), the machinery industry is divided into five categories: general machinery, electrical machinery, transport equipment, precision machinery, and metal products. However, from a narrow point of view, the main industrial machinery is used for manufacturing, production, and equipment and further divided into machine tools, industrial machinery, general machinery, and mechanical components of retail categories. The machinery industry can be described as a "mother industry" since it is not only considered a foundation for other industries but also an important industry for the sake of the whole nation's economy. This study uses the machinery industry to understand the degree of industrialization and industrial capacity, the country's economic competitiveness. Nowadays, the machinery industry is very important to industry as a whole in our society. In contrast to the slow progress in the past, the present situation is one of rapid change in both market and consumer habits. These change quickly, along with product innovation. The machinery industry began to accelerate their R&D and industrial upgrading and transformation, to meet the market's current situation and needs.

Lai and Wang (2009) point out that the Taiwanese machinery industry faces several problems. These are as follows: (1) The ability to make key components is relatively insufficient (2) There is a lack of senior technical personnel and new staff led the turnover rate (3) Homogeneity is high, with many mechanical products lacking product differentiation (4) There is a shortage of integration and design capabilities (5) There is a lack of large-scale industry support equipment and development (6) International marketing has not been completely established (7) There is still a gap between Taiwan and other countries in terms of quality and service of mechanical components.

Furthermore, let decision-making faster and effective cooperation model to determine the benefit of the company's decision-making and make the right decisions to guide enterprises in the inter-industry more competitive.

2.2 Decision-Making

Information in uncertain situations, as well as other factors that effect decision-makers, bring about a state of affairs in which the cooperation is able to achieve the desired objectives. However, ideals can't always be determined. Before they are, a co-operative can only speculate over several possible outcomes. After a period of time collaboration uncertainty had been unfolding on the emergence of one of the results. In the machinery industry, it can't be calculated how much coverage the case. It is best when both sides cooperate to towards improved methods of decision-making. This study will use non-parametric statistical methods in the Mann-Whitney U test and by Gigerenzer, et al. (1991) established the cue validities found by calculating the effectiveness of co-factors, and calculating the effective degree clue to filter applied to machinery industry co-factors.

2.2.1 Fast and Frugal Heuristic Tree

Fast and frugal heuristics refer to simple, task-specific decision strategies. It provides decision-makers or companies with a cognitive strategy for solving judgment and decision tasks (Gigerenzer et al, 1999). This is because the decision maker needs to make a judgment using only limited searches for information and without the use of a lot of computation. Thus, fast and frugal heuristics are simple to execute for them.

Most of the time, people have to make decisions quickly based on scarce information. Constraints of time, knowledge and computational capacities must be taken into account when modeling real-time decision making. A company that wants to save time and costs needs to make the decision to cooperate with other companies. They need to be fast and frugal to make decisions. There are lots of methods and tools for Decision-Making. However, which of them is best for an individual firm? There is a simple searching rule: "Take the Best"(TTB).According to Gigerenzer& Goldstein (1996) and Hoffrage et al (1996), point out that, their find the critique concerns the search rule of Take The Best(TTB), its stopping rule and decision rule are not discussed and the recognition heuristic. It's a lexicographic strategy which has established by Gigerenzer and Goldstein, (1996). We can check how important the cue is. And the validity of a cue is predictive accuracy. Compute the validities defined by

$$V=U_1/(U_0+U_1)$$

V=validity of any cue.

U_0 =the number of wrong (incorrect) inferences.

U_1 = is the number of right (correct) inferences.

When one object has the value 1 and the other has the value 0. Cues with a validity of 0.5 are neutral. And cues with a validity more than 0.5 are good.

The following is the step of TTB.

Step1. Search rule: Pick the cue with the highest validity of the two objects.

Step2. Stopping rule: If one object has a cue value of one and the other has a value of zero then stop searching.

Otherwise, pick the cue with the highest validity. Meanwhile, the remaining ones should return to Step 1.

Step3. Decision rule: If one object has a cue value of one and the other has a value of zero predict that the object with the cue value of one has the higher value on the criterion. If no cue discriminates, just guess.

In this study, we used take the best to search and calculate the most important factors. We then used this information to construct a "Fast and Frugal Heuristic Tree" (FAFHT). According to "Thinking" (2003) definitions the fast and frugal decision tree is a decision tree that has at least one exit leaf at every level. That is, for every checked clue, at least one of its outcomes can lead to a decision. Therefore, when a clue stems from a branch labeled 1, the decision will be positive. Conversely, the negative branch is labeled 0.

2.3 Cooperation factors

Most of Taiwan's machine manufacturers are located in Taichung, Changhwa and Nantou. Taking the three areas together, they have the highest export ratio in the country. Some firms take advantage of being situated within this favorable geographical cluster. Some firms select potential customers to get support to foster their market expansion. Due to the firm's cooperation with other firms having different motivations and viability. They use different strategies or different modes to select cooperation and interaction. It could not be easy. How to choose the company with the others, and maintain long-term relationship of cooperation? Lots of factors affect their decision-making. This study attempted to synthesize the theories, and try to discover the important factors.

2.3.1 Transaction costs

Transaction costs are conceptually introduced the cost of using the price mechanism by Coase's (1937). Market price mechanisms are inadequate because of ignored factors such as the transaction costs from the pre-costs include search, negotiation and contracting costs and after-costs includes monitoring, control costs that pre-cost and after-costs collectively referred to as transaction costs. Until Williamson (1975, 1985) based on the view of point from Coase, who was integrated the organization and strategy theories flourish the transaction cost theory, and become an important theory to management science and economics. When making a transaction, it is necessary to gather, process and evaluate for information determining whether the transaction is possible or not, with regard to the goods or service involved in the transaction, and with regard to potential transaction partners with whom the transaction will be done (Coase, 1937, Williamson, 1975).

2.3.2 Mutual trust

The key about constructs of trust include communication and coordination. The most important aspect is the linkages between these variables. If it improves in their relationships, it's benefit for a business-to-business setting. Trust, communication and coordination are considered to be core of mutual trust. Indeed, communication and coordination and trust are critical of business relationships because they encourage exchange partners to work at preserving the relationship and achieve mutual gains (Morgan and Hunt, 1994). It is claimed that communication and coordination and trust will produce efficiency, productivity and effectiveness, all of which are essential for any long-term project. Once trust is established, a high level of mutual trust may impact in the sales representative (Garver and Flint, 1995).

2.3.3 Strategic Cooperation

Kogut (1988) pointed out that the company composition of strategic partnership is to avoid-potential competitors entering the market, or weaken the competitive position of competitors. Kanter (1989) consider the business relationship taking into account potential sources of competitive advantages, especially with suppliers and consumers. To compared with the strategic cost and transaction cost, the two costs differences in cooperation activities and different selection criteria. In the motivation, strategic cooperation in the pursuit of long-time profit greatly, but the transaction costs to pursue the minimization of production and cost. In partner selection, the strategic focus on competitive position, relative to competitors or consumers the competitive position. On the other hand, the transaction cost is mainly on minimum cost.

2.3.4 Knowledge sharing

Steensma (1996) stated that the company with others has cooperation with the knowledge or skills to get an important source of learning. With the implementation of activities with partners from the opportunities, and the partner can learn the “embedded knowledge”, therefore, the firms have the opportunity to get learn new knowledge and capabilities (Crossan and Inkpen, 1994). Although the establishment of cooperation for the purpose of learning is not necessarily, the manufacturer learning behavior may occur intentionally or unintentionally (Tsang, 1999). In order to achieve goal, manufacturers with the other company cooperation, they will invest the resources, skills and knowledge, and manufacturers have the opportunity for cooperation not only use of base on their knowledge but also new knowledge for inter-company learning, and the cooperation with the partners, the each other have the opportunity to interact or communicate, the circulation of knowledge could become a platform for inter-firm cooperation (黃延聰, 2002).

2.3.5 Complementarity

Partners need to understand their degree of complementarity and similarity. The similarity of both partners when partners of lower similarity of technology or less overlap in case that the higher the complementarity of both partners (Mowery, 1996). Compatibility refers to the partner target complementary to each other, operating philosophy and corporate culture of similarity (Bucklin and Sengupta, 1993). Due to environmental and technical uncertainties, companies with limited resources under the circumstances, not to his own power into the competitive market, or cannot afford the risk of failure. Pfeffer and Salancik (1978) mentioned a complementarity view of resources, company cannot be completely self-sufficient, and company must rely on the external environment to survive or get access to supply of resources. Most reflect the needs of the company's external environment, so the idea of opening with each other cooperative behavior between the company need to share the responsibility, risk and reward, but still retain independence of enterprises (Lewis, 1990).

2.3.6 Experience of cooperation

According to 方志民 (2000) pointed out that when choosing a partner, there are several factors which help to assess the partner: (1) track record (2) past experience and friendship (3) cultural differences (4) relative size and commitment (5) future risks. If past experience of cooperation of the potential partners can signal opportunities for partnership. Cooperate culture is difficult to change, enterprises must consider when the cooperation of different organizational cultures impact, especially for international strategic alliances in terms of more countries to overcome cultural differences and organizational cultural differences of the dual cultural barriers. For the size and commitment is with the previously mentioned for the compatibility of partners is similar to the mean. In this study, these options will be considered co-factors for integration, mainly for these factors will be considered within the culture of the company made the decision.

2.3.7. Business conception

Most scholars explain business conception includes company scale, technical capability, management concept, corporate culture, or product properties (吳思華&方志民, 2000). The selection of business partners is made under following conditions (1) Ability to provide important resources of professional labors, resources and complementarity (2) Company

characteristics, business conception, and having similar goals (3) The existence of informal relationships between companies. It's different from traditional "customer - supplier" relationships, competing for control. Also emphasize on quality not quantity and create value for both at the same time. It means business focused the supply system which bring competitive and advantage. Establish mutual trust, honesty, and hold an objective attitude about the results. In addition to culture, and goals are similar, the companies can greatly reduce the risk of the supplier, and progress the supplier's production or service capabilities. Improve the degree of coordination, reduce internal conflicts, as well as the management level in close cooperation, collaboration and maximize the value creation of a common win-win model.

2.3.8 Delivery accuracy

According to the product mix or production forecasts delivery accuracy in a variety of product combinations to set the most appropriate proportion of production cycle product recommendations, determining the most suitable delivery time (林志涵 2002). Delivery accuracy of business decisions is one of cooperation's factors. Nowadays, industry lacks an effective management system for the delivery performance measurement with the management. Inexact delivery date and delivery time cannot unstable caused impact of lower quality and higher costs. Companies cannot always meet customer delivery requirements, despite the costs being cheap and the quality being good, orders get lost because of a company's focus on "speed" above all other considerations. Decision of delivery time mostly from the production management department in accordance with the schedule and decide. Also in accordance with the requirements of sales or customer product shipments scheduled for delivery. No matter which unit the decision delivery what need a complete system to manage and regulate.

2.3.9 Quality Assurance

Quality is a very complex concept (Shetty, 1987), manufacturers believe that the most important competitive advantage (competitive priorities) is consistent quality. According to the shared point of view of management scholars Deming (1990), Juran (1989) and manufacturing strategy scholars Ferdows & De Meyer (1990), the improvement of product quality not only increases productivity, but can also reduce the internal and external failure costs. Although the quality improvement of the quality of the initial cost will increase slightly, the product quality exceeds a certain level, the manufacturing costs and service costs will drop significantly. Companies can get high-quality, low-cost competitive advantage.

2.3.10 Cooperation degree

One highly important factor is that of good team chemistry. Such good chemistry fosters proper partnerships and a general willingness to meet the high level of cooperation on client demand. Each other could maintain a long-term opportunities for cooperation. In addition the interview of companies pointed out that company reached the highest cooperation level of basis on mutual trust. According to cooperation in between companies in order to achieve common goals and share the risks taken, shared benefits of long-term relationship, this relationship may be determined by the verbal contract. And the needs for the company's every departments fully of cooperate. It is also vital to share a common goal and a willingness and awareness to improve upon previous mistakes for the sake of achieving jointly held goals. According to Blenkorn, Noori (1991) and McCutcheon et al.(1997) it is vital to have a good degree of cooperation between parties in order to create more ideas and better

integration. Also, having fast communication between companies creates greater environmental adaptability and flexibility.

3. Research Methods

3.1 Research Methodology

This study is exploratory in nature, making use not only of the U test and AHP but also conducting a case study of a machinery manufacturer's cooperative relationships including an in-depth interview with executives responsible for product innovation at the company used for our case study, in order to understand the relationship between them. The research methodology is described in the following sections.

3.1.1 Mann-Whitney U test & V value analysis

As a first step, the Mann-Whitney U test, a non-parametric statistical test was performed in order to calculate the V value, and therefore obtain clues to the real effective value. The Mann-Whitney test is used to compare two sub-populations means (with the same size) which come from the same population. The Mann-Whitney U test is used when the data is ordinal. Since the Mann-Whitney U test is a non-parametric test, it does not assume any assumptions related to distribution. A formula can be used:

1. Add up the ranks for all observations that came from sample 1. The sum of ranks in sample 2 follows by calculation, since the sum of all the ranks equals $N(N + 1)/2$ where N is the total number of observations. $N \geq 2$

2. U is then given by:

$$U_1 = R_1 - n_1 * (n_1 + 1) / 2 \quad (1)$$

n_1 is the sample size for sample 1, and R_1 is the sum of the ranks in sample 1.

Note that there is no specification as to which sample is considered sample 1. An equally valid formula for U is

$$U_0 = R_0 - n_0 * (n_0 + 1) / 2 \quad (2)$$

The maximum value of U cannot exceed the value of the sample sizes. In such a case, the "other" U would be 0. The Mann-Whitney U is equivalent to the area that can be readily calculated. From the above formula, the study defines R, N and U to fit this clue of the validity.

Once all questionnaires have been collected, when a given question gets a positive answer (YES), it will be assigned a value of "1", if it receives a negative answer (NO), it will be assigned a value of "0". Most companies will emphasize one of the factors over others. Therefore, a general industry preference can easily be established by ranking each factor according to the number of positive responsive given by companies. Companies are assigned a random number. The values for U_1 and U_0 are calculated for each of these factors. Based on U_0 and U_1 , we then calculate the value of V. This study find the many of cooperation factors, before find the machinery industry decision-making cooperation factors, this study collation factors definition and design questionnaire to explore companies cooperation factors. And collect data and calculate of the V value filter the $V > 0.5$ factors. But V value has some research limit as follows:

(1) $1 \leq n < N$ (Sample numbers)

(2) V value between 0 and 1

(3) If $V = 0$ express, all in favor of or against that need to re-examine the relevance of factors and the industries. And this study collects and sort-out point factors definition as follows:

Cooperation factor	Definition	Scholar
Transaction cost	With limited information and environmental uncertainty. Enterprises concerns about the derived cost of transaction, such as search, negotiation, contract, after-sale supervision and control as considerations.	Coase (1937), Williamson (1975, 1985)
Mutual trust	The trust between firms includes communication and coordination. Before cooperation companies are willing to bear the uncertainty of each other's behavior in the future, and endure to the friction during cooperation. They have confidence and willingness to rely on trading partners. By communication they can understand each other and providing timely and accurate information.	(Morgan and Hunt, 1994), (Garver and Flint, 1995) (Berry and Parasuraman 1991)
Strategic Cooperation	Enterprise always use strategic cooperation to prevent potential competitors from entering the market, and weak the power of competitors. They get a competitive advantage from their mutual relationship.	Kougut,(1988), Kanter (1989)
Knowledge sharing	Possession of unique advantages for both parties. Not only implicit experience but explicit technology. The process of interaction between each other generated the innovation of knowledge. By the circulation of knowledge develop new technologies and reduce development costs, and R & D risks.	Steensma (1996), (Crossan and Inkpen, 1994), (Tsang, 1999), (Huangyan Cong, 2002)
Complementarity	Before cooperation they understand each other's complementary differences as well as the degree of similarity between them. Such as the target complementary, operating philosophy and corporate cultural will be consider in. Enterprises can't endure the risk of failure. Survival must depend on external supply of environmental resources. While the external environment responses the needs of enterprises. Cooperative behavior can share the responsibility, risk and reward, but still retains the independence of its business.	(Bucklin and Sengupta, 1993).Mowery, (1996) Pfeffer and Salancik (1978), Lewis, (1990) Lynch, 1989)
Experience of cooperation	Based on past experiences of cooperation and friendship companies reduce communication barriers. They can easily reach their goals. It will furthermore be one of the factors taken into consideration next time around.	方至民(2000)
Business conception	When the business conception and technological capabilities between partners, or corporate cultures is closer, it improves and maintains long-term relationship.	吳思華, 方志民, 2000
Delivery accuracy	Companies consider the cost of production delays. Thus on-time delivery without delay the time of the next plant products is important to firms. Accurate delivery to ensure the production line is not stagnant. That's one of the factors to consider during cooperation.	Interview of companies, (林志涵,2002)
Quality Assurance	Companies want to maintain the product quality to secure competitive. If this is not good enough, both lose	Interview of companies

	their competitiveness. They can't have strong cooperative relations. Therefore, their reputation will establish within the cluster.	
Cooperation degree	Important to have good team chemistry and a willingness to meet the high level of cooperation on client demand. This way, long-term opportunities for cooperation could be mutually maintained.	Interview of companies, Blenkorn, Noori (1991) McCutcheon et al.(1997)

After designing the questionnaire and arranging the companies to rank the factors, this study explores only factors with a V value greater than 0.5.

3.2 Data Analysis-AHP Analysis

After the factors are filtered and the questionnaires designed decision-makers can compare the factors in terms of importance. This study uses the analysis method AHP to calculate factors weight. Through the AHP ranked factors and descriptive the FAFHT.

3.2.1 AHP Summary

The Analytic Hierarchy Process (AHP) is a structured technique for organizing and analyzing complex decisions. The AHP first decompose their decision problem into a hierarchy of more easily comprehended sub-problems, each of which can be analyzed independently. The elements of the hierarchy can relate to any aspect of the decision problem—tangible or intangible, carefully measured or roughly estimated, well or poorly-understood—anything at all that applies to the decision at hand. Once the hierarchy is built, the decision makers systematically evaluate its various elements by comparing them to one another two at a time, with respect to their impact on an element above them in the hierarchy. In making the comparisons, the decision makers can use concrete data about the elements, but they typically use their judgments about the elements' relative meaning and importance.

4. Research Result and Analysis

4.1 Data Analysis-U Test and V Value

By U test and V value calculate the six cooperation factors. This study uses code names to definition the factors.

CR-Company Rank

F-Factors

- | | |
|--------------------------|------------------------------|
| A. Quality Assurance | E. Transaction costs |
| B. Cooperate with degree | F. Strategic Cooperation |
| C. Mutual trust | G. Complementary |
| D. Delivery accuracy | H. Experience of cooperation |
| | I. Business concept |
| | J. Knowledge sharing |

This study uses the two tables (Table 4.1 and Table 4.2) to display the data and calculate the data result (Table 4.3). This study collected 21 items of data that from the tool machinery has 8 copies filled out the questionnaires, precision machinery has 7 copies, plastics machinery has 3 copies, and hand tool machinery's companies has 3 copies. And filled out the questionnaire are company's decision-maker that includes CEO, Inventory Manager, Project Manager and General Manager. The filled out questionnaires came from the following people in the following percentages: 38% from CEOs, 29% from General Managers, 19% from Inventory Managers and 14% from Project Managers. This study collected the data and sorted

out the key points. According to U test have sequence limit, and this study had sort-out key point questionnaires. In accordance with interview with companies to ranked. (Table 4.1 and Table4.2)

Table 4.1 Sort of data

CR F	17	12	10	15	18	11	21	20	5	9
A	1	1	1	1	1	1	1	1	1	1
B	1	1	1	1	1	1	1	1	1	1
C	1	1	1	1	1	1	1	1	1	1
D	1	1	1	1	1	1	1	1	1	1
E	1	1	1	1	1	0	0	0	0	0
F	0	0	0	0	0	1	1	0	0	0
G	1	0	0	0	0	1	1	1	0	0
H	0	1	1	1	1	0	0	0	1	0
I	0	0	0	0	0	0	0	1	1	1
J	0	0	0	0	0	0	0	0	0	1

Table 4.2 Sort of data

C R F	13	14	2	8	3	6	16	19	7	1	4
A	1	1	1	1	1	1	1	1	1	1	0
B	1	1	1	1	1	1	1	0	0	0	0
C	1	1	1	1	1	0	0	1	0	0	1
D	1	0	0	0	0	1	1	0	1	1	0
E	0	1	0	0	0	1	1	1	1	1	1
F	0	0	1	1	1	1	1	1	1	1	1
G	0	0	0	0	1	0	0	1	1	1	1
H	0	0	1	1	0	1	0	0	0	0	1
I	1	1	1	1	0	0	1	0	1	0	0
J	1	1	0	0	1	0	0	1	0	1	0

Table 4.3 Result of V value

F	U₁	U₀	V	F	U₁	U₀	V
A	17	3	0.85	F	32	70	0.31
B	47	21	0.69	G	58	50	0.53
C	48	20	0.70	H	35	73	0.32
D	61	35	0.63	I	50	59	0.45
E	61	47	0.56	J	38	52	0.42

After calculating the V value that filtered the six factors are as follows: Transaction costs, Mutual trust, Complementary, Delivery accuracy, Quality Assurance and Cooperate with Degree. But the factors are not ordered in terms of importance. The U test and V value are used to filter the factors. This study uses the AHP analysis ranked the factors importance.

4.2 AHP analysis

This study recovered expert questionnaires for AHP analysis. By AHP method to find the factors relative weight to determine the priorities and the results are analyzed to explore. The ultimate goal is find that affect the machinery industry cooperation decision-making key factors and establish the FAFHT. To provide machinery manufacturers can fast and save the time and cost to decision correct judgment. And create the blue ocean market, and new revenue profit. According to the AHP research framework in Figure 6, and using pair-wise comparison to design the AHP questionnaire. The questionnaire consists of a part. This study not only concentrated on the target level but assessed the factors relative importance as well.

4.2.1 AHP questionnaire design and survey

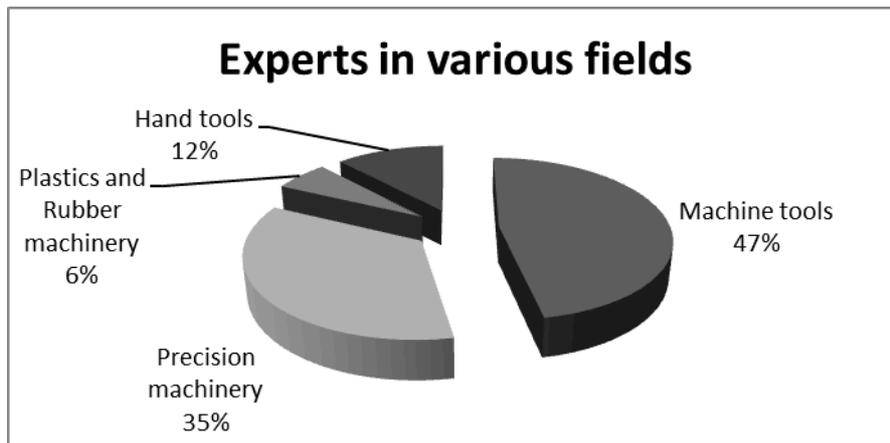
The study focuses on mechanical industry of the critical success factors to be explored. And personally visiting the industry experts conducted a questionnaire survey. Before, sent the questionnaire that this study personally visiting or by telephone to explain the study purpose, and describe the fill in the form. Out of a total of 21 questionnaires sent, 20 were recovered, and there was a recovery rate of 95%.

There were 21 questionnaires sent with 20 being recovered, meaning there was a recovery rate of 95%. The questionnaires were required by the consistency of AHP ratio test ($CR \leq 0.1$), sample of the questionnaire can be as effective. In this study had 20 recovered in the total number of questionnaires, and the total 17 questionnaires by the consistency ratio values were ≤ 0.1 correlation. One machine tool manufactures a total of 8 valid questionnaires by AHP's consistency certification and 6 copies of precision machinery and 1 copy of rubber and plastic machinery and 1 copy of hand tools. (Table 4.4) In this study the proportion of the questionnaire that the machine tool industry accounted for 47% of valid questionnaires is the most important research industry. (Figure 4.1)

Factory	Machine tools	Precision machinery	Plastics and Rubber machinery	Hand tools
Copies	7	6	1	2

Figure 4.1 Experts in various fields

Table 4.4 Experts in various fields of statistical analysis of questionnaires classification



Visiting of the experts period of service years for more than 20 years means possession of 2 people. Meanwhile, service of more than 10 years means possession of 13 people. Further, service of more than 5 years means possession of 2 people.

4.2.2 AHP Questionnaire Analysis

This section will focus on certification by the AHP consistency ratio ($CR \leq 0.1$). There were a total of 17 effective copies of questionnaires to experts. The research framework (Figure 4.2) of the zero level has an impact on decision-making machinery industry key success cooperative factor. The main purpose of companies considers the process of cooperation. The first layer has six dimensions of quality assurance, delivery accuracy; cooperate with degree, mutual trust, transaction costs and complementary. Through the factors weights find out the priority. And key decisions for the machinery industry cooperative factors analysis.

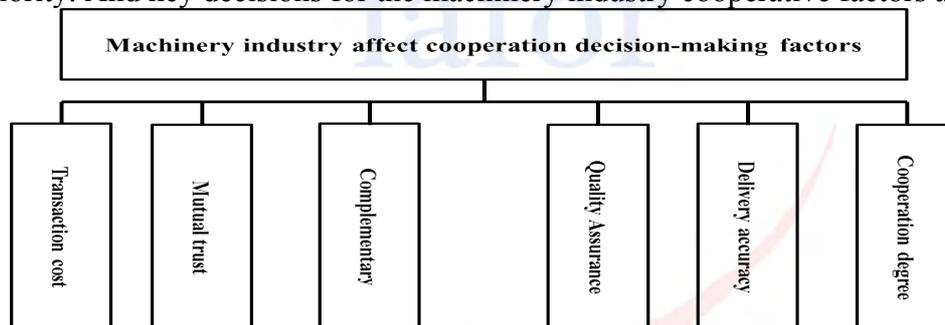


Figure 4.2 AHP design questionnaire research framework

The first level of the main assessment dimensions is weight analysis, including the impact of co-decision-making on machinery industry success, as follows in figure 4.3 with factors paired comparison matrix of dimension and in figure 4.4 with the factors weight and importance of rank.

Pairwise comparison matrix	Transaction costs	Mutual trust	Complementary	Delivery accuracy	Quality Assurance	Cooperate with degree
Transaction costs	1	1.6014297	2.4705570	1.0493747	0.7590549	0.9709069
Mutual trust	0.624442	1	2.0226743	0.8224242	0.5439163	0.6565906
Complementary	0.404767	0.404767	1	0.3621515	0.2823636	0.4176206
Delivery accuracy	0.9529485	1.2159175	2.7612751	1	0.4769794	0.92314
Quality Assurance	1.3174278	1.8385182	3.5415327	2.0965266	1	1.7587413
Cooperation degree	1.0299649	1.5230191	2.3945177	1.0832593	0.5685885	1
C.I.= 0.000813285 C.R.(C.I./1.24)= 0.000655875						

Figure4.3 factors paired comparison matrix of dimension.

Comparing weighted hierarchy weighted Ranking	Transaction costs	Mutual trust	Complementary	Delivery accuracy	Quality Assurance	Cooperation degree
hierarchy weighted	0.185	0.13	0.07	0.163	0.275	0.177
Ranking	2	5	6	4	1	3

Figure 4.4 the factors weight and importance of rank

From the results of the assessment cooperation decision-making machinery industry key success factors of six dimensions, the experts believe that "Quality assurance" dimension has the highest importance of the percentage is 27%, while the "transaction costs" the importance of accounting for the ratio of dimensions 18.5%, and the "Cooperate with degree" dimension ratio of accounting for 17.7% that the total proportion of 63.7%. Expert for the cooperation decision-making machinery industry key success factors of six dimensions of the paired comparison matrix that calculated C.I. = 0.000813285, C.R. = 0.000655875 are less than 0.1 fit in with Saaty's consistency requirements. The results of the weight can be regarded as reasonable and the six dimensions of the weight calculation that "Quality assurance" in relation to other dimensions is most important. Interview of manufactures points out no matter growth or recession in the economy that Quality assurance is the first factors to consider.

According to the results of the analysis, this study has used the factors' weights to set up the FAFHT model (Figure 4.5) even though the model is not complete. In the future, this study will continue to develop the model. Through exploring the model's left factors one evince know the company decision-making cooperation with other firms and in addition to the six factors. This study hopes to help companies to work quickly and save time during decision-making processes and cooperation with other companies.

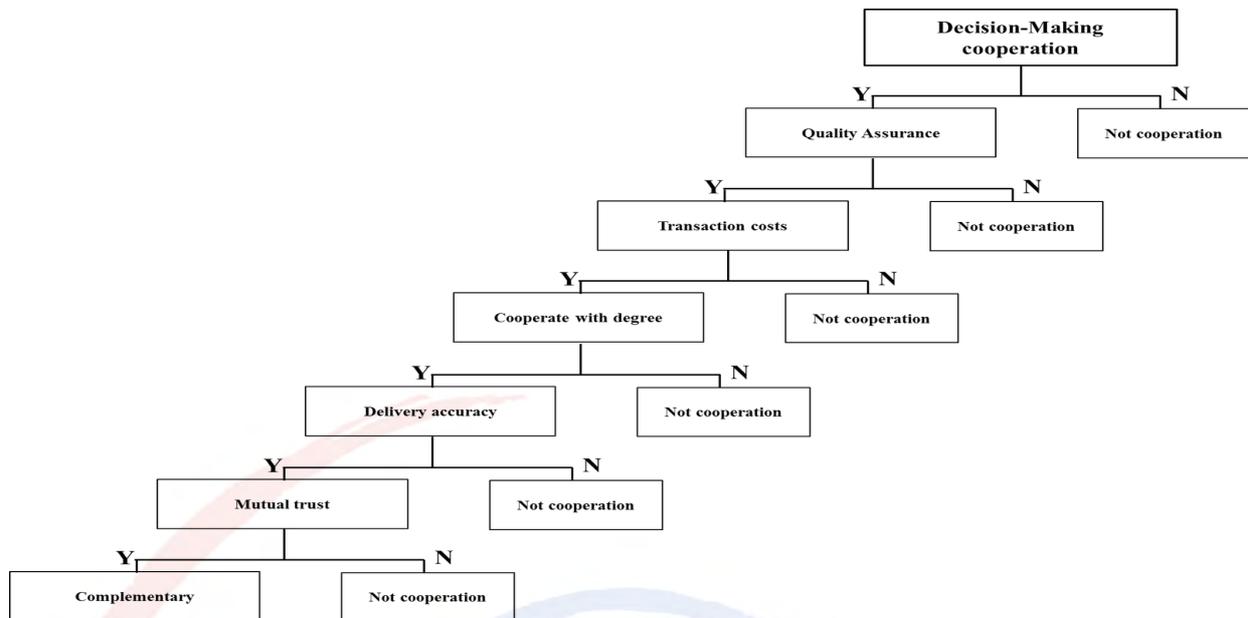


Figure4.5 FAFHT model

5. Research Conclusion and Suggestions

5.1 Research Conclusion

Government development policies point out that the machinery industry is focus of local development in the future. The machinery industry has a complete industry cluster to face of China emergence and developed countries technology innovation, but machinery industry still progress and through the cluster can face the different countries competition with together. The cluster not only convenient for companies but also create cooperation with other company opportunity. Companies within the industry cluster not only competition but also cooperation. Decision-making cooperative factors that experts point out some views and this study find some reasons. As follow some opinion,

According to the factors weights, the experts recognize the Quality assurance is company first consider in cooperative factor. This study finds two reasons one of China's machinery industry become famous in recently years that not only cheaper than Taiwan but also the technology gradually better. Therefore, this study finds the machinery industry gradually tend to more refined so requests the quality. Machinery industry gradually not uses the cheap cost to sale in the market. They concentrate on develop technology and turn to learn the new technology from Germany, Japan and American. Therefore, most companies compare transaction costs and cooperate with degree that most of company choices of the quality.

No matter what industry is being discussed, companies care about costs. Companies want to cooperate with other companies, if it is financially beneficial. They will consider the transaction cost.

The interview of companies and filled out the questionnaires let this study finds the many cooperative factors but most of managers of the opinion that economy environment is main change the decisive the cooperation reason. Due to the economy recession that most of company considers the Delivery accuracy is importance than Cooperation degree. But most experts indicate the cooperation degree and delivery accuracy are associated. If a company has good cooperate with degree and almost can pay the product on time.

In accordance with the FAFHT models that save costs to decisive cooperate company but the model not suitable on the developed new client because of the with new client cooperation need time to communication. However, in the machinery industry, if a company manufactures a product and the buyer is not satisfied, this will be a waste of time with an added need to spend on renewals. Most companies don't like such risks, like cooperating with new companies. They almost always decide the intimate companies and compare the other companies of manufacture the seller product to decide.

Finally, according the AHP analysis the FAFHT's cued and ranked the nodes but this study needs to conduct interviews of companies and complete the FAFHT model. This study needs more time to build complete models and try to find the right model node.

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Effect Industry Service Flexibility's Key Factors in Regional Network - A Study of Middle Taiwan's Machine Tools Industry

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The Asian Conference on the Social Sciences

Official Conference Proceedings 2012

Abstract:

The industrial cluster has been mentioned since the industrial service flexibility (ISF) relates powerfully with goal-driven innovation within clusters in regional network. ISF provides commerce and service relationships coordinating production and merchandise flows in regional network. From the perspective of Taiwan's machine tool industry (TMTI), even though the reverse development and expanding market in TMTI make upstream, midstream and downstream establish unbreakable relationships and ISF, due to the high degree of similarity of machines made in Taiwan, TMTI is currently confront with difficult situations of price wars, low-cost competition and heavy dependency of foreign key components. Therefore, this research discusses the influential factors of ISF and aims to discover the interrelationships between the TMTI cluster and ISF efficiency. Each enterprise must achieve and sustain high ISF to survive in the global economy. This research reviews the literatures and divides the dimensions of ISF efficiency into "internal flexibility" and "external flexibility". Internal flexibility can be described as management's capability to quickly adapt to internal business activities. External flexibility is related to customer requirements, firm's competitive advantage. This research further explores the influential factors of cluster and classifies it as three dimensions of "Geography", "Resource" and "Network". Furthermore, each dimension also divides into several sub-factors. This study mainly finds that the factor of "Network" is significantly influence the ISF efficiency, especially external flexibility, and Geography's sub-factors are not significant; but "Talent" is significantly. Finally this study provides the conclusions for TMTI enterprises to enhance production capacity, output and operating performances.

1. Introduction

1.1 Research Background

In recently, industries in different domains are developing very rapidly in Taiwan. Since it is a highly competitive industry environment, now, corporations are considering how to increase their competitiveness. This has resulted in industries more quickly to create geographical cluster and it can increase their more competitive advantage. In Taiwan, the machinery industry has been developing from the 1960s til now. Machinery industry has become a major industry in Taiwan. The industry's global annual output value is close to several trillion dollars. This research paper will focus on the cluster phenomenon, and also examining the machine tools industry as an example to discuss it.

1.2 Research Motivation and Objective

Competition in the market continues to increase, coupled with the market of Chinese is rising in the recent years. And make competition not reduce instead increases. Taiwan's industry uses a different competition model in the market, and also maintains industrial competitiveness by using an intricate division of labor. Most of the companies are SMEs in Taiwan, so that creates a production capacity shortage. So the issue of outsourcing becomes an important factor to illustrate the company's competitiveness. Based on these arguments, we can see that flexibility plays an important role in the Taiwan machinery industry.

This research wants to discuss for the cluster, to discuss the Industry Service Flexibility (ISF). In this research, want to understand how to affect the flexibility when the company in the cluster. And because the machinery industry is from an obvious cluster in the middle Taiwan (Industry cluster of machinery), so this research wants to discussion about machinery industry in the middle Taiwan.

2. Literature review

Here lists different scholar's viewpoint about cluster, flexibility and also introduce machine tools industry in the past few years. This study probes these definitions, and wants to clean out some integration definition.

2.1 Definition of Cluster

The issue of clusters has emerged in recent years since Florentine scholar, Giacomo Becattini, published his ground-breaking paper in 1979 and started the study of clusters. In the past thirty years, this has become an increasingly important and popular issue in industry and every country has actively established at least one science park or economic zone to form an industry cluster.

According to Håkansson and Snehota (1989), "businesses are constantly being born and strive to make connections with each other, and it is a truism that no business is isolated." Porter (2000) also describes clusters as being geographic concentrations of interconnected companies, specialized suppliers and service providers, firms in related industries and associated institutions in a particular field which compete, but also cooperate. And the following table cleans out many scholars definition of a cluster.

Table 1 Definition of cluster

Scholars	Definitions of cluster
Marshall (1890)	Together specialized manufacturers, industry vertical specialization and also can attract talent in industry cluster.
Porter (1990)	Cluster includes producer, consumer and competitor. They have geographic proximity also can complementarity of interests.
Krugman (1991)	Regional specialization can attract talented, add information, professional knowledge exchange.
Joseph & Rugman (1993)	Some or related industries company, concentrated in the same geographic. Each geographic have one or some major company and through cooperation or network to play a dominant position.
Anderson (1994)	Industry cluster is between the competitiveness of individual firms and efficiency inter-relations, it is basic on three dimensions: 1. Relationship of suppliers and buyers also can use relationship of input-output to view. 2. Relationship between partners and competitors, they are not only cooperate but also compete when development products. 3. Relationship of resource share, sharing to use public facilities and research resource.
Rosenfeld (1997)	Company in the concentrate of space. Even the firm size (number of employees) not so highlight, still because the space of proximity and co-dependent to generated complementary.
Brown (1998)	Cluster can help enterprise that the degree of vertical integration of supply chain , manufacturing range of decision-making, increase the existing plant capacity, decision-making of the new facilities and locations, increase product depth, add new products in existing markets, add new products in new markets and investing in new process technology.
Olson (1998)	Technical work, university and R&D center, transport and communications infrastructure and high quality life, these four resources can be a core capability to generate cluster.
Porter (1998)	Cluster is in the concentrate of space and also have geography proximity, they have commonality and complementary for each other. They can have both of competition and cooperation relationship in the same time.
Padmore & Gibson (1998)	Enterprise interaction makes the prosperous phenomenon. This interaction may through competition and cooperation or through supplier or customer to make it in value chain.
Feser & Bergman (1999)	There is very closely link in the variety of common behavior. Like ion may through competition and cooperation or through supplier or customer to make it in value chin
Roelandt & denHertog (1999)	Cluster can be a production network. Enterprise interdependence for each other in a strong link of value chain.
Hill & Brennan (2000)	Core industry and complete industries are composed of competitive industry cluster, make economic development and enhance the competitiveness of the region. The phenomenon of geographic concentration of competitive enterprises, or in the same region within the industry can be building a frequent trading relationship between the companies with other industries. Manufacturers can use the same technology or to share specialized labor, and then over other parts of the same industry competitive advantage.
Porter (2000)	Cluster can use upper, middle, downstream industries to make a production

Scholars	Definitions of cluster
	chain and to get more competitive advantage.
Mathews(2010)	Three aspects to this process of industrial concentration or clustering: 1. The firms need to be specialized and co-specialized in some particular product or group of products calling for commonalities in activity chains. 2. The firms need to be inter-linked or inter-related in some way to generate something beyond mere agglomeration economies. 3. The firms need to have some geographic concentration.
王緝慈等 (2000)	Cluster is mutual connection enterprise in geographic proximity. They have commonality and complementarity in the same industry.
洪敏雄等 (2000)	High quality human resources, support industry, technology infrastructure, improve infrastructure, government and capital resources may affect to form cluster or cluster work.
吳仁瑜 (2001)	Five factor of successful cluster: "R&D capability", "good quality and quantity of solid professional manpower", "technology transfer pipeline", "good infrastructure" and "funding sources."
張陽隆 (2001)	Industry cluster effect helps industry development, companies within the industry cluster will be a better communication mechanism, the flow of knowledge will be better and institutionalized norms will be more obvious, while the high cluster effect manufacturers performance is also better in organizational.
蘇麗玉 (2003)	Become an important agricultural industry of Tianwei cluster factors: natural conditions, advantages, location advantages, advanced production technology, production and sales in one place, the formation of industrial networking, government policy.
司徒達賢 (2001)	Some industries upstream and downstream firms have set up factories in the neighboring regions, forming so-called "clustering phenomenon", its purpose is to pursue similar areas brought delivery orders, production and marketing coordination, co-design, production support each other, etc. facilitation effect, Furthermore, due to coexistence of the same community, for mutual understanding and mutual trust will have a positive effect.
楊智盛 (2004)	Point out the cluster is a group of close relations between the upstream and downstream industries, while in specific locations.
邱程瑋 (2002)	The cluster is defined as a cluster of companies in the same production chain focused on space, the phenomenon of competition and cooperation.
魏江 (2003)	Cluster is linked to a specific area of business and organizations in the geographical aggregates, the cluster memory in the industrial chain business of vertical linkages and competitive enterprises and horizontal linkages between complementary businesses.
李振文 (2004)	Related industries can provide a lot of competitive advantage source, and manufacturers are concentrated in the neighboring regions, to share the latest research results and thus promote the development of innovation and growth.

Based on the above concepts, some key factors need to be considered when forming a cluster, and it is proposed that these factors can be categorized in three major dimensions, namely, Geography, Resource and Network, as the following table 2.

2.2 Definition of Flexibility

Technology has become increasingly complex in this century, and because of this trend, consumers have begun to demand more humane manufacturing processes, as well as high

quality products. Therefore, the global market has begun to pursue the attributes of low cost and high quality. Some scholars believe that this means creating economies of scale before developing products, since this will help to achieve the goal of low cost. However, since there is also a need to produce high quality, it is essential to achieve a delicate balance between economies of scale and labor. Because large enterprises, corporate entities and group companies have huge structures, it is hard for them to change their processes to adapt to the environment or meet specific customers' needs. However, although small and medium enterprises (SMEs) are capable of making a rapid response, they do not have the capacity to produce a large number of quality products. These enterprises need to outsource and improve their technology in order to obtain large orders, which is where the concept of flexibility in clusters becomes useful.

Flexibility can also be sub-divided into many categories, such as flexibility of objects, characteristics, relationships, industries, etc. Like Newman, Hanna, and Maffei (1993) describe flexibility as being a fundamental instrument for dealing with uncertainty. If enterprises want to keep their competitive advantage, they should start to consider building their own system. Sethi and Sethi (1990) link a variety of these and classify 3 dimensions and 11 sub-dimensions of flexibility, which include machinery, materials handling, operation, process, product, routing, volume, expansion, program, production, and market flexibility, as shown in Figure 1. Volberda and Rutges (1999) categorize flexibility into internal and external types, and so does Chen (2009). Carlsson (1989) also supports this kind of classification, as shown in Figure 2.

Table 2 Dimension definitions

Dimensions	Definition	Scholar
Geography	Cluster must have the geographic connect. Not only the distance between but also include the size of firm/cluster. Geography is an indispensable factor. If firm/enterprise doesn't have any common in geography. Then it's impossible to form the cluster.	Porter (1990) 、 Porter (1998) 、 Anderson (1994) 、 Feser & Bergman (1999) 、 Joseph & Rugman (1993) 、 Rosenfeld (1997) 、 Hill & Brennan (2000) 、 王缉慈等 (2000) 、 魏江 (2003)
Resource	The technology could spread pretty soon and sharing in the cluster. There have many specialized technology/service and also have infrastructure, and the firm who in the cluster can use these resource to development themselves. The resource include a lot, like technology, person, money, infrastructure... etc.	Anderson (1994) 、 Feser & Bergman (1999) 、 Brown (1998) 、 Hill & Brennan (2000) 、 Luger (2001) 、 Krugman (1991) 、 Grant (1991) 、 Chatterjee & Wernerfelt (1991) 、 吳仁瑜 (2001) 、 洪敏雄等 (2000)
Network	In the cluster, company exist competition and cooperation to form interactive network. There also can form information network to transmission or pass some industry information.	Porter (1998) 、 Porter (2000) 、 Anderson (1994) 、 Roelandt & denHertog (1999) 、 Koltler (2000) 、 Joseph & Rugman (1993)

Internal flexibility, according to the literature, internal flexibility is mainly focused on the production line. It refers to operation, process, manufacturing, etc., and it is these flexibilities which enable enterprises to control their production rate. The five internal flexibility factors can be described as Machine Flexibility, Material Flexibility, Routing Flexibility, Labor

Flexibility and Operational Flexibility. External flexibility, according to the literature, external flexibility is mainly focused on the market environment. It refers to product, strategy, structure, etc., and it is these flexibilities that help enterprises to control their production or develop their company strategies. The seven external flexibility factors can be described as New Product, Mix Flexibility, Modification Flexibility, Delivery Flexibility, Volume Flexibility, Structural Flexibility and Strategic Flexibility.

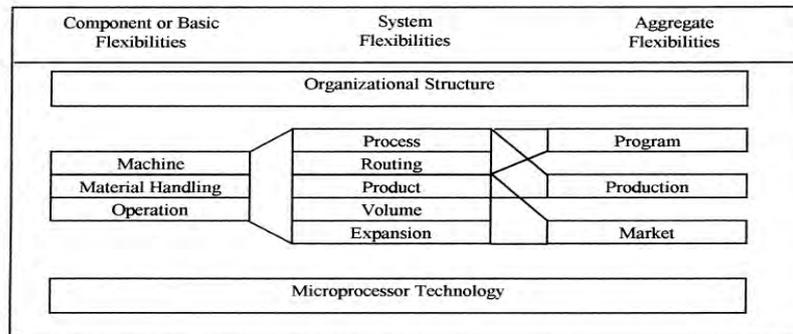


Figure 1 Linkages between the various flexibilities

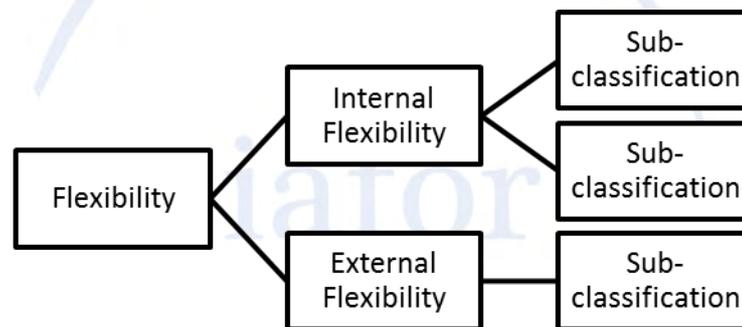


Figure 2 Flexibility classification schematic diagrams

The following table illustrates internal and external flexibility as described by different scholars.

Table 3 Definition of internal and external flexibility by different scholars

Scholar	Dimension/factor	Definition
Chen(2009)	External/Product	A capability of the manufacturing system to introduce and make new parts and products or modify product with maintain its functional characteristics by using existing facilities
	External/Volume	The ability of a manufacturing plant to operate economically over a range of production volumes.
	External/ Delivery	The ability to vary delivery schedule.
	Internal/ Labor	Flexible workers who have variety ability to handle uncertainty in the production process, they can respond to changes in demand by shifting the workforce as needed.
	Internal/Machine	The ability of equipment to perform different operation economically and effectively, which means enterprises can use the same equipment to produce diversity products.

Scholar	Dimension/factor	Definition
Browne et al.(1984)	Internal/Material Handling	Ability to transport different work pieces between various processing centers over multiple paths economically and effectively.
	Machine	The ease of making the changes required to produce a given set of part types.
	Process	Produce a given set of part types, each possibly using different materials, in several ways
	Product	Changeover to produce a new (set of) product(s) very economically and quickly
	Routing	Handle breakdowns and to continue producing the given set of part types
	Volume	Operate an FMS profitably at different production volumes
	Expansion	Building a system and expanding it as needed, easily and modularly
	Operation	Interchange the ordering of several operations for each part type
	Production	The universe of part types that the FMS can produce
	Sethi and Sethi(1990)	Machine	Refers to the various types of operations that the machine. Its ability to move different part types efficiently for proper positioning and processing through the manufacturing facility it serves.
Material Handling		A part refers to its ability to be produced in different ways.
Operation		A manufacturing system relates to the set of part types that the system can produce without major setups.
Process		The ease with which new parts can be added or substituted for existing parts.
Product		A manufacturing system is its ability to produce a part by alternate routes through the system.
Routing		A manufacturing system is its ability to be operated profitably at different overall output levels.
Volume		A manufacturing system is the ease with which its capacity and capability can be increased when needed.
Expansion		The system to run virtually unattended for a long enough period.
Program		The universe of part types that the manufacturing system can produce without adding major capital equipment.
Production		The ease with which the manufacturing system can adapt to a changing market environment.
Parthasart hy and Sethi (1993)	Automation	Extent to which flexibility is housed in the automation computerization. of manufacturing technologies
	Labor	Range of tasks that an operator can perform within the manufacturing system
Slack (1983)	Delivery	Ability of the system to respond to changes in delivery requests

2.3 Relationship between cluster and flexibility

Geography and Flexibility; In line with the above literature review, this research offers its own explanation of the Geographical dimension by investigating the relationship between “Geography” and “Flexibility”. It was found from the literature review that the geographical dimension is emphasized as being when companies cluster in the same region and help each other to achieve fast delivery and other advantageous factors. As 司徒達賢 (2001) proposes, in industry clusters, enterprises can effectively pursue a speedy delivery time, and Porter (1998) observes that, when an enterprise is located in an industry cluster, it can more effectively cooperate with other companies in the same industry to improve its competitiveness and acquire complementary technical support. It has been repeatedly shown that the geographical environment of clusters has an important impact. The research intends to explore the relationship between the geographical dimension and industrial service flexibility by examining the above description. It summarizes and collates the type of flexibility mentioned, such as flexibility in delivery and compares the delivery speed and capacity of an enterprise in a cluster with that of a non-cluster enterprise. Since this process is flexible in an industry cluster, it may be possible to increase the division of labor and enhance the competitiveness by virtue of the angle of geographical proximity. Finally, some parts of the literature suggest that geographical dimensions and flexibility have little relevance. However, geographical clustering enables more efficient delivery and delivery efficiency can increase industry flexibility; therefore, the literature review has demonstrated that there may be a correlation between the geographical dimension and flexibility which is worth analyzing in this study.

Resource and Flexibility; In line with the above literature review, this research offers its own explanation of the “Resource” dimension by investigating the relationship between “Resources” and “Flexibility”. It was found from the literature review that the resource dimension means the sharing of resources, the application of resources and the flow of resources. Anderson (1994) and Hill & Brennan (2000) propose that the sharing of resources in an industry cluster is essential, and can provide a huge corporate advantage. According to Krugman (1991), the sharing of resources among the cluster can attract talent and facilitate the exchange of business information, while Olson (1998) maintains that a cluster will create a more perfect infrastructure. 洪敏雄等 (2000) believe that the use of resources can affect the clustering effect and provide a configuration of resources to illustrate the cluster impact. In terms of the resources associated with this research, a series of scholars have demonstrated that clusters are indispensable sources of resources. In terms of flexibility, they seem to repeatedly display the impact of resource flexibility, and confirm that this flexibility in the flow of resources attracts companies to cluster. Also, the specialized division of labor in a cluster can help enterprises to achieve greater flexibility, and since clusters attract talent, these are averaged across enterprises for product development and the production process, which also impacts flexibility. It can be seen from the above discussion that there is a relationship between the dimensions of resources and flexibility in industry clusters. Companies are not only willing to enter a cluster because of the ability to share resources, but it also helps them to be flexible when facing rapid change. Therefore, this research will follow up and analyze the relationship between flexibility and resources in an industrial cluster.

Network and Flexibility; In line with the above literature review, this research offers its own explanation of the “Networking” dimension by investigating the relationship between “Network” and “Flexibility”. According to the literature review, the networking dimension

has a considerable effect on the value chain network in a cluster, and even the exchange of information and business interaction between firms in a cluster all depend on successful networking. According to Padmore & Gibson (1998) and Roelandt & denHertog (1999), a strong networked value chain is an important advantage in a cluster. Also, 張陽隆 (2001) proposes that a strong network to exchange knowledge in a cluster stimulates the development of the industry. 邱程璋 (2002) also believes that exchange and interaction is conducive to the success of an industrial cluster. According to the nature of networking described above, and in line with the relevance of the relationship between networking and flexibility, the networking dimension of an industrial cluster is emphasized as being one of interaction and exchange. This definition includes flexibility, regardless of the kind of flexibility, since internal and external communication has certain requirements. Frequent interaction and communication and a strong network can achieve flexibility, reduce costs, and improve efficiency and effectiveness. The literature reviewed in this research indicates that there may be some correlation between the dimensions of networking and flexibility in clusters. Since flexibility is necessary to support networking, enterprises can achieve low costs and high efficiency, and clustering can produce a more powerful network. This leads this research to analyze whether or not there is a correlation between the dimensions of networking and flexibility in clusters.

3. Research Framework and Method

3.1 Research Framework

In line with the literature review, the following research framework is developed to discuss the relationship between Cluster and Flexibility.

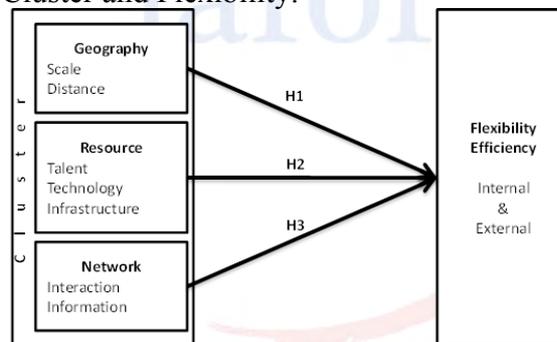


Figure 3 Research Framework

This research seeks to determine which dimension has more influence on flexibility. The research adopts three independent variables (Geography, Resource and Network) and one dependent variable (Flexibility/Efficiency). This is shown in Figure 3.

This research uses sub-factors to measure the influence of each dimension on the degree of flexibility. There are seven sub-factors of a cluster, and having measured the influence of each sub-factor, the results of each dimension will be combined to ensure the validity or invalidity of the assumed hypothesis. Also the flexibility use the same way to do the analysis.

3.2 Research Hypotheses

Base on the research objective and literature review, this research seeks to discuss the relationship between clusters and flexibility, which it divides into different dimensions according to the views of scholars like Chen (2009), Volberda and Rutges (1999) and Carlsson (1989). Clusters are divided into three dimensions (Geography, Resource and Network) and flexibility into two (Internal and External).

H1: Geography can positively influence flexibility

Geography is one of the dimensions in the cluster, and the research uses two methods to measure the relationship between clusters and flexibility in this dimension, one of which is Scale and the other is Distance. However, internal and external flexibility is also measured to test the total flexibility. Thus, the following sub-hypothesis is proposed to test the relationship between geography and flexibility:

H1a: Scale can positively influence flexibility

H1aa: Scale can positively influence internal flexibility

H1ab: Scale can positively influence external flexibility

H1b: Distance can positively influence flexibility

H1ba: Distance can positively influence internal flexibility

H1bb: Distance can positively influence external flexibility

H2: Resource can positively influence flexibility

Resources is one of the dimensions in the cluster, and the research uses three methods to measure the relationship between clusters and flexibility in this dimension, one of which is Talent, another is Technology, and the last is Infrastructure. However, internal and external flexibility are also measured to test the total flexibility. Thus, the following sub-hypothesis is proposed to test the relationship between resources and flexibility:

H2a: Talent can positively influence flexibility

H2aa: Talent can positively influence internal flexibility

H2ab: Talent can positively influence external flexibility

H2b: Technology can positively influence flexibility

H2ba: Technology can positively influence internal flexibility

H2bb: Technology can positively influence external flexibility

H2c: Infrastructure can positively influence flexibility

H2ca: Infrastructure can positively influence internal flexibility

H2cb: Infrastructure can positively influence external flexibility

H3: Network can positively influence flexibility

Network is one of the dimensions in the cluster, and the research uses two methods to measure the relationship between clusters and flexibility in this dimension, one of which is Interaction and the other is Information. However, internal and external flexibility is also measured to test the total flexibility. Thus, the following sub-hypothesis is proposed to test relationship between networking and flexibility:

H3a: Interaction can positively influence flexibility

H3aa: Interaction can positively influence internal flexibility

H3ab: Interaction can positively influence external flexibility

H3b: Information can positively influence flexibility

H3ba: Information can positively influence internal flexibility

H3bb: Information can positively influence external flexibility

3.3 Research Area

This research focuses on the machine tools industry, because the machinery industry is a huge industry which has been developed for more than six decades in Taiwan. This industry has formed a powerful network, which can help this research to collect complete and correct data

and information. However, it is impossible to collect data and interviews from the entire machinery industry in Taiwan, and since there are many categories of machinery industries in the world, including machine tools, hand tools, wood tool machines, and precision tools, etc., the research chooses the machine tool industry to conduct a questionnaire and expert interviews, since this consists of a huge cluster in Taiwan. However, industries also have a geographic connection in Taiwan, with many enterprises spread across different regions. However, the machine tool cluster is concentrated in the middle of the country, and the spread of industries can be seen in Figures A, B and C. Lastly, because most machine tool firms in Taiwan are SMEs, most of the data is collected from them, and only a few large and small enterprises are included.

3.4 Research Method

This research will use a questionnaire to collect the data, and at the same time, some company managers will be invited for an expert interview. The questionnaire will be designed from the literature review, but will also include some of the experts' suggestions to make it more complete. Having collected the data, a regression analysis will be used to analyze the hypothesis of each sub-factor (using SPSS 12.0). Finally, the results of the sub-factor analysis will be combined with those of the dimension analysis to conclude whether or not the hypotheses are valid. The questionnaire will consist of three major parts, which will be based on the literature review and modified by the experts' interviews. The questionnaire will be divided into three parts, the first of which aims to ask about the company's past experience, and also to acquire the company's overview of the industry. This part of the questionnaire is called "industry-associated factors". The second part begins by asking questions about each dimension, with three questions about each sub-factor, measured by Likert six point scales. This part is called "Affected industry flexibility dimensions". The last part is basic information about the company and personal information in order to understand who has completed the questionnaire. This part is called "Basic information". The research uses a liner regression to analyze the questionnaire data, and to find the significant < 0.05 sub-factors. It analyzes 14 sub-hypotheses, and combines each dimension's sub-factors for a conclusion. It also confirms whether or not Hypotheses 1 to 3 are valid.

4. Research Analysis and Results

Following the research method, having designed the questionnaire, they were distributed in two ways, one of which was distributing paper copies and other was online. The questionnaire surveyed machine tools firms in middle Taiwan, and after collecting the data, it was transformed by SPSS software. The reliability of the questionnaire (Cronbach's Alpha) was found to be 0.938, and Cronbach's Alpha > 0.5 indicates reliability. Therefore, the questionnaire was guaranteed to be reliable.

Having made a comprehensive survey of industry internal service flexibility, this research proposes three dimensions and assumes seven impact factors. However, only the resource dimension of talent and the network dimension of information have an impact on industry internal service flexibility. Having shown that only the network dimension can affect industry internal service flexibility, the present research also shows that an increasingly strong network of industry clusters can also increasingly strengthen industry internal service flexibility.

Table 4 Result of Analysis of factors and internal flexibility

	Dimension	Factor	T Value	Significant	Rank
Internal Flexibility	Geography	Scale	0.455	0.650	7
		Distance	1.048	0.297	5
	Resource	Talent	2.861	0.005**	2
		Technology	-1.063	0.290	7
		Infrastructure	0.482	0.631	6
	Network	Interaction	1.080	0.283	3
		Information	5.882	0.000***	1

Table 5 Result of Analysis of factors and external flexibility

	Dimension	Factor	T Value	Significant	Rank
EXternal Flexibility	Geography	Scale	-0.032	0.975	6
		Distance	0.006	0.995	7
	Resource	Talent	2.007	0.047*	2
		Technology	-1.486	0.140	4
		Infrastructure	0.712	0.478	5
	Network	Interaction	1.820	0.072	3
		Information	5.682	0.000*	1

For industry external service flexibility, this research can make some assumptions from three dimensions and seven factors to understand the influencing factors and dimensions. After the research analysis, it can be confirmed that only the two factors of interaction and information have a significant impact on industry external service flexibility, and because these two factors come from network dimension, it is easy to find the result. The research demonstrates that only networking has a significant impact on industry external service flexibility.

Having examined the above results of the analysis, it is found that different levels of management have different reasons for adopting an outsourcing strategy. The results show that a certain degree of outsourcing is higher as the level of management progresses, but on the whole, all the managers believe that outsourcing has a significant impact on a company's flexibility. However, the research finds that different levels of management believe in different benefits of outsourcing flexibility. At the general manager level, which is a high level of management, there is an obvious benefit of the ability to be forward-looking, not only considering the economic benefits of outsourcing, but also the technical level of the enterprise itself. Since these two considerations point to the fact that outsourcing increases flexibility, it is believed that this management level is more forward-looking. Although the other levels (factory/department manager level & director level) also consider the company's benefit (reduced costs), compared to the high-involvement level of management, these two levels only focus on manpower and delivery. However, these results appear to be reasonable for these management levels. This study shows that different levels of management have different ideas, and the main reason for this is their different range of responsibilities. High level managers think about forward-looking development and economic benefits, while lower level managers are not responsible for the company's future development. Thus, the results of this research show that, whatever level of management, they all believe that outsourcing is an important strategy, which can be used to increase the flexibility of the enterprise; however, different levels of management have different reasons for outsourcing.

Table 6 Production outsourcing rate at each manager level

Outsourcing of Production	General Manager	Factory/Department Manager	Director Manager
Yes, when necessary	52.4%	44.4%	47.8%
Yes, fixed ratio	47.6%	40.7%	34.8%
No		14.8%	17.4%

Table 7 Reasons for Outsourcing at each manager level

Outsourcing reason	General Manager	Factory/Department Manager	Director Manager
Reduce Costs	47.6%	44.4%	43.5%
Professional Production	61.9%	33.3%	34.8%
Process Improvement	0%	7.4%	13%
Need Long Time			
Manpower Shortage	33.3%	51.9%	39.1%
Accelerate The Speed of Delivery	38.1%	44.4%	34.8%
Enlarge Scale	9.5%	22.2%	0%
Non Production's Capacity(Part)	38.1%	33.3%	26.1%

5. Conclusion and Suggestions

As shown by the research results, only H3 of hypotheses H1-H3 has been verified. Table 4 and Table 5 show whether or not all the sub-hypotheses have been verified. The research results show that four sub-hypotheses have been verified, one sub-hypothesis has been partially verified and nine sub-hypotheses have not been verified, and the results of these sub-hypotheses lead to the results of the three hypotheses H1-H3. Only hypothesis H3 has been fully verified, hypothesis H2 has been partially verified, while hypothesis H1 has not been verified.

5.1 Different levels of managers have different views of the opportunity to increase industrial flexibility (outsourcing strategy)

In this research, high-level managers or entrepreneurs analyze the importance of industry service flexibility for firms, and all the managers and entrepreneurs interviewed believe that outsourcing is one of the strategies to enhance industry service flexibility. However, it is believed by this research that this phenomenon may be locked to middle Taiwan's machine tools industry. Because this industry has been developed for more than a dozen years, it has formed a dense network of cooperation for the professional division of labor and lower costs to maximize benefits, and this may be one of the reasons that this research has reached a similar conclusion. According to the results of this phenomenon, it was found that, although companies' top management believed that industry service flexibility could be improved by an outsourcing strategy, different management levels have different reasons for outsourcing. In simple terms, the results of this research show that higher-level executives or business owners are mainly concerned with the company's future development and thus, they value the forward-looking ability and timing of outsourcing. This main concerns technology and professional competence rather than other factors. However, for lower-level managers, the majority of factors to be considered are order-oriented. Their main concern is the ability to deliver products on schedule, and the lack of manpower affects these two factors. If there is

insufficient manpower, an outsourcing strategy is one consideration to increase industry service flexibility. It is clear that different levels of management recommend adopting an outsourcing strategy at different times, and this is a valuable discovery. When enterprises are considering outsourcing, it is mainly high-level managers who make the decision, and they look at it from the perspective of their own level. However, managers of the factory or production line consider that the main reason to adopt an outsourcing strategy is to complete and deliver customers' required products on time, and this is a totally different objective than the one pursued by high-level management. Therefore, this research illustrates that the decision to outsource must be made jointly by these two levels of management in order to balance their considerations. This will avoid decreasing the different angles and considering different strategies which may take the company in the wrong policy direction. Considering diverse perspectives is obviously the way to make the timing of outsourcing more comprehensive and perfect.

5.2 The industry is moving toward transformation, turning to high-value and own brands.

Thus, information and interaction has a most significant impact on business, and can also be described as industrial service flexibility.

The results of this research show that, except for the fact that the "Networking" dimension and part of the "Resource" dimension have a significant impact on industry service flexibility, most of the other dimensions do not. Having summarized the research, this is a very interesting finding. In the past, literature (like Anderson, Feser & Bergman, et al have shown that most clusters contain two dimensions, i.e. a geographic dimension and a resource dimension. In this research, it can be seen from a study by Anderson, Feser & Bergman, et al., that abundant regional resources should play a positive role in helping the growth of enterprises, which is why companies want to join a cluster. However, this research shows that, if enterprises want to increase their industry service flexibility, all they need do is strengthen the "Information" dimension. This research takes three dimensions to investigate the degree of difference between them in respect of their influence on industry service flexibility. The first dimension is "Geography", and the results show that the "Geography" dimension does not have a significant impact on industry service flexibility. This is because the goal of the research population of middle Taiwan's machine tools industry enterprises is located in an area with convenient transportation. The number of fast highways, railway transportation, seaports and international airports make transportation convenient compared to the same industry in other countries. Therefore, this research believes that this is why the "Geography" dimension is insignificant in enhancing industry service flexibility. However, this research also believes that the target population needs to be expanded in order to determine whether or not this factor has a significant impact on industry service flexibility. The second dimension is "Resource" and the results of this research show that this has a partial impact. According to literature by scholars like Brown, Krugman, et al., the ability to share resources is one of the main reasons for enterprise clustering. However, the results of this research indicate that resources only have a partial impact on industry service flexibility, and the reason for this is mainly the special nature of Taiwan's machine tools industry. Because Taiwan's machine tools industry has been developed over sixty years, it has formed a certain basis in terms of resources, and established a dense network of cooperation. This is a rare phenomenon in the world of industrial structure, and depends on close co-operation and networking, specializing in a delicate division of labor, to achieve a high industry value. Also, because of the specialization of industrial development, Taiwan's machine tools industry technology and infrastructure are mature compared to other countries, and this means that the industry service flexibility resources are mainly concentrated in the talent dimension. According to the findings of this research, the lack of talent and errors, as well as policy-orientation, makes it

difficult to train the appropriate personnel. Also, in recent years, enterprises have wanted to create their own company brand and high value-added products, which has led to a need to integrate professionals of different backgrounds in order to create greater benefits for companies. Although this type of talent is a badly-needed resource for enterprises, it is not easy to find. Thus, the results of this research show that the “Resource” dimension only partially impacts industry service flexibility. The final dimension is “Network” and the results of this dimension show that networking has a strong significant impact on industry service flexibility, and it is suggested that there are several reasons for this. One reason is that Taiwan’s machine tools industry has been developed for more than 60 years, as previously mentioned, and as the country’s main industry, it has formed a tight-knit network. Enterprises rely on the transfer of information, which in the past, included the transfer of product information because of the degree of mutual cooperation in industry. However, in today’s network, the main focus is information exchange between organizations, and this can only be achieved by a rapid exchange of information to increase the accuracy of product delivery, process changes, number of products etc. Business continuity is important in industrial clusters, the importance of networking for industry service flexibility is that Taiwan’s machine tools industry is entering a transitional stage. Companies are gradually moving toward high-value brands and are no longer confined to specialization, OEM etc., and this transformational direction needs a tight-knit network to share exhibition information, market information, etc. All these interactions can expand the breadth and reduce the time taken by enterprises to access information. Information can also be used to formulate forward-looking industrial policies and services, and greatly increase industry flexibility.

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Administrators Roles in the Development of School Collaboration Program, Parents and Community

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Abstract:

This study aims to explore the pivotal role of leadership on the development of school collaboration program, parents and community. The study also discusses the important elements that contribute to successful leadership through a case study. Eight administrators (N=8) in four schools were selected. Data was derived from interviews and supported with observation. Interview data was analysed using Nvivo version 8. Themes that are consistent with the factors for successful collaboration activities in the selected schools emerged. Results show that school administrators play an important role in making collaboration works. Personal commitment, effective communication skills help to get parents and the community to give their cooperation. Finally, results indicated that schools that have successfully carried out collaboration had the teachers' full support. The administrators had carried out various activities to develop teachers' competencies in order to promote collaboration in school. Therefore, personal commitment, knowledge and leadership skills as well as attempts to promote teachers' professional development contribute to successful collaboration in schools.

Keywords: Administrators, personal commitment, effective communication, staff development, successful collaboration.

1. Introduction

Organisation is viewed as the collaboration between human and source to reach a mission that could not be fulfilled by individuals (Hollenbeck 1995). Viewed through this definition, school is seen as an organisation that is consisted of the administrators, teachers and students. The main objective of this organisation is to offer the type of education that is in line with a nation that is multicultural (Kamarul, 2010). Students with specials needs are unlike typical students in that they need support and service from the community especially parents and professional agencies. In Malaysia, special education schools that cater for students with learning disabilities has formed a committee in the Individual Education Program for the student through the collaboration with parents, teachers, administrators and specialists (Guidelines on IEP, 2000). The panel is formed in order to help school gathers information and prepares the infrastructure for the students. In the West, parents and community awareness have begun early La Rosa (1997) study has shown that parental role is fully recognized in the development of children's education. The importance of parental role in school has led IDEA (2004) to give guidelines in every school. The guidelines are as follow:

- a. Participant of general education teachers on most IEP teams
- b. Increased parents involvement
- c. Required conflict resolution efforts when disagreements occurs
- d. Emphasis on educating students in the least restrictive environment
- e. Consultative special education services

The regulation is formed to ensure special education schools carried out collaboration in the IEP program. This is done to help students' development in school. It is undeniable that parental and community role are pivotal in today's education system. Parents are the main source of information on their children's development. Advancement in the global education system needs external support especially in terms of skills and physical expertise. Previous studies locally and abroad have discussed the effectiveness of collaboration among schools and community in developing the learning aspects of children at school (Sandra et al 2009; Sanders 2001; Catsambis & Beveridge 2001 & Juairiah 2004). For students with special needs, collaboration among parents and the community could enhance the educational service (Henderson & Mapp 2002; Rosemary 2000; Ballen & Moles 1994) and academic performance (Moore 1998 & Epstein 1995).

2. Statement of Problem

Carrying out effective collaboration in schools is not an easy task as this is a complex process. There are many issues that need to be solved as an early preparation before carrying out collaboration. An issue that normally surfaces is the principal's willingness towards carrying out collaboration culture in schools (Yanghee, 2009).

Principals are vital to the success of schools because they play many roles as leader. They supervise staff, interact with students, oversee student discipline, work with families and the community, manage school facilities, assist in curriculum decisions, plan staff development, and administer the budget, to name a few. With so many responsibilities, it is not surprising that strong principal leadership contributes to effective schools (Edmonds, 1979) and the

implementation of education programs and reform models (Jackson & Davis, 2000). Therefore, to strengthen collaboration culture in schools, principals should have personal commitment towards group work through collaboration. Previous research has shown that several schools have successfully carried out collaboration with parents and the community. This is due to the commitment given by principals and community (Daniel-White, 2002).

Principal's role has been identified as the important factor in developing collaboration in a school. The standard program for effective leadership (NPBEA) has strived to help principals by stating several as guidelines for carrying out effective collaboration. The standard has five main principles on knowledge and skills. When compared to traditional leadership principles, there are obvious differences in terms of:

- a. From technical skills to interpersonal skills
- b. From director to consensus builder and motivator
- c. From resource allocation to accountability for learning processes and results
- d. From campus administrator to integrator of school and community service
- e. From policy recipient to policy participant

If the principals could realize such leadership principles, parents and community would be willing to cooperate with the school. Such knowledge and skills will help principals in carrying out collaboration culture effectively in school. This can be done by planning the strategies for collaboration that is based on:

- a. Engage the community to build greater ownership for the work of the school.
- b. Share leadership and decision-making
- c. Encourage parents to become meaningfully involved in the school and in their children's learning
- d. Ensure that students and families are connected to the health, human and social
- e. Services they need to stay focused on learning

The school has to make a paradigm shift as successful collaboration is the key to school. Cocoran and Wilson (1997) outline nine characteristics of effective schools. Among these are schools that carry out collaboration. Effective school management is achieved through administrators' effort in bringing together parents, teachers and community. Mapp (2002) and Chrispeels & Rivero (2000) studies show that effective school administrators could bring together families from different background through three principles: focusing on trust, collaboration among teachers, parents and members of the community. Identifying, respecting and knowing parents' needs as well as holding up the collaboration philosophy are the three factors that have to be shared by parents and community. The knowledge, skills and principal's effort in carrying out collaboration do not come naturally but something that could to be learnt and practiced consistently. This can be done by role modelling administrators who have successfully carried out collaboration in their schools. An important aspect is the principals' willingness to accept change.

3. Objective of the Study

Collaboration has proven to give positive impact on students' achievement. A school's success is also characterised by the principals' ability in carrying out collaboration among parents and the community. Therefore, changes have to start from the principals themselves. Before this could be realized, principals should be equipped with knowledge, attitude and skills that lead to the collaboration culture in school. Principals' willingness to adopt collaboration culture could be achieved through:

- a. Teachers' professional development and collaborative working culture
- b. Have a professional working environment
- c. Help teachers to face challenges and solve problems effectively
- d. Motivate teachers and provide them with skills

Thus, this study focuses on leadership characteristics and factors that help administrators to successfully carry out collaboration so that these could serve as guidelines to other principals.

To achieve the objective of the study, some questions have to be answered:

1. What are the characteristics of principals who have successfully carried out collaboration in school?
2. What important aspects about personal commitment have to be adopted by principals to achieve collaboration culture in school?
3. How do communication skills help principals in solving problems in school?
4. How do principals shape teachers' role towards effective collaboration?

5. Methodology

This is a multi case multi site study that adopts the qualitative design. Data is gathered through interview and observation. Data is analysed by identifying emerging themes on principals' role towards the successful collaboration. The participants were principals and special education coordinators in four secondary schools in Malaysia. The researcher carried out semi structured interview to identify the scope of the discussion so that it was in line with the objective of the study. Sampling was carried out through questionnaires (Epstein, 2002) to identify schools that have successfully carried out collaboration. Observation was carried out to triangulate data. Observation was done to help the researcher identify physical environment, school culture and the relationship between administrators and teachers that contributed to collaboration culture.

6. Findings

The findings of the study show that there are several leadership qualities that contribute to successful collaboration. Below is the figure on characteristics of successful leadership



Figure 1: Administrators’ qualities that contribute to successful collaboration

Apart from having successful leadership qualities to work in groups, principals also have personal commitment in terms of interpersonal, attitude and knowledge that enable them to work with parents and community. This also encourages environmental factors. Environmental factors refer to parents, community and teachers’ role. The figure below shows principals’ personal commitment in enhancing collaboration culture in school

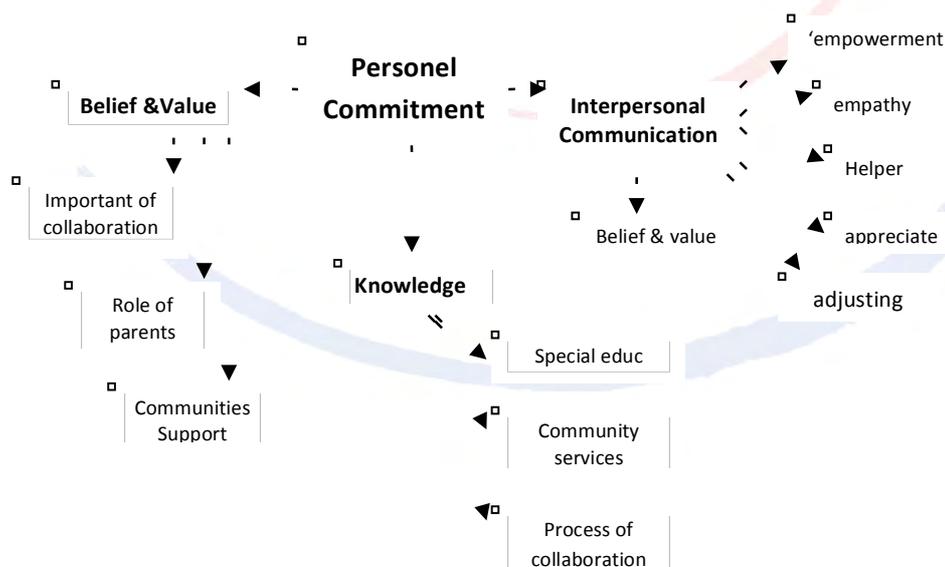


Figure 2: Administrators’ personal commitment towards collaboration

Personal commitment and knowledge alone do not guarantee successful collaboration in school but it has to include skills in attracting parents, community and school staff.

Communication skill is the important element in working in groups. The finding of the study suggests that the administrators' communication skills were evident through problem solving among students and parents in school. The administrators carried out the process of problem solving through collaboration. Administrators have the skill to listen, communicate through verbal and non verbal means to have a good rapport with parents and community in order to solve the problems together. The importance of communication skills could be seen in every steps of problem solving.

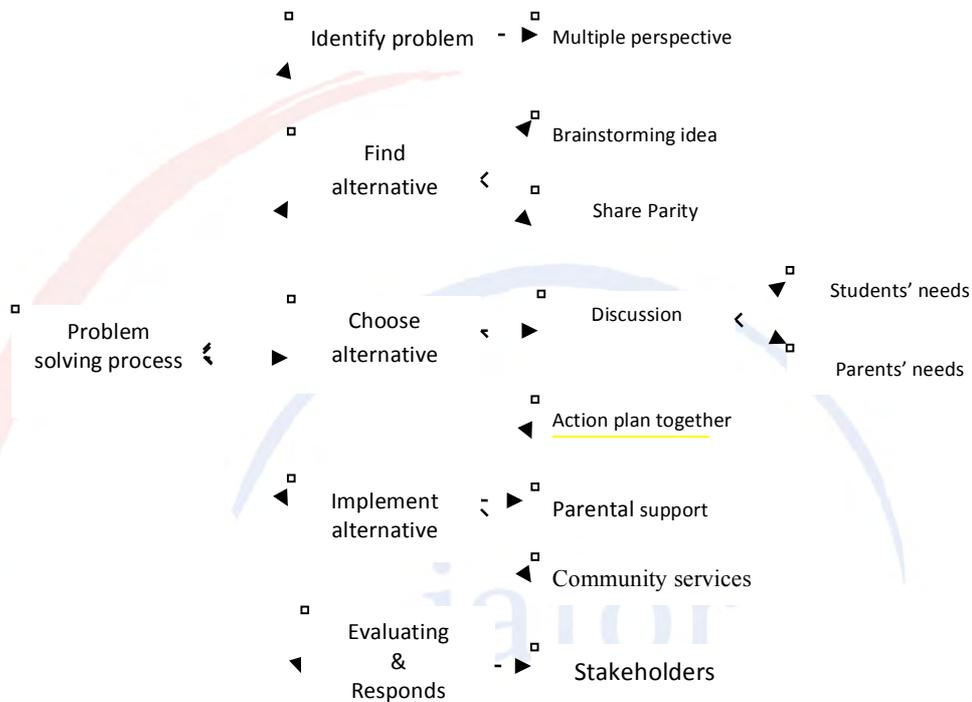


Figure 3: Model Of Problem solving process through collaboration

Schools that successfully carry out collaboration show that the administrators make sure all the staff has shared purpose which is promoting collaboration in school. Administrators who share their mission with teachers are sensitive towards the teachers' needs. One of the ways that administrators use to flourish teachers' support is to have professional development program so that teachers are aware, skilful and knowledgeable in carrying out collaboration. Administrators are also aware of teachers' well being and acknowledge their commitment. The figure below shows teachers' role in enhancing collaboration activities.

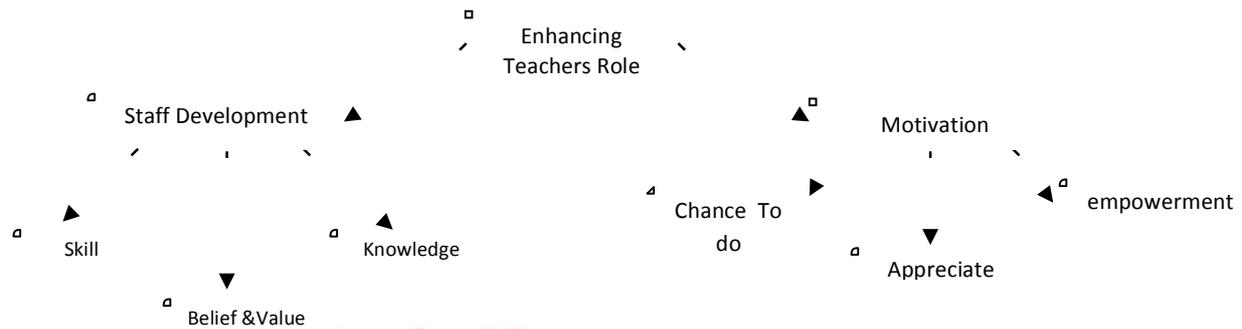


Figure 4: Enhancing teachers’ role in promoting collaboration activities

7. Discussion and Recommendation

Collaboration is not an easy task as it requires skills and knowledge to manage manpower so that they are ready to work sincerely with the school community. There will be barriers in the process of promoting collaboration. However, leadership factor is important in an organisation for collaboration to flourish. Successful leaders could bring together the school communities in realizing collaboration activities. This can be done through promoting a school situation that encourages meaningful involvement of parents and the community (Kasahara & Turnbull, 2005; Slaend& Garrick-Duhaney, 2002).

When discussing successful collaboration in schools, Friend and Cook (2007) state that school administrators must have commitment, then only skills and knowledge. These three aspects have to come hand in hand to help administrators plan collaboration program in school. The finding of the study is in line with the suggestions put forth by Friend and Cook (2007). School administrators who encourage collaboration culture have the will to carry out their mission with the parents’ and communities’ cooperation. Observation data also shows that administrators’ effort in preparing an environment that is conducive for parents such as having a waiting place near the special education classroom and sign boards. Teachers have excellent non-verbal communication skills. They are polite and accommodating. The school mission is clear in that administrator seriously take into account parents’ role in their effort to achieve success for both school and students.

Administrator’s success in realising collaboration is influenced by their communication factor. They show the willingness to listen to parents and at the same time, putting aside their own emotions. Some administrators could use the appropriate language which suits the parents’ background and culture. This is a unique ability in that it attracts parents and communities to join collaboration. The skill to communicate helps administrators in solving problems in school through collaboration. Without parents, community and school community support, problems could not be solved easily. A successful school leadership takes into account teachers’ role through equipping them with knowledge and skills to work with parents and community (Barth, 2006). Administrators can promote collaboration by motivating teachers, acknowledging their effort and giving them the opportunity to carry out collaboration activities with parents and the community.

Therefore, to gain success in carrying out collaboration, administrators have to have good leadership qualities. These include skills, knowledge and positive attitude towards group cooperation. Next, administrators have to plan activities that could attract parents and

community to join collaboration as these factors help in interpersonal problem solving (Bahr et al.2006; Griffin et al.2006).

8. Conclusion

In helping students with special needs, the administrators and parents' perspectives have to change from school culture to collaboration with parents and community. Schools act as the anchor in carrying out collaboration. Thus, administrators have to be knowledgeable, skilful and committed in promoting collaboration culture in school. Administrators should have a positive perception on collaboration, willing to take risk and adopting equality among members.

The success in exercising the above elements will influence parents, communities and school staff to take part in educational activities and school programs (Baharom 2011). When outsiders are ready to cooperate with administrators, school can get information and support in many aspects. Morros & Vrabel (1978) conclude that without effective leadership, schools will not be able to have good rapport with the community.

In conclusion, this study suggests several conditions for effective collaboration to flourish: Administrators should lead the activities. Secondly, they should give full commitment towards collaboration through enhancing skills, knowledge and positive attitude. Thirdly, administrators should have excellent communication skills and fourthly, they should be consistent in supporting teachers. This can be done by encouraging them to work together with parents and community. This study shows that schools that carry out the above suggestions have successfully improved the collaboration quality amongst teachers, parents and the communities.

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*An Ethno-Epidemiological Study of Lay Beliefs and Experiences of Fever-Related Illness
among Laotian Patients Living near the Lao-Thai Border*

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Abstract:

Fever, the most common symptom of infectious diseases, has different names and meanings according to the area, custom and culture. The objective of this research was, through the adoption of an ethno-epidemiological approach, to better understand lay beliefs, experiences and practices related to fever-related illness among local and cross-border Laotian people. Laotians know they get fever or *khaj* after *jab king* or touch their body parts (i.e., forehead, neck, arms and legs). They have other terms for fever such as *jeb* or *puiy*. Moreover, the term related to fever-related illness is built on the general term for fever or *khaj* are; *khaj-ai* (fever-cough), *khaj-hua-lom* (fever during season changing), *khaj-yung* (fever because mosquitoes bite or drink water or take shower with water where there were mosquitoes larvae), literally. Fever-related illness is caused by soul loss, seasonal change, hard work, or even *tidpad* (intrusion of foreign particles into th

INTRODUCTION

To date, infectious diseases are still the main causes of illness and death, killing more people than heart disease or cancer especially in developing countries [1-5]. Although scientists and policymakers in the 1960s believed that infectious diseases could be kept “under control” through the combined effects of development, sanitation, new medical technologies, and advances in the pharmaceutical industries, the incidence of infectious diseases has increased in the last two decades. Moreover, one unexpected phenomenon has been the emergence and/or re-emergence of new infectious diseases and drug-resistant diseases, whose incidence is increasing rapidly. Actually, globalization, urbanization, and transportation lead to massive migration of people which contributes to increase the risk of epidemic or pandemic occurrence of infectious diseases around the world.

When a set of symptoms appears in any person (for instance, fever, headache, muscle pain, etc.), it is the sign of a physical, social and/or moral disorder [6-8] whatever the culture of the individual [9, 10]. These symptoms arise a series of questions about the nature of the disorder, its cause, and its treatment, etc. [11, 12]. Socio-anthropological literature has shown the wide variety of perceptions on health and diseases, choices of treatment and treatment-seeking behaviours. For example, fever, which is the most common symptom of infectious diseases, has different names and meanings according to the areas and customs [8, 14-17]. Remedies are also varied [18-22] as are health-care facilities and providers who may range from Western doctors to different categories of traditional healers [23-25].

This research is, through the adoption of an ethno-epidemiological approach, to better understand lay beliefs, experiences and practices related to health and disease among Laotian people who live near the Lao-Thai border. Research questions are: What is the local terminology for fever-related illness; What are local perceptions of symptoms, causality, degrees of severity, impact of illness on the daily life, treatment and prevention of fever-related illness; What are the treatment-seeking behaviours in case of fever-related illness; What are the local perceptions of risk and models of occurrence of fever-related illness; and Which contexts may be related to or influence the choice of health-care services across the Lao-Thai border?

METHOD

This research is a qualitative study which realized through an ethno-epidemiological approach. This approach is thus an emergent cross-disciplinary health research methodology that combines the strengths of ethnographic approach for the understanding of socio-cultural meanings and contexts with the design, sampling, data collection, and analytical tools and strategies focusing on risk factors and disease outcomes developed in epidemiology but, however, with a shift in the meanings of the latter. For example, “host” is refers in epidemiology to “actor” (in the context of this research, any person with a history of fever-related illness) will be translated in ethno-epidemiology as “actor’s meanings” (i.e., perceptions of fever-related illness); in the same way, the conception of “agent” (i.e., germs, biological articles, etc.) will shift to a psychosocial unit of study (i.e. reactions to the disease, treatment-seeking behaviours, etc.) and “physical environment” will be more concerned with the context of incidence of a given illness [26]. All questions were made in the Lao language. A qualitative data analysis was applied in this study. The analyzing process was not totally separated from data collection, but data collection and data analysis were performed simultaneously in the field.

The site of the study was selected through the purposive sampling method. The informants also were chosen through the purposive selection method, their community of origin, the signs and symptoms of their illness, and agreement to be interviewed. If the person agreed to be interviewed, researcher asked if researcher could follow with the questionnaire. Then, researcher asked the permission to follow them in their community for in-depth interviews. The researcher recruited eleven of Laotian patients who were presenting with fever; were living in three different communities along the Thai-Lao border. In addition, the data also collected through participant observation include: physical environment (grow up of herbs or plants that can be of use for treatments, etc.); people life style (i.e., economic and/or ritual activities, etc.); treatment behaviours (i.e., self-treatment, traditional healer visiting, utilization of health-care services in homeland and across the border), etc.

Actually, this study the rights of informants were under proof of The Committee of Research Ethics (Social Sciences), Mahidol University, Thailand. And the informant's rights were consciously respected through the obtention of the informed consent. The patient names (informant names) and community names were changed for confidentiality purpose.

Fever or 'khaj' or 'jeb' or 'puiy'

Most of the Laotian patients in this study visited the Nongkhai provincial hospital because of fever and cough (45.5 %, five from eleven cases); fever, headache, muscle pain and red rash (18.2%, two from eleven cases); fever and running nose, fever and red rash, fever and stiff neck, and fever and headache (9.1% or one for each). Researcher found that Laotian give more than one definition of fever or fever-related illness. 'Khaj' 'jeb' or 'puiy' are the three terms that they use when they fall ill because of fever-related illness. However, there is a little difference between these three words. 'Khaj' or fever means increase of body temperature; sometimes there is no increase of body temperature, sometimes we have flashes of hot and cold at the same time. To feel not better, [to have] vertigo, muscle and body pain, are also called 'khaj'. 'Jeb' is to fall ill because of seasonal change or doing hard work'. In this way, 'Jeb' has the same meaning that 'Khaj'. Sometimes, 'Jeb' is a little different sense to 'Khaj' symptom and more consider about 'injurious' or 'painful' symptoms. In addition, 'Jeb' names the signs and symptoms of external lesions because of an accident. 'Puiy': all key informants said that 'Puiy' is more similar to 'Khaj' than to 'Jeb'. However, they use all three words sometimes the expression 'Jeb khaj dai puiy' or falling ill.

Regarding what they said, these names are used to define different kinds of symptoms, such as, for example: fever; fever with cough; fever with running nose; fall ill because mosquitoes bite; fall ill because seasonal change; fall ill because went to the forest; etc. These words can also be used during daily life or serve to qualify growing conditions, for example, in the following expressions children fall ill when they are changing of age or female fall ill during their menstruation periods.

Laotian people classify fever-related illness into three severity categories: normal *condition illness* (there is no more concern except in case of symptoms worsening, get other complicated symptoms or become too severe illness); *mild illness* (which needs that one takes medicine for a couple of days before recovery, sometimes there is no need to take medicine); and *severe illness* (which takes time for recovery or healing, if the patient does not get right healing he will die). They also classify fever-related illness into two contagiousness categories; illness may be *not contagious*, for example, growing condition fever, menstrual period fever, mosquitoes' bite fever, 'tanten' and common cold in adults; and it may be *contagious*, for example, fever with cough and common cold.

Laotian perceived impact of fever-related illness on daily life may be: stop working; stop working when either I or my daughter falls ill; sometimes, males have no need to stop working; and children stop going to school. When they fall ill, they need to heal (*pinpua or pua*). If their illness is recovery, they will return to their healthy and able for daily life. Laotian called when they have health or to be healthy '*yoo dee mee heang*' which means that people, under normal conditions, are living well and are able to work. Thus, health means for example, ability to eat, ability to sleep, children are able to play, etc. In this perception, the Laotian belief is similar to the World Health Organization definition of health and to be healthy. Secondly, a healthy person is 'is able to work, children can play, children are able to go to school, the elderly are able to go to the temple, etc. Thirdly, '*mee yoo mee kin*', i.e. their monthly family income is sufficient for life expenditures which permit them to 'health' again. But in case they don't recover or recovery takes time, they will be retreated or seek other health-care services. As summarized in diagram 1.

Diagram 1

Fever-related illness classification

For Laotian fever-related illness can be *classified* into various categories of *causation* which may be similar or different from the biomedical view or from the views of people around the world. As details following;

- ***Natural***: Fever is related to seasonal change, for example, in the case of '*khaj wat*' or common cold which occurs during the end of the rainy season and the beginning of winter (September to October). Common cold can occur at every age but especially in young children. And fever is also related to growing condition and body natural processes, for example, children transformation ages and during the menstrual period of reproductive women.

- Fever-related illness can be ***contagious***, such as, '*khaj tid pad*' or contagious fever, the symptoms of which are fever, more cough, more phlegm and more difficulty in breathing than normally during a fever-related illness. However, beliefs and experiences about germs do not exist.

- ***Supernatural causation***: Fever-related illness may be related to supernatural causation such as in the cases of '*khaj hak liad tai*-dengue haemorrhagic shock death case'. According to *Nang Bee*, whose husband died of an haemorrhagic fever, said with a very sad face 'My husband fell ill after coming back from fishing in the big pond nearby the community two days ago. He had fever, bloody vomiting and bloody feces in the morning. Then, we took him to the district hospital during the evening. In the late evening, the doctor at the district hospital sent him to the hospital in Vientiane Metropolis. He died there in the early morning. The elderly in the community said there are many spirits in the big pond. May be my husband did something wrong to them'.

- ***Related to hard work***: Fever and acute febrile respiratory disease symptoms are related to hard work, such as in the cases fever with tiredness after hard work. Regarding to *Nang Dian* said 'Sometimes, we have to finish working in our rice field under the rain and sun in a hurry. Then, we may fall ill because of fever'.

Fever-related illness detection

The main methods of investigation of fever-related illness can be divided into three categories: 1) *Jab king berng, king see hon kue fire* (touching the body, we will feel if it is hot as fire); 2) *tam poo tao poo kae* (asking to grandparents); and 3) *bang tua ka chai parod wat* (sometimes, using temperature instrument).

Fever-related illnesses treatment

Laotian patterns of treatment seeking behaviors can be divided into two methods; self-treatment, seeking treatment in homeland and crossing border for seeking treatment.

- ***Self-treatments or home remedies.*** This is the first treatment which Laotian use for relief of fever-related illness. For example, according to *Mae Bang*, a health volunteer of *Baan Chaitham*, said ‘Last week, when my son had fever and muscle pains, I bought for him a fever relief medicine from a drugstore in the market. There are four pills in one panel. He had taken two pills in the morning and two in the evening. The next day, he recovered and was able to work’.

- ***Seek treatment in homeland and crossing border to Thailand*** to relief their fever-related illness. Most informants said that they used first self-treatment, and, in case the treatment fails, they seek treatment in any health-care services in homeland and/or cross the border to Thailand. However, I found that among eleven informants I could divided to 4 groups: 1) seek health-care service in provincial hospitals in Thailand (eight of eleven), and one each for, 2) seek health-care service at private clinic in Lao PDR, 3) seek health-care service at private clinic in Thailand, and 4) seek health-care service from in government hospital in Lao PDR.

Contexts related to seeking health-care services.

In addition, researcher also realized in-depth interviews with other key informants, such as, neighboring households in the same communities that of the eleven key informants whom researcher were following from the Nongkhai provincial hospital. In this group, researcher interviewed twenty-seven key informants who had experiences of fever-related illness in the past month. Researcher also did interviews with the chief of communities (two persons, one from each community); health-care volunteers (two persons); and traditional healers (two persons). Thus, researcher interviewed a total of forty-five persons coming from three different communities. The details of informants and key informants demographical data and their choices of treatment show in Table 1.

Table 1

Informants and key informants consisted of adults, with a median age of thirty-eight years. When classified into specific groups, researcher found that: 1) the group who first seeks treatment for relief of fever-related illness through buying medicines in Lao PDR averaged forty years old; 2) the group who seeks health-care services in private clinics in Lao PDR averaged twenty-nine years old; 3) the group who seeks treatment at Nongkhai provincial hospital in Thailand averaged thirty-six years old; 4) the group who seeks health-care services in private clinics in Thailand averaged forty-one years old; 5) the group who bought medicines in Thailand averaged thirty-nine years old; and 6) the group who seeking treatment in private hospital in Thailand averaged thirty years old.

Informants and key informants consisted of females (thirty-three) and males (twelve). When considering seeking health services behaviours, there were of course more females in the five

groups than males, while in the group buying drugs from drugstores in Thailand for first treatment in case of a fever-related illness there were as more males than females.

Among informants and key informants, there were nine single persons and thirty-six were married. On this respect, researcher found that married persons preferred to cross the border for seeking treatment in private clinics (one household), to buy medicines in drugstores in Thailand (three households) while the majority of married persons tended to buy medicines from drugstores in Lao PDR (seventeen households) and also to cross the border for seeking treatment in the Nongkhai provincial hospital in Thailand (ten households).

About education level, most of informants and key informants have completed primary school or grade six (sixteen households), followed by lower secondary (thirteen households) and upper secondary (seven from forty-five). When considering seeking health-care services for relief of fever-related illness, I found that the lower secondary (ten households) and primary graduate informants (seven households) tended to buy medicines in Lao PDR, while upper secondary and bachelor's graduate key informants tended to cross the border for seeking health-care service in Thailand such as in the Nongkhai provincial hospital (four households, private clinic (one household), to buy medicines (one household) and in private hospital (one household). Key informants qualified with higher education could be employed in private sector or government sector, running their own business, with high income or health guarantee. Therefore, when they fall ill, they tended to cross the border for seeking health-care service in Thailand, especially in the private health sector. Conversely, key informants graduating at primary school also tended to cross the border to seek health service and they were more numerous than other groups. But they tended to seek health-care services in a Thai government hospital where service fees are lower and, in some cases, they can ask for free.

On the question of occupation, most of informants and key informants were farmers (sixteen from forty-five households), followed by private sector employees (six households), merchants (five households) and tobacco growers (five households). Among them, there were people buying medicines in Lao PDR for themselves in every sub-group, mostly farmers (seven households), employees (six households) and tobacco growers (five households). Besides, the group who cross the border for health-care services in Thailand consisted of farmers (nine households), and merchants (four households) who used every type of health-care services in Thailand, with the exception of private hospitals.

With respect to monthly income, the average income per household per month was approximately two point two millions Gibbs or about nine thousands Baht (the smallest amount of earnings was approximately four hundred thousand Gibbs or two thousands Bahts; the maximum income per household per month was ten millions Gibbs (approximately forty thousands Baht). When considering that family member of each household average five people, a monthly income of about two thousands Baht was considered as sufficient for and some households said that they could save money. When considering health-seeking behaviours, I found that people with lower and higher monthly earnings prefer to utilize health-care services in Lao PDR or to cross the border, but that those who earn approximately one to two millions Gibbs (four to eight thousands Baht) tended to buy medicines from drugstores in Lao PDR (twelve households).

On the question of Laotian relatives in Thailand, researchers found that most key informants had no relatives in Thailand (twenty-seven households). However, when considering seeking health-care services in Lao PDR and in Thailand, the group who had no relatives in Thailand tended to buy medicines in drugstores in Lao PDR when they fell ill (thirteen households), took treatment at private clinics in Thailand (eight households) when compared with those having relatives in Thailand (five and one household, respectively).

Researcher further asked to them what they do in case of an illness which is worsening or not improving after many days of treatment or also in case of an outbreak of a severe acute respiratory disease. In case of an illness which is worsening or not improving after various days of treatment, nobody answered buying medicines for cure or relief of the fever-related illness, or seeking health-care services at a private clinic in Lao PDR. However, in this case, Laotian indicated they would seek treatment in a government hospital in Lao PDR which they do not choose in case of a mild illness (nine households). In case of falling ill because of severe fever-related illness, the answers were: seeking treatment in government hospital in Lao PDR (fourteen households); and crossing the border for seeking treatment in the Nongkhai provincial hospital in Thailand (twenty households).

DISCUSSION

For Laotian people, '*khaj*' or fever is only a symptom as seen in the following terms '*king hone, toh hone, thua king khaj*, etc.' The terms '*king, toh, or thua king*' focus on '*king*' or body is getting warm or hot. In this study, researcher found that Laotian are more concerned about to be healthy or '*yoo dee mee haeng*'. Healthy is focused on the whole body, including spirits and souls. It is a state in which one can sleep, eat and drink, and conduct one's daily life normally. Healthy persons are able to work. So, they can keep their daily life and belongings and, also, their health which similar to WHO's definition on health.

When they fall ill, they will try to recover as soon as possible. In this study, researcher found that they use '*jab king*' or 'touching at body parts' for example the forehead, neck, arms and legs, etc. Thus, Laotian people diagnose a symptom after touching body parts: '*king hone*' or '*toh hone*' or 'body is getting hot'. In this sense, the meaning of '*king hone*' is not very different from that of 'fever' as defined by Western medicine, i.e. 'Fever is the temporary increase of body temperature (www.nlm.nih.gov/). However, Laotian view of fever-related illness is different from the Western medical view as seen with regard to the terminology, method of investigation, measure equipment and perceived degree of severity of illness. Moreover, Laotian people have other terms for 'fever' such as, '*jeb*' or '*puiy*'.

Regarding the causation of illness, Laotian believes that they can get these diseases from different places or causes. '*Khaj yung*', they are believed that they can get this disease from taking water or taking shower with water where there are mosquitoes or mosquitoes' larva. '*Khaj liad ook* or fever with blood vomit and blood feces' they believe they can get this disease because of wrong doing to the pond spirit, for example. According to Western medicine, dengue fever occurs because of the mosquitoes' bites and the introduction of the dengue virus into the patient's body. For Laotian people, diseases can be contagion and not contagion. At first, 'contagion and not contagion' can be considered as equivalent to the term 'communicable disease' in English. It must be said, however, that the underlying conception of 'contagion and not contagion' is

different from that of Western medicine. They probably learnt that contagion can occur from nature, environment, animals, and human contacts in family, classroom, community, including from tourists for diseases such as cold, cough, bird flu, influenza, etc. However, they don't perceive these diseases as contagious, but that they are incurring naturally. Moreover, they also believe that 'fever, or fever-related illness', can occur because of or soul loss. Laotian are beliefs that there are thirty-two souls (*kwaun*) in human body. If any one of them wander, is startled, or driven out of the body by any cause such as the seduction by malevolent spirits or being scared by car accident or travel, for example, the person may experience illness, psychological or emotional problems, and even die. Other perceived causes of fever-related illness are seasonal change, especially at the end of the raining season and the beginning of winter, hard work, growing condition in children, normal condition in a no-pregnant woman, etc. Another possible cause of illness is wrong deed to the ancestors' spirits and nature spirits. Otherwise, Laotian did not mention sorcery attack, food poisoning, or body imbalance as possible causes of fever-related illness as it was mentioned in previous ethnographies study [28].

In this study, I have compiled a total of thirteen Laotian terms related to types of fever-related illness with fever or *khaj* as core symptom. Most of these terms refer to symptoms of fever-related illness. Only one indicates the cause of the disease: '*khaj yung* or mosquitoes fever'. Moreover, in biomedicine, '*khaj yung*', '*khaj liad ook* or fever with blood vomit and blood feces' and '*khaj pa* or forest fever' have the same vector (mosquitoes, but different in mosquitoes species). Laotian people believe that they can get these diseases from different places or causes. '*Khaj yung*', they are believed that they can get this disease from taking water or taking shower with water where there are mosquitoes. '*Khaj liad ook* or fever with blood vomit and blood feces' they believe they can get this disease because of wrongdoing to the pond spirit. And '*khaj pa* or forest fever', they believe that they fall ill because they get something from the forest or made some wrongdoing to the forest spirit.

Researcher assumed that Laotian people are more concerned about illness symptoms than about illness causation because Researcher found that the terms used for diseases do not indicate the cause of the disease. They perceived the risk of contagion from other people. Moreover, the perceived degree of severity is an indication of the contagion of the disease. In this sense, this study is in accordance with previous studies. For Laotian people, diseases can be communicable and not communicable. They probably learnt that contagion can occur from nature, environment, animals, and human contacts in family, classroom, community, including from tourists for diseases such as cold, cough, bird flu, influenza, etc. However, they don't perceive these diseases as contagious, but that they are incurring naturally.

In this study, researcher found that Laotian people have different means of healing, such as, taking fever relief medicines, cooling body temperature by tepid sponge with wet cloth and 'blowing' on the head with Buddhist praying by an elderly in the family or community; sometimes, also, taking traditional herbs and/or Western medicines. Beside this, researcher did not found any disease preventive behaviors in the daily life and also during fever-related illness (such as, nature of the food eaten in case of illness, prescribed foods for children according to their age or for pregnant women, rituals for children, rituals for cover the body of the person, prescribed behaviours in the forest in order not to insult forest spirits, etc.) However, I found they are paying respect to the Lord Buddha, the ancestors, Gods and spirits to be healthy and lucky during Buddhist festivals (i.e., *Buddist Lent*, *Magha Puja* day, *Seasonal festival*).

Because Laotians believe that fever-related illness can affect themselves and their families, physically, mentally and in their daily life, they have to seek health-care services to cure or relieve their illness. However, their choices did not always support previous socio-anthropological findings. Brainard and collaborators [29], Davis-Roberts [8] and others [29, 30] have, for example, showed that when people fall ill, they would first seek home remedies, such as using local herbs, modern medicines, together with ritual. In case of failure of self-treatment, they would seek other forms of traditional treatment. In case of failure, they eventually seek modern or Western medicine. In this study, researcher has found that some of these steps or procedures of treatment are not always respected. In fact, in case of failure of self-treatment, patients prefer to seek the best health-care services for themselves or for family members. Especially, when the patient is the single child of the family and/or when some persons of the community presenting with the same illness symptoms have died. They even chose to cross the border for seeking health-care services in Thailand because they are more confident about their quality and efficiency. Moreover, demographical and economical factors, such as, monthly income, level of education, distance to the health-care services, cost of health-care services, having or having not relative in Thailand or Thai relatives, etc. little affect their choice.

CONCLUSION

As researcher have mentioned above in the introduction and research outcomes including results discussion, beliefs and experiences with fever-related illness may be or not similar with western biomedical perception. They may also differ from one area to another. For Laotian people, researcher found that '*khaj*' or fever is a terms '*king or toh*' focus on '*king*' or body is getting warm or hot. They use '*jab-king*' or 'touching at body parts' for example the forehead, neck, arms and legs, etc. for diagnose a symptom after touching body parts. However, Laotian view of fever-related illness is different from the Western medical view as regard to the terminology, method of investigation, measure equipment and perceived degree of severity of illness. However, the term '*khaj*' is not restricted to the meaning of 'fever'; it can also indicate an illness without 'fever'.

Regarding the causation of illness, Laotian believes that they can get these diseases from different places or causes, diseases can be communicable (*tidpad*) and not communicable (*bor tidpad*). They probably learnt that contagion, however, they don't perceive these diseases as contagious, but that they are incurring naturally. Moreover, they also believe that '*khaj*-fever, or fever-related illness', can occur because of soul loss, seasonal change, especially at the end of the raining season and the beginning of winter, hard work, growing condition in children, etc.

In this study, researcher found that Laotian people have different means of healing, such as, cooling body temperature by tepid sponge with wet cloth and 'blowing' on the head with Buddhist praying by an elderly in the family or community; sometimes, also, taking traditional herbs and/or taking Western fever relief medicines. In case of failure of self-treatment, patients prefer to seek the best health-care services for themselves or for family members. They even chose to cross the border for seeking health-care services in Thailand because they are more confident about their quality and efficiency. Moreover, demographical and economical factors have little affected to their choice.

Problems and Limitations

1. Language problem and limitation; Laotian language is somewhat similar to the language of the Northeast province of Thailand where I grew up during primary school and where, twenty years ago, I worked in the hospital after having my first degree in nursing. However, many words have different meanings, and it takes time to communicate and understand. For example, the Thai term '*sue kruang*' where '*kruang*' means machinery to help working such as, machines, electric appliances, etc. But in the Laotian language, it means a 'commodity to consume at home' such as food seasoning, soap, shampoo, toothpaste, and so on. And some terms are for calling diseases or causes such as '*payat*' for disease (or '*rok*' in Thai), '*tidpad*' for contagion (or '*tidtor*' or '*tidchiarok*' in Thai), '*non nam*' for mosquito larvae (or '*look nam* or *look nam yung*' in Thai).

2. Transport limitation. The three communities are located far from each other, and travelling in Lao PDR is a little inconvenient due to the vehicle used and roads are not smooth, especially during the raining season, so a lot of time was taken to reach each community.

3. As the political systems in the two countries are different, meeting people requires being careful. Local people assistance or guidance and sometimes travelling together were thus necessary. Moreover, to work in a community requires the acceptance of the local authority.

Implications

Applying the ethno-epidemiology perspective for the study of local perceptions on health and illness may help the work of health-care and non health-care workers. Ethno-epidemiology may lead to right healing or right treatment and can contribute to the prevention of diseases, especially severe contagious diseases.

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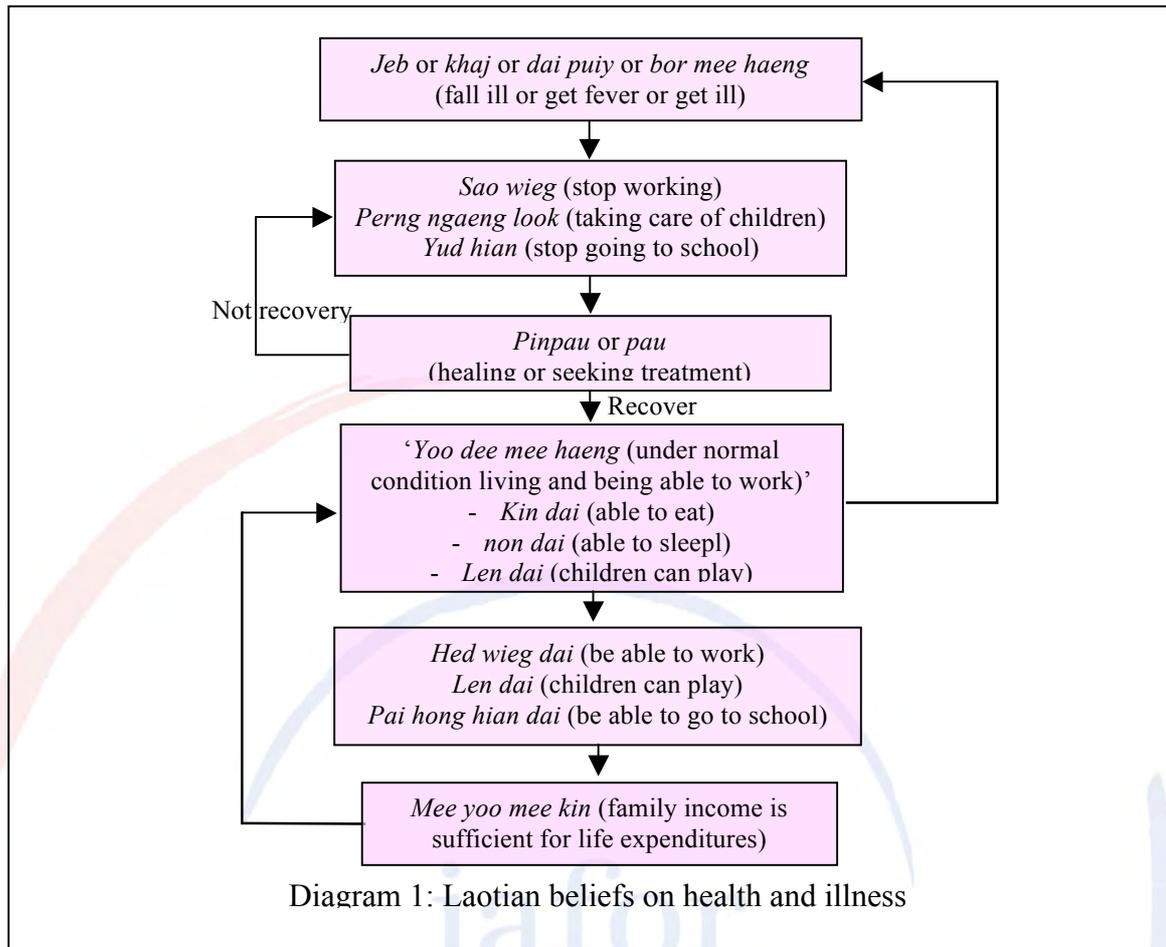


Table 1 Laotian informant and key informant's contexts and their choices of seeking health care services in case of fever-related illness.

contexts/ choices of seeking health care services (total 45 households)	buying medicine from drugstore in Lao PDR (21)	private's clinic in Lao PDR (3)	governmen t's hospital in Thailand (10)	private's clinic in Thailand (6)	buying medicine from drugstore in Thailand (4)	private's clinic in Thailand (1)
Age (mean 38.6 years)	40.9	28.7	36.3	41	38.8	30.0
Gender						
- male (12)	5	1	2	2	2	0
- female (33)	16	2	8	4	2	1
Status						
- single (9)	4	2	0	5	3	1
- married (36)	17	1	10	1	1	0
Education						
- primary school (19)	7	1	4	5	2	0
- junior second. school (13)	10	2	1	0	0	0
- secondary school (7)	3	0	4	0	0	0
- college/university (4)	1	0	0	1	1	1
- unschooled (2)	0	0	1	0	1	0
- other (0)	0	0	0	0	0	0
Occupation						
- farmer/rice farmer (16)	7	0	4	4	1	0
- merchant (5)	1	0	2	1	1	0
- tobacco growing (5)	4	1	0	0	0	0
- rubber tree growing (2)	1	0	1	0	0	0
- private's employee (6)	5	0	1	0	0	0
- government officer (2)	1	0	0	0	1	0
- student (2)	0	2	0	0	0	0
- owner business (2)	0	0	2	0	0	0
- no career (3)	1	0	0	1	0	1
- housewife (2)	1	0	0	0	1	0
Number of family's member (mean 5 persons/household)	mean 2.6 persons	mean 4.5 persons	Mean 6 persons	mean 4.5 persons	mean 6 persons	mean 5 persons
- 2-5 persons/household (2)	16		5			1
- 6- 10persons/household (2)	5	2	4	4	1	0
- > 10 persons/household (2)	0	1	1	2	3	0
		0		0	0	

Monthly family's earnings (mean 2.2 mil. Gibb/household)	mean 2.6 million Gibb	mean 1.9 million Gibb	mean 2 million Gibb	mean 1.6 million Gibb	mean 1 million Gibb	mean 5 million Gibb
- < 1 million Gibb (10)					0	
- 1 – 2 million Gibb (23)	3 12	0	4 2	3	3 0	0 0
- 2.1 – 3 million Gibb (2)	1 3	2 1	0 3	3 0	1 0	0 1
- 3.1 – 5 million Gibb (8)	2	0	1	0		0
- > 5 million Gibb (3)		0		0		
Relative living in Thailand						
- there is relatives (18)	8 13	1 2	5 5	1 5	3 1	0 1
- there is not relatives (27)						



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Organizational Ethical Climate and Employee Silence: A Cross-Level Analysis

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Abstract:

This study investigated the relationship between organizational ethical climate and employee silence. Multilevel analyses were conducted to test our hypotheses using a sample of 408 full-time employees from 24 high-technology firms in Taiwan. The results showed that instrumental climate was positively related to both acquiescent silence and defensive silence, whereas caring climate and independence climate were negatively related to the two silences. However, the results showed that the rules climate and the law and code climate did not have a significant association with acquiescent silence and defensive silence. Explanations for expected as well as unexpected findings are discussed and the theoretical and practical implications of these results are proposed.

INTRODUCTION

Employee silence is pervasive in modern organizations (Johannesen, 1974; Morrison and Milliken, 2000; Pinder and Harlos, 2001; Van Dyne et al., 2003) and has become an issue critical to organization management. In their interviews with 260 employees from 22 organizations in the United States, Ryan and Oestreich (1991) indicated that more than 70 percent of their subjects revealed that they felt afraid of speaking up to their organizations about issues or concerns that they had experienced at work. In another study, Milliken et al. (2003) found that 85 percent of the employees (34 of 40 people) in their interviews admitted to remaining silent to their supervisors about at least some of their concerns about their work since they felt that they could not bring any attention to their supervisor. Evidence from these two studies suggests that employees' silence about their work issues or problems is a common phenomenon in organizations. Surprisingly, however, the issue about employee silence has been largely ignored in the management literature. Recently, scholars have called attention to this issue and have advocated investigating the causes for why employees in organizations choose to remain silent (e.g., Milliken et al., 2003; Morrison and Milliken, 2000; Pinder and Harlos, 2001; Van Dyne et al., 2003).

Employee silence refers to the intentional withholding of ideas, information, and opinions that are relevant to the improvement of work and work organizations (Van Dyne et al., 2003). Previous research showed that the outcomes of employee silence can be either beneficial or detrimental for organizations. Sometimes, employee silence can help decrease managerial information overload, reduce interpersonal conflicts, and increase the informational privacy of coworkers (Van Dyne et al., 2003). Most of the time, however, employee silence is viewed as a dysfunctional behavior that can reduce innovations at the workplace (Argyris and Schön, 1978), interfere with organizational change processes (Morrison and Milliken, 2000; Ryan and Oestreich, 1991), devastate employee's job attitudes, such as satisfaction and commitment (Morrison and Milliken, 2000; Vakola and Maria, 2005), and even result in serious corruptions in organizations (e.g., Enron; Ashforth and Anand, 2003). Despite the significance of these negative effects, research on employee silence has been sporadic and sparse, and the causes of employee silence have remained under-explored in the management literature. As such, there is a need for more studies aimed at investigating the antecedents of employee silence.

In the present study, we were particularly interested in examining the relationship between ethical climate and employee silence. We chose ethical climate, a potential antecedent of employee silence, as the focus of our study for the following reasons. First, in an integrative model for explaining the phenomenon of employee silence, Pinder and Harlos (2001) suggested that organizational contextual factors are powerful antecedents of employee silence. Specifically, employees' perceived ethical climates of their organizations can serve as an important factor that determines whether they will speak up or remain silent about the problems they have experienced at work. Second, Martin and Cullen's (2006) meta-analytic review has shown that ethical climate is a salient antecedent of employees' dysfunctional behaviors. Because employee silence is often regarded as a kind of dysfunctional behavior, it can be logically inferred that employee silence is susceptible to the influence of organizational ethical climate. Last, in a recent study of employee silence, Tangirala and Ramanujam (2008) discovered that employees' procedural justice perceptions were significantly related to their silence behaviors. Because

organizational ethical climate is an important antecedent for employees' justice perceptions, it is reasonable to infer that the ethical climate is critical for understanding employees' silence behaviors. Based on the above three reasons, we chose ethical climate as the focus of our empirical investigation with expectations that it will lead us to a better understanding about employee silence. Because organizational ethical climate is a group-level variable and employee silence is an individual-level variable, our study was cross-level in nature. It represents an effort in trying to answer the call for exploring the influence of organizational contextual factors on employee silence. The findings of this study not only sheds light on our understanding of employee silence but also provides guidance on how to break the spiral of employee silence in organizations.

THEORETICAL BACKGROUND AND HYPOTHESES

Employee Silence

Pinder and Harlos (2001) used the term employee silence to describe an employee's "withholding of any form of genuine expression about the individual's behavioral, cognitive and/or affective evaluations of his or her organizational circumstance to persons who are perceived to be capable of effecting change or redress" (p. 334). It is important to note that the silence is not necessarily the antithesis or absence of voice (Scott, 1993; Van Dyne et al., 2003). Employee silence refers to the noncommunication resulting from a conscious decision of employees on withholding seemingly important information and concerns about their work (Morrison and Milliken, 2000; Pinder and Harlos, 2001; Van Dyne et al., 2003). Employee silence can be active, conscious, intentional, and purposeful.

Scholars have argued that employee silence is a multidimensional construct and suggested that it can take on different forms depending upon the underlying motives of the employees who act in silence. For example, Pinder and Harlos (2001) first conceptualized employee silence as a multidimensional construct on the basis of what they called acquiescence and quiescence motives. Building on these motives, they differentiated employee silence into two forms: acquiescent silence and quiescent silence. The former refers to a person's involuntary or passive withholding of relevant ideas or opinions about one's own work because of the feeling of resignation and the latter refers to a person's voluntary or proactive withholding of relevant ideas or opinions in order to protect oneself because of fear for possible negative consequences from revealing those ideas or opinions. In subsequent research, Van Dyne et al. (2003) used the term *defensive silence* to substitute Pinder and Harlos's (2001) quiescent silence. They argued that defensive silence is a better term than quiescent silence because the former is not only inclusive to the definition of the latter but also clearer than the latter, because the use of "defensive" avoids potential confusion from the multiple meanings of "quiescence" (e.g., compliance, agreement, or submissiveness). Van Dyne et al. further argued that employee silence can originate from prosocial motives. For example, an employee may keep silent on work problems for the good of his or her colleagues. Van Dyne et al. proposed a conceptual framework of three types of silence which emphasizes the influences of three different employee motives: acquiescent silence (a disengaged behavior that is stimulated by the resignation motive), defensive silence (a self-protective behavior that is stimulated by the fear motive), and prosocial silence (an other-oriented behavior that is instigated by the cooperation motive).

In the present study, we followed Pinder and Harlos's (2001) path to conceptualize employee silence as a multi-dimensional construct and focused our attention on the two types of employee silence proposed by Van Dyne et al.: acquiescent silence and defensive silence. The two silences are regarded as the negative aspect of employee silence because they refer to an employee's withholding of work-related information and ideas, which is behavior that has a negative consequence on organizational performance. The third type of employee silence, prosocial silence, represents the positive aspect of employee silence because of its beneficial effect on organizational performance. The present study chose to leave out prosocial silence because the study was mainly concerned with the issue of whether organizational ethical climate can be cultivated to reduce the negative types of employee silence. We were particularly interested in acquiescent and defensive employee silence in high-tech firms. The employees in the high-tech firms are usually highly-skilled and equipped with valuable work knowledge which is critical to organizational performance. Thus, negative types of silence behaviors greatly hamper the performance of their companies and deserved to serve as the subjects of the present study.

Ethical Climate

Ethical climate is defined as "the shared perceptions of what ethically correct behavior is and how ethical issues should be handled in an organization" (Victor and Cullen, 1987, p. 51). According to the work of Victor and Cullen (1987, 1988), the theoretical typology of ethical climate can be constructed along two dimensions. The first dimension is derived from Kohlberg's (1984) theory of cognitive moral development and composed of three levels of ethical criteria used for decision making, namely, the egoism, the benevolence, and the principle. The egoism refers to the self-interest focus and the self-interest maximization behaviors; the benevolence refers to the concern for satisfying the interests of as many people as possible; and the principle concerns the internalization of universal standards and beliefs by members of organizations (Cullen et al., 2003; Martin and Cullen, 2006; Victor and Cullen, 1988). The second dimension, derived from sociological theories of roles and referent groups in organizations (Merton, 1957), refers to the three loci of analysis used as a referent in ethical decision making, namely, the individual (one-self) focus, local (group or organization) focus, and cosmopolitan (society or humanity) focus. The individual focus refers to the use of one's own self as the prime referent for moral reasoning; the local focus refers to reliance on a group in one's own immediate social systems as the referent for moral reasoning; and the cosmopolitan focus refers to the anchorage on a referent outside oneself and one's own immediate group or organization in moral reasoning (Cullen et al., 2003; Martin and Cullen, 2006; Victor and Cullen, 1988).

By crossing the three levels of ethical criteria with the three loci of analysis, Victor and Cullen (1987) derived nine different types of ethical climate: self-interest, company profit, efficiency, friendship, team interest, social responsibility, personal morality, company rules and procedures, and laws and professional codes. Victor and Cullen (1988) used this typology of nine possible types of ethical climates to develop an ethical climate questionnaire and to collect empirical data to validate the typology. They found that there were only five ethical climate types existing in their data. These five types of climates are designated as instrumental (focus on the maximization of self interest), caring (concern for the well being of others), independence (concern for adhering to one's personal ethical beliefs), rules (expectation for adhering to

company's policies and procedures), and law and code (expectation for complying with the law and professional standards). A recent meta-analytic review (Martin and Cullen, 2006) has shown that the typology of five types of ethical climates found by Victor and Cullen (1988) were also found in most of the empirical studies in the literature

Ethical Climate and Employee Silence

The antecedents for employee silence can be individual as well as organizational (Pinder and Harlos, 2001; Tangirals and Ramanujam, 2008). Pinder and Harlos (2001) have suggested that individual predispositions, such as self esteem, communication comprehension, and locus of control as well as organizational contextual factors, such as organizational injustice, deaf ear syndrome, and climate of silence are important antecedents of employee silence. Tangirals and Ramanujam's (2008) empirical study showed that several individual-level variables, including the employee's workgroup identification, professional commitment, and justice perception, were negatively related to employee silence and an organization-level variable, the procedural justice climate, strengthened the negative relationship.

Schneider and Reichers (1983) have argued that organizational climate is a determinant more powerful than individual needs or motivations on employees' behaviors. Withey and Cooper (1989) have also indicated that group-level variables, such as group or organizational climates, account for more variance in employee communication choices than do individual-level variables. As research has demonstrated that ethical climate acts as a salient antecedent of employee's dysfunctional behavior (Martin and Cullen, 2006), a study of its effects on employee silence, a specific type of the dysfunctional behavior, may prove prolific because such a study will provide us an understanding about the causes of employee silence better than the individual variables that have been associated with employee silence in the literature.

An explanation that can account for the effect of ethical climate on employee silence is social information processing theory (Salancik and Pfeffer, 1978). The theory argues that individuals use information embedded in their direct social context (e.g., the norm of interpersonal interaction) to form their judgments about how they should behave in the situation where the social context is embedded. According to this theory, ethical climate can be regarded as an organizational context which is constituted by a set of ethical practices, values, and norms and acts as a source of information that can determine individual employee's attitudes and behaviors in organization. Similarly, Weber (1995) suggests that ethical values are embedded in organizations and can socialize employees toward particular ethical decisions, attitudes, and behaviors. If an organization is characterized by a strong ethical climate, its employees will regard ethics to be expected, desired, and rewarded in their workplace and are less likely to engage in ethical misconducts or dysfunctional behaviors (Martin and Cullen, 2006; Peterson, 2002; Wimbush et al., 1997). From this reasoning, we can expect that a dysfunctional behavior, like employee silence, will be less likely to occur in an organization where a strong ethical climate is manifested. The following sections will discuss how the different types of ethical climates can affect employee silence.

Under the instrumental climate, employees act in accordance with the concern for maximizing one's own interests to the extent of lacking consideration about the consequences of their

behaviors on other's well-being (Martin and Cullen, 2006). The instrumental climate encourages individuals to make decisions from an egoistic perspective. As such, one would expect that employees working under a higher level of instrumental climate will be more likely to conceal valuable ideas and information purposefully as a form of self-protection and be less willing to share critical knowledge with their co-workers in order to maximize their own benefits. This conjecture is supported by Wimbush et al.'s (1997) findings about a positive association between instrumental climate and employee's misbehaviors. A similar finding from Peterson (2002) on a significant positive relationship between egoism climate and unethical behavior also supports this conjecture. Hence, the following hypothesis was posited:

Hypothesis 1: Instrumental climate is positively related to employee silence.

Contrary to the effects of instrumental climate on employee silence, a caring climate encourages individuals to make ethical decisions from a benevolent perspective. If a caring climate is prevalent in an organization, its managers will be inclined to fulfill its employees' needs and value the employees' contributions to the organization and that, in turn, will facilitate employees' identifications with the organization (Leung, 2008). Under such a climate, employees are willing to reciprocate with positive behaviors to their organizations (Deshpande, 1996) and exhibit a sincere concern for other's well being which, in turn, will prevent them from engaging in dysfunctional behaviors. That is, employees under a higher level of caring climate will not only feel that their contributions to their organizations are valued and respected, but also become less fearful for the possible adverse personal consequences from speaking up. We expect that employee silence will occur less in organizations where a caring climate is prevalent.

Hypothesis 2: Caring climate is negatively related to employee silence.

The other types of ethical climates: the independence, the rules, and the law and code climates are deontological in nature (Martin and Cullen, 2006; Victor and Cullen, 1988) in the sense that they are principle-related and not subject to the means-end economic calculation. With an independence climate, organizations encourage their employees to make independent decisions on the basis of personal moralities and values. Under such a circumstance, employees will hold themselves responsible for a high ethical standard of performance and will sense a greater duty for expressing their opinions on work-related improvements for their organizations. Therefore, when confronted with a work-related issue or problem, employees are less likely to remain silent.

Under the rules climate, the decision making of an individual is expected to align with the organizational rules and policies. Such a climate makes employees feel that they have been given clear and consistent company rules and procedures to follow in their work processes. This feeling not only assures the employees that their act of expressing ideas, information, and opinions about work-related improvements is valued but also reduces their personal fears from unwarranted blames for speaking up about potentially disruptive work issues.

Under the law and code climate, the decision making of an individual employee is expected to adhere to external codes of ethics such as law or professional codes of conduct. When the law and code climate is prevalent in organizations, employees will be motivated to comply with existing external codes and be unafraid of the negative consequences for speaking up because

they believe that their actions will be safeguarded by the law or professional codes. Therefore, they will be more honest and candid in their jobs and less likely to remain silent about work-related problems they have experienced.

Based on the above arguments, we propose the following hypotheses.

Hypothesis 3: Independence climate is negatively related to employee silence.

Hypothesis 4: Rules climate is negatively related to employee silence.

Hypothesis 5: Law and code climate is negatively related to employee silence.

METHODS

Sample and Procedure

The participants of this study were full-time employees sampled from 24 high-technology firms in Taiwan, which included electronics, semiconductors, telecommunications, information technology, and software companies. We contacted the managers of these companies and requested their consent on their employees' participation. One questionnaire and a cover letter were sent to each participant. The letter explained the purpose of the study and assured the participants of the confidentiality and anonymity of their responses. The complete questionnaire was sealed in an envelope and returned directly to the researchers.

A total of 600 questionnaires were distributed and 426 were returned. Of the 426 returned questionnaires, 18 were eliminated because of missing responses, resulting in a valid response rate of 68%. The final sample consisted of 408 full-time employees from 24 high-technology firms. The number of participants from a single company ranged from 10 to 22, with an average of 17 ($SD = 3.39$). Of the 408 participants, 44.4% were male and 55.6% were female. The age of the participants ranged from 21 to 63 years, with a mean of 33.59 years ($SD = 8.27$). The average organizational tenure of the participants was 8.14 years ($SD = 8.35$).

The present study used a self-report, single-source approach to obtain measures for the variables on the basis of the following considerations. First, previous research (e.g., Tangirala and Ramanujam, 2008) has used the self-report approach to collect data on employee silence due to the inactive, implicit nature of the behavior. The lack of action in employee silence makes it ambiguous for observers to detect and interpret. It is highly possible that employees sometimes remain silent simply because they are uninformed or have nothing to say. Therefore, the use of another's (e.g., supervisor's or coworker's) observation as the measure of employee silence will likely be erroneous and invalid (Tangirala and Ramanujam, 2008; Van Dyne et al., 2003). Second, though the use of self-report assessment on all the variables in a research may lead to common method bias, it is not likely to occur in the present study because its independent variable, organizational ethical climate and its dependent variable, employee silence, are assessed by measures taken at different levels. The former is a group-level variable and is assessed by a group-level measure and the latter an individual-level variable assessed by an individual-level index. The difference in the level of measurement prevents the occurrence of the common method bias (Morgeson and Hofmann, 1999). Last, we used statistical remedies recommended by Podsakoff et al. (2003) to partial out the common method variance (CMV) that may possibly exist in this study. Specifically, we used the measure of dispositional general

affectivity of the respondent as a control variable to partial out the possible CMV in hypothesis testing. The dispositional general affectivity is an individual difference which can systematically bias people's cognitive or behavioral responses (i.e., ethical climate perception and silence behavior) toward their organizations (Cropanzano et al., 1993; Watson et al., 1988). In the present study, controlling for the dispositional general affectivity of respondents allowed us to remove a factor that may induce co-variation between ethical climate and employee silence because of systematic bias. On the basis of the above reasoning, it was justifiable for this study to use the self-report, single-source approach of data collection.

Measures

The measures of the variables were adapted from the scales appearing originally in the English literature. They were translated into Chinese by the authors and the translations were then reviewed by two bilingual experts. The experts were given the English and Chinese versions of the scales and asked to evaluate the appropriateness and the semantic equivalence of the translation (Shaffer and Riordan, 2003). A round of revision was conducted on the basis of their feedback. This review and revision process was repeated until no further inappropriateness or breaches in equivalence of translation were detected by the two experts. The above procedures was used to ensure the content validity of the measurements (Schwab, 2005).

Ethical climate. Ethical climate was assessed by using the questionnaire developed by Victor and Cullen (1988). Six items were used to measure the instrumental climate (e.g., "in this company, people are mostly out for themselves"), four items were used to assess caring climate (e.g., "the most important concern is the good of all the people in the company as a whole"), three items to assess independent climate (e.g., "the most important concern in this company is each person's own sense of right and wrong"), four items to assess rules climate (e.g., "it is very important to follow the company's rules and procedures here"), and four items to assess law and code climate (e.g., "in this company, people are expected to strictly follow legal or professional standards"). Respondents were asked to evaluate the extent to which they agreed with the items on a 5-point Likert-type scale with a range of 1 (*strongly disagree*) to 5 (*strongly agree*). The Cronbach's alpha for the instrumental, caring, independence, rules, and law and code climates was .84, .83, .75, .78, and .84, correspondingly.

Employee silence. Employee silence was assessed with ten items adapted from Van Dyne et al. (2003). Acquiescent silence was assessed by five items (e.g., "you passively withhold ideas, based on resignation") and defensive silence was measured by another five items (e.g., "you withhold your solutions to problems because you are motivated by fear"). Respondents were asked to indicate the extent to which they agreed with the items on a 5-point Likert-type scale with a range of 1 (*strongly disagree*) to 5 (*strongly agree*). Our analysis showed that the Cronbach's alpha was .81 for acquiescent silence and .89 for defensive silence.

Control variables. The individual difference variables of positive and negative affectivities were included as control variables in our hypothesis testing. The positive and negative affectivities of a respondent were measured by the 20-item PANA scale developed by Watson et al. (1988). Respondents were requested to indicate on a 5-point scale the extent to which they have generally experienced the mood described by each of the items in the past few weeks. The scale

had a range of 1 (*not at all*) to 5 (*very much*). The Cronbach's alpha was .90 for positive affectivity and .87 for negative affectivity. Other individual-level variables, including gender, age, and organizational tenure of the respondent, were also assessed in our survey questionnaire, but they were not used as control variables for hypothesis testing for the reasons explained in the next section.

Analysis

The data of the present study were multilevel in nature - gender, age, organizational tenure, affectivities, and employee silence were measured at the individual level while organizational ethical climate was assessed at the group level. Because correlation analysis showed that three of the individual-level variables—gender, age, and organizational tenure—were all unrelated to both the acquiescent and the defensive silences (see Table II in Results section) and preliminary regression analysis indicated that the three variables explained only a small, insignificant amount of variance in acquiescent silence and in defensive silence ($R^2 = .016$ and $R^2 = .050$, respectively), we decided to exclude them from the subsequent multilevel analysis performed for hypothesis testing. On the other hand, correlation analysis revealed that the other two individual-level variables, the positive and negative affectivities, were significantly correlated with the two silences and explained a large proportion of their variances ($R^2 = .181$ and $R^2 = .154$, respectively). Thus, we included them in the subsequent analysis and used them as control variables for hypothesis testing.

We used hierarchical linear modeling (Hofmann, 1997; Hofmann and Gavin, 1998; Raudenbush and Bryk, 2002), an analytical method most suited for multi-level analysis to test our hypotheses. We calculated the variance in the dependent variable (employee silence) explained by individual-level variables (positive affectivity and negative affectivity) and the variance explained by group-level variables (the five ethical climates). We also derived the total variance in the dependent variable explained by different models (see Table III in Results section) by using the formula suggested by Raudenbush and Bryk (2002).

RESULTS

Validity of Measurement

To evaluate the discriminant and convergent validities of the measures, we conducted a series of confirmatory factor analyses (CFA) on our variables. The results in Table I show that the seven-factor model—instrumental climate, caring climate, independence climate, rules climate, law and code climate, acquiescent silence, and defensive silence—fitted the data better ($\chi^2 = 1190.95$, $\chi^2/df = 2.88$, IFI = .88, CFI = .88, RMSEA = .068) than the other four competing models (see Table I) which were comprised by a fewer number of factors. Further, chi-square difference tests also demonstrated that the seven-factor model was a better fit than the four competing models. These two results provided evidence for the attainment of a satisfactory discriminant validity on the measurement of the seven variables. Moreover, the factor loadings of the items in each of the seven variables were all greater than .50 and reached statistical significance ($p < .01$), a sign for the attainment of a satisfactory convergent validity of the measurement (Anderson and Gerbing, 1988).

INSERT TABLE I ABOUT HERE

Aggregation for the Measurement of Organizational Ethical Climate

To create the group-level measure of organizational ethical climate, we aggregated the individual-level measures of ethical climate provided by the participants from each company by using the direct consensus composition approach suggested by Chan (1998). This approach uses the average of individual-level measures to derive a group-level measure. To justify the aggregation, we calculated the within-group agreement statistic (r_{wg}) (James et al., 1993) for each of the five ethical climates and for each organization.

The average r_{wg} for the 24 companies was .90 for instrumental climate, .87 for caring climate, .86 for independence climate, .89 for rules climate, and .90 for law and code climate. They all exceeded the conventionally accepted r_{wg} of .70 (James et al., 1993) and manifested a reasonable level of agreement. We also calculated the intraclass correlations (i.e., ICC(1) and ICC(2)) for the aggregated measures. The ICC(1) represents the proportion of the variance in the individual-level measure that is attributable to group membership and the ICC(2) represents the reliability of the group-level aggregated measure (Bliese, 2000). The ICC(1) was .11 for instrumental climate ($F_{23, 384} = 3.19, p < .001$), .11 for caring climate ($F_{23, 384} = 3.08, p < .001$), .11 for independence climate ($F_{23, 384} = 3.16, p < .001$), .07 for rules climate ($F_{23, 384} = 2.16, p < .01$), and .13 for law and code climate ($F_{23, 384} = 3.60, p < .001$). The ICC(2) was .68, .67, .68, .54, and .72 respectively. The results on the r_{wg} and ICC(1) showed that there was an acceptable within-group agreement on the individual-level assessment of ethical climate and the results on ICC(2) suggested that the derived group-level assessment of ethical climate was reliable.

Hypotheses Testing

Table II shows the means, standard deviations, internal consistency reliabilities, and intercorrelations for the variables that were measured at the individual and the group level. Gender, age, and organizational tenure were all uncorrelated with the acquiescent and defensive silences. However, positive affectivity was negatively correlated with the two silences and negative affectivity was positively correlated with the two silences. Acquiescent silence was positively correlated with defensive silence. The rules climate was positively correlated with the caring and the law and code climates, but negatively correlated with the instrumental climate.

INSERT TABLE II ABOUT HERE

Our hypotheses predict that ethical climate, a group-level variable, is significantly related to employee silence, an individual-level variable. For validating these hypotheses, there must be a significant between-group variance presenting in the dependent variable, employee silence. Thus, we first ran a null model to examine whether there was a significant between-group variance in acquiescent silence and defensive silence. The results showed that the chi square for acquiescent silence ($\chi^2_{23} = 88.64, \tau_{00} = .04, p < .001, ICC[1] = .14$) and for defensive silence ($\chi^2_{23} = 74.07, \tau_{00}$

= .03, $p < .001$, $ICC[1] = .11$) were all significant, which indicated that the prerequisite for a significant between-group variance was met.

According to the results from the level 1 analysis shown in Table III, positive affectivity was negatively associated with acquiescent silence ($\gamma = -.22, p < .001$) and defensive silence ($\gamma = -.15, p < .01$). However, negative affectivity was positively related to the two silences ($\gamma = .15, p < .05$ and $\gamma = .20, p < .01$, respectively). After controlling for the effects of the positive and negative affectivities, the results from the level 2 analysis manifested that the instrumental climate was positively related to both acquiescent silence ($\gamma = .39, p < .001$) and defensive silence ($\gamma = .16, p < .05$). The caring climate was negatively related to both acquiescent silence ($\gamma = -.27, p < .01$) and defensive silence ($\gamma = -.20, p < .05$). The independence climate was also negatively related to both acquiescent silence ($\gamma = -.39, p < .001$) and defensive silence ($\gamma = -.24, p < .05$). Accordingly, Hypotheses 1, 2, and 3 were supported by these results. However, the results in Table III revealed that the rules climate and the law and code climate had no significant association with both the acquiescent silence and the defensive silence. Hypotheses 4 and 5 were not supported.

INSERT TABLE III ABOUT HERE

DISCUSSION

This study contributes to the literature of employee silence by examining the cross-level effect of organizational ethical climate on employee silence, an endeavor responding to the call for exploring the causal influences of organizational contextual factor on employee silence. The use of aggregate measure of ethical climate in our multi-level analysis made the testing of the contextual effect of ethical climate more valid compared to the use of an individual employee's perceived ethical climate in a single-level analysis, a practice frequently seen in the literature (e.g., Martin and Cullen, 2006; Mulki et al., 2007; Tsai and Huang, 2008). The use of individual perception leads to a contamination on the measurement of ethical climate because the perception measure taps partly in the true level of organizational ethical climate experienced by an employee and partly in the idiosyncrasy in the employee's assessment of the climate. Though employees from a same organization share the same ethical climate, they may have different perceptions of the climate because of differences in experiences during encounters with the ethical events unfolding in the organization and because of differences in applying moral standards onto their judgments about the ethical events. The idiosyncrasy can magnify the measurement error of ethical climate and cause an underestimation on the effect of ethical climate on employee silence. However, by taking the aggregate of a group of employees' ethical perceptions to derive an organization-level ethical measure, we counter-balanced the random errors in perception to give rise to a better manifestation of the true effect of the ethical climate on employee silence.

The results of the study showed that after controlling for employees' positive and negative affectivities, the instrumental climate was positively related to both acquiescent and defensive silence. Under a strong instrumental climate, individuals may act from an egoistic perspective (Martin and Cullen, 2006; Victor and Cullen, 1988). Their behaviors are guided by self interest and characterized by an indifference to other's well-being. Over time, this climate may induce a competitive atmosphere within the organization. Affected by such an atmosphere, employees

may intentionally withhold work-related ideas and information as a form of self-protection and as a way of maximizing their own benefits. Alternatively, it is possible that employees may feel acquiescent and choose to remain silent because of doubts about the usefulness of revealing their ideas or information about work problems.

The results also showed that the caring climate had a negative effect on both acquiescent silence and defensive silence. Under the caring climate, employees may receive sincere concern and social support from their organizations, which can decrease fear of the negative consequences of expressing their ideas and opinions and can help them dissociate the belief that speaking up is pointless and unlikely to make a difference. Thus the finding of a significant relationship between the independence climate and the two forms of employee silence is consistent with our expectation. The independence climate encourages employees to make decisions and take actions on the basis of personal moralities and individually held values (Martin and Cullen, 2006; Victor and Cullen, 1988). Under such a circumstance, employees are more likely to behave according to the deontological principles of morality and to avoid acting in a dysfunctional way, such as being silent on critical work issues or withholding their ideas about the solutions of work-related problems. The findings of the associations between the instrumental, caring, and independence climates and employee silence indicate that the ethical climates which take a locus oriented toward individual's concern in Martin and Cullen's (2006) classification of ethical climate will have a significant influence on employee silence.

Inconsistent with our predictions, the results showed that the rules climate and the law and code climate had no significant association with either acquiescent or defensive silence. A plausible explanation for this unexpected finding is that the two climates place emphasis on a concern that is greater than oneself. The rules climate stresses the expectation for following the rules stipulated in work procedures in decision making and action taking. Such a concern takes local work situations (one's own workgroup or organization) as its main locus of concern (Martin and Cullen, 2006). On the other hand, the law and code climate stresses the expectation for meeting the requirement of the laws and standards of professions in decision making and action taking, a cosmopolitan (societal) locus of concern (Martin and Cullen, 2006). According to Van Dyne et al. (2003), an employee's decisions on remaining silent or speaking up are made on the basis of the individual's own motives, a manifestation of the self locus of concern. A locus of concern greater than oneself will lack such a motivational basis and be unrelated to employee silence. For this reason, employee silence would not be affected by the rules climate or the law and code climate because they focus the employee's attentions externally on a local or a cosmopolitan entity.

Managerial Implications

Several practical implications for reducing employee silence on critical work problems can be derived from this study. The finding of a positive association between instrumental climate and employee silence suggests that companies can work to reduce over-reliance on material incentives as rewards for their employees' performance and to increase the use of group-oriented cooperative behaviors (e.g., helping behaviors and other organizational citizenship behaviors) as a criterion for employees' performance evaluations. The two practices will mitigate interpersonal competition and intensify a concern for others within the organization and lead to a suppression

of instrumental climate in order to reduce employees' inclination for engaging in the act of withholding work-related ideas, information, or opinions.

The finding of a negative relationship between caring climate and employee silence suggests that companies can foster a caring atmosphere by ensuring their employees that their benefits are a major organizational concern in order to reduce inclinations towards employee silence. The negative association between independence climate and employee silence suggests that companies can empower their employees through delegation of responsibilities for decision making contingent on the receiving of sufficient moral judgment training, an act for inducing independent ethical climate in order to break their work-related silence. Combining these findings together with the findings of no association between the rules and the law and code climates and employee silence, this study informs companies that they can devote more effort to cultivating instrumental, caring, and independence climates and less to the rules and the law and code climates in order to remove employee silence.

Limitations and Future Directions

Several limitations of this study should be noted. The first concerns the generalization of the results of this study across different industries. The data of this study were collected from a sample of high-tech companies in the electronic, semiconductor, communication and information, and software industries and hence the generalization of the findings to traditional industries or to high-tech companies in other industries should be taken cautiously. To enhance the generalizability, future research can replicate the study in other industries

The second limitation is with regard to the generalization of the results of this study to employees from other cultural backgrounds. Our study was conducted in Taiwan, a country characterized by a culture of collectivism. In the collectivist versus the individualistic culture, the instrumental, caring, and independence climates may change their effects on employee silence. The collectivist culture debases self-focus concern and appreciates mutual caring and thus may magnify the influence of instrumental and caring climates on employee silence. In the individualist culture, this influence could be attenuated because the concern for one's self is seen as normal and mutual caring is not typically expected in interpersonal interaction. On the other hand, independence in responsibility taking and decision making is deemphasized in the collectivist culture and hence the effect of independence climate on silence could be attenuated. However, in the individualist culture, this effect may be magnified because independence and autonomy is highly valued in interpersonal interaction. Future research can test this moderating effect of culture on the relationship between ethical climate and employee silence.

The third limitation is that the present study did not examine the influence of ethical climate on prosocial silence, a positive type of employee silence that can bring benefits to organization (Van Dyne et al., 2003). If ethical climate can be used to suppress the two negative types of employee silence—acquiescent and defensive silences, it may also be applicable to enhancing prosocial silence, the positive type of employee silence. To develop a thorough understanding of the effect of ethical climate on employee silence, future research can be extended to study the positive types of employee silence.

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Table I. Confirmatory factor analyses for the variables

Models	χ^2	<i>df</i>	χ^2/df	IFI	CFI	RMSEA	$\Delta\chi^2(\Delta df)$
1. Seven-factor model ^a	1190.95	413	2.88	.88	.88	.068	--
2. Six-factor model ^b	1553.02	419	3.71	.84	.83	.082	362.07** (6)
3. Three-factor model ^c	3008.29	431	6.98	.67	.67	.121	1817.34** (18)
4. Two-factor model ^d	3356.01	433	7.75	.63	.62	.129	2165.06** (20)
5. One-factor model ^e	6322.28	434	14.57	.41	.41	.183	5131.33** (21)

Note: The values of $\Delta\chi^2$ and Δdf are differences between the seven-factor model and the other models. IFI = incremental fit index; CFI = comparative fit index; RMSEA = root mean square error of approximation.

^aThe model comprises the five ethical climates and two forms of employee silence.

^bThe model combines the two forms of employee silence into one factor.

^cThe model combines the five ethical climates into one factor.

^dThe model combines the five ethical climates into one factor and the two forms of employee silence into another factor.

^eThe model combines all the variables into one factor.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

iafor

Table II. Means, standard deviations, reliabilities, and intercorrelations of the variables

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
Level 1 (<i>n</i> = 408)									
1. Gender ^a	.44	.49	--						
2. Age	33.59	8.27	.10	--					
3. Organizational tenure	8.14	8.35	.03	.88**	--				
4. Positive affectivity	3.18	.54	.10*	.10*	.10*	(.90)			
5. Negative affectivity	2.20	.49	-.10*	-.13*	-.12*	-.17**	(.87)		
6. Acquiescent silence	2.26	.53	.02	-.04	-.04	-.35**	.24**	(.81)	
7. Defensive silence	1.99	.51	.03	-.02	-.02	-.26**	.29**	.62**	(.89)
Level 2 (<i>n</i> = 24)									
1. Instrumental climate	2.79	.27	--						
2. Caring climate	3.33	.29	-.18	--					
3. Independence climate	3.47	.30	.01	.04	--				
4. Rules climate	3.67	.21	-.42*	.49*	-.07	--			
5. Law and code climate	3.66	.29	-.22	.26	-.18	.68**	--		

Note: Cronbach's alpha is in parentheses.

^aDummy coded variable: 0 = female; 1 = male.

p* < 0.05; *p* < 0.01; ****p* < 0.001.

Table III. HLM analysis with acquiescent and defensive silences as the dependent variables

	Acquiescent silence		Defensive silence	
	Model 1	Model 2	Model 3	Model 4
Level 1:				
Intercept (γ_{00})	2.25***	2.24***	1.98***	1.98***
Positive affectivity (γ_{10})	-.22***	-.22***	-.15**	-.15**
Negative affectivity (γ_{20})	.15*	.15*	.20**	.21**
Level 2:				
Instrumental climate (γ_{01})		.39***		.16*
Caring climate (γ_{02})		-.27**		-.20*
Independence climate (γ_{03})		-.39***		-.24*
Rules climate (γ_{04})		.14		.01
Law and code climate (γ_{05})		-.14		-.13
Within-group variance (σ^2)	.20	.20	.20	.20

Between-groups variance (τ_{00})	.04***	.02**	.03***	.02**
$R^2_{\text{within-group}}$	.16	.16	.14	.14
$R^2_{\text{between-groups}}$		.48		.33
$R^2_{\text{total}}^a$	.14	.20	.12	.16

^a $R^2_{\text{total}} = R^2_{\text{within-group}} \times (1 - \text{ICC}[1]) + R^2_{\text{between-groups}} \times \text{ICC}(1)$. The ICC(1) is .14 for acquiescent silence and .11 for defensive silence.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.



*Preliminary Findings on the Use of Anti-Drug Campaigns and Communication Strategies
to Increase Awareness about the Dangers of Drug Abuse in Malaysia*

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Abstract:

PROBLEM STATEMENT: Today, drug abuse is severely affecting the society causing loss in terms of costs, productivity and increased crime. Many strategies have been introduced in addressing the drug problem either by strengthening the enforcement agencies, organizing prevention programs, and improving on methods of treatment and rehabilitation of drug users. In recent years, research-based prevention programs have proven effective (National Institute on Drug Abuse, 2003). These programs were tested in diverse communities, in a wide variety of settings, and with a range of populations. Although there are various types of drug prevention programs, there is lack of study in relation to anti-drug campaigns and communication strategies in the Malaysian context.

PURPOSE: The aim of this study was to identify the level of knowledge and awareness of the Malaysian society about the dangers of drugs and to determine if the use of media and communication strategies increases awareness about the dangers of drug abuse.

METHODS: A 61-item closed format survey instrument was developed to evaluate the use of anti-drug campaigns and communication strategies on drug abuse. A total of forty participants completed the questionnaires (n = 40) which includes 48% male and 52% female.

RESULTS: Two types of anti-drug campaigns and communication strategies utilized in Malaysia to increase awareness about the dangers of drug abuse are: (1) the mass media, and (2) outdoor advertisement (e.g. billboards, brochures, roadshows). Majority of the participants were found to have moderate knowledge and awareness about the dangers of drug abuse through the campaigns and strategies. Television shows the highest figure, followed by newspaper, radio, magazines and the Internet on the exposure of participants to campaigns.

CONCLUSION: The results highlight the feasibility of using a variety of media to educate and increase awareness about the dangers of drugs abuse. Suggestions for future study are also included.

1. Introduction

Today, drug abuse is severely affecting the society causing loss particularly in terms of treatment and rehabilitation costs, lost of productivity and increased crime. Many methods and strategies have been introduced in addressing the drug problem either by strengthening the enforcement agencies, organizing prevention programs and increasing anti-drug education as well as improving on methods of treatment and rehabilitation of drug users. In recent years, research-based prevention programs have proven effective (National Institute on Drug Abuse, 2003). These programs were tested in diverse communities, in a wide variety of settings, and with a range of populations. Although there are various types of drug prevention programs, there is lack of study in relation to anti-drug campaign and communication strategies in the Malaysian context.

According to Valente (2001), an assessment of the effectiveness of the media campaign will open up huge opportunities for intervention improvement while ensuring intervention goals can be achieved successfully. Hornik & Yanovitzky (2003) stipulates that failure to provide an assessment of the campaigns may result in the campaign not achieving the desired outcome.

Anonymous (2003) in his study on anti-drug campaign conducted by Leo Burnett and McCann-Erickson in 2002, targeting young people found that the campaign can have both positive and negative effects on the target group. The findings showed that 25 percent of the respondents have a tendency towards drug addiction after watching the anti-drug campaign and 75 percent of the respondents tend to stay away from drugs. This study proves the importance of assessment on the effectiveness of a campaign to ensure that the campaign will achieve its objectives and not add to existing problems.

Therefore, the aim of this preliminary study was to identify the level of knowledge and awareness of the Malaysian society about the dangers of drugs and to determine if the use of media and communication strategies may increase awareness about the dangers of drug abuse.

2. Method

By developing a better understanding of the Malaysian society's level of knowledge and awareness about the dangers of drugs and identifying whether the use of media and communication strategies increases awareness about the dangers of drug abuse, policy makers as well as those working directly in addiction may gain information that will make prevention efforts more successful. A quantitative method was adopted to serve as the method for this preliminary study.

2.1 Sampling

Respondents were those from all walks of life (youth, youth, residents' association leaders, leaders of youth associations) in Malaysia. Random sampling technique was used to select 500 respondents who were apportioned based on five different zones - Southern Zone (Johor, Malacca and Negeri Sembilan), Central Zone (Selangor, Kuala Lumpur and

Putrajaya), North Zone (Perak, Penang, Kedah and Perlis), East Coast Zone (Kelantan, Pahang and Terengganu) and East Malaysia Zone (Sabah and Sarawak).

2.2 Instrumentation

A 61-item closed format survey instrument was developed to evaluate the use of anti-drug campaigns and communication strategies on drug abuse. A total of forty respondents completed the questionnaires ($n = 40$) which includes 48% male and 52% female.

2.3 Data collection and analysis

Data in this study were obtained through two main sources. First, the secondary data source which achieved from books, magazine, journal, press and previous research and the sample itself as a primary source. Two enumerators were hired to facilitate the data collection process. They are responsible to meet all the respondents and deliver the questionnaire. All respondents need to answer the entire questionnaire themselves and return the questionnaire to the enumerators on the spot. Data for the study was analyzed using SPSS. As this is a preliminary study, only descriptive statistics were reported. Inferential statistics using Pearson correlation, t-test and ANOVA will further be used to analyze the data.

3. Results

Two types of anti-drug campaigns and communication strategies utilized in Malaysia to increase awareness about the dangers of drug abuse are: (1) the mass media (e.g. television, radio, newspapers, Internet), and (2) outdoor advertisement (e.g. billboards, brochures, roadshows). Majority of the participants were found to have moderate knowledge and awareness about the dangers of drug abuse through the campaigns and strategies. Television shows the highest figure, followed by newspaper, radio, magazines and the Internet on the exposure of participants to campaigns.

4. Discussion

The ability of the media campaign cannot be denied through a few examples of the impact of media campaigns. The findings of this preliminary study show that the acceptance of the media campaign in the country is expanding. This can be proven with the development of media itself. Starting from the era of 1940s where a specific agency for Malaysian radio and television was introduced, the first radio channel in Malaysia provide a positive stance through a variety of music-based programs, cultural-based competition such as drama and poetry to the audience at that time.

Electronic media play an important role in the process of information delivery because it is quick, cheap and accurate; directly disseminated to the user or from users themselves. In Malaysia, since television was introduced, it encourages users to switch the direction from the radio. At the time of the current technological advances, the Internet dominates over the other media channels.

This study supports previous literature that various media should be utilized to ensure the success of the media campaign. Television proves to be one of the highest media channel

to the recipient with large-scale performance; especially from industrialized countries. This is a great medium to convey the importance of visual messages. The weakness of this is type of media is the inability for the receiver to get a television signal. This weakness could be improved by utilizing another media, i.e. the radio; even though it can only deliver messages in audio form. Newspapers or magazines, on the other hand, provide a more detailed message and to a wider audience. Message can be more permanent and read repeatedly. And Internet is regarded as one of the bigger-scale channel. Messages can be conveyed not only the local area, but it can be read by people all over the world. Media can be written by anyone; business manager, secretary and secretary. Writing in the form of a website, blog, upload documents, newspapers, and live video allows information stored in this limitless space. However, the disadvantage of this type of media is that sometimes the information provided is doubtful in relation to facts and authenticity because almost anyone can write on any issue.

In conclusion, media campaigns can be used to provide information useful to the targeted recipient. However, scientific studies in the selection of media are essential for better planning and effectiveness of certain campaign. Investment in terms of money, time and good ideas will ensure that the media campaign will be successful.

This study has important implications to policy makers and people who work in addiction in understanding the issues of prevention strategies. More information can be gathered with a more comprehensive analysis of the data utilizing inferential statistics.

The results highlight the feasibility of using a variety of media to educate and increase awareness about the dangers of drug abuse. Future research needs to focus on in-depth exploration of media campaign experts on anti-drug campaigns using qualitative method, perceptions of drug users towards anti-drug campaigns and communication strategies in the use of media for anti-drug campaigns, the effect of mass communication campaign on anti-drugs in Malaysia as well as the most appropriate techniques, and strategies to be employed in developing media campaigns to increase the awareness of the dangers of drugs in Malaysia.

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Exploring Technology Diffusion by Using Bass Model- A Study of Industrial Cluster of Precision Machinery Industry in Central Taiwan Areas

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Abstract:

Precision machinery industry (PMI) is well known for the name of "mother of industry". Due to the government policy and Taiwanese enduring characteristics, PMI is well established in central Taiwan areas and forms an industrial cluster with small-and-medium enterprises (SMEs) and flexible service capacity to drives an impressive economic growth in recent decades. In order to propel PMI's global competitiveness in the era of modern innovated economy, it is essential to explore the technology diffusion in PMI not only to pursue a leading position in global manufacturing industry, but also to seek a sustainable advantage in modern engineering technology. This study aims to discuss the technology diffusion of PMI in central Taiwan areas and enable enterprises in other industries to follow the innovated footsteps of PMI.

Technology diffusion arises after technological progress and technological innovation, and it is related to the process of marketing communications. Bass (1969) proposed the diffusion model, which is well-known and widely used to discuss new products and sales of technology diffusion. Based on the past literatures of Bass model, most of them are using the existed information to extend the diffusion theory for the purpose of market analysis and demand forecasting of new technologies. In order to understand the degree of technology adoption, this study adopts Bass model to simulate three parameters, innovation coefficient p , imitation coefficient q and potential market size m . Finally this study compares the findings with Rogers's (1962) research outcomes of innovation diffusion to analyze the exploring the connection between innovator and imitator in industrial cluster.

Chapter 1 Introduction

1.1 Background and Motivation

According to the Precision Machinery Research Development Center (PMC), Taiwan's machinery industry has already gained a leading position on the internal market and step by step is gaining greater popularity in the global market, such as in America, Germany, Italy, and Japan. These countries still has a competitive advantage over Taiwan. Currently, Taiwanese companies acknowledge that competition and collaboration are important due to more integrated global markets. Domestic and international alliances occur in many different industries and increase competitiveness (Lai & Tsai, 2009).

The standard of precision machinery technology reflects a country's industrial and technological strength. A review of the development footprint in our country, Precision Machinery Industry (PMI), shows that Taiwanese companies always strives for the best, mainly rely on small and medium enterprises sized (SMEs) in central Taiwan. According to government statistics in 2010, the output value of Taiwanese machinery industry had exceeded NT. 860 billion. Market analysts also estimate that growth rate is up to 12% with a chance to become another trillion dollar industry.

Since new technology is developing at an astonishing rate across the world, technology diffusion becomes often discussed issue in developing countries and regions. Industrial cluster contributes to establishing satellite systems which is a corporate and synergy system. Cooperation in the industrial cluster can raise productivity and the efficiency. Therefore, Taiwan has a chance to become the capital of global precision machinery.

Technology innovation is uncertainly and may be causing the problem in the process of technology innovation directly (Dosi, 1982). The concept of technology innovation can be separate into diffusion of innovation (DOI) and technology diffusion. The competition mode in machinery industry is external competitor threat, the challenge of consumer and user find fault more and more, it will find the problem of product and become pressure of firms' innovation. It should expand to international by using cluster effect to accelerate competition action between innovator and imitator.

1.2 Research Objective

Many firms still suffer from uncertainly innovation to measure the competitiveness of technology diffusion. The purpose of this study is to measure technology diffusion by using the Bass Model to generate outcomes and influential factors from the feature of industrial, technical, and

manufacturer. Under the analysis of this study, it may further provide understanding of influential factors toward competitiveness of technology diffusion in central Taiwan area's PMI.

Taiwan machinery industry division of labor exquisite from past to present, it owns the entire and unique supply chain globally and mainly belongs to SMEs. Comprehensive and observation overall environment, enterprise and market, found that technology diffusion may be important because of the power of industrial cluster, if enterpriser want to invest and plan source, therefore, using scientific method to measure technology diffusion model is urgent demand, this study's research objectives are as following:

1. Build related diffusion model about technology, to estimate the type of technology diffusion in industrial cluster.
2. Compare with Roger (1962) DOI theory and Bass Model built in this study, to explore the connection between innovator and imitator, to examine this model's technology diffusion feasibility in industrial cluster.
3. Estimate the efficient of industrial feature factor, technical feature factor and manufacturer feature factor in technology diffusion, and rewrite the technology diffusion model, to forecast tendency of industrial cluster in the future.

Chapter 2 Literature Review

2.1 Industrial Cluster of PMI in Central Taiwan Area

2.1.1 Overview of PMI

The PMI is the driving engine that arouses a nation's primary industries. It's the hub industry of a country, and often used to measure a country's industrialization and industrial capacity. Taiwan's PMI has been playing the builder behind Taiwan's industrial upgrading staged. In addition, the government policy and Taiwanese endurant characteristics, PMI is well established in central Taiwan areas and forms an industrial cluster with SMEs and flexible service capacity to create a complete interfirm-service supply chain and drives an impressive economic growth in recent decades.

The domestic machinery industry develops in central Taiwan and become the most important bridgehead, it also weight highly and leader machinery industry. From the scope of PMI, it can be regarded as related industries from upstream to downstream on supply chain, that is to say, from manufacturing processes, technical support or support services, to product manufacturing (Tony, 2002). A representation of the industrial chain of activities in PMI sector is presented in Fig. 1.

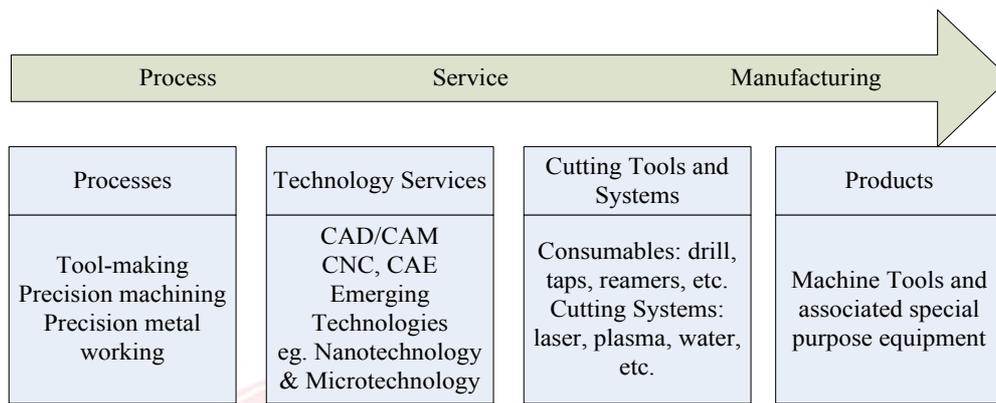


Fig. 1 PMI industrial chain

Aimed at PMI domestic state of management, generalizing interview result and including strengths, weakness, opportunities and threats (SWOT) (陳鐵元, 2005), its management strategy SWOT analysis as following Table 1.

Table 1 SWOT analysis of PMI's management strategy

Strengths	Weakness
1. Satellite system 2. SMEs' flexibility 3. Division of labor from cross-Strait relations 4. International marketing	1. Key components rely on import 2. Product homogeneity highly 3. R&D and funds not enough 4. Expert talent not enough
Opportunities	Threats
1. Authorize manufacture and cooperation are highly 2. Demand of China market bigger 3. WTO 4. 3C industry prosper	1. High quality product from US, Japan, Korea 2. Newly-emerging country rise and develop quickly 3. China's 12 th five-year plan

(Source: this study)

2.1.2 Industrial Cluster

Marshall (1890) early proposes the concept of industrial district, it called that the associated industry integrate together, except the common affect of external economic factor, also has production factor each other. Anderson (1994) also against industrial cluster, they stress that firms or companies are requirement with geographical proximity, interactive depend on each other at the same time, link with flexible industrial organization, and enhance each production efficiency or competitiveness to reach the development of regional economic.

According to Breschi & Malerba (2001), they think that industrial cluster will result in technology merge and cause interdependence, technology diffusion and the accumulation of knowledge are due to the important factors in the exchange of each other's technology.

2.2 Fundamental Diffusion Model and Bass Model

2.2.1 The Conception of Innovation

The word of “Innovation” is raised by Rogers (1962). Rogers believes that only if an individual or a unit adopts new idea, technology or entity, it called innovation. The scope of innovation raised by Schumpeter (1932) is organization innovation and technology innovation.

From the above definition, as regards the innovation, it’s a concept or process that can bring value in widely. Duncan (1972) thought that whether to use or physical process on the originality, only if there are new concepts in them, which can be regarded as innovation. Although the focus for this study is technology innovation, we can’t underestimate the importance of process innovation. The established process of PMI in central Taiwan is also an innovation which exploring in this study.

With the shorter of product life cycle, rapid change in technology and customer need, if enterprises want to survive, they must update their capabilities to improve organizational flexibility continually. Technology play the important role on management of research and development (R&D), it always in back office and unknown. The product life cycle gradually shortened, and enterprise have long-term capacity of new technology is the most important competitive advantage (Prahalad & Hamel, 1990).

2.2.2 Diffusion of Innovation

DOI is a theory that seeks to explain how, why, and at what rate new idea and technology spread through cultures. A professor Rogers in 1962 who is specialties on rural sociology, focus on the new technology of how farmers to accept and adopt the process (Rogers, 1962).

Rogers (1995) mention that diffusion is the process in a certain period of time, through specific channels of communication, a social system in the process of communication between members, and the ultimate goal is to innovate and spread new things in the social system. It’s the process of technology innovation through the communication to organization, which enabled members adopt and become user. In the process of Rogers’s DOI theory, it has four important elements that influence the spread of a new idea: the innovation, communication channels, time and social system, the following will discuss this element’s characteristics and contents that affect innovation diffusion.

1. The innovation

Rogers (1995) defined innovation as: those who are individuals or units new thoughts, ideas or

transaction, which is innovation. Innovation is wide-scale; it can be an idea, technology or knowledge. Innovation has five characteristics, it will affect people whether to accept new things.

- (1) Relative advantage: Compare with the existing things, whether or not user increase their benefits.
- (2) Compatibility: After adopting new things, whether its values, past experience and demand is unity or not.
- (3) Complexity: The difficulty that user understand and use for new things.
- (4) Triability: Refer to the trial before adopting new things, and to decide it.
- (5) Observability: After adopting new things, whether its result is observable or not.

2. Communication channels

Communication need to be a two-way process of convergence, rather than as one-way, linear acts in which one individual seeks to transfer a message to another in order to achieve certain effects (Rogers & Kincaid, 1981). It needs every kinds of communication channel when new thing diffuse to individual. It can be divided into mass-media and word-of-mouth as following:

- (1) Mass-media: it's the way that potential users are conscious of new things fast and efficiency, such as TV, newspaper, internet, etc.
- (2) Word-of-mouth: it has the characteristics of immediate, two-way, highly selective and easy feedback, etc., which is the way persuaded people to adopt new things.

3. Time

The innovation-decision period is the length of time required to pass through the innovation-decision process (Rogers, 1995). "Rate of adoption is the relative speed with which an innovation is adopted by members of a social system. (Rogers, 1983)" For individuals, the decision process of new idea can through five stages as Fig. 2:

- (1) Knowledge: User knowing and understanding the existence of innovation.
- (2) Persuasion: The period that individuals convince innovation.
- (3) Decision: After observe and increase know of innovation, then decide whether to adopt or reject. Rogers (1962) notes that it is the most difficult stage to acquire empirical evidence.
- (4) Implementation: Individuals began to try new things.
- (5) Confirmation: After a in the use of period, personal decision to continue or discontinue use.

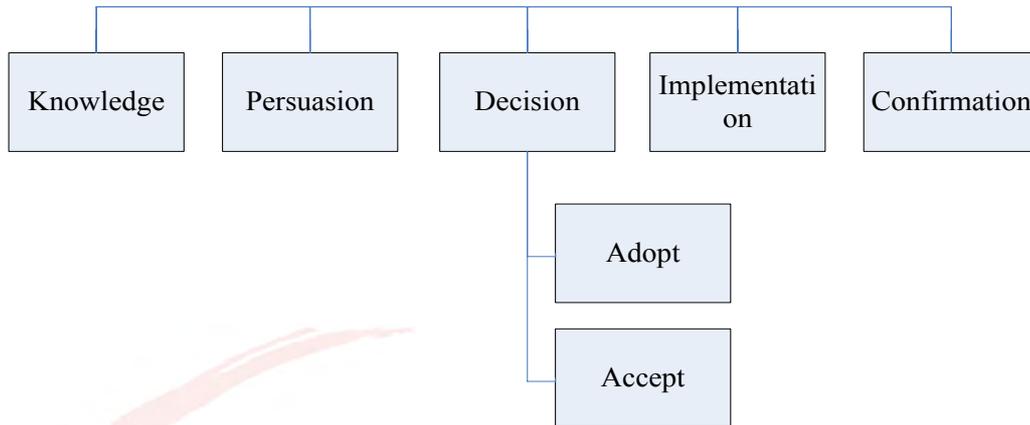


Fig. 2 Five Stages in the Decision Innovation Process

4. Social system

According to past diffusion literatures, using the process of diffusion based on time, innovation adopters can be depicted as S-Curve of diffusion model. The curve states the innovation adopters, usually tends to normal distribution (Rogers, 1995). The rate of diffusion is followed by different kind of innovation and different social system, it describe a specific innovation of diffusion situation in a specific social system (Mansfield, 1961). The phenomenon of innovation diffusion is shown in Fig. 3.

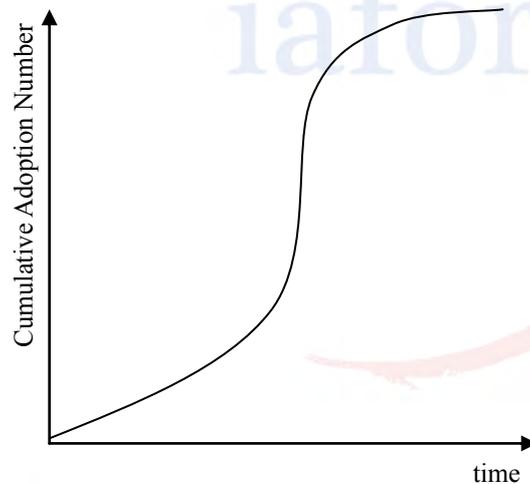


Fig. 3 S-Curve of Diffusion of Innovation (Rogers, 1995)

Bass (1969) divides consumer into innovators and imitators according to consumer durables. Briefly, from adoption of technology innovation, whether to trial or not, or decision to adopt or not, time is the most important factor in this stage, the rate of adoption is also affected by time, from the point of S-Curve (Mahajan & Peterson, 1979), time and the number of adoption should be proportional directly.

2.2.3 Fundamental Bass Model

Fundamental diffusion model focus on the change of adopter quantity for innovation behavior,

concerned about the development of technology innovation. It derivative from the epidemiological concept of hazard function, hazard ratio is probability of an event happening in a short time interval in one group, the probability of an event means consumer has not adopted this technology before t time, and will adopt at t time. $H(t)$ represent that the conditional probability at t time, mathematical expressed as below:

$$H(t) = \frac{f(t)}{1 - F(t)} \quad (2-1)$$

There is a famous initial adopter of fundamental diffusion model in marketing, diffusion model raise by Fourt & Woodlock (1960), Mansfield (1961) and Bass (1969), these three kinds of model combined as Bass Model in 1969:

1. Fourt and Woodlock Model

Fourt and Woodlock (1960) raise fundamental diffusion model, they claim that the main reason consumer adopting new product are affected by external influence, for instance, advertisement caused the consumer's interest, that mathematical model as follows:

$$H(t) = p \quad (2-2)$$

Which p is a constant, called it the coefficient of innovation in general, the function of this model is a modified exponential diffusion cure.

2. Mansfield Model

Mansfield (1961) claim that new technology diffusion is affected by word of mouth. It is irrelevant to the previous adopters, belonging to the result of internal influence, that mathematical model as follows:

$$H(t) = qF(t) \quad (2-3)$$

Which q is a constant, called it the coefficient of imitation in general, the function of this model shows logistic curve or S-Curve.

3. Bass Model

Bass (1969) merge Fourt & Woodlock (1960) and Mansfield (1961) into an integrated model. Bass mentions diffusion model, separate the potential adopters from behavior and adopting channels as innovative behavior and imitative behavior. It's the main enlightenment about diffusion model on marketing, the follow-up scholar are research according to Bass fundamental model continually. Therefore, follow-up also call diffusion model as Bass Model, that mathematical model as follows:

$$H(t) = p + qF(t) \quad (2-4)$$

Bass Model assumes that the potential adopters of innovation technology are affected by two kinds of communication – mass media and word-of-mouth. Bass (1969) defines innovator as the cluster that adopt by mass media of his own, but not those who have purchased in the time t , and

they often daring and venturesome; imitator adopt innovation by word-of-mouth will affected by previously purchaser. Thus, mathematically the model can be expressed as:

$$\frac{dY(t)}{dt} = (p + \frac{q}{m}Y(t))(m - Y(t)) \quad (2-5)$$

Where,

$Y(t)$: The cumulative number of adopters before time t in market

p : The coefficient of innovation

q : The coefficient of imitation

m : Market potential

2.3 Technology Diffusion Theory and Related Research

PMI structure in central Taiwan, mainly in SMEs, the characteristics of PMI are efficiency, quality and stability, but still have a gap with leading brand of advanced countries, emerging nations catch up at the back, and there is a general consensus among companies about the switch. SMEs often due to lack of innovation, R&D resources and funds, in order to obtain the incentive to innovate, it must be through community efforts to develop technology and exchange each other's resources.

The study of DOI begins with Tarde's book (1903) on *The Laws of Imitation*, after that, a large number of literature starts to discuss the phenomenon of diffusion in industry (Wejnert, 2002). Innovative technology diffusion means an abstract conception or idea, actual technical information, and even the operation of whole social system between the adoptions (Roger, 1995). Therefore, the concept of technology innovation diffusion can be separate of two parts:

(1) Diffusion of innovation (DOI)

The concept, information, knowledge spread all belong to the process of innovation, the main carrier is technology diffusion, through the diffusion of DOI, enterpriser would accept new technology and adopt, DOI according as enterprisers' conscious and perspicacity.

(2) Technology diffusion

It comprises the diffusion of R&D and the technology diffusion by innovation, technology diffusion according as technology in itself, the technical change of enterprisers' attitude, and the technical absorptive capacity of enterprisers.

Chapter 3 Research Methodology

Use mathematical model to explore Diffusion of Innovation, mostly with Bass raise Bass Model in 1969. The Bass Model describes the process how new technologies get adopted as an influence between users and potential users, among all the users are innovator and imitator. Bass (1994) describes two forces would be positively influenced by the previous adopters, which is innovator and imitator. The first force represented by the coefficient of innovation p and the second force

by q as the coefficient of imitation.

Bass (1969) address four assumptions of Bass diffusion model, as follows:

1. Forecast product is new product that adopts new technology or process, this new product produce from innovative activity of new state.
2. Every consumer is purchase a unit commodity and not redundant purchase. Among the consumers are innovator and imitator, innovator is independent judgment and not affect by the others, they purchase themselves; imitator is affect by social pressure or mass media as adoption time go, which prompt themselves purchase.
3. Market potential consumer is fixed which will purchase product finally.

The coefficient of innovation and coefficient of imitation are fixed.

Thus, this study build the Bass Model based on original Bass paper (1969), building the formulation as following, if $f(t)$ is density function, described the time of adoption of a population and $F(t)$ is the cumulative function, from literature review, we know that the hazard function describing the conditional probability at time t (or proportion of those not yet adopting) is proposed as:

$$\frac{f(t)}{1 - F(t)} = p + qF(t) \quad (1)$$

$$\frac{dF}{dt} = p + (q - p)F - qF^2 \quad (2)$$

Assuming $F(0) = 0$, the solution to the differential equation in (2) is given by:

$$F(t) = \frac{1 - e^{-(p+q)t}}{1 + \left(\frac{q}{p}\right)e^{-(p+q)t}} \quad (3)$$

Then, the density function becomes:

$$f(t) = \frac{\frac{(p+q)^2}{p} e^{-(p+q)t}}{\left(1 + \left(\frac{q}{p}\right)e^{-(p+q)t}\right)^2} \quad (4)$$

The total number of ultimate adopters (the market potential) is given by m and assumed each adopters only adopt one units, the sales volume of t times can use $S(t) = mf(t)$ to transform into the form of destiny function, where $f(t)$ is given by formula (4). This is the Bass Model in the time domain, if the cumulative adoption domains, where $Y(t) = mF(t)$, it can be write as formula (5) and (6):

$$S(t) = pm + (q - p)Y(t) - \left(\frac{q}{m}\right)[Y(t)]^2 \quad (5)$$

$$Y(t) = m \left[\frac{1 - e^{-(p+q)t}}{1 + \left[\frac{q}{p}\right]e^{-(p+q)t}} \right] \quad (6)$$

where

- $S(t)$ = The predicted number of customers who have already adopted the innovation in period t ;
- $Y(t)$ = The cumulative of previous number of customers in the adopting target segment at time t ;
- p = The innovation coefficient of technology diffusion;
- q = The imitation coefficient of technology diffusion.
- m = The number of basic potential adopter of PMI in central Taiwan Area

Chapter 4 Research Analysis and Result

Technology diffusion happens behind technology progress and technology innovation. Technology innovation relates to the spread process in the market and decides whether manufacturer adopt technology innovation, which may concern with mass media or word of mouth all the process.

The diffusion of innovation can use to develop technology life cycle, Bass Model provide forecast adopters of new product. This chapter show simulating analysis result by using Matlab R2009a program, know the unit time point of technology diffusion by chart.

This chapter uses assume combination and parameter setting in Chapter 3. Set the initial data of innovation coefficient p value as 0.03, imitation coefficient q value as 0.38. The accumulative total is 0.001 each time, the initial people number of potential market m value is 78180, and the source of data is from PMI in central Taiwan in 1997. Base on this source data, this study setting employee will growing 3% every unit time (as Table 2). As a result of the Bass Model will cause graph depict by the difference of group, the amount of group will influence graph. This study use different group to estimate the main of the foundation DOI graph, which is fit the original Bass Model. This part separate from two operation equation to discuss Bass Model, one is technology innovation that already accumulative adopters $Y(t)$, the other one is the number of adopter $S(t)$, the latter $S(t)$ is according to the result of $Y(t)$ equation. Compare this two operation equation, to analysis and discuss technology diffusion in difference unit time.

1. The accumulative number of adopters $Y(t)$

$Y(t)$ means technology innovation through mass media and word-of-mouth in the market, derive technology diffusion eventually, it's already accumulative adopters in the unit time of t . The difference group of data as Table 2, substitute this data into formula (6) and do modeling analysis with Matlab.

Table 2 The difference group of data

Item	Innovation coefficient (p)	Imitation coefficient (q)	Market potential (m)
1	0.03	0.38	78,180
2	0.031	0.381	80,525
3	0.032	0.382	82,941
4	0.033	0.383	85,429
5	0.034	0.384	87,992
6	0.035	0.385	90,632
7	0.036	0.386	93,351
8	0.037	0.387	96,152
9	0.038	0.388	99,036
10	0.039	0.389	102,007
11	0.04	0.39	105,067
12	0.041	0.391	108,219
13	0.042	0.392	111,466
14	0.043	0.393	114,810
15	0.044	0.394	118,254
16	0.045	0.395	121,802
17	0.046	0.396	125,456
18	0.047	0.397	129,220
19	0.048	0.398	133,096
20	0.049	0.399	137,089
...

From Fig 4~6, Bass Model depict in already accumulative adopters curve $Y(t)$. The amount of accumulative adopters increases when the increase of unit time. When modeling data reach to modeling data of 60 group', that is to say, the whole PMI adopting technology innovation needs no more than 60 unit time. These cumulative number of adopters $Y(t)$ similar to S-curve, it's appear inflection point at 10 unit time approximately, reveal that technology diffusion curve similar to S-curve.

The technology life cycle go through technology processing, technology innovation, and then technology diffusion. From Fig. 4~6, it needs 10 unit time approximately to wide range changeable of cumulative number of adopters, technology innovation can be convinced and

satisfied adopters' expected impression when a technology enter to the market. After 10 units time approximately, the range of cumulative number of adopters tend to gradually and reach stability. From the result, this study find that adopters need are close to technology diffusion. For satisfied of firm's long term development, adopters will take action when technology innovation is valued for adopter. To broaden the scope, a unit of estimated adoption reaches to 80 and 100 unit times, like Fig. 7, the curve also similar to 50 and 60 unit times (Fig. 6).

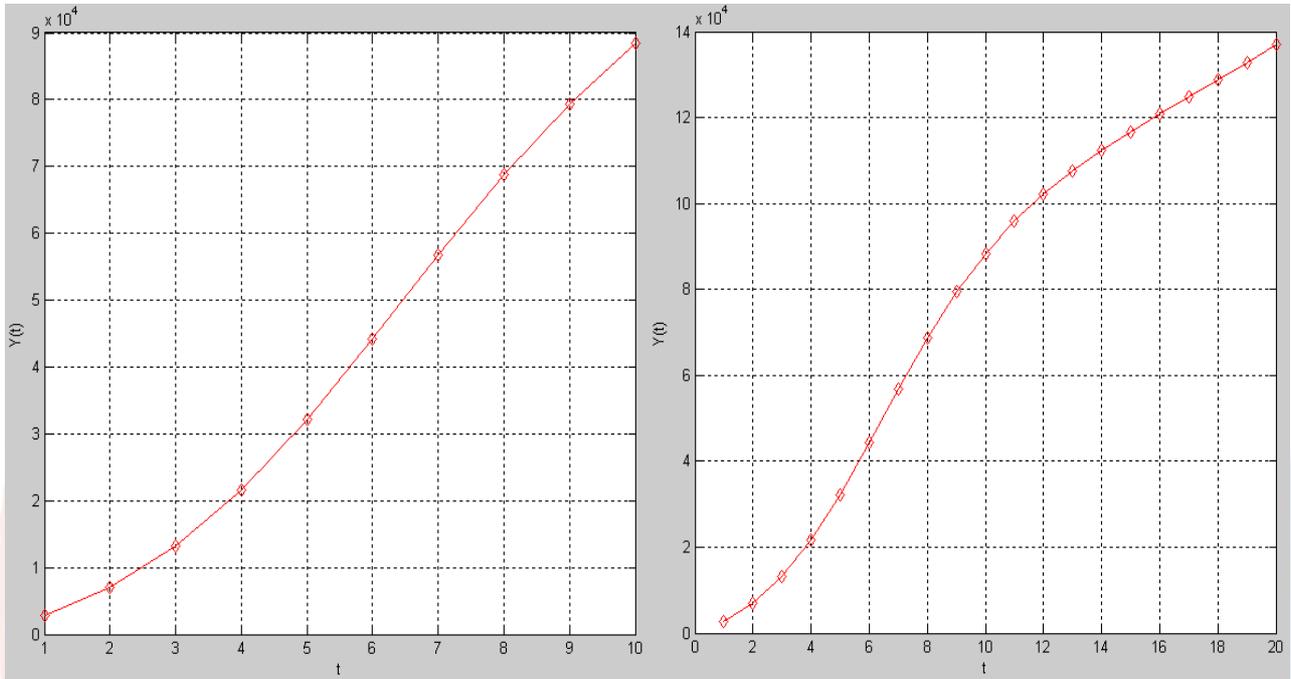


Fig. 4 Bass Model plot $Y(t)$ modeling data of 10 and 20 groups'

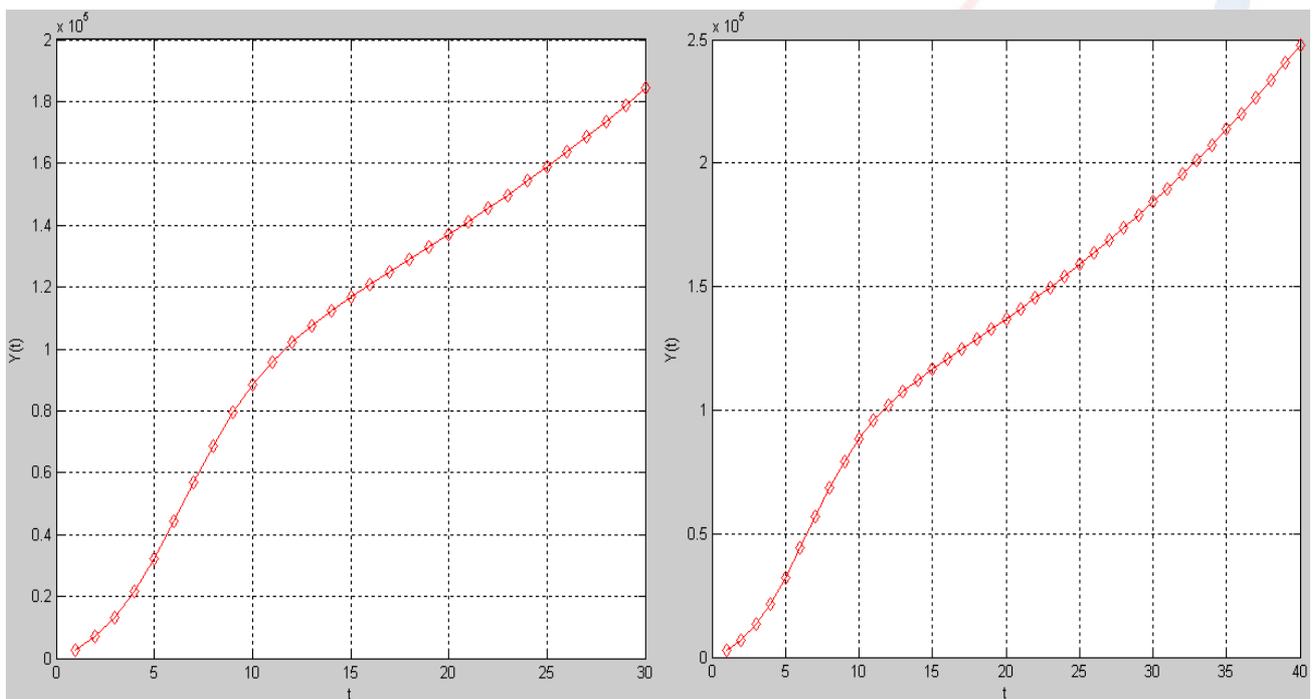


Fig. 5 Bass Model plot $Y(t)$ modeling data of 30 and 40 groups'

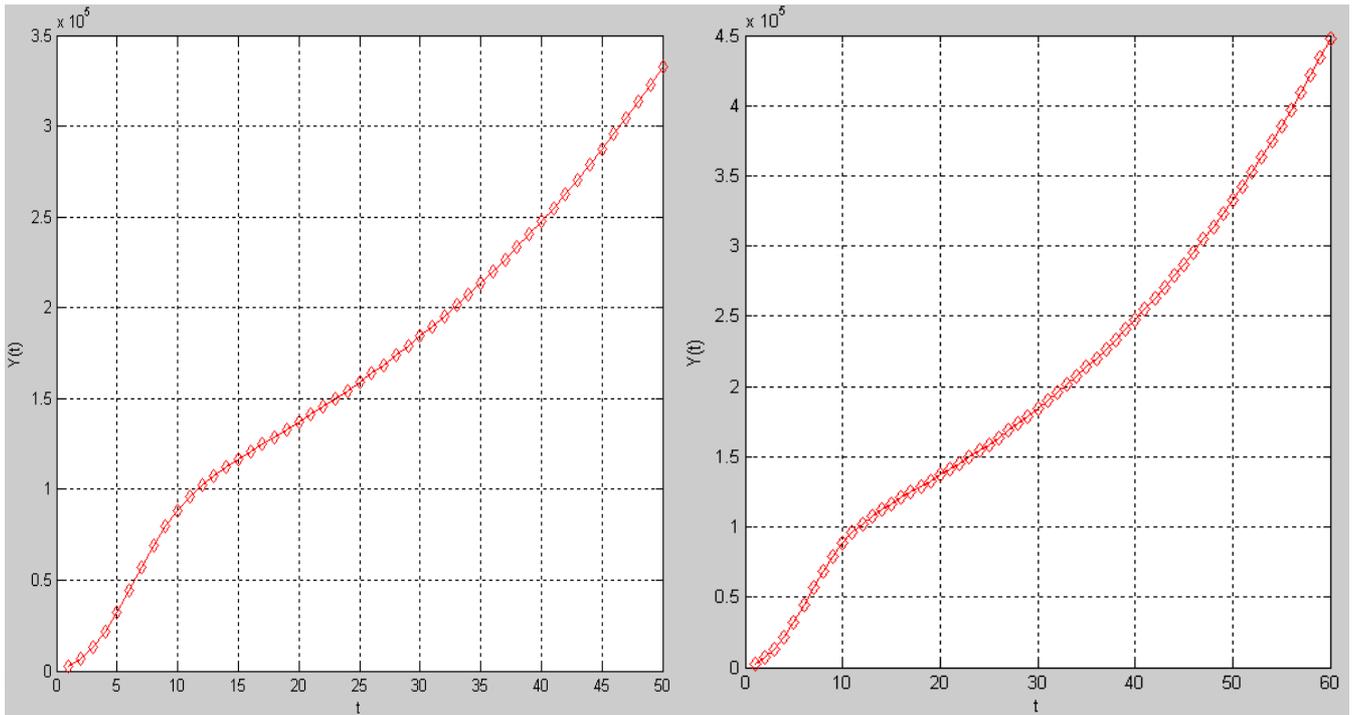


Fig. 6 Bass Model plot $Y(t)$ modeling data of 50 and 60 groups'

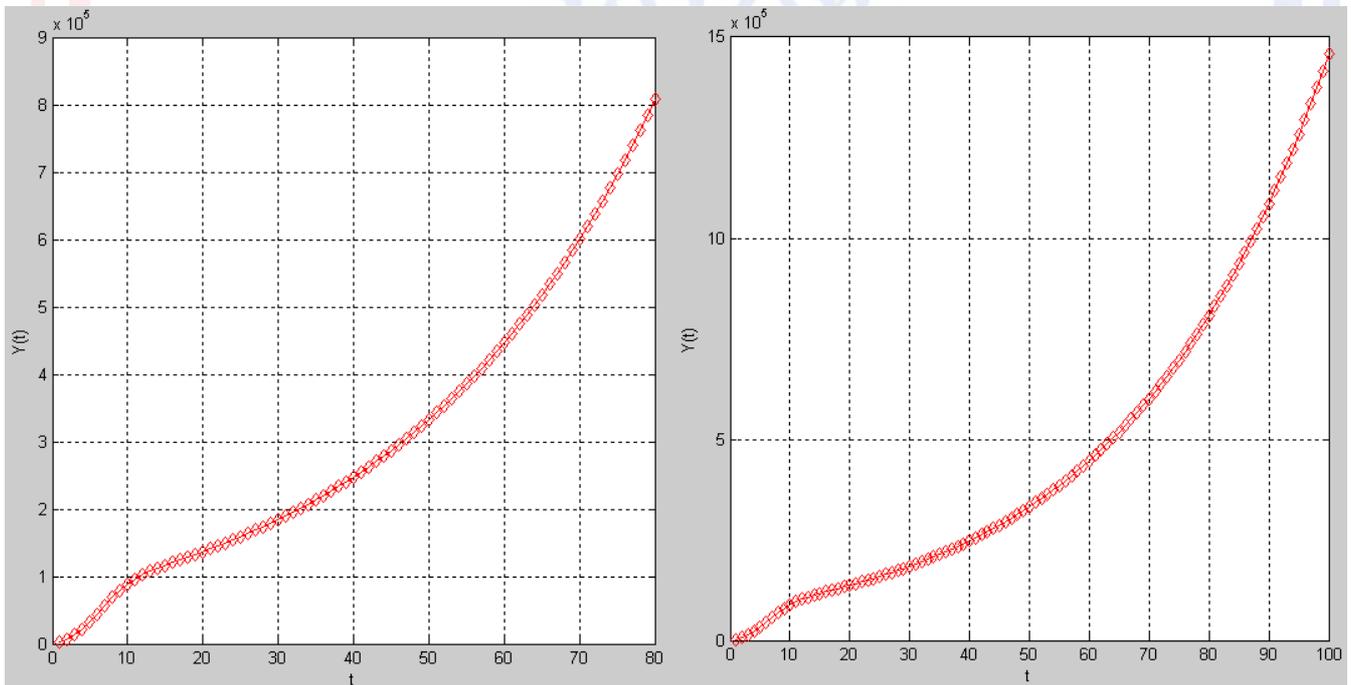


Fig. 7 Bass Model plot $Y(t)$ modeling data of 80 and 100 groups'

The PMI industrial cluster formed with SMEs, which is specialization degree highly in cluster. The cumulative number of adopters $Y(t)$ between firm, it relationship can be separate into innovative cumulative adopters and imitate cumulative adopters, its formula as (7) and (8).

$$Y_{innovator}(t) = m \frac{p}{q} \ln \left[\frac{1 + \frac{q}{p}}{1 + \frac{q}{p} e^{-(p+q)t}} \right] \quad (7)$$

$$Y_{imitator}(t) = Y(t) - Y_{innovator}(t) \quad (8)$$

Innovator stride across to time and adopter type, in the process of market diffusion, the number of innovator less than the number of imitator in general. Substitute data in Table 2 into formula (7) and (8), this study get Fig. 8, among the figure, green curve is imitate cumulative adopters, blue curve is innovative cumulative adopters. In the beginning, innovative cumulative adopters more than imitate cumulative adopters. Imitator increase double at 4 unit time (data as Table 3), and exceeded in number of innovator. Total cumulative adopters are the sum of innovative cumulative adopters and imitate cumulative adopters, if compare with these three cumulative adopters curve, this study find that the change of total cumulative adopters similar to imitate cumulative adopters, like Fig. 9, red curve is total cumulative adopters.

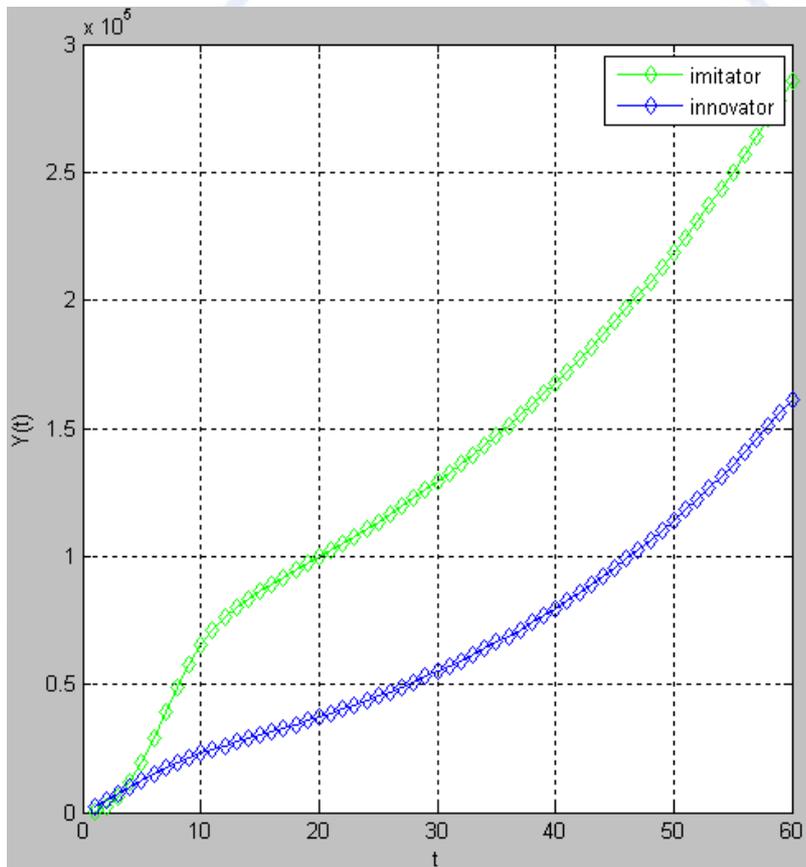


Fig. 8 Bass Model plot innovator and imitator

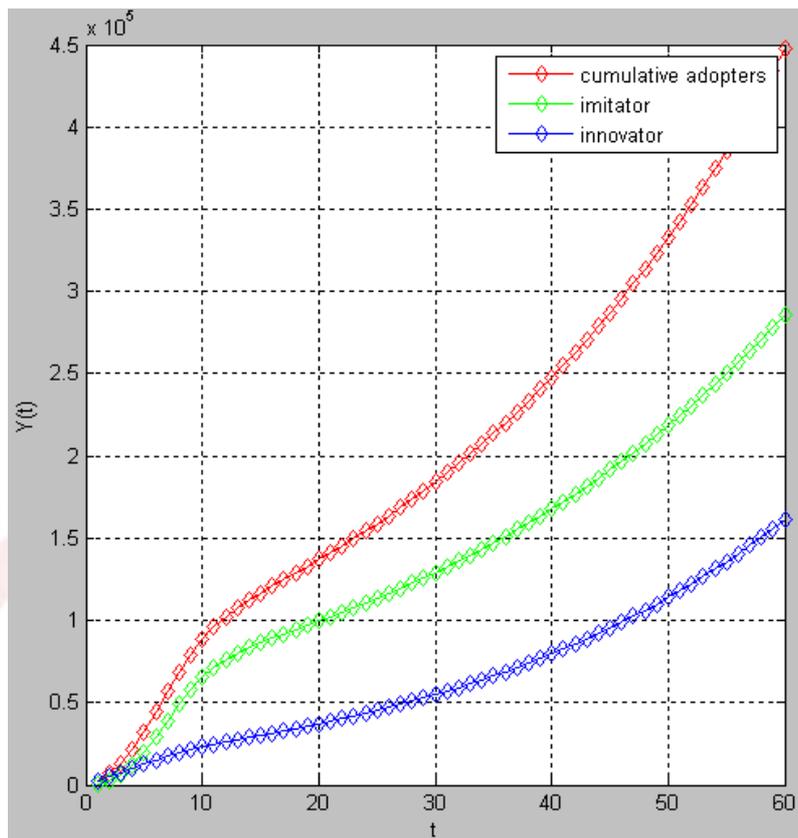


Fig. 9 Bass Model compares innovator and imitator with cumulative adopters

Table 3 Innovators and imitators cumulative adopters

t	Innovators cumulative adopters(people)	Imitators cumulative adopters(people)	Total cumulative adopters(people)
1	2,306	490	2,796
2	4,797	2,276	7,072
3	7,419	5,844	13,263
4	10,097	11,558	21,655
5	12,738	19,432	32,170
6	15,250	28,960	44,211
7	17,565	39,194	56,759
8	19,648	49,084	68,732
9	21,507	57,864	79,371
10	23,177	65,214	88,391
...

In the industrial of PMI, the demarcation line of innovator and imitator is blurred, it is suitable for define adopters as external influence and internal influence. Generally speaking, the manufacturers who have technology innovation ability and willing to leading produce. Large-scale manufacturers in PMI always regard as innovative leader; however, many of

small-scale manufacturers are imitator, they adopt technology innovation according to technical maturity, technical complexity and technical obtain the cost of large-scale manufacturers. From Fig. 9, innovative cumulative adopters are about a third of the total cumulative adopters. This study observes innovator and imitator that the difference number of cumulative adopters from last unit time to this unit time. As Fig. 10, imitate cumulative adopters changeable is quite obvious, and it's significant difference at the beginning of imitation, the variable number growing like a steep slope, and peaked at 6 unit time approximately. Otherwise, the changeable number of innovators is smooth comparatively.

If such innovator play R&D role in PMI and imitator is the role of sales, innovator R&D know technology penetrative and not limit by others opinion. Sales of SMEs lay a foundation on past technology as imitate sample and create innovative product.

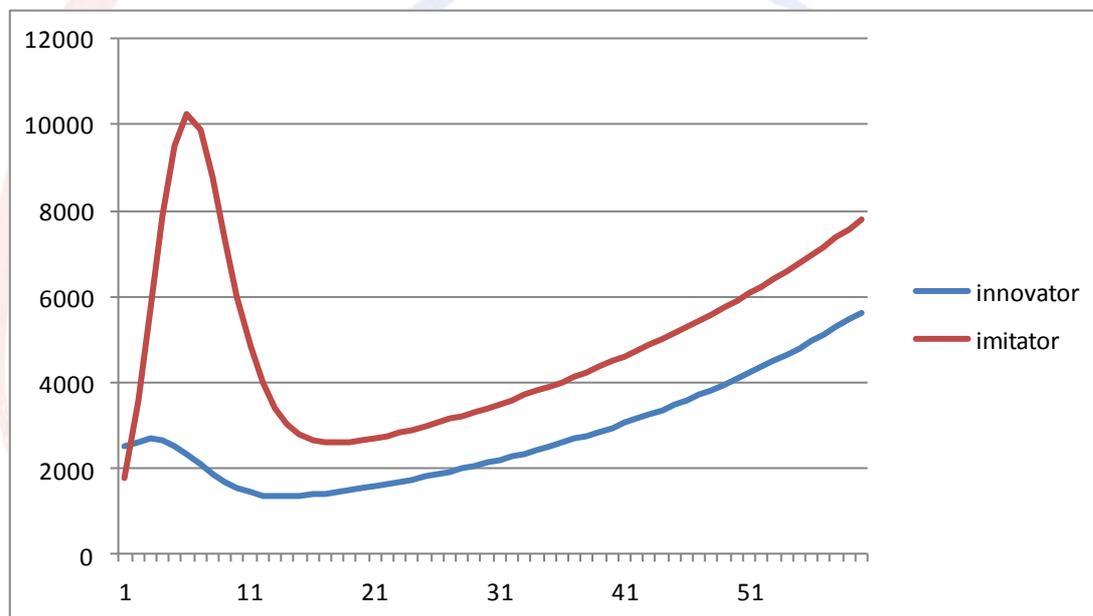


Fig. 10

Increase numbers of innovator and imitator cumulative adopters

According to assumption of Chapter 3, potential adopter is a fixed value, and adopts technology innovation eventually. When fix innovation coefficient and imitation coefficient as a group parameter (as Table 2), potential adopters (m value) not growing with time, fix m value at 78,180 and 447,190, which is group data of 1 unit time and 60 unit time. The more potential adopters, the cumulative number of adopters $Y(t)$ need most time to reach peak, in Fig. 11, when $m=447,190$, peak time is about 15 unit time, however, $m=78,180$, only about 10 unit time. In constant, cumulative adopters curve shows steep slope at the initial stage, whether the number of adopter (as Fig. 11).

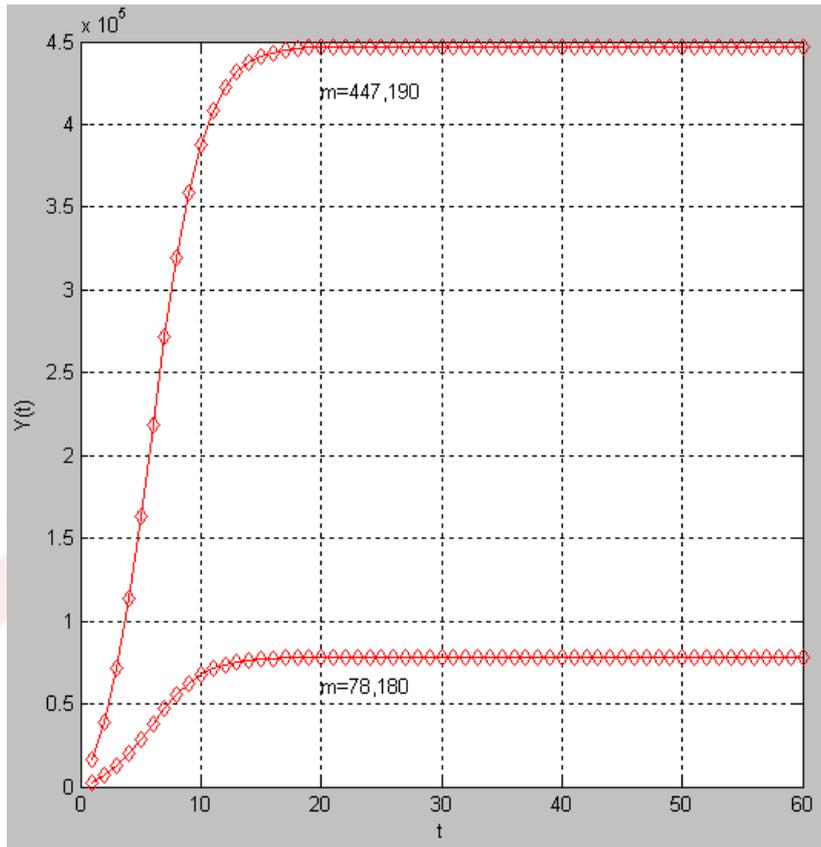


Fig. 11 Bass Model plot $Y(t)$ when potential adopter (m value) is fixed at 78180 and 447,190

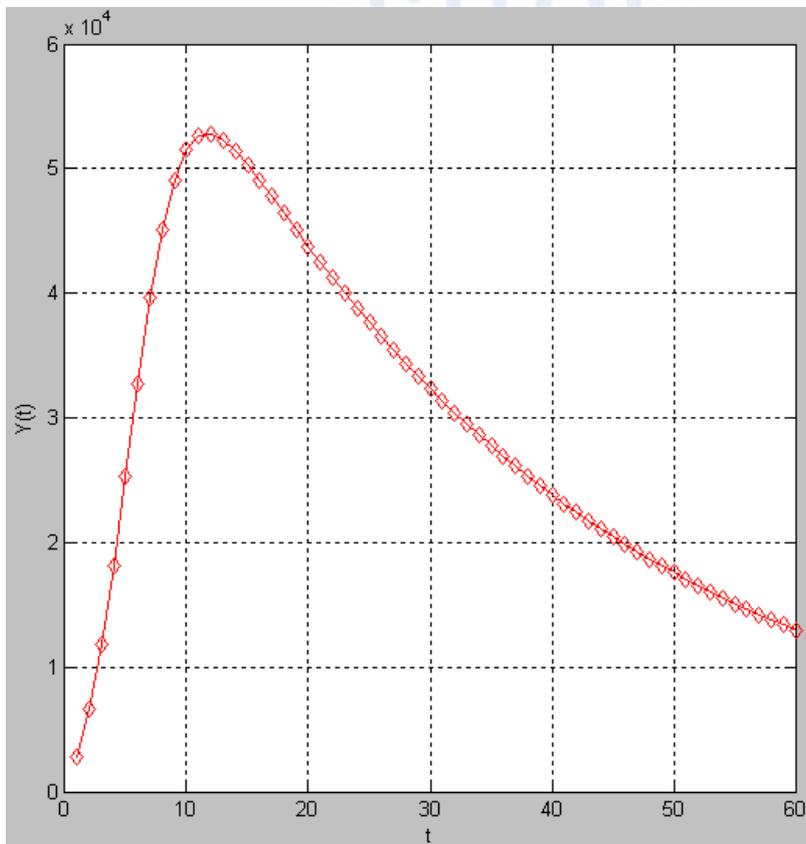


Fig. 12 Bass Model plot $Y(t)$ when m value slowdown

If innovation coefficient p value's initial data is 0.03, add 0.001 each unit time; imitation coefficient q value is 0.38 starting, also add 0.001 each unit time. Potential adopters m value is 78,180, assume PMI employee decline 3% with each unit time, its curve as Fig. 12. The cumulative adopters of one-fifth unit time former are like Fig. 11, curve growing speedy as a slope. It reveals that in the initial stage of decline employee, it will not influence the cumulative number of adopters, when new technology launch into market, the cumulative number of adopters are decrease as slide with the decline of potential adopters (m value). From this finding, there are different with Fig4~7 which is rising smoothly with the growing of PMI employee.

The logo for 'iafor' is centered on the page. It consists of the lowercase letters 'iafor' in a light blue, serif font. The text is surrounded by several large, overlapping, semi-transparent circular arcs in shades of light blue and light red, creating a decorative, circular frame around the central text.

2. The number of adopters $S(t)$

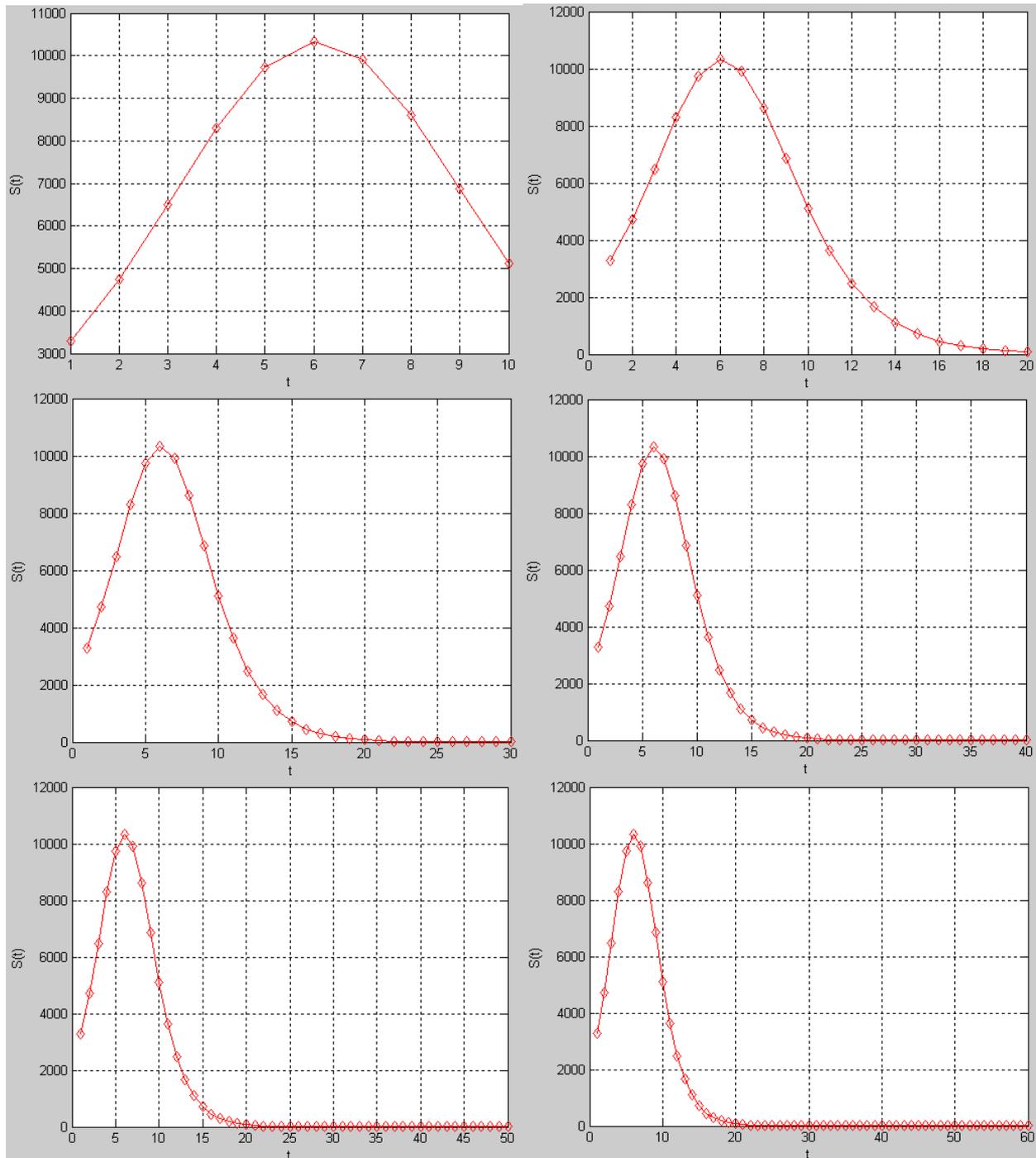


Fig. 13 Bass Model plot $S(t)$ with 10, 20, 30, 40, 50, 60 groups data

The number of adopters are different to cumulative adopters, the formula $S(t)$ as (5), it according to the result of cumulative adopters $Y(t)$, substitute $Y(t)$ into $S(t)$ derive Bass Model. The parameter setting is similar to the number of cumulative adopters $Y(t)$, innovation coefficient p value's initial data is 0.03, add 0.001 each unit time; imitation coefficient q value is 0.38 starting, also add 0.001 each unit time, and potential adopters m value is growing through the changeable of PMI employee, detail group data look at Table 2. Fig. 13 is the number of adopter, its

modeling unit time is 10, 20, 30, 40, 50, 60 groups data.

Modeling 60 group data, this study find that curve smooth gradually at one-third of the whole unit time, and the number of adopter tend to zero. Supposing simulate m value as growing, fixed and decline, the curve of adopters number $S(t)$ as Fig. 14. The number of adopters in cluster will grow, fixed or decline with potential adopters, three curves nearly overlapping in Fig. 14, only the peak number of adopters are different. However, the cumulative number of adopters $Y(t)$ is gradually gliding with 3% decline of the potential adopters each unit time. By contrast, the adopters curve $S(t)$ almost overlap, this study find that no matter potential adopters vary to increase or decrease, as well as innovator and imitator, it's curve show smooth which the curve $S(t)$ almost overlap.

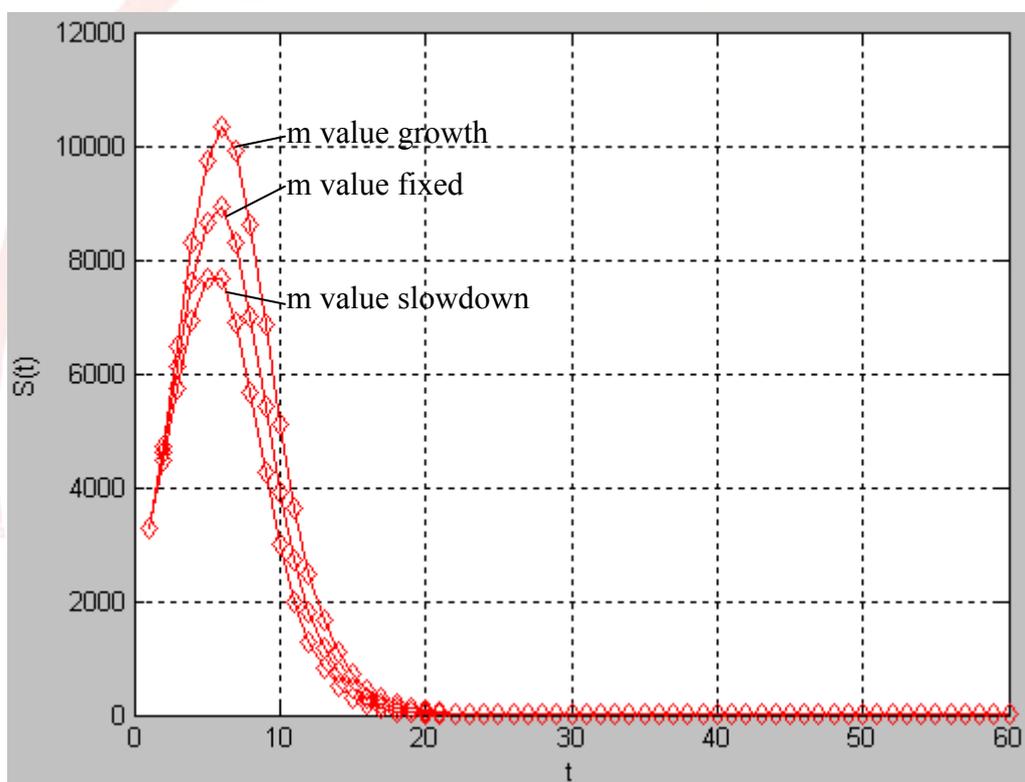


Fig. 14 plot $S(t)$ with m value growth, fixed and slowdown

The curve $Y(t)$ and $S(t)$ has close relation, due to $Y(t)$ is the cumulative number of adopters, and $S(t)$ is depict the number of adopters. The reason why $S(t)$ vary are not strong as $Y(t)$, look at m value decline with 60 group data of $Y(t)$ and $S(t)$ in Fig. 12 and 14, there one sixth of a front curve is dramatize, after that, $Y(t)$ gliding smooth but $S(t)$ decline in short time. With these two curves, this study has mutual proof. An industrial cluster plays an important role in central Taiwan, especially for PMI, its supply chain completely from upstream to downstream, which bring economical miracle from past three decade. For the well development of PMI, innovator and imitator is all the potential adopter, innovator will leading imitator into creating more miracles.

Chapter 5 Conclusion and Suggestion

The policy decision manager of firm thinks about the most important problem is to lead time of

technology innovation to enter the market successfully. Early adopter and later adopter might be considered, although early adopter give priority to acquire benefits, they receive the risk of failure or mistake. However, the later adopters could avoid immature risk of technology.

Exploring the relationship between innovator and imitator, a new technology adopts at a specific unit time in the market. The potential adopters includes both innovator and imitator, innovator not affect by adopters, the important of innovator is maximum in the initial unit time, as time goes on, their significance decrease gradually. However, imitator affects by word-of-mouth of adopter because of community pressure, there are more and more forerunners drive imitator to follow to adopt. The cluster of SMEs has advantageous to interchange information of technology innovation through the process of diffusion. Furthermore, geographical space neighbor, cooperation relationship closely, information interchanges frequently, these raise firm's cognitive ability for technology innovation, and firms don't need to make an experiment personally. Only take message interchange and observe cluster member, they can apply the process and result for technology innovation, predict the cost, risk and benefits for adopt some technology innovation, and then make adopt choice.

The sized of PMI has become outstanding on the whole machinery industry, it seize of superior environment factor, which make manufacturer interchange experience of technology innovation. The most important is manufacturer should reach to topic for their technology innovation, if their brand has good reputation, then adopters will spread out, once reputation become difference, and it will diffuse more quickly.

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Americans' Perceptions Toward Immigrants: Test of Contact Theory and Protestant Work Ethic

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Abstract:

The discordant nature of American values, attitudes, and behaviors toward immigrants has been the subject of a substantial body of research. Attitudes toward immigrants are best characterized as ambivalent; that is, they contain both positive and negative elements. While attitudes toward immigrants have often been marked by hostility and discrimination, many Americans espouse a belief that the United States is a nation of immigrants, and that cultural diversity is one of America's foremost strengths. While on the one hand, Americans value egalitarianism – characterized by social equality, social justice, and concern for others in need – they also value the Protestant Work Ethic (PWE), an individualistic belief in hard work, self-discipline, and individual achievement. This study analyzed the data on Americans' attitudes toward immigrants (n=382). The results of repeated measures ANOVA indicated a significant effect of ethnic origin ($p < 0.001$), with European immigrants perceived most positively and Middle Eastern immigrants least positively. The results of regression analyses also revealed that egalitarianism was associated with positive attitudes toward immigrants and PWE with negative attitudes ($p < 0.001$). Further, close contact was associated with positive attitudes toward immigrants ($p < 0.01$), whereas impersonal contact did not have impacts on attitudes toward immigrants. Implications for intercultural education are discussed.

Introduction

The discordant nature of American values, attitudes, and behaviors toward immigrants has been the subject of a substantial body of research. The literature suggests that attitudes toward racial and ethnic outgroups, including immigrants, are best characterized as ambivalent; that is, they contain both positive and negative elements (Biernat, Vescio, Theno, & Crandall, 1996; Crandall & Eshleman, 2003; Katz & Haas, 1988; Katz, Wackenhut, & Hass, 1986; Maio, Bell, & Esses, 1996). The sympathy and antipathy that individuals express toward these groups is hypothesized to be due to two strong, but conflicting American values (Biernat, et al., 1996; Katz & Haas, 1988). While on the one hand, Americans value egalitarianism, characterized by social equality, social justice, and concern for others in need, they also value the Protestant Work Ethic (PWE), an individualistic belief in hard work, self-discipline, and individual achievement (Katz & Haas, 1988; Katz et al., 1986). Biernat and colleagues (1996) suggest that egalitarianism is negatively associated with all forms of prejudice, whereas adherence to the PWE is positively associated with prejudice toward those outgroups viewed to violate the PWE. This finding is consonant with other research on prejudice that shows that perceived value violations by outgroups are associated with increased prejudice (Crandall & Eshleman, 2003; Rokeach, 1960).

Research on Americans attitudes toward immigrants consistently shows that a large percentage of Americans hold prejudiced views of immigration and immigrants (Stephan et al. 1999). Further, immigration may be viewed as both a realistic threat (i.e., as competition for resources) and a symbolic threat (i.e., threat to worldview) (Stephen et al., 1999). The present study further tested this notion by examining the relationship of egalitarianism and PWE with attitudes toward immigrants of different ethnic origins. We argue that immigrants provide a model system for testing the role of the PWE in that some ethnic origins are viewed stereotypically as upholding the PWE (e.g., Asian immigrants), whereas other ethnic groups are viewed stereotypically as rejecting the PWE (e.g., African immigrants). In this way, by examining various ethnic origins we can more closely test the nature of ambivalent prejudice with respect to the role of the PWE.

Despite these factors that result in increased prejudice, many individuals espouse positive attitudes toward immigrants and form close relationships with immigrants. The contact hypothesis is based on the notion that prejudice originates from unfamiliarity and separation between groups and that contact among the groups will lead to more positive intergroup attitudes (Brewer & Gaertner, 2001). Brown, Vivian, and Hewstone (1999) suggested that positive contact between groups as a means to reduce prejudice is one of the most enduring ideas in the study of intergroup relations. Beginning with the work of Allport (1954), research on the effects of social contact has examined the conditions under which social contact results in reduction of prejudice. The current study focuses on the effects of personal (vs. impersonal) contact on perceptions of immigrants. In his review of the literature on social contact, Pettigrew (1998) suggests that cross-group friendship potentially addresses all four conditions of the contact hypothesis, and thereby represents the optimal situation for prejudice reduction. Further, personal contact with individual outgroup members may generalize, thereby making attitudes toward the outgroup more positive (Hewstone & Brown, 1986; Pettigrew, 1997). Conversely, impersonal contact refers to passive and superficial contact with outgroup members. Such experiences may actually lead to more negative attitudes toward the outgroup in that these interactions may be difficult, such as when individuals speak different languages (Crandall & Eshleman, 2003; Hewstone & Brown, 1986).

Method

Sampling and Sample

The setting for our study of ambivalence and social contact on prejudice toward immigrants was St. Louis, Missouri. The number of immigrants living in St. Louis has spiked in the last two decade after St. Louis was designated a preferred community for refugees of the genocide in Bosnia-Herzegovina. In addition, immigrants from Southeast Asia, the Middle East, and Africa have continued to migrate to St. Louis in large numbers (International Institute of St. Louis, 2005). It is estimated that the number of immigrants living in the city of St. Louis, including people from Eastern Europe, Middle East, Asia, Africa, and their American-born children is close to 100,000, about one-third of the population of the city, making the area one of the most ethnically diverse cities in the Midwest.

The sampling frame for the current study was limited to individuals residing in St. Louis, Missouri. St. Louis County was divided into four regions: north, central, south, and suburbs to ensure adequate racial compositions and median family incomes within the sample. Four zip codes were then randomly selected from within each of these four regions. Selected zip codes were then given to Americalist, which provided lists of names, addresses, and telephone numbers. Within each of the eight zip codes, 125 addresses were randomly selected (for a total of 2,000). A total of 382 people responded the survey without a follow-up letter (174 male, 202 female, 6 missing). The sample comprised of 288 Whites, 42 Blacks, 40 participants from other racial minority groups, and 12 missing). The mean age of the sample was 50.10 ($SD = 13.82$), and 360 of the participants were born in the United States.

Measures

Social Contact. Participants completed an 11-item social contact scale based on a revision of a previous scale devised by the first author (Matsuo, 1992). This scale was intended to measure personal (e.g., “How many of your close friends are immigrants?”) and impersonal contact (e.g., “How many immigrants do you encounter at work or school?”).

Attitudes toward Specific Ethnic Groups. Participants reported their attitudes toward Asian, African, Middle Eastern, Bosnian, and European immigrants by completing semantic differential items. Participants were asked to make five bipolar ratings for each ethnic group on 7-point scales for the following dimensions: *cold-warm*, *negative-positive*, *unfriendly-friendly*, *disrespectful-respectful*, *uncomfortable-comfortable*, *unwelcoming-welcoming* (modified from Voci & Hewstone, 2003). Six items were summed to form an Attitudes to Specific Ethnic Groups scale.

General Attitudes toward Immigrants. Participants were asked to report their attitudes toward immigrants in general by completing a modified version of the 10-item scale used by Starr and Roberts (1982). The original scale was modified to measure attitudes toward immigrants living in St. Louis. Examples of items include “St. Louis has too many immigrants” and “It would be better if immigrants settle in another city or country.” Responses to each item were made on a 5-point scale with endpoints ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). Items were summed to form a General Attitudes toward Immigrants scale.

Humanitarianism / Protestant Work Ethic Scale. This 21-item scale was developed by Katz & Haas (1988) and was designed to measure Humanitarian/Egalitarian beliefs and beliefs that correspond to the Protestant Work Ethic. Responses to each item are made on a 6-point scale, ranging from -3 (*Strongly Disagree*) to 3 (*Strongly Agree*). Items were then summed to form an Egalitarian Scale and a Protestant work ethic scale (see Katz & Haas, 1988).

Results

We first tested the assumption that perceptions toward refugees varied by ethnic origin. Repeated measures ANOVAs were used to compare the ethnic groups on each of the bipolar dimensions. Mean ratings with associated standard deviations are reported in Table 1. For the cold-warm dimension, results indicated a significant effect of ethnic origin, $F(1, 133) = 15.595, p < .001$ with European immigrants perceived most positively and Middle Eastern immigrants least positively. The results were similar for the negative-positive dimension ($p < .001$), unfriendly-friendly ($p < .001$), uncomfortable-comfortable ($p < .001$), and unwelcoming-welcoming ($p < .05$). No differences were found for the disrespectful-respectful dimension.

We next conducted a series of immigrants analyses to test the effects of several demographic variables, American values (Egalitarianism vs. PWE), and social contact on attitudes toward refugees. We tested these variables first on general attitudes toward immigrants, and then separately on each different ethnic group. The results are shown in Table 2. Demographic variables had significant impacts on neither the General Attitudes nor on Specific Ethnic Groups. As hypothesized, Egalitarianism had a significant positive impacts on both the General Attitudes ($B = 0.586, p < 0.001$) and on attitudes toward each ethnic group ($B = 0.633, p < 0.001$ for Asians, $B = 0.737, p < 0.001$ for Africans, $B = 0.741, p < 0.001$ for Bosnians, $B = 0.878, p < 0.001$ for Middle Easterners, and $B = 0.368, p < 0.001$ for European, and $B = 0.592, p < 0.001$ for Latino immigrants). In other words, the stronger Egalitarianism a person had, the more positive attitudes he/she tends to hold. Further, PWE had a significant negative impact on General Attitudes ($B = -0.231, p < 0.001$), such that greater adherence to the PWE was associated with more negative attitudes. Finally, while Personal Contact had a significant positive impact on General Attitudes ($B = 0.241, p < 0.001$), Impersonal Contact did not have a significant impact on General Attitudes.

The results indicated that general attitudes toward refugees are, as hypothesized, dependent upon Egalitarian beliefs ($p < .001$), such that increases in egalitarianism are associated with more positive attitudes, PWE ($p < .05$), such that greater adherence to the PWE is associated with more negative attitudes, primary social contact ($p < .001$), such that increased personal contact is associated with more positive attitudes. Similar associations were observed in individual models.

Discussion

This study provides initial evidence that people in St. Louis hold ambivalent attitudes toward immigrants and that these attitudes are based upon the maintenance of dual conflicting values of egalitarianism and PWE. The present study also shows that contact with outgroup members plays an important role in determining attitudes toward these groups. The results also suggest that the interplay between egalitarianism and PWE is dependent on the ethnicity of the outgroup. These results provide a preliminary explanation for why prejudice toward some ethnic groups has diminished substantially over the last fifty years, while prejudice towards other groups remains unchanged. For example, although attitudes toward Asian and European immigrants have become more positive over time, attitudes toward other ethnic groups have become more negative (e.g., Middle Eastern immigrants). Further research is needed to test this assertion more explicitly.

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Table 1. General descriptive data

Total N = 382

Age, mean (sd) = 50.10 (13.82)

Variable	N
Gender	
Male	174
Female	202
missing	6
Race	
White	288
Black	42
Asian	10
Latino	4
Native American	12
Other	14
missing	12
Country of birth	
U.S.	360
Other	20
missing	2
Highest education	
Grade school	10
High school	38
Technical school	8
Some college	80
College	94
Post-college	142
missing	10

Table 2. . Perceptions of immigrants by ethnic origin: results from repeated measures ANOVA

	Asian	African	Bosnian	European	Middle Eastern	Latino (F-ratio)
Cold-Warm (N=156)						
M	4.59	4.74	4.39	4.63	3.87	4.82
	(14.559)***					
SD	1.52	1.54	1.58	1.52	1.75	1.60
Negative-Positive (N=154)						
M	5.03	4.58	4.47	4.73	3.96	4.79
	(14.693)***					
SD	1.57	1.54	1.63	1.55	1.72	1.52
Unfriendly-Friendly (N=154)						
M	4.94	4.74	4.74	4.74	3.88	4.92
	(15.753)***					
SD	1.62	1.64	1.45	1.48	1.94	1.47
Disrespectful-Respectful (N=154)						
M	5.32	4.73	4.62	4.66	4.08	4.73
	(17.703)***					
SD	1.51	1.48	1.48	1.42	1.85	1.61
Uncomfortable-Comfortable (N=146)						
M	4.82	4.68	4.52	4.70	3.81	4.68
	(15.369)***					
SD	1.67	1.48	1.48	1.42	1.80	1.55
Unwelcome-Welcome (N=150)						
M	4.80	4.72	4.57	4.63	3.81	4.83
	(15.919)***					
SD	1.66	1.43	1.47	1.47	1.71	1.56

Note: Larger values indicate perceptions that are more positive
 *** p < .001

Table 2. Attitudes Toward Immigrants by Race, Age, Gender, American Values and Social Contact

	General	Asian	African	Bosnian	Middle Eastern	European	Latino
<i>N</i>	288	216	198	166	192	210	214
Race (1 = White, 0 = Non-White)	4.173*** (.212)	2.106 (.089)	.853 (.037)	1.528 (.065)	3.015 (.109)	2.174 (.108)	-1.734 (-.082)
Age	-.034 (-.062)	-.005 (-.008)	-.006 (-.009)	.035 (.048)	.120* (.155)	.062 (.110)	.034 (.051)
Gender (1 = Male, 0 = Female)	2.698** (.173)	4.361*** (.261)	.229 (.012)	2.315 (.127)	2.663 (.124)	-.326 (-.023)	1.350 (.084)
Religion (1=Non-Christian, 0=Christian)	.717 (.041)	1.663 (.087)	.964 (.047)	3.369* (.161)	4.810** (.199)	3.879** (.226)	2.924** (.163)
Egalitarianism	.586*** (.406)	.633*** (.409)	.737*** (.443)	.741*** (.435)	.878*** (.443)	.368*** (.278)	.592*** (.395)
Protestant Work Ethic	-.231*** (-.229)	.083 (.075)	-.229* (-.176)	.170 (.133)	-.033 (-.021)	.222** (.227)	.051 (.044)
Personal Contact	.241** (.161)	.265* (.172)	.049 (.030)	-.230 (-.145)	.325* (.172)	.049 (.037)	.235* (.159)
Impersonal Contact	-.010 (-.007)	-.139 (-.087)	.319** (.184)	.287 (.167)	.168 (.084)	.121 (.086)	.108 (.066)
Constant	29.571***	19.266***	20.112***	15.946***	3.020	18.835***	20.884***
R²	.328	.261	.316	.211	.304	.161	.283
F Statistic	17.003***	9.153***	10.908***	5.258***	10.010***	4.804***	10.132***

Note: Standardized Beta coefficients are reported in parentheses. * $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed)

Ethnoarchaeology of Horse-Riding Falconry

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Abstract:

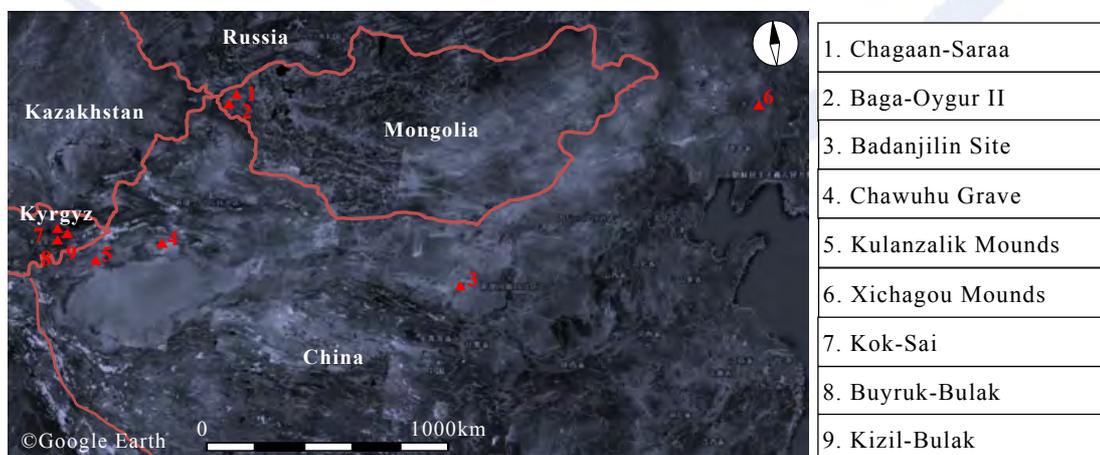
ORIENTATION: My paper focuses on significances of the long tradition of "falconry" in East Asia. In reference to archaeological evidences, animal-herders lived in the mountainous region of Altai and Tianshan have been kept and succeeded extraordinary knowledge and arts to tame raptor, especially Golden Eagles for hunting activities since more than 3000 years ago. Through ethnoarchaeological studies, the original context of falconry with meaningful history of human-raptor cooperation is described in answer to the special theme for "Sustaining the Future". Besides, the role of archaeologist/ anthropologist in the record and memory of intangible heritage will be also under reconsideration.

SCOPE & METHODOLOGY: The research is based on combination of archaeological research and ethnographic interpretation. (1) Archaeological evidences of falconry lead to reconstruct a classical form of falconry in ancient East Asia. Besides, (2) Fieldworks and concentrated participant observation of contemporary Altai-Kazakh Falconry and Falconers in Bayan-Ölgii Prefecture (western Mongolia) guide to deepen understanding of falconry. Through these researches, (3) sustainability of traditional falconry for future will be scientifically endorsed from ethnoarchaeological aspects.

RESULTS: Own ethnoarchaeological researches are gradually clarifying the reasons for supra-generational tradition of "eagle-obeyed falconry" in Mongol-Altai regions. The original form of falconry had been developed in the "nomadic" society neither royal activities nor fan-sporting game. Especially, "the horse-riding falconry" is rather practiced for actual fox-hunting in winter pasture. Besides, the number of Golden Eagles would have been stabilized due to the fact that eaglets are well tamed by local falconers. Namely, Kazakh falconers and raptor have been in coexistence and have raised each other up to exchange their utilities in traditional transhumant society. It is therefore able to suppose that to keep activating the transhumant animal-herding is the only thing to preserve/ sustain tradition of horse-riding falconry for future.

1. Introduction

The origins of the art of falconry still remain ambiguous. According to an old hypothesis, developed by German ethno-agriculturalist E. Werth (1954), the cultural sphere of falconry, so to speak “domestication of large-sized raptors”, was overlapped to that of “spade-used agriculture” due to the necessity for domestication of large-sized herbivores. In the Victorian Age some British falconers thought that the origins of falconry were dated back to ancient Egypt due to the presence of mural paintings. In contrast to “The Egyptian Origin Theory” of falconry, H. Epstein (1943: 497-509) almost for the first time mentioned the fact of the existence of falconry during the reign of Sargon II (722 B.C. ~ 705 B.C.) in the Assyrian Empire. J. V. Candy (2002: 161-201) also stated that the history of falconry may date back to around 2000 B.C. in reference to the falconer motif at Kültepe site in middle Anatolia (Turkey). In fact, one of the earliest images of a falconer can be seen in “*Silver Vessel terminating in the Forepart of a Stag*” (a fabulous ryton-style cup) made by ancient Hittites at Bogazköy (Hattusha) during 14th~13th centuries B.C. (The Metropolitan Museum of Art: 1989.281.10), and the “*Stella of Tarhunpiyas*” (the grave stone statue) probably made at Marash in Southeastern Anatolia in 8th century B.C. (The Musée du Louvre: AO 19222). However, one general scientific viewpoint of the origin of the intangible culture of falconry has been hardly specified only by archaeological findings.



Map. 1 Archaeological Sites mentioned in the Paper



Fig. Altai-Kazakh Falconer

The study of falconry culture is still in little progress, especially what concerns its classical style and context. Taking into consideration these ambiguities, this paper analyzes the classical style of Asian falconry culture and its potential origins based on the archaeological findings mainly from northern and central Asia. This study also shows ethnographic interpretations of these discoveries from anthropological and some ornithological points of view. One of the main objectives of this study is to contribute to the understanding of the socio-cultural importance of falconry in the history of mankind and to develop a special program to sustain this culture for future generations.

The standing point of this research is ethnoarchaeology based on two steps – archaeological compilation and ethnographic interpretation: (1) Archaeological images of raptors' predatory scenes and horse-riding falconers are collected mainly from northern and central Asia (map.1), and reviewed according to their chronological order (All figures in this paper are originally drawn from cited images with own observations). (2) Some ethnographic interpretations are given for individual figures and motifs; ethnographic information is derived from own fieldwork from 2006 to 2011 which was carried out around the Lake Issyk-kul in Kyrgyz (Soma 2007, 2008) and Altai-Kazakh (Mongolian) communities in Mongolia (Fig.1) (Soma 2011a, 2011b, 2011c, 2011d).

The study attempts to shed light on the classical style of falconry, which differs from its current practice. As a result, its long-lasting tradition basis for intangible heritage is also clarified from ethnoarchaeological point of view.

2. Early Representations of Birds of Prey

from 3000 B.C.

2.1. Raptor Hunting Scene in the Northern Altai Mountains

It is extremely difficult to establish whether there was actually falconry in ancient times basing only on archaeological evidences. However, there are numerous ancient rock engravings of birds of prey in northern Asia (Кубарев, Цэвээндолж & Якобсон. 2005: 556). Predatory scenes of birds of prey were one of the most important themes in ancient times in the north Altai Mountains regions (Western Mongolia). It seems no coincidence that there are different kinds of rock carvings of raptors in these areas, along with the preserved tradition of eagle-tamed falconry by local Kazakh animal-herders. These depictions are thought to date back to 3000 B.C. ~ 2000 B.C. It is understandable whether they have falconry custom or not, predatory scenes of raptors were paid great attention as the subject matter for rock art representation.

For example, a fish-hunting scene by a predatory bird is found at Chagaan-Saraa (Цагаан-Салаа) petroglyph site (Fig.2). In terms of ornithological analysis, piscivorous (fish-eating) raptors are not very abundant in the western Mongolia. Falconry birds such as Golden Eagle (*Aquila chrysaetos daphanea*), Northern Goshawk (*Accipiter gentilis*), Saker (Falco cherrug) and Peregrine Falcon (*Falco peregrinus*), etc are rarely considered to be usual fish-hunters in this region. It is highly probable that this motif was either Palla's Fish-Eagle (*Haliaeetus leucoryphus*) or White-Tailed Eagle (*Haliaeetus albicilla*) which are the only two usual fish-eating migratory birds visiting this area once in a while (Gombobaatar & Usukhjargal. 2011: 42-43). However, in early autumn some local Altai-Kazakh falconers often feed their tamed-eagles with river fish (dace, trout, etc.).

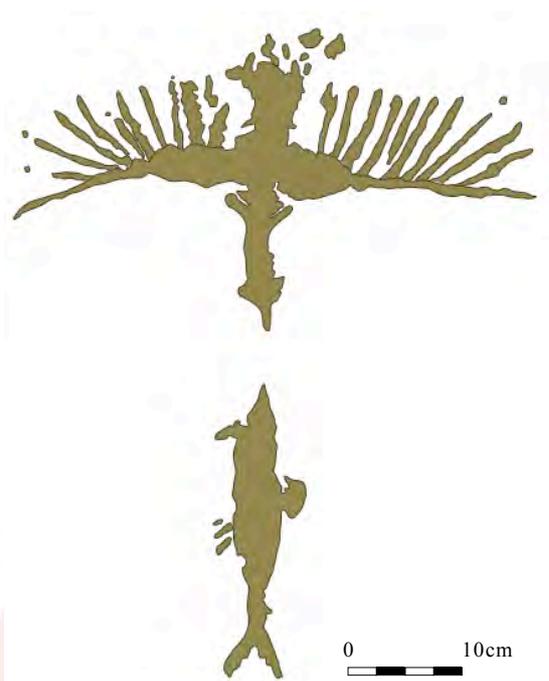


Fig. 2 Predatory scene at Chagaan-Saraa

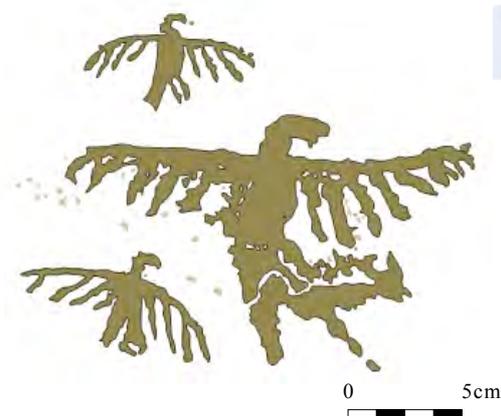


Fig. 3 Predatory scene at Baga-Oygur II



Fig.4 Petroglyph at the Badanjinlin Desert

Furthermore, there is a unique hunting scene at Baga-Oygur II (Baga-Oйгура II) petroglyph site (Fig.3) (Кубарев, Цэвээндолж & Якобсон . 2005: 366). Three eagles are chasing an herbivore (rabbit or deer), despite the fact that one can rarely meet them in local natural surroundings. Golden Eagles and other hunting birds usually do not attack their prey with other birds due to exclusive possession of their own territory. Gordon (1973: 156-157) tells that Golden Eagles sometimes hunt cooperatively in pair or with several other members in August and September, although it is not usual case in Scotland. In connection to this fact, a falconry operation by Kyrgyz and Altai-Kazakh falconers is inevitably carried out with plural eagles and falconers. The roles of hunting participants are divided into falconer(s) and prey-searcher(s) based on a local tradition. This kind of hunting cooperation has been established to prevent zero-hit situations and poor-catch. If the primary attack by the first eagle is failed, then the second one is made to fly, in case if it also fails, the third one flies to assault on the quarry (Soma 2007, 2008). It is thus considered that cooperative hunting by eagles engraved in Baga-Oygur II does not happen very often in nature except of the falconry scene. An implicative scene is also found in a petroglyph at the Badanjinlin Desert of Alaşan District in Inner Mongolia Autonomous Region (Fig.4) (Gai 1998: 76). It seems to be a more concrete scene of hunting by two horsemen, who chase a prey with a flying bird. However, the exact date

when this drawing was made is unclear.

The cooperative way of hunting by birds is also known in a technique of fishery with cormorant in China and Japan (Laufer 1931). The way is thought to be a unique derivative custom from "bird domestication for hunting" in a human history.

2.2. Predatory Raptor Motif in Scythian Metalworks

The archaeological evidences of a real hawk's bone imply more concrete connection between humans and raptors. In the southern foothill of the Tianshan Mountains (contemporary Xingjian Uygur Autonomous), a set of actual four hawk talons are unearthed from funeral goods in a group burial chamber (M113) at the Chawuhu Ancient Graveyard No. 4 (察吾呼 4 号墓地) established in ca. 10th century B.C. (Heqin Prefecture, Bayangolin Autonomous) (Xingjian Wenwu-Kaogu Yanjiusuo. 1999: 80). This was probably the set of talons taken from a right or a left leg. In addition, some hawk skeletons were also found at the Kulanzalik Burial Mounds (庫蘭薩日克古墳群), made during 5th century B.C. (Aheqi Prefecture, Kizil-su Kyrgyz Autonomous) (Xingjian Wenwu-Kaogu Yanjiusuo. 1995: 20-28). It was estimated that all these bones belonged to 12 individual hawks in total, which were buried together in a small mound (93AK-M5) situated in the northeastern side of so called "Adult males' mound". Besides, a gold plaque depicting a hunting scene of a predatory bird on deer was found in the other burial chamber (93AK-M5; no. C) (Fig.5). It may be the potential evidence of captive predatory birds in this period and area.



0 1.5cm

Fig. 5 A gold plaque found from Kulanzalik Burial Mounds

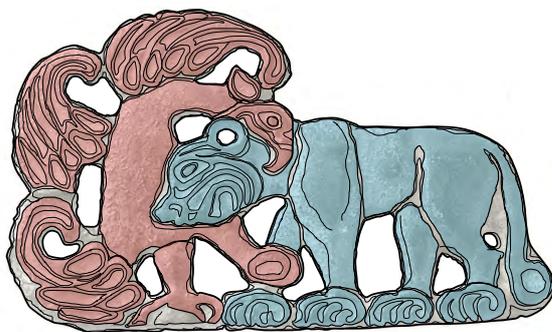


Fig.6 Eagle and Snow Leopard

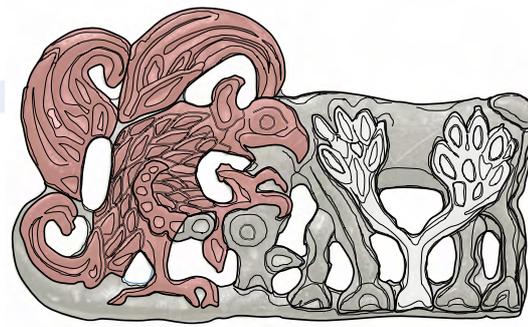


Fig.7 Eagle Predatory on Ibex

Similarly, the central concern of the Scythian art is local animals, which dwelled in the northern Eurasian steppe belt. Evidently, the art of the Scythians was derived from deep observations and analysis of wild animals and raptors. After the 5th century B.C., the animal conflict motif, such as a struggling motif of raptor and feline (probably Golden Eagle and Snow Leopard (Fig.6) (Tokyo National Museum. 1997: 126) and predatory on ibex (Fig.7) (Bunker. 2002: 103, 109), extensively characterized the main Scythian subject matters, probably made in the southern Siberia. The motif was created to describe both realistic and mystical features, of which the cultural linkage might have been succeeded from former petroglyphic art traditions. These two examples well expressed the hunting scene of the eagle on the ground, which stuck out to grab the prey by its leg. Despite no raptors naturally will try to hunt a Snow Leopard and there is no record of predatory on, it is considered that only Golden Eagle could make predatory on large-sized herbivores like Red Deer, Siberian Ibex, goat, in addition to antelope (Goodwin. 1977: 789-790) and coyote (Mason. 2000: 244-245). There were times when grey wolfs were often hunted by well tamed eagles in the local horse-riding falconry practice. Altai-Kazakh falconers sometimes capture Palla's Cat (*Felis manul*), the Mongolian wild cat. Therefore, these motifs might have been produced with an extensive imagination by ancient local people.

According to these archaeological findings, one can partially understand that ancient people in north and northeastern Asia had strong concerns for local birds of prey. And in fact, they had started to capture or tame birds nearly 3000 years ago, whether falconry was practiced or not at that time.

3. The Image of Horse-Riding Falconers from 3rd Century B.C. to 8th Century

3.1. Northern China

The visual representations of a falconer can be tracked back to the 3rd century B.C., the period during the rise of the Hun Empire and the spread of its hegemony and nomadic cultural taste along the northern territory of Eurasia

The image of a falconer was found in Xichagou Ancient Grave Mounds (西岔沟墓群) in Northeastern China

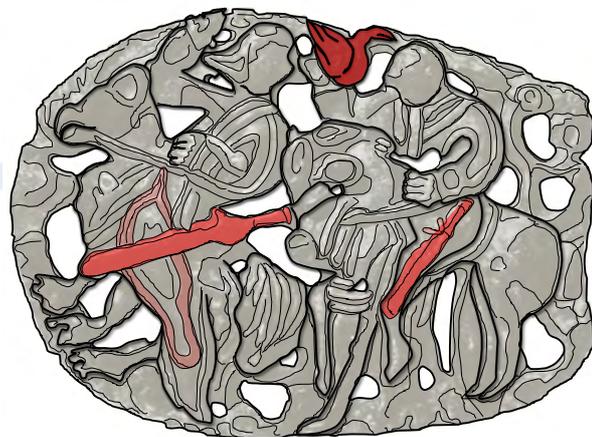


Fig. 8 Bronze belt buckle from Xichagou Mounds

(northeast Xifeng, Liaoning Province) (Fig.8). This bronze belt buckle depicts galloping two horsemen (Bunker, Kawami & Linduff. 1997: 79-80 (Fig.A112)). The latter horseman perches a hawk (or falcon?) on his right hand. This is the same



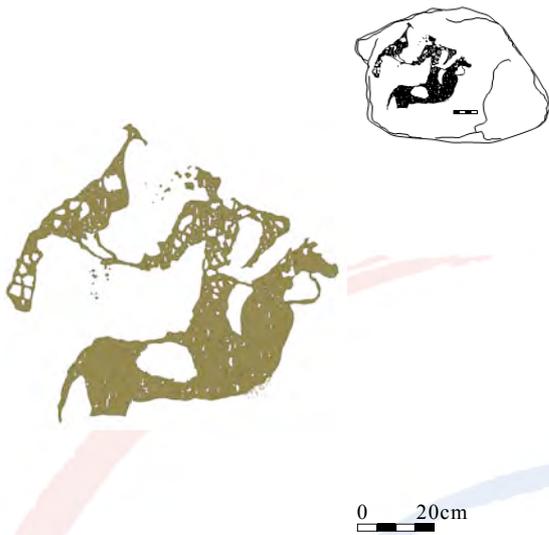


Fig. 9 A figure at Kok-sai

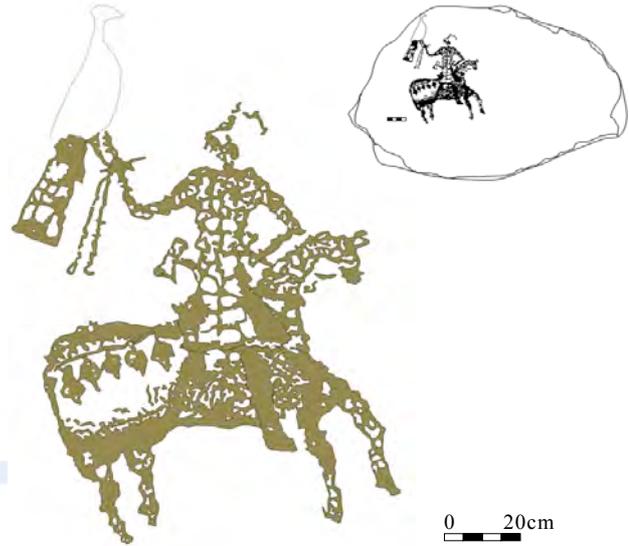


Fig. 10 A figure at Kok-sai

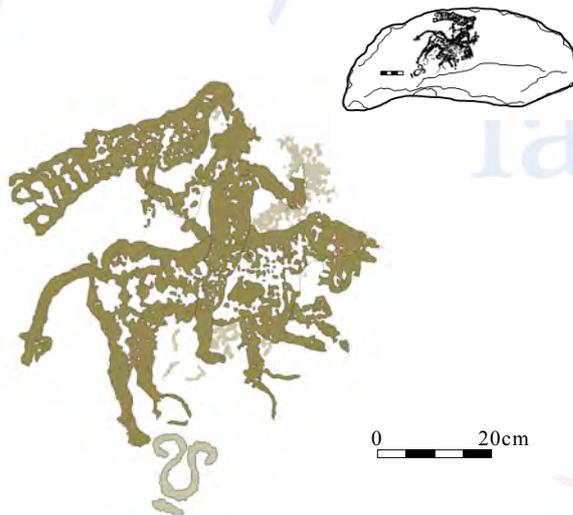


Fig. 11 A figure at Kok-sai

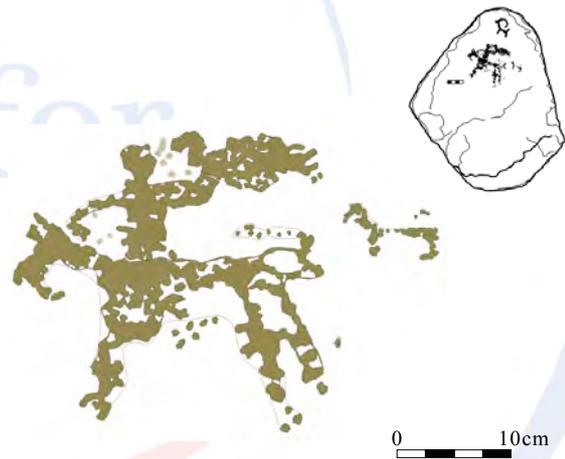


Fig. 12 A figure at Kizil-Bulak



Fig. 13 A figure at Buyruk-Bulak

style as horse-riding falconry in the Kyrgyz and the Kazakh communities. The buckle is thought to be the artifact of nomadic taste produced about 3rd century B.C., the end of the Warring States Period of China. This is therefore probably one of the earliest figures of the horse-riding falconer in Asia.

3.2. Tien-Shan Mountains (of Eastern Kyrgyz)

This kind of images became abundant after the Turkic (Göktürk) period (6th century) along the Tianshan Mountains regions. In the Khaganate Period (during 7th ~ 8th century), falconer images were depicted on rock canvas at Kok-Sai (Көк-Сай) (Fig.9, 10, 11), Buyruk-Bulak (Бөйрөк-Булак) (Fig.12) and Kizil-Bulak (Кызыл-Булак) Petroglyph sites (Fig.13) in Kyrgyz Republic (Табалдиев & Солтобаев. 2002: 68-73; Табалдиев & Жолдошов. 2003). These rock carvings of hunting scenes with birds of prey are very similar in their style to the contemporary practice of the Kazakh falconry (see Fig.1). Some falconer's equipment is also recognized in these pictures. In Fig.9, a head of the eagle is rendered in round shape as if covered by hood (called *Tomoga* in Kazakh) before hunting (Fig.14). In Fig.10, a clear depiction of jess (*Ayak-baw*), a set of leather leg straps to hold a raptor, is observed as if the eagle is just in the flight motion (Fig.15). In Fig.11, there is an unclear depiction of an arm-brace (*Baldak*). It is



Fig.14 Eagle's hood (*Tomoga*)



Fig.15 Eagle's jess (*Ayak-baw*)



Fig.16 Arm-brace for horse-riding (*Baldak*)



Fig.17 Falconer's gantlet (*Bialai*)

Y-shaped pillar to put a right wrist on being on a horseback, used only by Kyrgyz and Kazakh falconers (Fig.16). In addition, the falconer's gantlet (*Bialai*) should be inevitable to perch the eagle on, despite the fact that it is unrecognizable from the images (Fig.17).

Most of the depicted falconers probably hold a Golden Eagle of almost their body size except Fig.13. In this image the only falconer is assumed to hold a relatively small raptor (a hawk or a falcon) on his left wrist. The falconer is probably targeting four waterfowl (geese?) and one heron (or crane?) walking in line in front of the hunter. In case of Kyrgyz and Kazakh falconry, game birds are not considered to be usual objects to hunt with. In addition, it is said by local falconers that Golden Eagles are not really good at hunting for waterfowls and small mammals because of their heavy body size. In this sense, one can interpret this image as the scene of "hawking" or "fowling" by a tamed long-winged or short-winged raptor (possibly, goshawk, saker, or peregrine, etc.).

For the additional analysis, three falconers depicted in Fig.9, 10, 11 perch their birds on their right hands, and two others in Fig.12, 13 are left-handed. Horse riders normally perch their bird on their right wrist. Kyrgyz and Kazakh falconers also have the tradition of holding their raptor on their right wrist. On the contrary, European and Asian falconries in "non-nomadic societies" are usually left-handed in their style. An early Persian falconer figure is seen on a small bronze plaque made during 7th ~ 8th century, probably from post-Sasanian to Umayyad period (Fig.18) (Epstein 1943: 498 (Fig. II)). This plaque also shows left-handed style falconry which also represents a highly equipped falconer with his armour and horse bridle bells in front.



Fig.18 A bronze plaque from Iran

The difference arises in the local customs of horse riding. It is understandable from the Fig.8 that the ancient nomadic horse riders attached and hanged their bow, sword and equipments on their left when being on a horseback. Further decisive factor is based on the manner of riding a horse. The steppe people usually grab the reins firmly with their left hand before riding on a horse from the left side. Falconry is never carried out without horse-riding in a pastoralist community. According to paintings found in India, Persia and Arab regions, some noble falconers which belong to the noble class of the

society hold their predatory birds on their left wrist even while being on a horseback. Besides, falconry was also practiced both standing and horse riding in these regions. It is probable that the servants and attendants might have handed over a bird to their master after they rode on (referred to “*Prince Akbar and Noblemen Hawking, Probably Accompanied by His Guardian Bairam Khan*” (The Metropolitan Museum of Art: SL.17.2011.1.2). Namely, it is assumable that the left-handed style falconry was an alteration made by sedentary falconers, which they derived from the noble way of falconry.

According to archaeological evidences it is highly probable that the style of horse-riding falconry was carried on by nomadic pastoralists for more than 2300 years. Particularly, the tradition of eagle-tamed falconry has been continued since 7th ~ 8th century in the Tianshan Mountainous regions. It is not chance coincidence that Kyrgyz horse-riding falconry, mainly tamed Golden Eagles for fox-hunting, had been well preserved until 1990’s in the same regions.

4. Socio-Ecological Significances of Ancient Falconry

4.1. Falconry and its Eurasian-Wide Adaptability

One can partially clarify inherited traits of supra-regional and strong social penetration of the falconry culture from archaeological aspects.

According to sedentary living spheres in Eastern Asia, specific records and inscriptions about falconry are scarce before the age of the Han Empire (202 B.C.). The falconry and falconer representations were seen in the magical and realistic scenes of stone carving wall (画像石) during 1st ~ 2nd century, the inside panels of funeral chamber for nobles in Shandong Province (Zhongguo-Huaxiangshi Quanjibian Jiweiyuanhuibian. 2000: 40). Afterwards, falconry was brought to the east end of Eurasia, the Japanese Archipelagos, from 6th century more or less according to haniwa figurines in the Tumulus Period. Besides, it is also ambiguously premised that falconry was transmitted to Europe after intrusion of the Hunnish people in the end of the Roman Empire. Falconry might have been started in Britain since 8th century during the reign of Ethelbert of the Saxon monarch in the year 760 by evidence from an old letter to the German King (Hamilton 1860: 172-173). Whether by cultural transmission or independent occurrence, falconry had become a stable socio-cultural domain in both ends of Eurasia until 8th century.

Archaeologically speaking, the geographical sphere of falconry culture is coincidence

with “nomad’s territory” in northern Asia from and a massive expansion of political hegemony of “the Nomad’s Empire” in the ancient times. Horse-riding custom was one of the main contributions for physical mobility. Besides, low population density in the steppe territory is rather one of contribution to ease transmission of culture and information among wider spatial range. Thus, falconry, so to speak “domestication of predatory birds”, has been deeply anchored in animal-herding life style.

4.2 Food Accessibility rather than Rituality

Anthropologically speaking, winter hunting practice is inevitable in nomadic animal-herding society to secure their food for subsistence and animal-fur for cloths and trading. It is caused by limited availability of meat and daily products, and the lack of material stuff in a pastoralist community. According to the local life in Northern Altai, livestock such as sheep, goat and cow lose 1/3 of their weight in winter. Cow milk is also reduced from 4 liters to 1 liter in average. Therefore falconry with tamed eagles has probably played the crucial role of securing food provisions in winter.

However, contemporary Kyrgyz and Kazakh falconry is/ was not practiced only for food consuming purposes, but also for fur acquisition from fox-hunting, which is used for trade and other private purposes. According to the environmental condition including avifauna, it is very hard to find waterfowls and game birds for food in winter. As far as the ethnography of Kazakh falconry was observed in the Altai regions, falconers would not also hunt lagomorphs on purpose. Similar situation was also observed at the southern shore of the Lake Issyk-kul. It is defined that the food availability of classical mode of falconry is rather less functioned in the local nature of Tienshan and Altai Mountainous regions compared to the European falconry. Therefore from its early stage, falconry is rather developed with intentions for recreation, sport-hunting, ritual or fur-acquisition which have indirect connections with food obtaining purpose in livelihood.

In connection to this perspective, figures of horse-riding falconers in the ancient times might have much more ritual and symbolic meaning, rather than daily hunting practice.

5. Conclusion:

Ancient Clues towards Sustaining Falconry for the Future

The paper is concentrated on compilation of archaeological representations of predatory scenes by raptors and figures of horse-riding falconers in north and central Eurasia. Some ethnographic interpretations are also the central theme in reference to

fieldworks about contemporary Kyrgyz and Kazakh horse-riding falconry. Ethnoarchaeological analyses bring the fact that the tradition of horse-riding falconry dates back to approximately 2300 years ago. It is also highly possible that the style was developed for rather symbolic and ritual functions than practical food securing purposes according to the local environment and avifauna.

The archaeological materials also clarify that falconry was easily over the boundary of culture, region and society. It is still hypothetical that horse-riding mobility contributed to physical expansion of falconry culture. Nowadays, falconry is recognized in more than 60 countries (UNESCO 2010: 3). Especially, the presence of figures of horse-riding falconers in the Tienshan regions confirms the fact that the tradition of Kyrgyz falconry has a long history. Whether by “diffusion” or by “independent occurrence”, Eurasian-wide falconry has been in practice for more than 1200 years.

However, these long-lasting traditions of falconry practically disappeared in the Lake Issyk-kul regions (Kyrgyz) in 1990's (Soma 2007, 2008). Furthermore, actual hunting operations have been also disappearing in the Altai-Kazakh community in the Bayan-Ölgii Prefecture (Mongolia) (Soma 2011a, 2011b). The only contribution of this ethnoarchaeological research would be to (re)evolve a millennium long significance of horse-riding falconry, which has been transmitted from generation to generation in the Kyrgyz and the Kazakh societies for hundreds of years. Sustaining falconry culture for future generations is heavily dependent on successive conservative actions based on the criteria created by a local axiological idea.

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The Use of Formative Assessment Techniques in Science Subject in Primary One: A Case Study

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Abstract:

A proper and effective implementation of formative assessment techniques in the classroom will help to improve pupils' learning. Oral questioning, exercises, seatworks, quizzes, discussions, projects, assignments and homeworks are among the common formative assessment techniques applied by teachers during the teaching and learning process. This paper reports the findings of a qualitative study undertaken to identify the formative assessment techniques used by a teacher during the teaching and learning process in a World of Science and Technology classroom. A case study design was used, and the study was conducted in a primary school in Penang, Malaysia. The school is a showcase school for the School Based Assessment programme. One World of Science and Technology teacher participated in the study. Data was obtained through an observation. The finding was discussed according to the use of formative assessment techniques in the teaching and learning process. The study showed that the teacher adopted a variety of assessment techniques to improve the pupils learning and help them achieve the learning objectives. The study also noted the teacher's use of different techniques which are functionally complimentary to one another to suit different purposes. Using various formative assessment techniques is important to enable teachers to make correct decisions based on the pupils capacity, capability and skills. Using various assessment techniques also helps to ensure high validity of the constructs measured. As a whole the finding of the study significantly demonstrates how formative assessment can be effectively implemented as part of the teaching and learning process in a World of Science and Technology classroom.

Introduction

Standard Curriculum for Primary Schools which was introduced in primary one in 2011 adopts the concept of School Based Assessment (SBA) to assess pupils' learning. In SBA, formative assessment or assessment for learning is emphasized to enhance the learning of the pupils and their potential as a whole. This change was implemented in order to address the need to assess students in a more comprehensive manner (Na'imah, 2011). Formative assessment is a continuous process, integrated into the teaching and learning (T&L) process and therefore capable of producing a more comprehensive assessment of the students. Using formative assessment techniques accurately helps pupils master what is taught as well as giving them the opportunity to communicate, demonstrate understanding and fulfil their needs to improve their learning (Black & Wiliam, 1998). It is also capable of providing relevant information to pupils during the learning stage to help them improve their performance and achievements against the learning objectives and standards (Chappuis & Chappuis, 2008). The used of formative assessment techniques also provides information on teaching quality (Hall & Burke, 2003).

However, the purpose of assessment techniques used in T&L process should be understood by teachers. It is important because the term formative assessment technique is also called by other names such as design (Brookhart, 2007), techniques, tools and activities (Pinchock & Brandt, 2009) all of which refer to activities that are used in a process of assessing pupils performance. In the concept formative assessment, the process of assessment is combined and embedded into the T&L process, with both activities moving in tandem with one another (Brookhart, 2007; Mohd Azhar & Shahrir, 2007; Stiggins & Chappuis, 2006). Because it is simultaneous and embedded, formative assessment techniques are sometimes referred to as designs, techniques, equipment or activities of T&L and the line distinguishing between formative assessment and the process of T&L is not always clear. As a matter of fact, this difficulty in distinguishing formative assessment from the process of T&L is exactly the reason why the adjective 'embedded' is used to describe formative assessment (Gallagher, 1999). Formative assessment may be conducted informally through discussions, observations, oral question and answer activities, seatworks, writing exercises, homeworks, projects, portfolios, group works, quizzes, assignments, self assessments, and dialogues (Black & Wiliam, 1998; Brookhart, 2007; Harlen, 2007; Scherer, 2007). All these techniques can help students to develop their thinking and reflective skills, enhance their understanding, as well as providing them with the opportunity to think in-depth and express their ideas (Black & Wiliam, 1998; Brookhart, 2007; Cizek, 2007; Chappuis & Chappuis, 2008; Harlen, 2007; Scherer, 2007). The use of these techniques can also encourage active pupil's participation in the process of learning (Black & Wiliam, 1998; Crooks, 1998; Hamm & Adams, 2009; Scherer, 2005; Stiggins & Chappuis, 2006). Other than that, the use of various techniques in formative assessment helps to improve the validity of the constructs measured (Brookhart 2009). This is very important as it helps teachers to make sound and informed decisions regarding the learning of the pupils as the information on which these decisions are based is obtained from many different sources (Brookhart, 2009).

Statement of the problem

The change from summative assessment which emphasizes tests and examinations to formative assessment advocated by SBA has attracted many complaints from teachers. There appears to be a feeling of insecurity among teachers to conduct formative assessment during the process of T&L. The application of formative assessment is still weak as teachers are less skilled especially in integrating formative assessment techniques into the process of T&L. The age old practice of teaching and assessing pupils separately still holds sway among teachers who consider techniques of formative assessment as something new and should be implemented separately although these

techniques have always been part of their T&L (Black & Wiliam, 1998; Brookhart, 2007; Hall & Burke, 2003). Teachers still need training to carry out formative assessment in their classroom (Black and Wiliam, 1998), both in terms of techniques and implementation.

The issue of formative assessment techniques has been widely addressed by many different proponents of formative assessment. Black and Wiliam (1998) suggest for teachers to use a variety of techniques as tools for formative assessment as long as such techniques are capable of providing them with relevant information to help them modify their instructions and to plan the next lesson. This is supported by Scherer (2005) who states that all techniques which enable teachers to obtain information on the status of the understanding, skills and knowledge of the pupils can be used as formative assessment techniques. Despite this, more information with regards to formative assessment techniques is needed to alleviate teachers' fears and reservation in conducting formative assessment in the classroom. This is especially so as formative assessment techniques can also function as techniques for the T&L process. Guidelines provided by Black & Wiliam (1998), Brookhart (2007), Hall & Burke (2003) and Scherer (2005) on the use of formative assessment techniques do not provide enough details to optimally guide teachers in their effort to conduct formative assessment successfully. Fisher and Frey (2007) assert that a technique functions as part of the T&L process when it is used to convey the content and concepts of the subject, but the same technique functions as part of the formative assessment process when it is used after the content and concept of the subject have been explained. Subsequently they recommend that teachers conduct formative assessment after teaching the content and concept of the subject for ten to fifteen minutes.

Notwithstanding Fisher and Frey's (2007) explanation on the difference in functions of activities as formative assessment techniques and as part of the T&L process, there is a real need for teachers to be exposed to the proper use of formative assessment techniques. A research conducted by Mohd Azhar and Shahrir (2007) found that teachers generally use questioning techniques as a teaching technique and not as an assessment technique. This is supported by Suzana and Jamil (2012) who noted that teachers tend to mix up between formative assessment techniques and T&L techniques. Zamri and Nor Razah (2011) found that teacher's use of questioning techniques to enhance students learning was still low. Brookhart (2007) discovered that compared to secondary school teachers, primary school teachers are more to use a variety of observation techniques in formative assessment as they consider observation as the main technique of formative assessment. A study by Hall & Burke (2003) suggested the use of formative assessment should be well planned to suit the various levels of ability of pupils. This would allow pupils to better demonstrate their abilities, talents and interests (Hamm & Adams 2009). Suitable activities can include physical movement of the body such as singing, acting, storytelling, reading poems and poetry which can improve the learning of various skills such as physical, cognitive, affective, social and emotional (interpersonal and intrapersonal).

Issues related to information derived from the use of formative assessment techniques must also be given attention. Information derived from these techniques can be used to gauge and understand the student's level of achievement. This information must be used effectively to plan for the next course of action to improve student's performance. These include providing meaningful feedback to students and modify the process of T&L to suit the needs of the students. Thus, it is important that teachers obtain this information including through observation of student's behaviour during the formative assessment activities, because such information can help assist them to make informed decisions and judgments about what to do next in the process of learning and teaching.

Research Objective

The purpose of this study is to explore how World of Science and Technology teachers in primary schools apply the formative assessment techniques in the T&L process.

Research Question

The study was conducted to clarify the question "How are formative assessment techniques used during the process of T&L in the subject of World of Science and Technology?"

Methodology

This study makes use a qualitative case study approach to address the research question posed. The method was chosen based on the desire to understand the phenomenon in depth (Yin, 2003) and to get a clear picture (Marohaini, 2004) of the use of formative assessment techniques in the subject of World of Science and Technology for primary one. In an effort to make this research more relevant, a show case school for the SBA programme, located in Penang, Malaysia was selected as the site for the study. Selection of the participants was done through purposive sampling to address the need of the researcher to explore, learn and understand the phenomenon effectively. For this to occur the participant selected must possess good knowledge and information regarding the phenomenon being studied (Merriam, 2009) as this helps to improve the credibility of the findings (Patton, 2002). The participant for this study was chosen based on strict criteria: The participant must have at least five years of teaching experience; must possess reliable and excellent knowledge about formative assessment; and must possess current and up to date information of the use of formative assessment techniques.

Data was collected through non-participant observation technique (Bogdan & Biklen, 2007; Marohaini, 2004; Merriam, 2009) conducted in the classroom to provide a true picture of the use of formative assessment techniques in the classroom. Data was analyzed in two stages. The first analysis was done during the field work and the second, a content analysis, was carried out after the completion of the field work. Manual frequency calculation technique was used to establish the patterns of formative assessment techniques often used by the participant (Abd. Murad, 2003). A Matrix is used for inference analysis.

Findings

The finding was presented according to how each of the formative assessment techniques was utilized by the respondent.

Oral Questioning Technique

Oral questioning technique was used in all the three phases of teaching and learning process. In the induction set, open ended questions requiring short answers were used. These were knowledge level questions which allow teachers to gauge the pupils' knowledge of the subject. The answers given by the pupils to these questions at this stage of the lesson help the teacher to introduce the topic. In the case of this study, the topic was 'animals'. The following vignette from the study demonstrates how this can be conducted:

The teacher started her lesson by playing a track of animal sounds on the CD player.

"Now I'm going to play the CD for you. Listen to the sound of the animals" she instructed her pupils. "Can you hear the sound?"

The pupils responded with a "Yes".

The teacher then proceeded to ask the pupils a series of open ended questions. "What animal sound can you hear?" After the sound of a bird, the teacher asked the students to imagine the features of a bird.

"Have you ever seen a bird?" She asked.

"Yes" The pupils responded.

"What do birds have" The teacher asked another question.

"Wings" The pupils answered.

"What else?" The teacher continued.

"Beaks" The pupils answered.

"What else?" The teacher continued with her questioning.

"Feathers"

"What else?"

"Feet"

"What else?"

"Eyes"

"Good"

The teacher then explained that what the students mentioned were characteristics of a bird. She then informed the students that they were going to learn about body parts of animals. She showed the students a picture of a bird and picture of a fish and proceeded to teach them about body parts of birds and fish.

Oral questioning was also used at the middle stage of the T&L process. In this study, after explaining the characteristics of birds and fish, the teacher used oral questions to gauge her students' level of understanding of the subject.

"What body parts of a fish have we seen just now?"

"Fins"

"What else?"

"Scales"

"What else?"

"Tail"

"Did we see anything else?"

"Mouth"

The Teacher then asked the pupils to compare the body parts of a bird to that of a fish. This was to assess the depth of the students understanding of the subject.

"Can you tell me a body part that is present in both a fish and a bird?"

"Tail"

"Can you give me another one?"

"Eyes"

"What body parts can we see in a bird but not in a fish?"

"Wings"

"OK. How about parts we can see in a fish but not in a bird?"

“Fins”

“Good. Now can you tell me a body part we can see in a bird and a fish but different in shapes?”

“Mouth”

“What do we call the mouth of a bird?”

“Beak”

“Good.”

At the closing stage of the T&L process, oral questions can be used to determine students overall understanding of the subject. Oral questions at this stage can be used to demonstrate whether students have really understood the subject or not. In this study the teacher demonstrated this by asking oral questions designed to encourage students to make their own conclusions about the subject.

“Did you enjoy the lesson today?”

“Yes”

“Was the lesson fun or not?”

“Fun”

“Good. In that case tell me what you have learnt today”

“Birds and fish”

“What did we learn about birds and fish?”

“Eyes, beak, legs, fins, tails”

“That’s correct. We have learned about the body parts of birds and fish”

Group Discussion Technique

In addition to the oral questioning technique, the teacher also used group discussion technique to assess pupils understanding of the lesson. The pupils were asked to work in groups of five to complete a task related to the subject. The task required the students to write the body parts of a bird on a sticker and stick them at the right places on a picture of a bird given. They were given a few minutes to discuss their answers in their respective groups before presenting it to the class. The discussion time given took into account the pupils’ ability and the level of difficulties of the task.

Singing Technique

As a formative assessment technique, singing can be used at the closing stage of the lesson as a way of assessing students understanding in a fun and exciting manner. In this study, the singing activity was carried out twice at the closing stage of the lesson. At the end of the activity, the teacher asked general questions related to the students’ feeling. The lyrics of the song, however was not related to the subject of body parts of either a bird or a fish, and it was therefore not very clear whether the activity served the function of formative assessment or simply a technique to conclude the lesson.

Discussion

The result of the study has highlighted some salient highlights related to the use of formative assessment techniques in the World of Science and Technology primary one classroom. To begin with, there is need for teachers to ensure the use of the various techniques which are relevant and appropriate to the level and ability of the pupils (Hall and Burke, 2003). In the context of this study, the teacher has demonstrated that they used the formative assessment appropriately. The

use of three formative assessment techniques throughout the the process of T&L. The oral questioning technique was used to assess students understanding throughout the lesson. The group discussion technique was used towards the middle stage of the lesson to gain further information on the student's level of understanding of the subject. This was to supplement information derived from the use of the oral questioning technique. Towards the end of the lesson, the teacher made the effort to gain further information on the student's understanding of the subject through the use of the singing technique.

The result demonstrated the feasibility of using oral questioning throughout the T&L process. Oral questioning technique is frequently used in all phase of the T&L process (Black and Wiliam, 1998; Fisher & Frey, 2009, Stiggins, 2001) to gauge students understanding. In the study the teacher demonstrated this feasibility by using the technique in all stages of the lesson. At the beginning of the T&L process, oral questioning technique was used to examine the readiness of students to learn. The teacher's use of this technique at this stage of the lesson also helped to engage students to be involved in the T&L, examine their background knowledge of the subject and introduce the title of lesson (Black & Wiliam, 1998). During the middle stage of the T&L process, oral questioning technique was used to obtain information on the status of the students understanding up to that point of the lesson. Information gained at his point of the lesson would be useful in helping the teacher to decide on the next course of action to take regarding the T&L process. However in the context of the study it was observed that the questions used throughout the process were mainly lower order questions which may not have been able to assess the higher cognitive abilities and skills of the students. Such information may lack both accuracy and reliability needed by the teacher to make inform decisions regarding the next course of actions to take in the T&L process. It was also debatable whether lower order questions of this type would be able to help promote students thinking. It is important that the questions used are appropriate with the student's skills and level of ability, as well as relevant to the objectives to be achieved.

Group discussion technique helps enhance the pupils' communication and interpersonal and intrapersonal skills (Hamm & Adams, 2009). This technique is student centered (Cizek, 2010) and encourages students' active participation in the T&L process (Black & Wiliam, 1998; Crooks, 1998; Hamm & Adams, 2009; Scherer, 2005; Stiggins & Chappuis, 2006). Active involvement of students in the discussion process helps them to understand the purpose of learning and encourages them to strive for success (Black & Wiliam, 1998). In the study the teacher's use of this technique towards the middle of the lesson to gain information on the students understanding of the subject was suitable and appropriately timed. However, just like the use of the oral questioning technique, the task that the pupils were required to do in the discussion activity may not have presented enough challenges to stimulate the students higher order cognitive skills and ability. Apart from that, the task only required the pupils to identify the body parts of a bird, even though the they were also inrtroduced to the body parts of a fish in the earlier stage of the lesson. This may have affected the accuracy and reliability of the information obtained from the activity, and this in turn may have had a significant implication on the teacher's decision making regarding the T&L process as a whole.

The use of singing as a formative assessment technique in this study may not have achieved its intended objective to gain further information on the student's level of understanding of the subject presented in the T&L process. The teacher may have successfully gained information on the student's status of emotions which is related to the affective aspect of the lesson through the student's body movement, use of space, response to the music, and their interpersonal and intrapersonal display (Hamm & Adams, 2009) but it was doubtful whether the activity had provided relevant information on the students understanding of the subject of body parts of animals. The lyrics of the song contained no mention of any body parts of either a fish or a bird,

even though the title of the song 'Ikan Kekek' refers to a type of fish, widely known in Malaysia. The singing activity also did not require the students to show any level of understanding of the subject they had just learnt. It was a good activity to assess the students in terms of the affective and psychomotor domains, but whether it had any value as a formative assessment technique to assess the students' skills and cognitive understanding within the confined of this study was debatable.

As a whole, the study shows that the techniques used were appropriate to achieve learning goals (Brookhart, 2010; Black & Wiliam, 1998; Stiggins & Chappuis, 2006) even though the execution of each technique can be improved to get more valid information about the current status of student learning. This use of various formative assessment techniques is important to ensure that the information gained about the learning of students truly reflect the level of their skills and cognitive abilities (Black & Wiliam, 1998). Using various techniques of formative assessment also helps ensure that the information obtained is more reliable as it is based on different sources. Apart from that, the use of formative assessment provides teachers with information about the quality of learning experienced by students (Hall & Burke, 2003). In addition it helps to ensure the information gained has high construct validity (Brookhart, 2009). Such information helps teachers to make more accurate and informed decisions related to the quality of the T&L process and to plan for the next lesson (Black & Wiliam, 1998). Teachers however need to ensure that the assessment activities are conducted after the teaching of content and concept of the subject (Fisher & Frey, 2007).

On the less positive side, the finding of the study shows the level of the activities conducted throughout the lesson was low and this did not give the teacher enough room to manoeuvre in terms of providing meaningful feedback to the students. The questions used during the oral questioning activities and the discussion activities for example were mainly low level lower order questions. The same applies to the singing activity. This means information gained may not truly reflect the pupil's ability and therefore may not be of much help in terms of improving the students learning. Also, once the students were able to achieve the standard set in the learning objectives, the teacher failed to use the information gained through the formative assessment activities to challenge the students to strive for greater achievement. In other words, the formative assessment techniques were effective in terms of providing the teacher with information on the students level of learning ability, but teacher did not successfully utilize this information to improve students learning.

Conclusion

Although the use of formative assessment techniques by the participant is limited to three techniques, this study has provided an example of the use of student friendly assessment techniques appropriate to the abilities of students and the learning objectives to be achieved (Brookhart, 2010; Black & Wiliam, 1998; Stiggins & Chappuis, 2006). The techniques used in this study also encouraged successful and active involvement of students in the process of learning (Black & Wiliam, 1998) as well as enhancing the communication skills of the students (Black & Wiliam, 1998; Crooks, 1998; Hamm & Adams, 2009; Scherer, 2005; Stiggins & Chappuis).

However, even though teachers are capable of using the formative assessment techniques effectively, there seems to be some difficulties in distinguishing the function; whether a technique being implemented functions as a formative assessment technique or functions as a T&L technique. When a technique is used to train students on certain skills, then the technique functions as a T&L technique. When it is used to gain information as to the level of the student's

learning, then it functions as a formative assessment technique. Also, in the context of this study, there is a need to improve teacher's awareness of using the information gained through the formative assessment activities to make necessary improvement on the T&L process to suit the needs of the students in order to improve their performance. Therefore, the importance of using a variety of assessment techniques in the T&L process warrants more trainings, seminars and workshops to be conducted to provide teachers with the avenues and means of getting quality information and hands-on experience of the proper and quality use of formative assessment techniques. Teachers need to be exposed to a variety of knowledge and skills related to formative assessment. These include the purpose of formative assessment, implementation strategies, the different techniques, data collection and recording, interpreting, and most importantly using information gained from the assessment activities to make decisions related to the T&L process in general. Formative assessment is complimentary to the T&L process as a whole. It is not something which is isolated and detached from the learning process. It is embedded into the process of T&L in the classroom. The difficulties of conducting formative assessment in the classroom lie not with any real complexity related to the formative assessment itself, but rather on the lack of awareness and confidence among teachers to implement the process in the classroom. This study, by demonstrating, albeit briefly how formative assessment techniques can be implemented effectively, has contributed significantly towards improving teachers general awareness of formative assessment and its implementation in the classroom. It has also contributed significantly towards improving confidence among teachers to implement formative assessment and therefore improve the efficiency of their T&L process in the classroom. Lastly, this study contributes some confirmation on experts' opinion that the use of various techniques helps to improve the pupils' learning.

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How to Measure Students' Creativity?
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Abstract:

Innovation starts with the brainchild of creative individuals. Therefore, students need to synergize the culture of creativity in their daily activities to enable them to optimize human capital with first class mentality. Creative qualities in students, if not polished will subsequently be less prominent. Creative potential can be identified by the instruments that are able to measure the creativity of students. Creativity instruments have been developed by scholars like Guilford, who engages in the development of the instruments that measure divergent thinking, and later, there are other popular instruments, such as Torrance Test of Creative Thinking, Remote Associates Test and Khatena-Torrance Creative Perception Inventory. However, characterized by the process of developing instruments for local context, requirements and terms of culture and context of the education system to track students' creativity have been essential. Constructs that will measure students' creativity in this research are domain-relevant skills, creative-relevant skills, motivation, dynamic, and also being daring, resourceful, hardworking, independent and self-efficacious. Constructs are extracted from the integration of three theories of creativity. This research will use a survey of the quantitative method to examine the item functioning and instrument calibration. In addition, the qualitative method is also implemented to obtain experts' opinion on the correspondence of conceptual framework and the construct's validation. The data will be analyzed using the Rasch Measurement Model and Structural Equation Model, both of which can determine the study's construct validity based on the Confirmatory Factor Analysis (CFA).

Keywords: students' creativity, creativity instruments, constructs validation, Rasch Measurement Model, Structural Equation Model.

Introduction

Globalization, which becomes witness to increased competition for talent, continues to name human capital its most valuable asset. To achieve the developed nation status in its own right, we need to have a generation of students that are flexible, able to adapt and keen on competing globally. Creativity is a contributor to the survival of institutions and organizations before it propels the nation to surge forward. According to Robert (2003), a pragmatic approach is concerned with the discovery of creativity and understanding. Meanwhile, Amabile (1996), suggests that the overall innovation begins with creative ideas generated from individuals or from teams, and it is a starting point for innovation. Thus, a culture of creativity needs to be practised among students. This is to optimize the potential of the students in providing a meaningful contribution to national development.

The education system serves as a platform to provide young people with various knowledge and skills, in the anticipation that they may be better able to face the many challenges in life. In the context of providing an ideal education, the established aims and objectives of education in the 21st century is obvious. The Ministry of Education has been organizing and planning to improve, strengthen, and enhance the quality of education in both primary and secondary levels according to changes that are taking place in the socialization of society today. The goal of tertiary education lies in the principle of continuity of the education sector to produce graduates who are knowledgeable and competent in their respective fields of study and who are able to apply knowledge to practice.

The third pillar of the New Economic Model for Malaysia 2010, resulting from the Economic Transformation Program seeks to transform Malaysia into a developed and competitive economy by 2020. The citizens will enjoy high quality of life and higher levels of income growth. This is the right time for creativity and innovation to be developed. Referring to the Tenth Malaysia Plan 2010, the government will undertake a comprehensive reform on human capital development cycle, which begins early from childhood up to the time when they are ready for the occupational world.

Background of the Study

Higher education is an interactive and flexible ecosystem. Based on the National Higher Education Strategic Plan Beyond 2020, students will be more responsive and able to translate the objectives of the current strength of the country through the mobilization of national scholars including: (i) first class human capital that is capable of using knowledge in a proactive, creative, innovative and (technically) highly skilled manner; to address global environmental changes to improve quality of life; contribute to the prosperity and wealth of the country (ii) knowledge, ideas, and creativity; that are generated from research, absorption and adaptation of existing knowledge from around the world that could be the basis for national development. Vision 2020 stresses on the promotion of human resource development, including the creation of a workforce that is disciplined, productive and with improved skills needed to face the challenges of the industrial development through a culture of excellence. This is in line with the third core, the National Higher Education Strategic Plan, which reinforces a culture of research, innovation, and creativity among students.

Students' contributions to innovation have been proven internationally, and in fact, are the epitome of creativity. It is therefore important to identify the students, as indicated by Treffinger (1987), one who have outlined six purposes of measuring creativity:

- a) Identifying and supporting students' strengths and helping them recognize the strengths and weaknesses, respectively.
- b) Expanding the understanding of individual ability and being able to predict the performance of the students.
- c) Making diagnosis of the needs of students, to effectively plan various challenging activities that stay parallel with their creativity.
- d) Evaluating the effort or program that has been implemented to enhance creativity.
- e) Providing a standard measurement of consistency in the communication of findings
- f) Assessing domains of creativity and see how they work in various situations and levels of motivation to explore further.

Definitions of Creativity

Creativity is the exploration of new knowledge that has not been identified. Although there are many new ideas to be generated, a variety of alternative solutions can be achieved on existing problems, or on issues that will emerge. Thus, creativity is the ability to describe the opportunity in every challenge. Creativity means having a choice in any situation (Zelinski 1994). Maimunah (2004) states that creativity starts with a creative thinking that generates ideas towards solving problems, making improvements, increasing productivity, enhancing effectiveness and adding values. Creativity is a collection or set of attitudes, and the driving ability of individuals to generate original and new ideas (Fisher 1990).

Edward de Bono (1992) defines creativity as an effort to think through a new lense to explore new alternatives in view of a phenomenon. Next, de Bono describes creativity as a skill that can achieve the highest level through the training environment that leads to intensive skills, such as swimming, bike riding and racing. Sternberg (2000) also agrees with de Bono that creativity is a skill that can be sharpened, and not due to natural ability. An example highlighted by Sternberg is the creativity in decision making. The concept of creativity is very wide and not limited to space and time. Creative individuals are normally able to see a particular thing the same way as everybody else but their way of thinking works differently (Wycoff 1995).

According to Bell (2001), creativity shown by individuals in the BC phase is centered on trial and error techniques aimed at survivability. They do not practise the technological or scientific method. Lubart (1990) further makes a point that creativity is driven by a cultural community. The study by Naderi et al. (2009), and Chusmir and Koberg (1986) shows that overall, there is no significant difference between male and female creativity. On the other hand, the study by Sajjadi-Bafghi (2007) on the Iranian students and Sing and Ling (1996) for Chinese students in Hong Kong reveals that male students are more creative than female students.

Based on a study by Keegan (1996), adults and children have different levels of creativity because creativity is based on the adult areas of expertise and depth of knowledge, accompanied with clear focus and goals. Meanwhile, the creativity of children normally surrounds the idea of fun, without them having to think about specific ideas or specific goals in order to complete any

assignment. These findings are supported by Albert (1996), who discloses the fact that creativity in adults and adolescents only shows minimal survival from childhood.

Six P's

Theoretical approaches to creativity can be considered in terms of which facets of creativity to emphasize. Typically, the aspect of theoretical framework is meant to be referred as the four Ps; person, product, process, and press (Plucker et al., 2004). However, Runco (2007) has broadened the scope of this framework by presenting two entities of persuasion and potential.

Creative person: Studies of this facet allow researchers to focus on individual characteristics that include creative personality, motivation, intellectual intelligence, emotional intelligence, thinking and knowledge (Baer and Kaufman 2005). The theory relevant to this facet is the Investment Theory of Creativity by Sternberg and Lubart (1995) and the Componential Model of Creativity by Amabile (1987, 1996). Meanwhile, Barron (1995) also produces constructs which include intrinsic motivation, enthusiasm, experience and autonomy.

Creative process denotes the actual experience of being creative. The Geneplore model presented by Finke, Ward and Smith (1992) describes two phases of framework; generation (building structure pre-inventive) and exploration (evaluating possible alternatives and choosing the best). The measurement that emphasizes the creative process is the Torrance Test of Creative Thinking (TTCT) and any measurement involving divergent thinking, such as the Remote Associates Test (RAT).

Creative environment: An environment that covers the learning environment, or work and living environment since young until now (Kaufman, Plucker and Baer 2008). Meanwhile, Kozbelt, Beghetto and Runco (2010) emphasize that the interaction between the individual and the environment will generate creativity. Amabile and Gryskiewicz (1989) have found eight aspects that create a creativity-stimulating environment, namely: a) freedom of expression, b) challenging assignments, c) a lot of resources, d) support group, e) various co-workers, f) the recognition, g) spirit of cooperation and h) open-organization policy. One theory that focuses on the relationship between creative people and the environment is the Systems Model proposed by Csikszentmihalyi (1996).

Creative products: Kaufman, Plucker and Baer (2008) explain that the creative product is a tangible product, the expression of ideas or what the responses submit. However, most measurements tend to emphasise being creative on a product that can be seen or measured, such as painting, poetry, clothing, music composition, mathematical solutions and answers to questions or solving problems. The Consensual Assessment Technique (CAT) is exclusively used to evaluate the product directly. The theory relevant to the creative product is the Model Propulsion by Sternberg, Kaufman, and Pretz (2005). This model considers the impact of a creative contribution to its field. This model is typically parallel to the magnitude of the superior creativity (eminent-C or big-C).

Creative persuasion: Introduced by Simonton (1990), the explanation lies in that the creative individual has the ability to convince and change the mindset of others. Thus, individuals are the

ones who are likely to influence and change the conservative perspective to a different, more novel perspective. Runco and Richards (1998) describe persuasion as relevant to everyday creativity (everyday-c or little-c).

Creative potential: is presented by children and other individuals who need a creative environment such as access to education or any form of support, to ensure that their creativity can be harnessed (Runco 2003, 2008). Many more individuals have the potential but are not yet productive, at least not in a socially meaningful way. Even individuals who are already performing at very high levels may still have room for improvement, which is a casual but useful way to think of potential, and conversely, those of us who are not performing at high levels are said to have a great deal of unused potential (Runco 2008).

Instruments of Creativity

In the 1950s and 1960s, Guilford had been actively developing instruments that measure divergent thinking on a large scale. Among the instruments that emphasize testing for divergent thinking are the Structure of the Intellect-Learning Abilities Test (SOI-LA; Meeker et al. 1985), Structure of the Intellect-Divergent Thinking Test (SOI-DT; Guilford, 1967), Wallach and Kogan's test (1965), and Getzels and Jackson's test (1962). Some popular creativity instruments such as the Torrance Test of Creative Thinking (TTCT; Torrance 1984, 1990), Remote Associates Test (RAT; Mednick, 1967) and Khatena-Torrance Creative Perception Inventory (KTCPI; Khatena & Torrance 1976, 1990). Group Inventory for Finding Creative Talent (GIFT; Davis & Rimm 1980), Group Inventories for Finding Interests (GIFFI; Davis & Rimm 1982), Creative Product Assessment Matrix (CPAM; Besemer & O'Quin 1986), Consensual Assessment Technique (CAT; Amabile, 1996), Scale of Creative Attributes and Behavior (SCAB; Kelly 2004) are also used to measure creativity. Meanwhile, another instrument related to creativity that has been pioneered by the local researcher is the Yanpiaw Creative-Critical Styles Test (Ycreative-criticals; Chua 2004).

Kaufman et al. (2008) and Starko (2010) categorize the TTCT and RAT as measurement tools for the creative process. KTCPI consists of two-part inventories namely What Kind of Person are You (WKOPAY) and Something About Myself (SAM), designed to identify creative individuals. GIFT is a self-report, which is designed to measure the creative potential of students from grades 1 to 6. GIFFI parts I and II are consistent with GIFT, but it is designed to measure the creative potential of lower and upper secondary students. However, Weeks (1985) reveals that some of the items have been criticized for cultural bias. CPAM is designed to identify the characteristics of creative product. Meanwhile, CAT works, based on a combination of measurement by a panel of independent experts on the creative product of real-world perspective. CAT is not tied to any particular theory of creativity and it has sometimes been called "the gold standard" in the measurement of creativity (Carson, 2006). CAT is less used in assessing individuals but, it is widely used in research and school-based tasks such as in the context where highly creative students participating in special programs (Kaufman et al. 2008). Meanwhile, SCAB has been developed by Kelly (2004) to measure creativity based on the measurement of creative and divergent-thinking personality. The Ycreative-criticals is a local research instrument that measures creative thinking, critical thinking and balanced thinking.

Based on the creativity instruments above, there are differences in terms of theoretical, constructs and conceptual frameworks used. In addition, the instruments also apply different respondents'

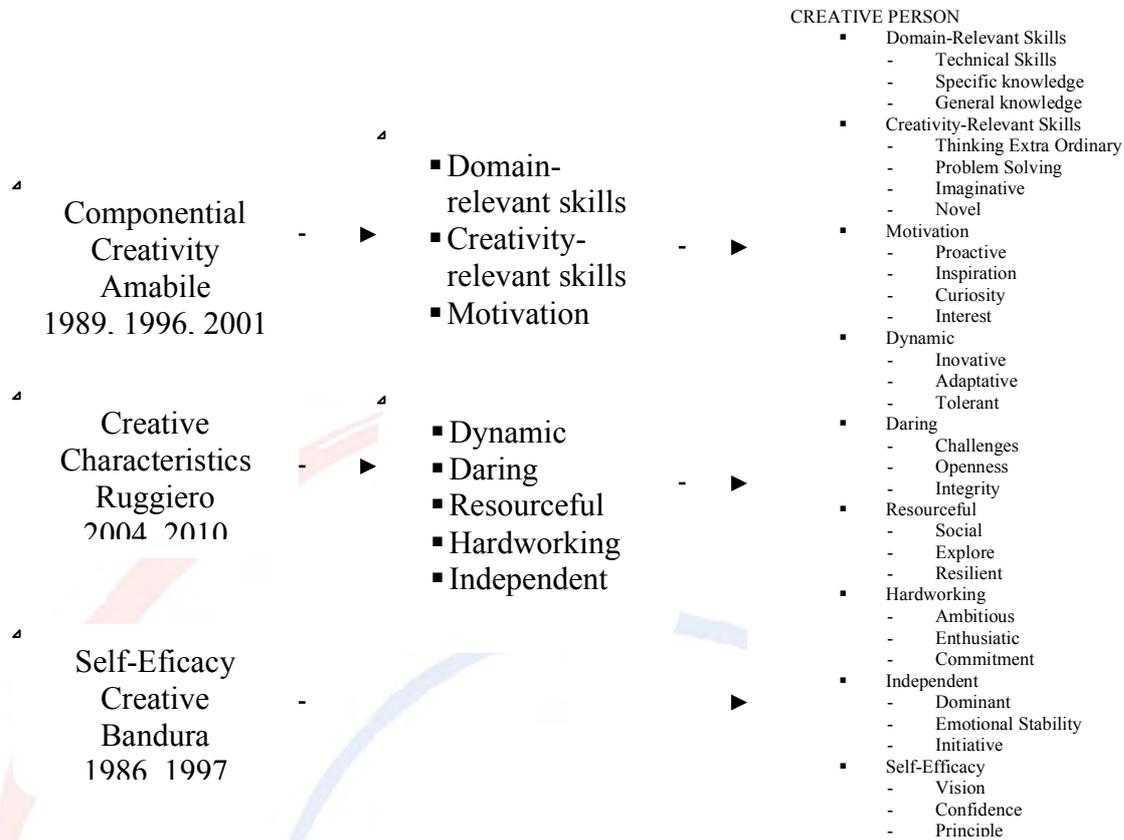
backgrounds and age range. Furthermore, the measuring instrument has been applied in different contexts, such as measuring process, products, persuasion, press and potential. In relation to the above phenomenon, the construction of instruments should be developed to stimulate students' creative tendencies.

Conceptual Framework

Creativity disciplines are continuously debated, reviewed and placed through stages of development. It is a very exciting field to be investigated, because many recent innovations have been born through creativity. Competition in this new century requires high surge of creativity in students to ensure they have a balanced human capital in order to compete with the global world. Creativity is very important in today's education system to produce students who become part of a creative community, thus inventing a creative workforce. Literature shows that the theory of creativity will continue to be explored by new or prolific researchers and a dynamic phase characterized by the current pattern. Theories that truly mature and are robust as to be made the guiding literature towards understanding creativity are yet to emerge (Treffinger, 1989), and additionally, space to explore the phenomenon of creativity is always stretched.

This study highlights the components of creativity Amabile (1989, 1996, 2001), the creative characteristics Ruggiero (2004) and creative self-efficacy (Bandura 1986, 1997). According to Amabile (2001), the three components necessary to produce creative human capital are the domain-relevant skills, creative-relevant skills and motivation. Domain-relevant skills suggest the love for knowledge, embody technical skills, specific knowledge made explicit in the underlying disciplines and show a variety of common knowledge. Creative thinking skills enable the individual to think outside the box, solve the problem, be imaginative and produce original ideas. Motivation implies the characteristics of a person who is proactive, inspired, always has curiosity and a genuine interest. Creative features based on Ruggiero emphasize the dynamic nature, daring attitude, being resourceful, hardworking, and independent. Dynamic construct shows the nature of innovative capacity, patience, and adaptability. Daring attitude emphasizes individual characteristic that always loves challenges, is open and robust with integrity. Creative people have a lot of resources through the social network, they are explorative in nature and have high resilience in the face of all challenges. Furthermore, a creative person is hardworking with high ambitions, enthusiasm, and commitment. Creative individuals are also able to highlight the independent nature of dominance, emotional stability and high initiative. This is consistent with the efficacy of self-asserting that every creative person needs to identify their own strengths and interests with a visionary attitude, confidence and with principles.

As a result, a creative person in this study is measured by constructs and concepts outlined in the above framework. The instrument that is to be built is based on the theories. The conceptual framework of this study is shown in the figure below:



Conceptual framework for development of creativity instrument

Research Design

Research design is a plan and strategy adopted to determine the validity of the research, to enable researchers to interpret the findings of the study (Wiersma 2000). The design of the study has been focused on the direction taken by the source information in a systematic study (Creswell 2008).

Justification for the design of the creativity instrument is built on the principle of instrument development by Gregory (2011), Downing (2006), Cohen and Swerdlik (2005), Murphy and David Shofer (2005), Nitko (1983) and Wright and Stone (1979). The landscape development of student creativity instrument consists of three phases, summarized as follows:

- Phase I :Planning
 - Identify the purpose of the instrument
 - Literature review
 - Interview panel of experts
- Phase II :Construction of Items
 - Analysis of experts' interview transcription
 - Generate item bank
 - Experts item review
 - Improvement item
- Phase III: Instrument validity
 - Preliminary
 - Pilot study

- Actual study

Data Collection Procedures

Data collection procedures involve both qualitative and quantitative methods. From early studies, researchers will have to prepare the interview protocol, to identify a panel of five experts, and make an appointment for an interview. After the interview process, researchers will conduct the transcription, analysis, validation, and ultimately issue a report. Once the sub-constructs and constructs are verified, the items' construction will be started. Instruments that have been following all the constructs will be presented to a panel of experts for verification. The next process is to obtain the permission from each faculty to administer the instrument in the preliminary stage, a pilot study and the actual study.

Data analysis procedures

Researchers will analyze the interview transcriptions manually. Interview data on experts are the data used to design the instrument of creativity. This data is intended to obtain the consent of experts to study the conceptual framework developed by the researchers. The interview data analysis procedure is carried out on six stages, namely (1) arranging the data, (2) generating categories, themes and patterns, (3) encodes the data, (4) test the understanding that has arisen, (5) searching for alternative explanations, and (6) writing a report (Marshall and Rossman 1980). The next step concerns with obtaining the consent item from a different panel of experts in the form of a dichotomous response. Data from the panel experts will be analyzed to obtain Cohen's kappa reliability index. The reliability index of inter-raters is used to measure the degree of consensus on the two sets of scores (Cohen, 1960).

The quantitative data analysis adopts three methods; (1) Statistical Package for Social Sciences, SPSS version 18, (2) Winsteps 3.69.1 and (3) Analysis of Moment Structure, AMOS version 16. Data analysis based on the Rasch measurement model will focus on the item polarity, item map, individual map, misfit item, fit item and the separation index. Researchers have also used the Rasch measurement model to determine the individual item. Differential item functioning analysis is used to see the bias item. Further research will be using the Structural Equation Model to measure the model of the Confirmatory Factor Analysis based on empirical data. Different analyses help make more informed decisions from raw data, especially the construction of the instrument that shows psychometric aspects (Wright, 1999).

Conclusion

It is necessary to develop instruments which are tailored to the needs of creativity, culture and local context, and that go in tandem with the terms of national education. In addition, emphasis is also placed on the psychometrical aspects such as validity, reliability, and quality items. Therefore, this study should be conducted to build an authentic instrument for measuring creativity in students, in line with education and employment needs. Thus, an instrument that can measure students' creativity values needs to be valid, reliable, suitable, and to be developed to ensure that they follow the mainstream in continuing education and face the realities of the future.

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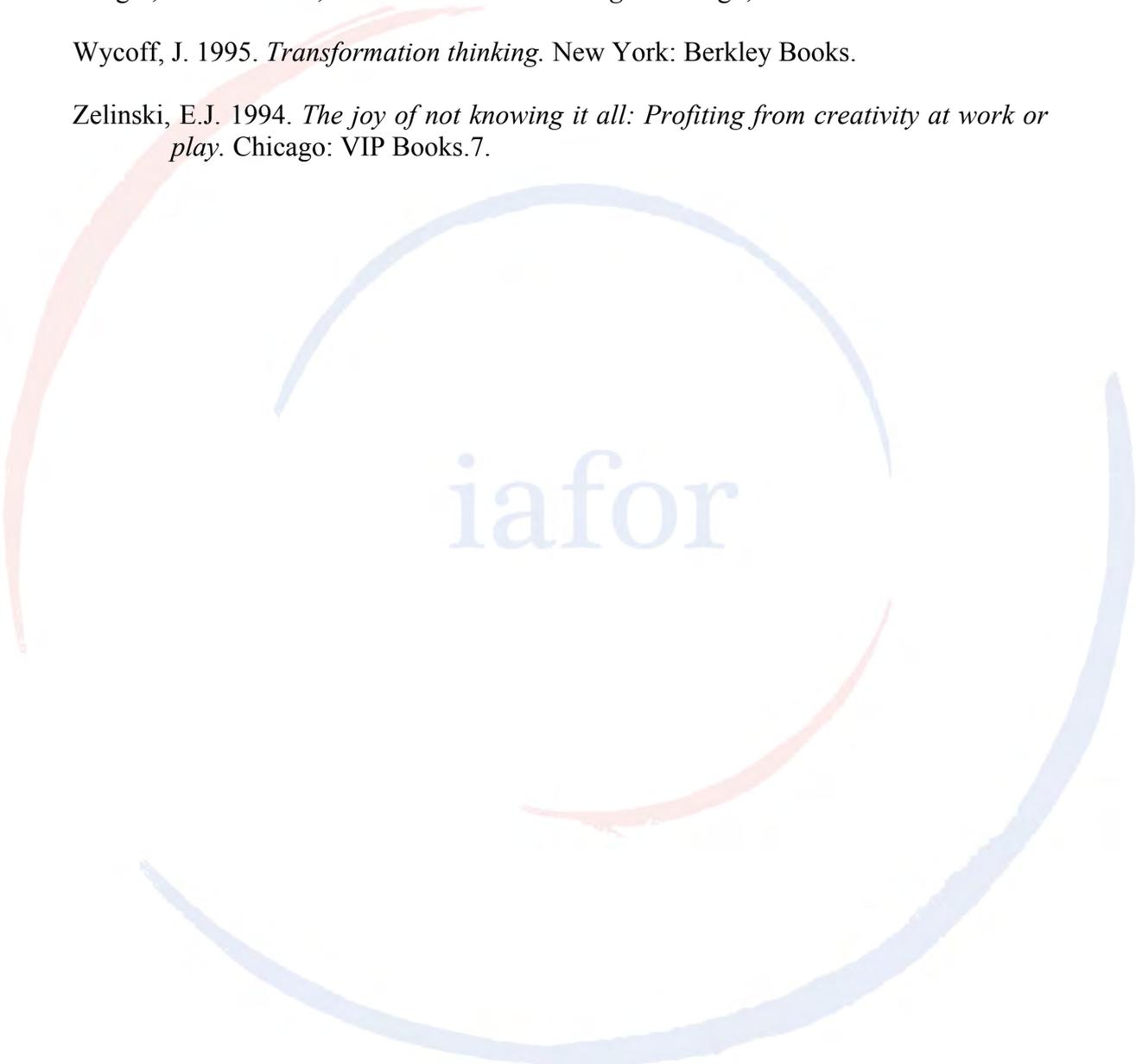
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What May Lead behind Electronic Government Rapid Step ? (An Indonesia Perspective Study)

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The Asian Conference on the Social Sciences

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Abstract:

The existence of government as state organ that oblige to provide good services for its citizen, requires many efforts in its creative way to fulfill its goal. Rapid development of information technology development has influenced the emergence of electronic government as a result of society demand, yet the role of electronic government may seen as a way to foster advantages in one's country living. In its practice, the role of human rights also reinforce practice of good government, since it will provide set of values to establish good governance especially in cyberspace area in a sustainable manner.

This paper attempt to analyze major areas that needs the collaboration between good government and human rights enforcement and what effort may take to optimize the practice of electronic government in fulfill legal certainty and justice in above four major areas.

Four major areas that need equal collaboration between human rights enforcement and good government action are: (1) democratic institutions that lead the participation of public policy making through formal and informal forum; (2) delivery of state service that lead to state responsibility in provide fundamental citizen needs such as food, education, health, house; (3) the rule of law consist of advocacy for legal reform and public awareness in national and international legal framework; (4) anti corruption measures that lead to accountability, transparency and public participation in shape anti corruption measures.

Meanwhile, in effort of optimize electronic government requires equal combination of good security system in operates electronic government system, adequate legal instrument to conduct dispute settlement and trustable human resources in above four major areas.

1. INTRODUCTION

The existence of globalization and rapid growth of human life are inseparable issue nowadays. In its essential ways, globalization as social transformation process bring different human being live in many regions of the world gather in one borderless area. Anthony McGrew defines globalization as *“growing interconnectedness and number of distinctive attributes. Firstly, it implies social, political, economic activities are becoming stretches across national frontiers such that events, decisions and activities in one part of the world come to have immediate significance for individuals in distant part of the globe....fourthly, growing interconnectedness generates a host of transnational problems, which cannot be resolved by the action of individual governments but only through multilateral and international cooperation..”*[1]

The convergence of globalization also bring the emergence in human development wave phase as categorized by Alvin Toffler as agricultural wave stressing the role of agricultural infrastructure, industry wave stressing the role of production and information technology wave that works in support and determine the transformation of an organization[2].

The components of state likewise an organization consist of territory, citizen and government. Government in conduct its duty oblige to provide good services for its citizen, yet with the development of information and technology may foster efficiency and transparency in information sharing by the establishment of electronic government's role in one's country living. In its definition by World Bank Group, electronic government consider as the use by government agencies of information technologies such as wide areas networks, internet and mobile computing that have abilities to transform relations with citizens, businesses and other arms of government.[3] What electronic government offers is efficiency, responsive action, transparency, legitimacy and business opportunities in market of goods and services and improving its services and collaboration toward citizens, business, professional community and non governmental organizations[4].

Nevertheless, the effort of good practice of electronic government will be useless without human rights appreciation as the fundamental rights, such as rights to have adequate living, rights to free from fear, rights to have information transparency. The implementation and stressing of human rights role believe to optimize the practice of electronic government since it will provide set of values to establish good governance of cyberspace in sustainable manners.

International world has put its attention and support in information technology development and electronic government role by the establishment of World Summit on the Information Society (WSIS) in Geneva 2003 and Tunis 2005 in a pair of UN sponsored conferences that address issues concerning information, communication and information society. UN aims to help bridge the global digital divide between developing countries by increasing access to modern ICT services. The Summit was the widest ranging, comprehensive for the future of information society and it show cooperation between governments, private sector, intergovernmental organizations[5].

Indonesia as part of international society also shows its support by the establishment of National Information Technology Framework that addressed the use of information technology in trade, government and human resources development to provide good governance and foster democracy practice. In 2003 Indonesia established InPres 3/2003 on Policy and National Strategy in Electronic Government Development enclosed with government infrastructure development guidelines, in 2008 Indonesia effort expand by the establishment of Law 11/2008 on Information

and Electronic Transaction to strengthen government support in information and technology development[6].

Ironically, based on World E-Government Development Ranking Indonesia effort has not show great result since gradual decrease from 85th rank in 2004 to 96th rank in 2005 follows to 106th rank in 2008 and 109th in 2010. Indonesia's practice in collaborating fulfillment of human rights aspect in electronic government and its management in one building government system has not show significant result, meanwhile in other neighbor country such as Singapore has established one building government system that effectively work in 2008, follows by Denmark that introduced the online registration system for land owner[7].

This paper attempts to analyze major areas need to enhance for the equal practice in human rights and good government and what effort may take to optimize the practice of electronic government in fulfill legal certainty and justice in above major areas.

2. ANALYSIS

2.1 Major Areas to Foster Good Governance in Electronic Government Practice

Governance term derived from the ancient France word "gouvernance" meaning that the state of being governed. UNESCO defined electronic governance as "*the public sector's use of information and communication technology with the aim of improving information and service delivery, encouraging citizen participation in the decision making process and making government more accountable and transparent*". Based on above UNESCO definition reflects the electronic governance goals in maintain government are increase government internal organization relation, providing good services and information, and increasing government transparency against corruption[8].

The existence of electronic governance itself in conduct its objective have three essential elements, which are electronic administration, electronic services and electronic democracy. The objective of electronic administration are increase government internal organization relation, providing good services and information, and strengthen government credibility and accountability through information and technology implementation, meanwhile the element of electronic service establish to provide sufficient service in information technology and communication and electronic democracy goals in maximize information and technology and support public participation and consultation to enhance democratic relation between government and society in establish government policy[9].

In its essential way, the practice of good governance in good government and human rights enforcement are mutually reinforcing toward others. Human rights principles provide a set of good values to guide the work of government, other political and social actor and reinforce the work of good governance itself. There are major areas to foster good governance in electronic government practice, that are[10] :

a. Democratic Institutions Area

- What means by democratic institutions are the appliance of civil society organization and media initiated collaborative project to raise awareness within communities about their rights to participate. Media is no more become the only communicators of fact but they may act as catalyst for community efforts to demand good governance. In its practice in Indonesia the implementation of local government has its role especially with the establishment of Law 32/2004 on local government that recognized the central role of participatory local

government on designing and implementing effective development policies. It requires local government to initiate formal structure where public can participate in local affairs and make integrated development planning.

b. State Service Area

- What means by state service as also regulates in International Covenant on Economic, Social and Cultural Rights meaning that state has the responsibility conducted by government to provide fundamental needs for citizens such as sufficient food, house, education, guarantee citizens rights to free from the fear of government actor abuse.

c. Rule of Law Area

- What means by the enforcement in rule of law meaning the existence of legal reform advocacy to enhance public self-awareness for citizens rights especially when government fails to conduct its duty over citizen fundamental rights fulfillment.

d. Anti Corruption Measurement Area

- Corruption may be defined as the abuse of entrusted public power for private benefit. While good governance refers to the exercise of authority through political and institutional processes that are transparent and accountable and encourage public participation.

Corruption has negative impact on the realization of basic rights, yet corrupt governance fails to offer citizens adequate and accurate information about government and policies. In this manner, corruption undermines the Government's ability to deliver an array of services, including health, education and welfare services, which are essential for the realization of economic, social and cultural rights. Corruption particularly affects the poorest and most marginalized, who greatly depend on public services. Corruption also discriminates in the access to public services in favor of those able and willing to offer bribes. In such situations, people become discouraged from exercising their civil and political rights and from demanding that these rights be respected. Importantly, corruption contributes to a culture of impunity, since illegal actions are not consistently punished and laws are not consistently upheld.

Strategies to combat corruption share a great deal with human rights principles. In particular, anti-corruption initiatives stress the importance of transparency and accountability, putting emphasis on the right to request and obtain information from State officials, as well as on the importance of providing information in an easily accessible and understandable manner. The role of international organization and regulation also matters a lot. Corruption that regard as transnational crime is no more particular state problem but also many countries problem, the supportive action by Stolen Asset Recovery (STAR) established by United Nation and cooperative works by countries matters a lot for corruption elimination.

2.2 Essential Efforts to Optimize Electronic Government Practice

In a comprehensive use of electronic government, there are four models of information and technology use that are : (1) Government to Government that stressing on the interaction between central government and local government in providing one gate system data and information; (2) Government to Employee that stressing interaction between government and its staffs to optimize human resources management; (3) Government to Business that stressing interaction between government and trading actors related to government electronic procurement; (4) Government to community in its objective towards policy transparency in government bureaucracy[11].

In its practice in Indonesia, the establishment of Law 25/2000 on holistic development not only involved central government role, but also local government to provide authority divide between central and local government as established in Law 32/2004 on Local Government. In further action the establishment of Inpres 6/2001 on Telemetric Use and Development extend the concept of electronic government in its policy framework to provide standardization on society service and support to optimize local government work with the appliance of authority divide in Indonesia. Nevertheless, there are few problems related with the practice of electronic government system, that are: the absence of government priority in regulates further development of electronic government, the existence of old paradigm that consider information technology as a reformation tool instead of society reformation catalyst, and lack of information access and policy in knowledge development on public citizen.

One of the legal basis in Indonesia legal system that consider to optimize the work of electronic government is the implementation of General Good Government Principle (*Algemene Beginselen van Behoorlijk Bestuur*) as an ethic guidelines and unwritten legal norm to provide good governance in good government system. There are few main principles that consider as important points that are : responsibility principles, accountability principles, fairness principles and transparency principles. Responsibility principles focus on the implementation of legal supremacy enforcement and regulations in maintain public needs, meanwhile accountability principles aims on government's role in minimize society clash of conflict within the establishment of strict regulation related to executive, legislative and judicative responsibility. Fairness principle relates with justice and equity enforcement in conduct public needs activity and minimizes government abuse. Meanwhile, transparency principles aim on the providing of public activity information that fulfills accuracy and consistent principles towards government important information[12].

Furthermore, there are actions that may conduct to support and enhance the practice of electronic government, such as : (1) providing comprehensive website to fulfill society demands in assistance their appreciation and problem feedback; (2) the appliance of strict legal regulation supported with top-down policy to guarantee the maximal result of the demand goals; (3) comprehensive cooperation between central government, local government and university as the source of knowledge and project funds; (4) providing electronic government committee as policy maker coordination between prospective affiliated party in enhance electronic government; (5) provide clear mechanism and priority program in every project related with the practice of accountability, responsibility principles to enhance more in maximize electronic government practice.

2.3 Concluding Remarks

The practice of electronic government is no more than a brand new issues that one's country need to readapt within the emergence of new technology, yet it needs equal combination between legal regulation that may guarantee the practice of electronic government supported with General Good Government Principle, not to be missed the capability and moral building of related parties on the practice of electronic government also become underline points that fostering the success of electronic government practice that provide legal certainty and justice towards society

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Further Reading Materials

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Law 11/ 2008 on Information and Electronic Transaction.

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Traffic Congestion, Causes and Effect on Residents of Urban Cities in Nigeria

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Abstract:

The study examines the effect and causes of traffic congestion in Ibadan city, Nigeria. The study was carried out in three neighbourhoods (Agbowo, Bodija and Agodi Gate) in Ibadan North Local Government Area. Survey approach through questionnaire was used for data collection. 50 respondents were sampled in each of the three neighbourhoods making a total of 150. Descriptive statistics of means, simple percentages and charts were employed in analysing the data collected. Results show that 51.3 % of the respondents spend between 21 minutes and above on congestion daily while 20.7 % spend between 5-15 minutes and 1.3 % less 5 minutes. It was equally observed that residents in the city spend almost twice the time they would use on their trip from home to office due to traffic congestion. On the temporal and spatial pattern of traffic congestion in the three neighbourhoods, results reveal that Agbowo (65.3 %) recorded the highest traffic congestion in the evening and morning period followed by Bodija (48 %) and Agodi Gate (31.4%). On ranking of some major routes in the study area on traffic congestion by respondents, Agodi – Iwo Road route ranked highest with a mean value of 1.45 followed by University of Ibadan(U.I) – Bodija- Agodi Gate route with mean value of 1.27 and Sango- Iwo Road 1.03. Further findings are revealed and advice proffered to policy makers and stakeholders for proper decision making and implementation.

1.0 INTRODUCTION

The rate of urbanization has been increasing over the years in both the developed and developing countries. However, urbanization rate in developing countries are higher because most developed nations have almost reached their threshold of urbanization. The high rate of urbanization experienced in developing countries pose a great challenge to infrastructural development in most cities. Cities over the years have witnessed an exploding rate of growth in most developing countries [1] [2]. The continued alarming growth of the urban population is one of the major factors partly contributing to the high rate of physical development mishap in Nigeria [3] [4] [5].

Urban dwellers in Nigeria are faced with a myriad of problems ranging from security of lives and property, traffic congestion, health, housing, poverty and many others. [14], notes that whether we think of welfare services or employment opportunities, the urban system in Nigeria today is already proving inadequate as a means of achieving the type of social order that the country desires. With an urbanization rate of about 5.5 percent per annum [15], it is anticipated that the urban population in Nigeria would have reached 65 percent of the total population. The focal point of this study, Ibadan city is not left out of the various challenges enumerated so far facing urban centres in Nigeria. Ibadan is the third largest city in Nigeria with a population estimate of 3,800,000 [16]. In terms of areal extent, the city is the biggest in the country with 11 Local government Areas and a land mass of 214 km² in 1988 [17]. Ibadan is a large sprawling city with no discernable pattern of growth or development and this has earned the city such epithets as “the world’s largest indigenous city,” “the black metropolis” or “the largest urban village in Africa”. Ibadan is on altitude of 237.7 metres above the mean seal level [17]. Over the years, the city has been grappling with traffic congestion along the major roads within the metropolis. One of the major functions of the spatial structure of any human settlement is to facilitate the movement of people and goods within the settlement [18]. Efficient transport system coupled with good road networks enhances the movement of people within any urban centre.

2.0 AIMS AND OBJECTIVES OF THE STUDY

The study examines the following as its specific objectives;

- To examine the cause(s) of traffic congestion in the city
- To identify spatial- temporal pattern of traffic congestion in the city
- To examine the average time spent on traffic by road users in the city
- To identify the losses incurred by road users in the city due to traffic congestion
- To identify those things that needed to be done to reduce traffic congestion in the city.

3.0 LITERATURE REVIEW

Generally it is not easy to exhaustively define the Level-of-Service (LOS) concept otherwise known as concept of Quality of Service (QOS) indicators because different people and different urban regions may put different emphasis on various components of the concept [19]. For instance, on the part of transport consumers (the travellers), the dimension of Level-of-Service (LOS) considered are travel time, bus frequency, comfort, terminal standards, bus stop facilities, interchanges between routes and services among others [20] [21]. Travel time usually contains several different elements. For a transit trip, it includes walking into the bus station, waiting time for bus, travelling time in the transit vehicle and walking time to the

destination [22] [23]. Convenience could be measured at the bus stop in terms of terminal location, shelter provided, and traffic safety. In transportation engineering, LOS concept is widely used to denote the QOS derived from the operational characteristics of transportation facilities [21]. The concept of LOS is widely recognized worldwide and popular in traffic and transportation engineering operations as a performance measurement tool [24] [25]. It is used in the Highway Capacity Manual (HCM) to represent the Quality of Service (QOS) and or corresponding satisfaction indices provided by a transportation facility as perceived by the users [26]. For the purpose of this study, the level-of-service (quality of service indicators) of the road networks in Ibadan city as perceived by the road users will be considered by these variables (a) travel distance from home to work and (b) average time spent on traffic. These variables were chosen because they will help in explaining the quality of service or level-of-service (LOS) road users in the city enjoy on the transport infrastructure that enhances their intra-urban mobility and accessibility.

Traffic Congestion occurs when there is an imbalance between transport demand and **supply** at a specific point in time and in a specific section of the transport system. Meaning that the available transport infrastructure at that given time is being overstretched. Congestion can be perceived as an unavoidable consequence of the usage of scarce transport resources, particularly if they are not priced [29]. The last decades have seen the extension of roads in rural but particularly in urban areas, most of them free of access. Those infrastructures were designed for speed and high capacity, but the growth of urban circulation occurred at a rate higher than often expected.[29] Observed that the most notable urban transport problems are:

- **Traffic congestion and parking difficulties.** Congestion is one of the most prevalent transport problems in large urban agglomerations, usually above 1 million inhabitants. It is particularly linked with motorization and the diffusion of the automobile, which has increased the demand for transport infrastructures. However, the supply of infrastructures has often not been able to keep up with the growth of mobility. Since vehicles spend the majority of the time parked, motorization has exceeded the parking lot available which has created space consumption problems particularly in the central business district (CBD) where the spatial imprint of parked vehicles is significant.
- **Longer commuting.** On par with congestion, people are spending an increasing amount of time commuting between their residence and workplace. An important factor behind this trend is related to residential affordability as housing located further away from central areas (where most of the employment remains) is more affordable. For instance, in Ibadan city, most residents are now moving to the sub-urban areas where land is cheap to build their houses. Therefore, commuters are trading time for housing affordability.
- **Difficulties for non-motorized transport.** These difficulties are either the outcome of intense traffic, where the mobility of pedestrians, bicycles and vehicles are impaired, but also because of a blatant lack of consideration for pedestrians and bicycles in the physical design of infrastructures and facilities. This is a common sight in most urban centres in Nigeria where vehicle owners are at loggerhead with motorbike riders popularly called “Okada”.
- **Loss of public space.** The majority of roads are publicly owned and free of access. Increased traffic has adverse impacts on public activities which once crowded the streets such as markets, shops/ kiosks, parades and processions, games, and community interactions. In Ibadan presently, the indiscriminate citing of event centres along some major roads in the city results in congestion on weekends when most

social functions are held. Traffic flows influence the life and interactions of residents and their usage of street space. More traffic impedes social interactions and street activities.

- **Environmental impacts and energy consumption.** Pollution, including noise, generated by circulation has become a serious impediment to the quality of life and even the health of urban populations. Most vehicles especially diesel trucks generate a lot of CO₂ that is huge enough to impair the vision of the driver of an oncoming vehicle in the opposite direction resulting to accident most times.
- **Accidents and safety.** Growing traffic in urban areas is linked with a growing number of accidents and fatalities, especially in developing countries. Accidents account for a significant share of recurring delays. As traffic increases, people feel less safe to use the roads.

[29] Observed that traffic congestion in the urban centres could be viewed in daily trips that is mandatory (workplace-home) or voluntary (visit to friends, relations, market/shopping etc). Mandatory as the name implies is often performed within fixed schedules while voluntary is based on the person's decision to embark on such trip at any given point in time. Urban congestion comes in two categories:

- **Recurrent congestion.** The consequence of factors that cause regular demand surges on the transportation system, such as commuting, shopping or weekend trips. However, even recurrent congestion can have unforeseen impacts in terms of its duration and severity. Mandatory trips are mainly responsible for the peaks in circulation flows, what this means in essence is that most of the congestion in urban areas are recurring at specific times of the day and on specific segments of transport system. This is true for most urban centres in Nigeria. In fact some major roads in Ibadan city exhibit these characteristics.
- **Non-recurrent congestion.** The other half of congestion is caused by random events such as accidents and unusual weather conditions (rain, snowstorms, etc.), which are unexpected and unplanned. Non-recurrent congestion is linked to the presence and effectiveness of incident response strategies. As far as accidents are concerned, their randomness is influenced by the level of traffic as the higher the traffic on specific road segments the higher the probability of accidents.

4.0 STUDY AREA AND METHODS

The study was carried out in Ibadan north local government area of the city. The reason for selecting this local government is based on its location within the seat of government. It records a high inflow of human and vehicular traffic on daily basis. A well designed/structured questionnaire was used to collect data on the demographic characteristics of the respondents, travel distance to place of work, time of the day traffic is encountered along the way, causes of traffic congestion. Fifty respondents were randomly chosen in each of the three neighbourhoods making a total of 150 in all. The data was collated and analyzed using statistical package for social sciences (SPSS). Results are presented using simple percentages and charts.

5.0 RESULTS AND FINDINGS

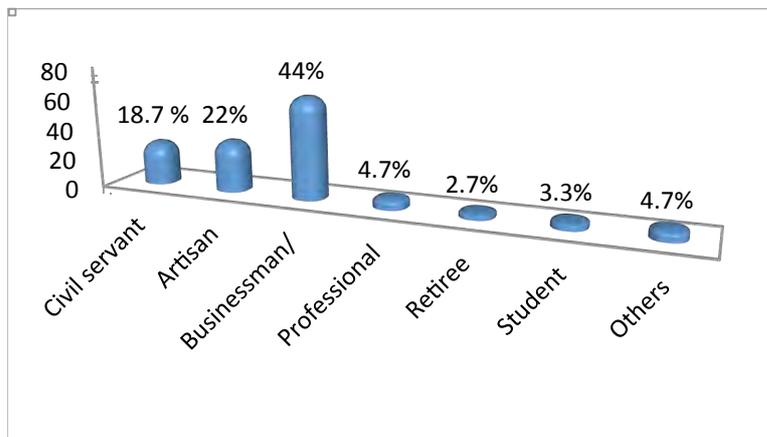


Fig 1 Occupation of respondents

5.1 Demographic characteristics of respondents

In the study, 62 female and 88 male were sampled with a mean age of 37.4 years for both sex. The results in Fig 1 show that 44 % of the respondents engage in business, 22 % are artisans, 18.7 % civil servants, 4.7 % respectively are professionals, 3.3 % are students while 2.7 % are retirees. Going by this breakdown, it is obvious that most of the respondents engage in private businesses and public service.

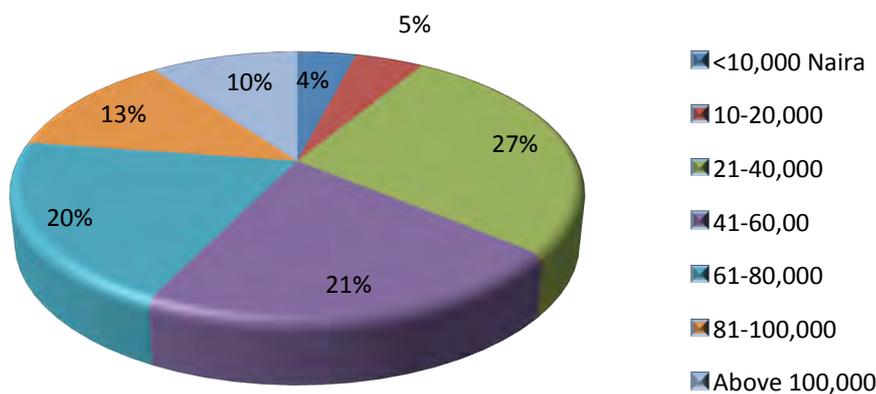


Fig 2 Monthly incomes of respondents

Results in Fig 2 show that 27 % of the respondents sampled earn between 21-40,000 Naira per month, 21% between 41- 60,000, 20 % between 61-80,000, 13 % between 81-100,000, 10 % above 100,000, 5 % between 10-20,000 and 4 % less than 10,000. Looking at the breakdown, it could be said that more than half (68 %) of the respondents in the study area

monthly income ranges between 21- 80,000 Naira. The reason for this is not farfetched as could be seen in Fig 1 most of the respondents are businessmen who may even surpass the average amount they claimed to be making in some months, equally with recent increment in worker's salary; one would expect this pattern of income distribution in the above figure. The percentage whose income is less than 10,000 per month is very small compared to the high income earners as shown in Fig 1.

Table 1 Vehicle and motor bike ownership

Do you own a vehicle?			Yes 86 (57.3%)	No 64 (42.7)
If yes, how many?				
1	45	30%		
2	28	18.7 %		
3	10	6.7 %		
4 & above	3	2 %		
For what purpose do you use it?				
Private	60	40 %		
Commercial	20	13.3%		
Both	6	4 %		
Do you own a motor bike?			Yes 31 (20.7%)	No 119 (79.3%)
For what purpose do you use it?				
Commercial	15	10%		
Private	13	8 %		
Both	2	2.7%		

6.0 VEHICLE AND MOTOR BIKE OWNERSHIP

Regarding vehicle ownership, results in Table 1 indicate that 57.3 % of the respondents owned their own vehicle while 42.7 % do not. In terms of number of vehicles owned, 30 % owned one vehicle, 18.7% owned 2, 6.7% owned 3 and 2 % owned 4 or more. The purposes for which the respondents use their vehicle for was equally examined. Results indicate that 40 % use their vehicle for private purpose while 13.3 % is for commercial and 4 % use theirs for both. Equally, the results in Table 1 show that 20.7 % of the respondents owned motor bike while majority (79.3%) do not. 10 % use their motor bike for commercial purpose (Okada rider) while 8 % is for private use and 2.7 % use theirs for both. A closer look at this result indicates a high vehicle ownership among respondents. The reason for this is in two fold, first, in the last few years there has been an upward review of workers salary in the country compared to fifteen years ago, and therefore many civil servants can now afford fairly used vehicles popularly called 'Tokunbo'. Equally, the Federal government's decision to increase the age limit of fairly used buses and trucks imported into the country has made it possible for many people who hitherto could not purchase buses with lower age limit to have one.

Table 2 Trip distance from home to work

Distance in minutes	Frequency	Percent
< 10	8	5.3
10-20	25	16.7
21-30	67	44.7
31-40	37	24.7
Above 40	13	8.6
Total	150	100

7.0 TRIP DISTANCE FROM HOME TO WORK

In a bid to examining the distance residents in the city travel before getting to their work place, the results in Table 2 show the distance covered in minutes. However distance as used here implies the number of minutes it will take residents to get to their work place assuming there is no congestion on the way (real distance). Results from this table indicate that most (44 %) will spend between 21- 30 minutes before getting to their work place, 24. 7 % between 31-40 minutes, 16.7 % between 10-20 minutes, 8.7 % above 40 minutes and 5.3 % will spend less than 10 minutes. A review of the break down shows that most of the respondents will spend between 20-40 minutes before getting to their work place while only few spend less than 10minutes and more than 40 minutes.

Table 3 Spatial- temporal pattern of traffic congestion in the city

Neighbourhood	At what time of the day do you encounter traffic congestion along the route to your home – office?				
	Morning	Afternoon	Evening	Morning & evening	Throughout the day
Agbowo	2 (4.1%)	0 (0%)	2 (4.1%)	32 (65.3%)	4 (8.2%)
Bodija	4 (8%)	5 (10%)	8 (16%)	24 (48%)	7 (14%)
Agodi	4 (7.8%)	5 (9.8%)	5 (9.8%)	16 (31.4%)	6 (11.8%)
Total	10 (6.7%)	10 (6.7%)	15 (10%)	72 (48%)	17 (11.3%)

8.0 SPATIAL - TEMPORAL PATTERN OF TRAFFIC CONGESTION

The spatial pattern of traffic congestion in Agbowo, Bodija, Agodi and time of occurrence are examined in Table 3. The result indicates that traffic congestion is very high in the three neighbourhoods in the evening and morning period compared to afternoon. However, there are variations across the neighbourhoods. The breakdown shows that 65.3% of respondents at Agbowo stated that they encounter traffic during this period compared 48% recorded at Bodija and 31.4% at Agodi during the same period (morning and evening). One of the reasons that could be added to high traffic recorded around Agbowo is based on the fact that University of Ibadan(U.I) is within that vicinity so most workers and students live around

the neighbourhood. Equally, its proximity to Bodija food stuff market the biggest in Oyo state could be adduced to the high traffic recorded as most trailers coming to the market from northern part of Nigeria go through this route. Another salient point that could be seen from the result is that more traffic is recorded at Bodija (14%) throughout the day compared to 11.8% and 8.2% respectively recorded at Agodi and Agbowo. The type of traffic congestion recorded in the study area could be described as recurrent in nature as most of the trips that respondents engage in along these routes are mandatory or voluntary in nature that is trip to work, place of residence, market and so on (29)

Table 4 Average time spent on traffic congestion daily by respondents

Average time spent	Frequency	Percent
< 5minutes	2	1.3
5-10 minutes	7	4.7
11-15 minutes	24	16
16-20 minutes	14	9.3
21-25 minutes	39	26
26-30 minutes	23	15.3
Above 30 minutes	15	10
Total	126	82.6%

9.0 AVERAGE TIME SPENT ON TRAFFIC DAILY

Of the total population sampled, 126 (82.6%) stated that they experience traffic congestion on their way to work while 26 (17.3%) do not. The result in Table 4 shows the breakdown of the average time residents spend on traffic daily. 26 % stated that traffic congestion lasts between 21-25 minutes on the average along their route, 15.3 % said between 26-30minutes, 10% above 30 minutes, 9.3 %between 16-20 minutes, 4.7 % between 5-10 minutes and 1.3 % less than 5 minutes. Going by these results, it could be said that 51.3 % of the respondents sampled in this study spend an average of 21 minutes and above on traffic daily. When this result is compared with the results in Table 2 it is obvious that most respondents in the study area spend almost the same number of minutes it will take them to get to their place of work on traffic most times. Mathematically, this implies that a resident whose house is 25 minutes drive to the office will eventually spend 50 minutes or more.

Table 5 Ranking of some routes in the study area on congestion

Route	Mean score	Rank
Ojoo-UI-Sango	0.98	4 th
Agbowo -Express	0.89	5 th
UI-Bodija-Agodi Gate	1.27	2 nd
Agodi Gate-Iwo Road	1.45	1 st
Sango- Iwo Road	1.03	3 rd
Agodi Gate- UCH- Mokola	0.7	6 th
Mokola - Dugbe	0.6	7 th

10.0 RANKING OF SOME MAJOR ROUTES IN THE STUDY AREA BASED ON THEIR LEVEL CONGESTION

In order to ascertain the level of traffic congestion along some major routes in the study area, respondents were asked to rank these routes based on their own perception. Results indicate that Agodi Gate-Iwo Road route scored highest with a mean value of 1.45 followed by University of Ibadan (U.I)-Bodija-Agodi Gate with mean value 1.27, Sango-Iwo Road (1.03), Ojoo-U.I-Sango (0-98), Agbowo- Express (0.89), Agodi Gate-University College Hospital (UCH) - Mokola (0.7) and Mokola – Dugbe (0.6). Some deductions could be made from these results. First Agodi Gate – Iwo Road route is located near the auto spare parts market on one end and on the other end is the building materials shops located close to the road. Against this backdrop, most trucks bringing goods to both markets offload their products along this route thereby causing obstruction to other road users. Again, the very fact that this route is located within various bus terminus where passenger buses coming in and going to neighbouring states load makes traffic to be heavy. With all these activities going on along this route, the reason for it being ranked as number one by the respondents is not farfetched. Again, U.I –Bodija- Agodi Gate route was ranked second, and the reasons are stated earlier in this text. Sango – Iwo road route could be described as a spill over from Iwo road traffic since both routes are interlinked.

Table 6 Causes of traffic congestion in the city

Causes	Frequency	%
Many vehicles on the road	40	26.7
Narrow road networks in the city	33	22
Bad roads	30	20
Indiscriminate erecting of shops/display of wares by roadside	21	14
Drivers impatience	15	10
Many motorbikes in the city	11	7.3
Total	150	100

11.0 CAUSES OF TRAFFIC CONGESTION

On the causes of traffic congestion in the city, results in Table 6 indicate that 26.7 % of the respondents attributed it to too many vehicles in the city while 22 % claimed that the roads in the city are narrow and 20 % attributed it to bad roads. Also 14 % observed that indiscriminate erection of shops display of wares by traders contribute to traffic congestion along some major routes in the city while 10 % claimed that impatience on the part of most drivers in obeying traffic laws result to congestion most times. 7.3 % said its a result of too many motor bikes. Their argument is that these bike riders most times do not obey traffic laws; equally, they compete with vehicles on the existing narrow roads in the city there by causing traffic congestion. Going by the breakdown of these results, the number one cause respondents observed is high number of vehicles in the city and this is associated with the high rate of urbanization the city of Ibadan has experienced over the years. Similarly, the second cause of traffic congestion as shown by the results above is narrow road networks in the city; as majority of the motorable roads were build over four decades ago when the population was sparse.

12.0 LOSS INCURRED DUE TO TRAFFIC CONGESTION

Out of 150 respondents sampled in this study, 24 (16 %) claimed that they do not incur any loss to traffic congestion while 126 (84 %) agreed that they incur losses. The table below presents the breakdown of losses incurred by respondents.

Table 7 Loss incurred by road users to traffic congestion in the city

Type of loss incur	Frequency	%
Arrive at work late	38	25.3
Miss appointments with clients	25	16.7
Children get to school late	27	18
High burn rate of fuel on traffic	19	12.7
Get home late at night	7	4.7
Get to place of work tired	10	6.7
Total	126	84

The losses the respondents incur as a result of traffic congestion in the city are both human and material as shown in Table 7. 25 % of respondents stated that they arrive to their place of work late as a result of this while 16.7 % claimed that they miss appointments with their clients, 18 % said that their children most times get to school late, 12.7 % claim that whenever they are trapped in traffic that a lot fuel is burnt, 6.7 % observed that they get to work most times tired and 4.7 % attribute their arriving home late after work to traffic congestion. It is obvious that lateness to work by parents and children to school most times topped the list of losses incurred by respondents. Equally, missing of appointments and burning of more fuel than required are other losses respondents identified. For the first two losses mentioned, it is obvious that productivity on the part of workers is reduced as a result of time wasted on the way while students most times miss classes. Again, when appointments are missed it equally results to low productivity especially for the self employed since they have other competitors whom their clients may patronize. There is also reduced productivity due to tiredness on reaching their work place.

13. CONCLUSIONS AND RECOMMENDATIONS

In this study, an attempt has been made to examine the effect and causes of traffic congestion in an indigenous African city Ibadan, Nigeria by considering the components of level-of-service (LOS) or quality of service of the transport infrastructure. It is obvious from this findings that the quality of service (LOS) residents are getting from the transport infrastructure is inadequate. Traffic congestion is one of the problems of urbanization facing most cities in Nigeria. However, that of Ibadan seems to be more pronounced because of its size and primordial nature. The city from the outset was not properly laid out unlike other emerging cities in the country that have master plan. Also, it was observed from the findings that residents incur both human and material losses due to traffic congestion in the city. Some of the causes of traffic congestion identified in the study include: high number of vehicles plying the roads, narrow road networks, bad roads, indiscriminate erection of structures near roads in the city and impatience on the part of some drivers. It is hoped that if these causes are properly addressed the city will in the near future witness free flow of traffic. Based on these findings, the following recommendations are made for public policy makers and other stakeholders in Oyo State:-

- Oyo state government should carry out town planning reforms with a view to righting the wrongs in the planning structure of the cities and hence expand the existing roads network in the city by making them dual carriage and build new ones with good interlink.
- There should be a strict implementation of rules and regulations through the town planning authorities with strict adherence to erections of retail stall.
- A law banning street trading should be set in motion and offenders should be prosecuted to serve as deterrent to others.
- Provision of functional mass transit which offers alternativemeans of getting to ones destination instead of driving inpersonal cars.
- Resuscitation of ailing railway lines in the city to enhance intermodal link with the roads, functional traffic lights for effective control of traffic and in short basic infrastructures in both urban and rural areas to reduce rural-urban migration.

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*Tribal Council as a Decision-Making Mechanism for Reconstruction after Disasters: A
Case Study of Ulaljuc, Taiwan*

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Abstract:

Since 2006, the Council of Indigenous Peoples, Executive Yuan launched a tribal council scheme for the purpose of integrating the traditional power structure and modern administrative system. The design of tribal councils provides a platform for traditional head of tribe, elected leader of village, and community development association to decide common affairs in their tribes.

When major disasters happen, the communities of indigenous people have to coping with the damages as well as deal with external assistance, either from public sector or from NGOs. The research originally focused on how organizations emerged during interim housing stage influenced the reconstruction and rehabilitation process for the community after a typhoon disaster in 2009. However, the authors found that tribal council, a pre-existing mechanism, seemed to be an appropriate platform for negotiation and decision-making for the community to go through the reconstruction. Several suggestions related to community life management in the permanent houses were collected through data collection and interviews.

Key words : Tribal Council, Disaster Reconstruction, Community Organization

Tribal Councils as a Decision-Making Mechanism for Post-disaster Reconstructions :
A Case Study of Ulaljuce

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In August 2009, Typhoon Morakot hit Taiwan with severe precipitation. Because of the fragility of geological features in mountain area and deposit in the riverbed, the huge amount of water caused catastrophic mudslides, which damaged Tainan, Kaohsiung, Pingtung, and Taitung, especially indigenous communities. This disaster, often referred as the 88 Flood, destroyed at least 1,700 homes, and brought damage to another 160 thousand. It is estimated at least 600 people killed or missing (Ministry of Interior, Taiwan, 2009).

Because of steep terrain, soft soil, and poor drainage in Taiwu Village, Taiwu Township, Pingtung County, soil loss were so severe that cracking were observed on houses, churches, schools etc. The seriousness of stratigraphic subsidence pushed this indigenous village facing the choice of migration issue. The impoverished villagers were temporarily relocated in Jongchan Base in Pingtung, and the rest of villagers were scattered. Till the completion of Xinchu Farm permanent housing in August 2011, qualified villagers moved in, and the traditional name of Ulaljuce was reclaimed.

This research was inspired by the research finding of 2011, the researchers noticed the different expressions to public affairs between people from Laiyi and Taiwu Townships (Chen & Huang, 2011). In addition, a research interviewed people from Taiwu Township and Laiyi Township showed that the quality of life for people from Taiwu was lower in many dimensions (Huang, Chen, Yao, Liu, & Wen, 2011). Chen & Huang (2011) emphasized that “the struggle between traditional and modern power might emerge after moving in permanent houses.” This research, therefore, focused on Taiwu villagers’ inactivity to public affairs during interim housing period, and the power dynamics of Taiwu Village after resettlement in permanent housing.

Brief History of Taiwu Township

Taiwu Township in Pingtung County is comprised of Taiwu Village, Jiaping Village, Jiasing Village, Wan-an Village, Pinghe Village, and Wutan Village, whose residents are people of Paiwan tribe. Before 2009, most villages have migrated to the foot of mountains, except Taiwu village. Taiwu Village, as one of the major clans of Paiwan, its influence went as far as Taitung County in its heyday. However, its power

decreased to only its own village over time.

The old village of Taiwu located on the right bank of upper Ulaluce Stream and the hinterland of a spur (paljakcauk) of northern Dawu Mountain (paraishideian). The village was situated about 1,050 meters above sea level. Its east side was northern Dawu Mountain, north side was Doupuloukoupouri Mons, and south side was Doutsaloumouy Mons. Because of its inconvenient communication, the village was relocated to an altitude of 752 meters with the government's assistance in 1960's (Liu, 2010).

In the past, the major crops of Paiwan were millet, taro, sweet potato, and quinoa. The economic crops included cassava, soy, peanut, and dioscorea opposita. As the socioeconomic type switched from agriculture to business, many people migrated for better livelihood. In recent years, the tribe has promoted the coffee industry by organizing the Production and Marketing Teams of coffee in 2006. As a result, the total cropland of coffee is about 24 hectare, and the output of coffee beans is about 5,000 kilograms per year (Office of Taiwu Township Pingtung County, 2012)

Paiwan society is divided into classes of chiefs, nobles, and tribe people. Chiefs hold the most power, including the land ownership, the management rights to animals and plants, and the command of tribe people. Nobles are in charge of command, negotiation, and helping minority groups. (Hsieh, 2007)

Tribe Council: A Cornerstone of Indigenous Autonomy

During the presidential election period in 1999, the representatives of indigenous tribes and the then-presidential candidate Chen Shui-bian signed a document of A New Partnership Between the Indigenous Peoples and the Government of Taiwan¹ in Orchid Island. This treaty-like document declared the support of indigenous autonomy and the recovery of traditional territory for indigenous tribes. After Chen Shui-bian won the 2000 presidential election, he reaffirmed the New Partnership Agreement between indigenous tribes and the Government of Taiwan. This agreement reassured

¹ The seven articles in the A New Partnership Between the Indigenous Peoples and the Government of Taiwan includes: 1) to recognize the natural sovereignty of Taiwan's indigenous peoples; 2) to promote indigenous autonomy; 3) to sign land treaties with Taiwan's indigenous peoples; 4) to restore traditional names of villages, mountains and rivers, 5) to restore traditional territory; 6) to restore traditional use of natural resources, and promote ethnic self-development; and 7) to replace indigenous legislators with tribal delegates.

the respect to autonomy entities of indigenous tribes.

In the indigenous traditions, however, the notion of nation didn't exist in the 12 tribes in Taiwan. The lack of official system made the quasi nation-to-nation relations regress to the tribe-to-nation relations. In order to promote tribes' autonomous development, the establishment of tribe councils in every tribe is necessary. Then, each tribe council nominates a representative to form a tribe council of 12 tribes, which can negotiate with the Government of Taiwan more equally and efficiently (Chang, 2005).

The Council of Indigenous Peoples, Executive Yuan promoted the Implementation Directions of Tribe Council since March 10th, 2006. Later, the amended Implementation Directions of Tribe Council was issued on January 21st, 2011. The article one stated that "in order to assist indigenous tribes establish autonomous mechanism, Council of Indigenous People, Executive Yuan formulates this implementation directions." In addition, the article 2 noted that "according to Indigenous Peoples Basic Law, Regulations for Joint Management of Indigenous Area Resources, or other regulations, the tribes are allowed to execute rights of consent, participation, joint management, and benefit-sharing. It is permitted to treat public affairs with the resolutions of tribe councils, unless other laws or regulations refer to specific decision-making processes." Clearly, Implementation Directions of Tribe Council stated the timing and decidable range of tribal councils.

Compared to the tribal councils of indigenous tribes in the United States, such as Choctaws² or Yakima Nation³ (O'Brien, 1989), it is notable that the indigenous tribes in Taiwan are allowed to have rights of consent, participation, and distribution in documents. In the process of implementation, however, the power struggle between government and indigenous traditions is inevitable. Generally, resolutions of tribal councils are encouraged in dealing with public affairs. This mechanism promotes the establishment of the tribal council of single tribe.

²"The council members, whose seats are spportioned by population among the seven communities, are responsible for regulating tribal property, manaing tribal funds, employing leagal counsel, establishing and enforcing tribal ordinances, levying taxes, developing economic policies, establish an executive department, and promoting and protecting the health, peace, moral, education and general welfare of the tribe. Each council member reports regularly to his or her local community organization (O'Brien,1989)."

³In 1947 a rule change provided for election by the General Council of half of the Tribal Council members every two years for four-year terms. The tribal council's primary responsibilities are to protect tribal property, to promote social welfare, and safeguard the Yakima nation's treaty rights.

Since 2006, the notion of tribal councils was promoted; however, it caused administrative incompatibilities in many tribes, where “The Four Guardians” had held leaderships of tribes for a long while. “The Four Guardians” is an expression which indicates the four leaders of indigenous tribes, including a town chief, a village chief, a religion leader, a chairperson of community development association. It has been difficult to promote policies under the leadership of “The Four Guardians.” The chairperson of tribal council, the fifth leader of tribes, supposedly would make policies even harder to work out (Wusai, 2007). In addition, the legality might be an issue when conflicts happen between the resolutions of tribal councils and the political system (Tien, 2011).

In brief, the notion of tribal councils represents the idea of equality between indigenous people and national system. It needs a lot of work to implement from individual tribes to alliance among tribes. However, this research found an example of tribal council which complied with Implementation Directions of Tribe Council, integrated various leadership of tribe, and helped its people go through the difficult process from disaster to completion of resettlement.

Research Design

Research Methods

This research is a qualitative research, which holds two research problems:

1. What makes villagers of Taiwu village inactive to public affairs compared to Laiyi?
2. How community organizations and their dynamics during the period of interim housing influence the living of permanent housing?

Interview and participative observation were employed as research method. The researchers designed a semi-structured questionnaire of open questions about interviewees’ living experience from interim housing to permanent housing. Furthermore, interviewees’ opinions to the functioning and decision-making mechanism of habitants’ organizations were collected. The researchers also participated and observed meetings of the tribal council after resettlement in the permanent housing. The dynamics among organizations and power structures was well-noted in the minutes. Moreover, the internal discussion among the researchers

was helpful to verify and comprehend the data collected from interviews, minutes, and observation records. Ultimately, the role of tribal council, especially when major events happened, was concluded in this research.

Choice of Interviewees

In order to obtain stakeholders' opinions, the interview of this research focused on people who lived in Ulaljuc, and experienced the Typhoon Morakot and the tribal council. Some habitants who were not the power core were also interviewed for collecting ordinary habitants' opinions. The background of interviewees listed as Table 1.

The logo for 'iafor' is centered on the page. It consists of the lowercase letters 'iafor' in a light blue, sans-serif font. The text is enclosed within a large, light blue circular arc that is partially visible, suggesting a larger circle. The background of the page features a large, faint watermark of the 'iafor' logo, which is a circular shape composed of two overlapping arcs, one in light blue and one in light red.

Table 1

Background of interviewees

Interviewee	Gender	Identity	Place	Employment	Status of Resettlement	Participation status of Resettlement Committee	Move in permanent house
R1	Male	Tribal Chief	R1 Home	Farmer	Jongchan Base	N	Y
R2	Male	Secretary, Ulaljuc community development association	R6 Home	Public officials	N	N	Y
R3	Female	Villager	R3 Home	Unemployed	Jongchan Base	N	Y
R4	Male	Villager	Grocery store	Woodcarving Artisan	Jongchan Base	N	Y
R5	Female	Villager	R5 Home	Unemployed	Jongchan Base	N	Y
R6	Male	Chief of village	R6 Home	Chief of village	N	Y	Y
R7	Male	Chairperson, Ulaljuc Tribal Council	Taixiao Cafe	Farmer	N	Y	Y

Research Finding

Satisfaction with Living Experience in Interim Housing

The living environment of interim housing was not comfortable, such as problems of sound-proof and heat insulation. The interviewees, however, showed positive satisfaction to living in the interim housing and the service of public sectors and private service teams. Besides, they were also aware of their own responsibilities to self-care and autonomy.

Painting, furniture, everything was ready at my move in. The television, refrigerator, stove, a set of table/chair were all theirs. Living there felt not bad although the sound-proof was not pretty good. No problem. Kids lived well (R5).

The managers were from Red Cross. I deeply appreciated those who I called cute guys and ladies. As long as something happened to us, we would go for them. Once, my pipe was blocked. I went for them and asked them to pay for it although it was my fault. How ridiculous they were (R4)!

Tribal Council as a Decision-Making Mechanism

Habitants in Jongchan base were from five villages, including 254 persons of 44 households from Taiwu Village Taiwu Township, and 268 persons of 67 households from Laiyi and three other villages. In the habitant meeting, people from Taiwu and Laiyi performed differently in terms of proactivity to public affairs in interim housing. Interviewees of Taiwu all thought that nothing should be cared in the interim housing but resettlement and living in the permanent housing. They didn't appreciate the other people's proactive reaction to public affairs.

No comment....what can I do? I just moved in here (permanent housing) as fast as I could (R3).

Because there is only a tribe in the Taiwu Village, each tribe has its own way (to handle public affairs) (R4).

The fact emerged, after the interview, that the management committee or inhabitant meeting of interim housing were not one of the major decision-making mechanisms for

inhabitants from Taiwu. The interviewees mentioned and cared only resolutions or discussion made in meetings of the tribal council.

This research found less articles which showed positive to the implementation of the tribal council although the Ulaljuc tribal council had existed since 2007 【TC-960325】

4. In the Ulaljuc tribal council, one chairperson would be nominated, and the election would be held every four years. Every household would be informed by mails when major events needed to be decided. The village chief and the chairperson of community development association would sit shoulder by shoulder on the stage, except the chairperson of Ulaljuc tribal council. Tribespeople might participate to discuss tribal affairs by choice.

The Ulaljuc tribal council can be regarded as a decision-making mechanism above the existing organizations such as village office, and community development association etc. Village officers are in charge of the administration of meetings, such as notices and minutes etc. And villagers' participation is fairly active.

Not many people participated meetings of tribal council. Sometimes a half or more than a half...sometimes more than one hundred participants. Sometimes meetings were held in the activity center (R3).

The tenure of chairperson is four years. The chairperson is replaced at every election. Some people agreed the tenure of four, then it was done. The tribal council has only one chairperson without staff (R7).

The role of Ulaljuc tribal council after Typhoon Morakot

Decision of Relocation. After the Typhoon Morakot on August 8th 2009, the tribal council of Taiwu village had been regarded as an official role to decide the major event when other villages were still debating about resettlement. On August 20th, the second meeting of tribal council was held 【TC-980820】. Two things were decided in the resolution. First, whole village moved out regarding the seriousness of subsidence. Local police station was asked to execute the mandatory evacuation if needed. Second, the tribal council passed the resettlement and the organization of resettlement committee unanimously. Meanwhile, members of resettlement committee were elected as Table 2. On August 27th, the Legislative Yuan passed the Special Statute

⁴ Meeting was held three times in 2007, four times in 2008, twice in 2009, six times in 2010, seven times in 2011, and three times in 2012 till present.

For Reconstruction For Post-Typhoon Morakot Disaster which gave the legislative basis to the resettlement.

You need to have the endorsement of tribal council to establish the resettlement committee. Therefore, most of people agreed with resettlement, and the committee members were elected then (R2).

Table 2
Resettlement Committee of Taiwu Village

Position	Nominee
Consultant	Hua Chia-Chih, Hua Chen, Village Chief Sun Wan-Chiao , Legislator Chien Tung-Min, Legislator Kao Chin Su-Mei, Representative Pan Ming-Li
Chairperson	Yen He
Commissioner	Chih Wa-De, Lei Cheng-Hui, Juan Hui-Chen, Hua An-Yi, Ting Kuo-Ping, Chuang Tao-Chi, Huang Jung-Erh, Chiang Chiu-Mei, Wei Jung-Kuei

Note. From the minutes of tribal council of Taiwu Village on August 20th 2009 【TC-980820】 .

Arrangement of Interim Houses. 70 household of temporary shelter were needed after Typhoon Morakot, however, the Jongchan Base could offer only 44 households. This number was far from enough although some of people had housed to stay in other places. The tribal council, therefore, made a decision that the homeless and low incomes were the priority for interim houses; the rest would be decided by drawing lots. These people were the first group of inhabitants in the interim housing. People lost in drawing lots had the priority move in houses renounced by first group. The people of first group might join the drawing lots for the rest of available houses.

At that time, people with houses were eliminated (from interim housing), then 70 households were waiting for interim housing. For the special cases, tribal council considered the reasonability of arrangement, and made the decision that people without relatives had the priority of move-in. the rest of quota were decided by drawing lots. Therefore, 30 or some households were eliminated. The relationship among people was changed at that time. If the first group didn't move in...same as... then the second group could take their places, 30 and some households moved in available houses. The rest of houses

were arranged with drawing lots for the first group. The replacement was done unconditionally. The tribal council decided the whole thing (R2).

Living in the Jongchan Base is about one year and eight months. The first year we followed the tribal council's decision; and the second year we won in the drawing lots (R3).

Distribution of Donatives. After Typhoon Morakot, the donatives came to disaster areas from many places. To distribute donatives fairly is another responsibility of the tribal council. Considering of the Jongchan base as a collective place for victims, a lot of donatives were sent there and took by inhabitants of the first group. In the meeting of tribal council in 2009, the regulation of donatives distribution was discussed, and decided that the donatives should be given to whoever needed them equally

【TC-980820】 .

Although the donatives are huge, those money and resources from charity groups, they are all in the interim housing. Those who don't live in the interim housing didn't get any. Then they assigned the village chief to receive the donatives for them. In the end, the tribal council changed the situation, so every household can get the donatives(R2).

Arrangement of Permanent Houses. Two years after Typhoon Morakot, the Xinchí Farm was completed⁵. The tribal council performed a crucial function for the arrangement of permanent houses. In the second meeting of 2011, the tribal council unanimously passed the reclaim of traditional name, Ulaljuc, which was used the name of new community. Meanwhile, a resolution was announced, “1) Juan Hui-Chen, Lei Cheng-Hui, and Yen He proposed that the Tribal Chief and Members⁶ should have the priority for permanent houses regarding their great contribution to the tribe. 48 votes for approval, and 2 votes for disapproval. 2) The drawing lots for 117 permanent houses was completed satisfactorily.

According to the minutes, the Tribe Chief and leaders of various power structures

⁵Red Cross built 117 houses, including 92.6 and 105.8 square meters, in Xinchí Farm. The roof used traditional indigenous pattern and style. Three different styles of ample garden consisted of parking space, front yard and back yard. The multi-functional activity center and production and marketing center of coffee are built up in the public space.

⁶Members are the members of resettlement committee. Juan Hui-Chen is the current Representative of Taiwu Township, Lei Cheng-Hui is the current Chairperson of Taiwu Township Council, Yen He is the current Chairperson of Ulaljuc community development association, Hua An-Yi is the current Chairperson of tribal council, and Ting Kuo-Ping is the current Village Chief.

decided their permanent houses without drawing a lot. The rest of tribespeople did the drawing lots. This process demonstrated the dynamics of traditional and modern power in terms of the arrangement of permanent houses.

Tribe Chief living at the center was decided by people, the village; the rest was decided by drawing lots. The space in front of houses is convenient for setting up a swing, dancing, and the festivals....Yes, yes, yes, people discussed in the tribal council and decided to live here (R1).

The Representative, Chairperson, Village Chief, and Tribe Chief chose their houses first, then we did ours by drawing lots (R5).

Yes, people did draw lots. Otherwise, people would prefer the locus close to streets for business. After the completion of houses, people would start this and that...The government of county allowed us to decide. Either drawing lots or people make their own choice. we decided to do the drawing lots for fairness (R3).

The Role of Ulaljuc Tribe Council in Permanent Housing

After moving in the permanent houses, the insufficient space and the linked houses made the Karaoke as a problem. Because the speakers were left outside, the excess singing affected neighbors who needed tranquility, and disturbed the classes at the Primary School of Taiwu. Some inhabitants called for police to handle the noise problem. In the fifth meeting of tribal council on October 24th 2011, it was decided that singing could be done after school till 10 pm **【TC-1001024】** .

In the daytime, it can't be turn on. There are classes at school. We have the rule. They can sing till 10 pm. After 10, it should be turn off. This was declared in the tribal council (R7).

There is a time limit for Karaoke. From 5 pm. To 9 pm. It is decided in the tribal council. A fin may occur if violated. The police will do the fine. They seem worried that it might affect students' learning. The Principal Wu reminded in the meeting. The Village Chief was mad. So that's the decision (R3).

Conclusion

This research originated from the inactivity to public affairs for people from Ulaljuc (Taiwu Village Taiwu Township), compared to people from Laiyi Township. After the interview and data collection from minutes of the tribal council, it was found that the tribal council had been used as the mechanism of decision-making for major events since 2007. The management committee of interim housing and the inhabitant meeting were for trivial matters.

In the process of reconstruction after Typhoon Morakot, Ulaljuc employed the tribal council as the communicative forum which allowed various organization discuss in the same room. The resettlement, move in to the interim housing and permanent housing and the public affair after move in all were discussed and decided in the tribal council.

The logo for the International Association for the Advancement of Social Sciences (iafor) is centered on the page. It consists of the lowercase letters 'iafor' in a light blue, sans-serif font. The logo is surrounded by two large, overlapping circular brushstrokes: a light blue one in the foreground and a light red one behind it, both with a soft, painterly texture.

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How to measure risky driving behaviours of electric and motorized two-wheelers in China? A critical review of current existing tools used towards Chinese drivers

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Abstract:

Today, Chinese people rely heavily on Electric Two-Wheelers (E2W) both the scooter and the bike styles (Cherry & Cervero, 2007). Together with the Motorized two wheelers (M2W) that would sooner or later be excluded from the road traffic in some big Chinese cities, their production keeps growing (Asian Development Bank, 2009) This phenomenon is going along with a high rank of E2W riders' mortality. However, understanding of the factors that could explain their accident involvement is still needed. Studies to improve this knowledge are far from being numerous enough. Adopting this objective, we launch a research program which aim to improve specific knowledge about the risk of E2W compared to M2W riders in Shanghai. We adopt a social-cognitive psychological approach and we follow urban planning concerns. As a first stage of this research work, we first review the literature aiming to find out what definition is made of dangerous/risky driving behaviors and how there are measured in the Chinese road context. That lead us here to critically report the currently used tools in regards to both cars and two-wheelers dangerous/aberrant/violations driving behaviours. We point out a general lack of definition of the label of violation and that there is actually no formalized definition of risky driving behaviours. We argue the need to go beyond a classical but restrictive design in terms of errors, violations or self/hetero aggressive intent. Finally, we suggest to only refer to Dula & Geller (2003) sole definition of risky driving behaviours in order to be operationalized into items dedicated to E2W and M2W riders.

Keywords Driving behaviours, risk, electric-two-wheelers riders, motorized-two-wheelers riders, China, social-cognitive psychologist approach

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Introduction

From Europe, the mode of transport that is so stereotypical China remains the human powered two-wheelers i.e. the bicycle. However, the road landscape diversifies and Electric two-wheelers (E2W or electric bike) have emerged as a popular mode of transportation in many large cities during recent years (Weinert and al., 2007). Actually they compose the main part of the two-wheeled traffic beside regular bicycles. It is not easy to have clear statistic data about the distribution of vehicles types as well as about road safety in China and in many other developing countries (Luoma & Sivak, 2007 in Zhang, Tsimhoni, Sivak and Flannagan, 2010). One official source even though it is not that quite recent, 2009, is the Asian Development Bank with its report titled “*Electric bikes in the People’s Republic of China: impact on the environment and prospects for growth*”. There, statistics features report E2W ownership as estimated in 2007 to be between 33 million and 45 million (Feng, Jiang, et al., 2007; Zhejiang Bike Web 2007). More recently the estimated total number of E2W was over 120 million in 2010 (Xinhua news, 2010 in Wu, Yao, Zhang, 2011). Motorcycles ownership in the PRC reached 80 million by 2005 (National Bureau of Statistics 2007) and there are around 460 million bicycles and 13 million cars. In this Asian bank development bank report, it is underlined then that there is no category for E2W in the National Statistics Bureau data set. Therefore, it is difficult to determine whether E2W are counted as bicycles or small utilitarian motorcycles (which could include mopeds) or not counted at all since registration requirements differ from city to city. Most importantly, the growth development in China of E2W is expected to keep going notably. For instance in Shanghai, the LPG two-wheelers (Liquefied Petroleum Gas) which were still 288 000 in 2009, will in 2013 be banned. Since 2003, this has been already the case for the motor gasoline two-wheelers. This displacement mode is closely related to considerations of urban planning. With the expansion of cities, the decline of peri-urban areas and the increasing congestion of roads, the appeal for E2W is that it allows travelling long distances at low cost. In this context, Wu, Yao, and Zhang (2011) report that Chinese government agencies are showing an increasing interest in promoting two-wheeled traffic. But this growing popularity of two-wheeled traffic is not without safety concerns. In 2004, 13,655 regular bicycle riders died and 54,286 were seriously injured in road accidents. These statistic figures represent 12.8% of all traffic fatalities and 11.3% of injuries (CRTASR, 2004 in Wu, Yao, Zhang, 2011). Traffic safety for E2W riders is considered as an even more severe problem since the number of fatalities and injuries has increased dramatically over the past few years. In 2004, 589 E2W riders died and 5295 were seriously injured. The corresponding figures increased to 2469 and 16,468, respectively in 2007 (CRTASR, 2007 in Wu, Yao, Zhang, 2011). To sum up local views about E2W are quite ambivalent (Cherry, 2007) as the general context is of a growing crisis of unsafe roads with a mortality rate four to five times higher than in other nations. It is in this general context that the *Road Traffic Safety Law of the People's Republic of China*¹ has been stated in 2003; the Chinese first-ever law on road traffic safety. It was intended to address this alarmingly high traffic fatality rate. Opponents of E2W often cite the number of deaths as proof of dangerousness while others consider that this reflects their vulnerability (Cherry, 2007). Either dangerous and/or vulnerable, a deeper knowledge on risk factors of both E2W and

¹ http://english.gov.cn/laws/2005-09/07/content_29966.htm

M2W riders and their accident involvement is required and more specifically in the Chinese context.

Adopting this objective, we launch a research program which aims to improve specific knowledge about the risk of E2W riders in China under a social-cognitive psychologist approach and in comparison with M2W. In this paper, and as a first stage of this program, we refer to general statements and Chinese specificities regarding traffic road context and vehicles' interactions. Then we classically refer to the literature in order to answer the question "what is called a risky driving behaviors as a two-wheelers?" and "how are they actually measured in the Chinese traffic road context?". We reviewed both how a definition is made and how it is operationalized into items. That lead us to critically examine currently exploited tools in China about both cars and two-wheelers related to dangerous driving behaviours: the Chinese Driving Questionnaire (CDQ, Xie & Parker, 2002), the aberrant driving behaviors questionnaire (Shi, Bai, Ying & Atchley (2010), and the Chinese Motorcycle Rider Driving Violation (CMRDV, Cheng & Ng, 2010).

General statements and Chinese specificities regarding traffic road context and vehicles' interactions

Generally speaking, we can state from the Western literature that the traffic road involves various users with different designs of vehicles (E2W, M2W, cars...) as various driving styles that result from the physical and dynamic characteristics of these vehicles. All these elements lead to difficulties in terms of interactions management between these users, notably between power two-wheelers riders and car drivers (Hole et al., 1996; Horswill et al., 2005; Crundall et al., 2008; Hancock et al., 1990; Obenski, 1994; Van Elslande, 2002; Jaffard and Van Elslande, in press). Two explanations are the potential mutual misunderstanding or ignorance of the driving situation's determinants and difficulties in taking others into account. These include various practices among users which can be related to the physical and dynamic characteristics of their vehicle and their level of familiarity with other users (Ragot-Court et al. 2011; Mundutéguy & Ragot-Court, 2011; Crundall et al., in press; Shahar et al., in press; Comelli et al., 2008; Magazzù et al., 2006; Weber and Otte, 1980; Brooks and Guppy, 1990; Crundall et al. 2008). Over this general statement that might be quite common to different countries we have to highlight the specificities of the Chinese road context as at least different from the western countries. First in Europe, EW2 are almost absent from the road landscape and M2W still account for less than 2% of all road traffic in term of kilometers driven! Other strong differences with EU countries exist about the vehicles fleet: heavily-loaded trucks, many non-licensed motorcycles, and a large number of pedestrians (Zhang, Tsimhoni, Sivak and Flanagan, 2010). Shi, Bai, Ying and Atchley (2010) explain that since 2000 due to the increase of urbanization and motorization in China, the Chinese road traffic receives a massive additional numbers of new drivers with varied driving experience on road in China. They point out the weakness of driver training and the unfamiliarity with road safety and the rules for economic and historical causes. They claim that after years of cycling (traditional mode), the abrupt transition to motorized mode is able to generate safety problems. Indeed, there are some distinctions between the two modes regarding restrictions of traffic lanes, different priority rules etc. The authors assume that some drivers would reproduce the same behavior as those practiced by bike such as stopping anywhere and anyway. To sum up, the road regulations, the infrastructures and the fleet of vehicles are in China not yet stable. It's also the case about the driving trainings conditions. Finally, another Chinese characteristic of the road is that according to traffic laws in China, and though having great differences in

physical performance, both E2W and regular bicycles are classified as non-motor vehicles. Moreover, both E2W and regular bicycles are operated in the same lanes and are subjected to the same traffic rules. However, most E2W on the road exceed the performance limits of the national standard and travel much faster than regular bicycles (Weinert et al., 2007; in Wu, Yao, Zhang, 2011). All in all, these statements argue for expected differences between users in China and Western countries in term of driving behaviours and consequently of risky driving behaviors as well.

Critical review of literature: which definitions and which measures are made of risky driving behaviours on the Chinese road context?

Now that we described the Chinese road context and stated its peculiarities, we keep it as a general background to assess the literature. We critically review recent research studies implemented in China aiming to find out “what is called a risky driving behaviors as a two-wheelers?” We review both how a definition is made and how it is turned into items for implementations in China. First a simple research on Scimedirect gives us a glance on the still needed research publications 1/at an international level 2/on the field of safety road in China 3/under the social and psychological sciences approaches. Indeed, a search using “China” and “safety road” as keywords to look for in abstract, keywords, and title brings 19 publications as a results. The former one is dated from 2006! Then a search within results targeting “two-wheelers” brings only one paper²! Targeting “cycle” instead, only brings 9 additional papers. It informs that concerning dangerous driving behaviors including the ones of two-wheelers riders, research studies focus on three specific driving behaviors: helmet use, red-light running and speed behaviors. Then, to fulfil our goal for giving a definition to risky driving behaviors as two-wheelers, we opened up our search with no limitations to two-wheelers but including also cars.

First, we refer to Xie and Parker (2002) who relevantly point out that some Chinese cultural factors, personality factors and attitudinal factors as well might play a role on accident risk distinctively from other cultures. Additionally, they mention for example that some classical demographic factors have been shown to have a different weight or none compared to Western populations. In this paper the authors aim to deal with driving behaviors in two Chinese cities and their involvement with traffic accidents. These driving behaviors they focus on are first mentioned as “aberrant driving behaviors”, then as “aggressive violations”, as “driving violations”, and finally “intentional driving violations”. As no definition is provided these designations can be understood as interchangeable. Here considered traffic road violations are understood both as intentional and aggressive. For the purpose of their study, Xie and Parker (2002) make use of the Manchester Driver Behaviour Questionnaire (DBQ) initially developed by Parker, Reason, Manstead and Stradling (1995) for the Western drivers. Then one shall be stated that according to the items of this tool the risk as linked to traffic accident is here strictly operationalized as violations, lapses and errors. Then, references to the road’s regulation are obvious. Based on the DBQ, the authors develop the Chinese Driving Questionnaire (CDQ). This covers culture-specific topics that emerged from interviews and literature review. Respondents express their agreement with 40 statements related to the importance of social hierarchy, the road safety measures, and attempts to escape

² Changxu Wu, Lin Yao, Kan Zhang, The red-light running behavior of electric bike riders and cyclists at urban intersections in China: An observational study, *Accident Analysis & Prevention*, Available online 2 July 2011, ISSN 0001-4575, 10.1016/j.aap.2011.06.001.
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the sanctions, the questioning of the lawful authority by some drivers who think first to their own interests rather than safety. Additionally to the development of the CDQ, the authors add to the DBQ an extended set of driving violations relevant in China. Then this extended version of the DBQ refines categories as errors and lapses, aggressive violations, lane-use, inattention errors, maintaining progression violations, and signalling of impatience. Having a closer look on these factor labels one can question why this idea of (intentional) aggression is only enlighten in this second violation factorial items group and not in another one. It appears as quite debatable for main of these items: "Chase a driver who angered you", "Get involved in unofficial races", "Race away from traffic lights", "Overtake on the inside", "Break speed limit", "Drink and drive", "Show an aversion to other road users". When even the DBQ itself is noticed as the "DBQ aggressive violation scale", we defend that those driving behaviors are over-interpreted like intentional aggression. Since contextualization of the driving situation often lacks in these items, it makes them imprecise. As an example "Race away from traffic lights" besides an intentional aggression can otherwise correspond to a judgmental/perception errors. Another example "Break speed limit" instead of a willingness to show one-self aggressive to another could respond to one sensation seeking need. In this regard, Xie and Parker themselves mention in discussion about results variability according to age of the sample, a study of sensation seeking in a Chinese sample by Wang et al. (2000). Otherwise it could be an overuse of the concept of aggressiveness as Shi et al. (2010) referring to Xie and Parker describe it as emotional instead. Finally, this above critical analysis brings us to defend a methodological point of view. Either intentional aggressiveness, ignorance, sensation seeking, or whatever personality, cognitive, social or cultural factors, any explanatory factors of traffic rules violations should be independently measure from the (risky) driving behaviors themselves. Confounding violations items to intentional aggression motives is a restrictive or bias approach that does not allow investigating on further explanatory factors.

More recently, Shi, Bai, Ying and Atchley (2010) that we mentioned before, drove a study among Chinese drivers as well (Beijing city). The authors aim to understand the nature of aberrant driving behaviors. Despite a lack of definition, as the authors refer to Reason et al. (1990) it is clear that these behaviors must be understood as violations (intentional) and errors (non intentional behaviors). They aim to compare among the new set of car drivers, self-reported driving behaviors of Chinese people with those that we know in the West. Rather than make use of currently used tools in Western countries, the authors highlight the need to develop a "localized Chinese and standardized version of the DBQ" to be applied everywhere in China. They acknowledge as an excellent innovation Xie and Parker (2002) CDQ development as its combination with the DBQ for discovering new predictors. Nevertheless, they argue that these predictors may have changed in the last decade. Their point of view is that "interpersonal network" and "social hierarchy", which are the two most important factors in the CDQ are no longer valid for the new generation of Chinese drivers. The authors also assume that the increased number of drivers who switch from bicycle to car should lead to the finding of more "self-willed" behaviour from these new drivers. Therefore, Shi and al. take the opportunity to develop an updated tool. All in all this is about 25 items of violations and errors. Six items from the extended DBQ (Xie et Parker. 2002) and nine from the original DBQ (Reason et al. 1990) having been shown to be related to accidents are included. Ten new items are designed from prior interviews. Factor analysis reveals five factors: "Emotional Violation", "Risky Violation", "Distracted Error", "Self-willed violation" and "Inexperience Violation/Error". Interestingly for our purpose, except "inexperience Violation/Error", all these violation factors are assumed as deliberate, intentional behaviors. It appears to be debatable when reading some items lacking of contextualization to determine

whether the behavior is intentional or not. The disparity of items for each factor blurs a tentative of categorization by the authors. Furthermore, errors are presupposed to be due to the distraction or from inexperience. But errors while driving are not that restricted. Fail to notice a pedestrian crossing can sometimes be due to the low cognitive conspicuity of pedestrians.

Finally, Cheng and Ng (2010) seem to be the only one to focus on Motorcycle Chinese riders. They could develop for example an adaptation of the Motorcyclists' Riding Behavior Questionnaire (MRBQ, Özkan & al. 2011; Elliott & al, 2007). Distinctively, the MRBQ is only dedicated to motorized two-wheelers when the DBQ, the CDQ and recently Shi et al. (2010) questionnaire focus on car drivers. The MRBQ reveals that motorcycle riders behaviours respond to a five-factor structured model: traffic errors, control errors, speed violations, performance of stunts and use of safety equipment. But the MRBQ as among other current tools has been developed in Western countries and mainly in English language. Cheng and Ng share Xie and Parker (2002) as Shi et al. (2010) 's point of view (2002) that contextual factors in terms of social, cultural, and traffic environments could also influence the driving behavior of Chinese drivers, especially their tendency to violate. Hence, they argued the need for an *ad hoc* measure to evaluate driving violations of motorcycles in China. They aim to "locally develop" a questionnaire. Finally, they design the Chinese Motorcycle Rider Driving Violation (CMRDV) scale. It consists of 19 items. The intent is to assess the driving violations of Chinese motorcycle riders and evaluate its screening accuracy between accident-involved and accident-free motorcycle riders. Nevertheless, one could counter-argue that authors' goal is not yet fully reached here. Indeed, in China the idea of "locally developed" can suffer some significant regional differences, even cultural ones. In Cheng and Ng's paper, Chinese riders are clearly quoted as from mainland China, Taiwan, and Hong Kong. However the methodologies of the scale development and the test phases have been exclusively driven in Hong-Kong. First, a working group including a principal motorcycle driving instructor from the Hong Kong School of Motoring, a commercial motorcycle accident avoidance instructor, a high experienced licensed motorcycle rider, and two expert instructors have been involved for the CMRDV items generation. Then, a final sample of 680 Hong Kong riders of motorcycles with an engine capacity between 50 and 250 cc composed the population for the test of the full survey questionnaire. Therefore, the items of the CMRDV are designed in traditional characters and some of them are so typically Cantonese way of oral talking. That appears relevant despite the fact that official languages are English and Chinese (Mandarin or *Putong hua*), however Cantonese (or *Guangdong hua*) is acknowledged as the *de facto* official spoken variety of Chinese language in Hong Kong. To make it clear, 97% of the population in Hong Kong speaks Cantonese and it is the main variety of Chinese language used in education, broadcasting, government administration, legislature and judiciary as well as in daily social communication. However, in Mainland China Mandarin dominates. That makes non-negligible differences features in the choice of a tool for the measurement of driving behaviors. Additionally, it shall be mentioned some differences between Mainland China and its Special Administrative Regions regarding the level of traffic regulations, the advancement of the road infrastructure and regarding traffic directions. People drive on the left side in Hong-Kong and Macau while on the right side in Taiwan and Mainland China. Therefore it seems to us quite premature to reach the conclusion as claimed by the authors that the CMRDV can be applied to any Chinese Motorcycles riders driving behaviors. Besides, as usual in most of studies, Cheng and Ng here do not take into account the very wide diversity of motorcyclists in their data analysis and comments (Mundutéguy and Ragot-Court, 2011). Indeed, their sample gathers riders of vehicles with engines between 50cc and 250cc which covers a range of differences regarding physical and

dynamics properties. Electric two-wheelers themselves can be scooter or bike styles. But no data analyses are introduced under this distinctive feature. Finally, the authors do not include in their sample riders with less than three years of experience with two-wheelers and narrow to expert riders for the generation of items. Then one could put in question the representativeness of the results while two-wheelers new drivers have distinctive driving behaviors and a high accident record rate according to the Western literature. Furthermore it has been shown a higher risk for young motorcyclists for getting involved in accident and moreover those of high severity (Yannis & al, 2005; Nakahara & al, 2005 ; Kraus & al, 1976 ; Huang & Preston, 2004 ; Mullin & al, 2000 ; Zambon, & Hasselberg, 2006a). Even if driving experience is also a significant factor to explain accident (Sexton et al., 2004) young age comes first (Taylor & Lockwood, 1990). Rutter and Quine (1996) give as an example one willingness among young people to break the law and violate rules of the road traffic.

Towards a more comprehensive definition of risky driving behaviour

Our main statement is that there is currently no available definition about what is a risky or dangerous driving behaviour as two-wheelers, both for Chinese and Western studies. Generally, literature about driving behaviors as linked to road accidents does not provide a formal definition. Even more, there are no standard designations between different research papers or within one research paper itself. "Aberrant driving behavior", "intentional driving violation", "interpersonal aggressive violation" are alternatively and even confoundedly mentioned to designate driving behaviours as linked to accidents. Our observation is consistent with Dula & Geller (2003) systematic content analysis. Following the objective to clarify imprecise lines definitions of what are dangerous driving behaviours, the authors suggest that dangerous driving behaviors embrace those that put in danger or potentially in danger the others. They identify in the literature three main categories of dangerous driving behaviors: (a) intentional acts of bodily and/or psychological aggression toward other drivers, passengers, and/or pedestrians (acts may be physical, gestural, and/or verbal in nature); (b) negative emotions felt while driving (including frustration, anger and rage, but which might also include sadness, frustration, dejection, jealousy, etc.); and (c) risk-taking behaviors defined as dangerous behaviours performed without intent to harm self or others. This third class includes such behaviours as speeding, general tailgating, running red lights, weaving through traffic, manoeuvring without signalling, and frequent lane changing. Following our goal to measure risky driving behaviors of both electric-two wheelers and motorized-two wheelers in the Chinese road context, we suggest to be based on Dula and Geller third level definition of dangerous behaviors. *One driving behavior is risky if it (potentially) puts in danger oneself or endangers others in the traffic system, out of self/hetero aggressiveness and out of negative emotions felt while driving.* We think that adopting this definition will allow to go beyond the violations/aggressive intention and errors' usual reading approaches of aberrant driving behaviours related to accidents, moreover when it is debatable that these last ones can be seized through self-reported method. The interest is to explore further explanatory factors of these dangerous driving behaviours including aggression intention as it can be measured separately, as other explanatory factors. Already some individual, personality trait factors have been explored as the well-known sensation seeking trait, but social psychological and cultural factors still need to be investigated. We demonstrated there is currently no satisfying available measure that gathers the features of 1/ measuring risky driving behaviors of two-wheelers without neglecting the specificities of the vehicle driven (type and categories of two-wheelers for example), 2/ being "locally" adapted to the Mainland China traffic road context and 3/ therefore in Chinese language (meaning Mandarin). A continuation then should be the development of this still missing self-reported questionnaire according to the definition of

risky driving behaviors we introduced. Plus, according to the peculiarities of the Chinese road context (as roads shared between drivers with and without driving license and, recent modal shift from one type -often non-motorized- of vehicles to another motorized ones for drivers of various ages), we think such a tool should avoid any driving regulations references in the design of risk-taking behaviours items.

Conclusion

Generally speaking aspects related to human factors in road safety issues are still lacking in China. The approach we suggest is valuable as it allows going beyond a technical and mechanical vision on the general question of urban mobility. More specifically, one aim is to contribute improving knowledge about specific risk and vulnerability factors of E2W riders and M2W riders respectively in interactions with car users. Our critical review introduced in this paper provides a first step. We defend the need to take into account the specificities of the local context and the evolution of transport mobility in the investigation of driving behaviors. Finally, the development of an ad hoc tool to measure risky driving behaviors dedicated to the two-wheelers in China shall be later quickly adapted with few modifications to others developing countries road context in Asia and then in South America. Eventually, new knowledge that would be developed under this approach should benefit to European countries. As the environmental protection motives are increasing, so are the use of M2W and E2W.

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Factor Analysis of Tourism Effects on People in Hua Hin Municipality, Prajuabkirikhan Province

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Abstract:

The purpose of this research was to analyze the effects of tourism on people in Hua Hin municipality area, Prajuabkirikhan province. The sample group was 400 people living in their hometown located in Hua Hin municipality area, Prajuabkirikhan province. The sample group was selected by convenience sampling. The instrument used was questionnaire and the statistics used were frequency, percentage, average, standard deviation and factor analysis. The research results revealed factor analysis of tourism effects on people could be divided into 5 aspects including economic, social, cultural, environmental, and physical aspects. The overall variance could be described at 73.368%. The qualitative finding during collecting the questionnaires was that there were some communities opening pubs and bars for almost all of the lanes and people who were living in those areas labelled "Do not disturb". This can be believed that those people got effects directly from tourism.

1. Introduction

The tourism business is considered very important through the economic section of Thailand. The proportion of Gross Domestic Product (GDP) is around 6% and numerous incomes from tourism flows into the country in terms of foreign currency. Moreover, this originates the income distribution within the country. However, economic crisis in 2007 affected all over the world as well as domestic problems no matter from politic uncertainty, conflict and violence in the country, the strong baht, these made the numbers of foreign tourists travelling to Thailand, even the Thai tourists, are decreasing consistently. Therefore, the government issued the measure to motivate tourism in several forms to help the entrepreneurs and promote both foreign and Thai tourists for travelling in Thailand (The National Statistical Office of Thailand, 2011).

Nonetheless, tourism plan must not be interested in only the development but must make understanding clearly that how society and people in the community perceive or get effects from tourism because tourism can bring both advantages and disadvantages to the people in the community (Pearce, Moscardo, and Ross, 1996), for example, tourism originated the employment which will bring income to the people in the community to have a good life. In addition, the tourism can bring the tax, constructions and facilities to the locality. On the other hand, tourism can bring negative effects as well such as the congestion, noise pollution, murder, pollution and environmental damages in several ways (Akis, Peristianis, and Warner, 1996).

Jafari (1986) said that during the year 1960, the study of effects of tourism emphasized only the positive effects but in the year of 1970, the study focused on negative effects. Until 1980, the study of effects have been emphasized both positive and negative way. Since then, there have been a lot of theories mentioned about the tourism effects. One of those theories were Social Exchange Theory appeared in several researches, such as Juroswki, Uysal, and Williams (1997), the theory claimed that tourism could acquire benefits but also brought the costs to the people in community. Moreover, the research found that tourism caused economic benefits but negative effects in terms of social, cultural and environmental effects.

Hua Hin municipality is located in the east of Hua Hin district, Prachuabkirikhan province attached with Thai gulf. The area is in rectangle shape. The west is full of mountains and the areas leaning down to the sea at Thai Gulf. The areas are around 86.36 square kilometers or 53,975 Rai. The route is Phetkasem road (highway number 4) crossing from the north to the south around 22 kilometers long far away from Bangkok around 230 kilometers. The areas are crowded community and commerce around 3% and there are also communities scattered not crowded far away, this is the agricultural area, empty space and military areas. For the city expansion, it is expanded long through the Phetkasem road. There are a lot of tourism places such as hotel, restaurant and the establishment related to tourism numerously. Therefore each year almost 2 million tourists visiting and this makes the amount of money spread out in the community more than 6 billion baht per year. Hua Hin municipality is a palace location, Klai Kang Wol palace where H.M. King Bhumibol Adulyadej and Her Majesty Queen Sirikit stayed for not a long time in the past. Hua Hin municipality is the pollution control area according to the announcement of the National Environment Board [NEB], 13th volume (B.E. 2539) and the area which environmental protection measure was used the measure of environment protection according to the announcement of Ministry of Natural Resources and Environment, B.E. 2547. The county of Hua Hin municipality covers 2 sub-districts, which are Hua-Hin sub-district and Hnong Kae sub-district (Hua Hin municipality, 2011).

The components of tourism effects through people in this area are not indicated clearly. Thus, the researcher has to use the technique of factor analysis which is the technique of multivariate statistics

analysis. The purpose of this technique is to explain the co-variance relationship among several variables with a few components (Wanichbancha, 2007)

With the reasons mentioned above, the research of “Factor Analysis of Tourism Effects on People in Hua Hin Municipality, Prachuabkirikhan Province” happens. This focuses on the tourism effects on people living in their hometown located in Hua Hin municipality area, Prachuabkirikhan province.

2. Research Methodology

The methods of the research were as follows:

2.1 The scope of this study was a quantitative research carried out by surveying the people living in their hometown located in Hua Hin municipality area, Prachuabkirikhan province. The content of survey was about analyzing the effect factors of tourism on the people in Hua Hin municipality, Prachuabkirikhan province.

2.2 The population used in this research was the people who the people living in their hometown (born or had the census in this area) located in Hua Hin municipality area, Prachuabkirikhan province. The population used had to have the election right which was equal to 35,255 persons (Hua Hin Municipality, 2011)

2.3 The sample group was calculated by using the Yamane Formula and got the sample size around 400 persons then using the convenience sampling between October-November, 2011.

2.4 The instrument used in this research was questionnaire which could be divided into 3 parts including 1) general data of the respondents, 2) behavioral data related to tourism and 3) opinion factors about effects of tourism on the community.

2.5 Process of the Research

2.5.1 Reviewed the literature to study the framework, theory and research contributions from related books, journals and articles to determine the issue.

2.5.2 Drafted the questionnaire in accordance with the research purposes by considering the validity of content and language.

2.5.3 Got 2 experts of behavioral science and marketing field to consider the validity of questionnaire by selecting only the question items which had the Index of Item Objective Congruence : IOC more than 0.50.

2.5.4 Got the revised questionnaire by the experts to test with the people living in their hometown located in Cha-Am Municipality, Petchaburi province for 30 persons. It was found that the Cronbach alpha coefficient of the questionnaire was equal to 0.884 which had the value nearly 1. It was indicated that the questionnaire had high reliability (Pisalboot, Yaisawang and Assawadechanukorn, 2006).

2.5.5 Got the questionnaire which had validity and reliability collected the field data through the people living in their hometown located in Hua Hin municipality, Prachuabkirikhan province for 400 sets. The data was collected between October-November, 2011.

2.6 Data analysis; the researcher examined the validity of the data and got the data analyzed by statistic program in terms of general data of the respondents and behaviors about tourism. Descriptive Statistics were used which included frequency and percentage.

For the factor analysis of opinions about effects of tourism on the community of people living in Hua Hin municipality, Prachuabkirikhan province, it is used by factor analysis by Principal Component Analysis by Varimax’s method. The criteria used for considering the factors was Eigen values which had to be more than 1 and the Factor Loading value had to have the Absolute value more than 0.5 (Wanichbancha, 2007).

In addition, the calculation of mean, standard deviation and average interpretation on items in each aspect of the questionnaire were used by holding the criteria of meaning interpretation as the details as follows:

The average score of 4.51 – 5.00

means

the most level

The average score of 3.51 – 4.50	means	much level
The average score of 2.51 – 3.50	means	moderate level
The average score of 1.51 – 2.50	means	little level
The average score of 1.00 – 1.50	means	the least level

3. The Results

After the researcher had collected, examined and analyzed the data, the research results were as follows:

3.1 Most of the sample group was female 274 persons (68.50%), 197 persons (49.25%) had the age between 20 – 30 years old, 231 persons (57.75%) had single status, 287 persons (71.75%) got bachelor degree, 103 persons (25.75%) worked in the private sections, 176 persons (44.00%) had income between 10,000 – 20,000 baht, 212 persons (53.00%) had the family members between 4-5 persons.

3.2 The research results of behaviors in tourism of the respondents could be concluded that 173 respondents (43.25%) felt the most regret if they had to move out of Hua Hin municipality area. 245 respondents (61.25%) had the members in the family worked for tourism business. 103 respondents (25.75%) talked to the tourists for 5 times within 12 months. 385 respondents (96.25%) never participated in the tourism development plan in Hua Hin municipality. The average of opinion that how quickly the Hua Hin municipality developed was equal to 4.27 (1 was the most slowly developed and 5 was the most quickly developed). The average of assessment on tourism development in Hua Hin municipality was equal to 3.35 (1 was the worst developed and 5 was the best developed)

3.3 The analysis results of the effects of tourism on people's opinions in Hua Hin municipality area, Prajuabkirikhan province could be concluded that for the data appropriateness examined, it was found that the KMO value (Kaiser-Meyer-Olkin) was equal to 0.786, this was nearly 1 and the Bartlett's Test of Sphericity value was equal to 5837.524 (Sig = 0.000). This indicated that the appropriate data used for analyzing the factors by using the method of primary components analysis could be divided into 5 factors. This could describe the total variance at 73.368% (as shown in Table 1) as follows:

3.3.1 Component 1, the Eigenvalues value was = 6.557. It could explain the variance at 21.458 including 1) tourism brought incomes to the small-SME in the municipality area, 2) tourism helped creating work to the locality, 3) the living conditions of people in the locality better because of the tourism, 4) tourism is the main income for the development of Hua Hin municipality, 5) tourism helped attract the investment within the locality, and 6) tourism originated additional careers of people in the locality. This component was called "economic component".

3.3.2 Component 2, the Eigenvalues value was = 5.076. It could explain the variance at 17.224% including 1) tourism destroyed the traditional traditions of the locality, 2) some parts of residents got effects from tourism development, 3) tourism made the cost of living of people in the locality increase, 4) tourism damaged the public more, and 5) tourism brought murders. This component was called "social component".

3.3.3 Component 3. The Eigenvalues value was = 3.901. It could explain the variance at 14.454 including 1) tourism made traditionally cultural reservation of the locality, 2) tourism originated harmony cross-cultural communication, 3) tourism caused public relations of local culture to external parts, and 4) tourism caused income from local culture. This component was called "cultural component".

3.3.4 Component 4. The Eigenvalues value was = 2.878. It could explain the variance at 12.704% including 1) tourism caused pollution, 2) tourism caused crowded of people and traffic, and 3) the tourism entrepreneurs intruded the reserved places. This component was called "environmental component".

3.3.5 Component 5, the Eigenvalues value was = 1.916. It could explain the variance at 7.528% including 1) tourism caused reservation or development of historical places or important

places, and 2) tourism caused the development of utility system and facilities. This component was called “physical component”.

Table 3: The factor analysis results of the effects of tourism on people’s opinions in Hua Hin municipality area, Prachuabkirikhan province

Component	Factor Loading	Mean	S.D.	Interpretation
Component 1: Economic				
1) Tourism brought incomes to the small-SME in the municipality area	0.875	4.27	0.74	Much level
2) Tourism helped creating work to the locality	0.807	4.18	0.76	Much level
3) The living conditions of people in the locality better because of the tourism	0.712	3.97	0.94	Much level
4) Tourism is the main income for the development of Hua Hin municipality	0.661	4.02	0.69	Much level
5) Tourism helped attract the investment within the locality	0.624	3.88	0.81	Much level
6) Tourism originated additional careers of people in the locality	0.589	3.87	0.83	Much level
Component 2: Social				
1) Tourism destroyed the traditional traditions of the locality	0.814	3.45	0.67	Moderate level
2) Some parts of residents got effects from tourism development	0.797	3.62	0.71	Much level
3) Tourism made the cost of living of people in the locality increase	0.734	3.71	0.75	Much level
4) Tourism damaged the public more	0.691	3.34	0.62	Moderate level
5) Tourism brought murders	0.507	3.29	0.88	Moderate level
Component 3: Cultural				
1) Tourism made traditionally cultural reservation of the locality	0.778	3.54	0.74	Much level
2) Tourism originated harmony cross-cultural communication	0.754	3.48	0.70	Moderate level
3) Tourism caused public relations of local culture to external parts	0.721	3.57	0.87	Much level
4) Tourism caused income from local culture.	0.684	3.40	0.57	Moderate level
Component 4: Environmental				
1) Tourism caused pollution	0.784	3.78	0.64	Much level
2) Tourism caused crowded of people and traffic	0.771	4.01	0.70	Much level
3) The tourism entrepreneurs intruded the reserved places	0.696	3.52	0.59	Much level
Component 5: Physical				
1) Tourism caused reservation or development of historical places or important places	0.694	3.78	0.59	Much level
2) Tourism caused the development of utility system and facilities	0.647	3.70	0.62	Much level

4. Summary and Concluding Remarks

According to this study, the research methodology was carried out by quantitative research using the 400 questionnaires. The above conclusions can be applied to the discussions as follows:

1. For general data, it was found that most of the sample group was female age between 20 – 30 years old with single marital status. The educational degree was bachelor degree and the occupation was private section employees with monthly income between 10,000 – 20,000 baht. The members in the family were around 4-5 persons.

2. For the analysis results of tourism behaviors of the respondents, it can be concluded that most of the respondents felt regret the most if they had to move from their hometown of Hua Hin municipality. Most of the respondents had the family members working for tourism business. For 12 years so far, most of the respondents talked to the tourists for 5 times. Moreover, most of the respondents had never participated in the plan. For tourism development in the Hua Hin municipality area, the average of opinions viewed that the Hua Hin municipality developed quickly at 4.27% and the average of assessment on tourism development in the Hua Hin municipality was at 3.35%

3. For the analysis of factors of the tourism effects towards people in the Hua Hin municipality area, Prachuab Kiri Khan Province; it can be divided into 5 aspects including economic aspect, social

aspect, cultural aspect, environmental aspect, and physical aspect. The total variance could be described at 73.368%.

The recommendations from this research are as follows;

1. For the research results, it was found that the respondents rarely participated in local development. Therefore, Hua Hin municipality should build community participation from people section more, such as organizing the stage of folklores circulating in each community or organizing public hearings in the large project and important.

2. For the research results in terms of factor analysis in overall, it was found that most of the respondents focused on the economy the most. However, sustainable development should be managed mutually in every aspect no matter what the aspect is, physical, social, cultural, or even the environmental aspect.

3. For overall image of the research, it was found that people in Hua Hin municipality thought that tourism affected more positive way than negative way. Anyway, for Hua Hin municipality development, the related organization shouldn't ignore the minority in the society. And the most important, for the tourism development, no matter what its level is, the governmental organizations have to realize the perception, ideas and effects both positive and negative ways which will happened to the people in community as well.

4. During the time of data collection, the researcher noticed that most of the areas in Hua Hin municipality area had been developed very well. Most of the people weren't be affected directly by the tourism. However, there were some communities or some lanes opening pubs and bars for almost all of its areas. And the people who were living at those areas labeled "Do not disturb" there. This can be believed that those people got the effects directly from the tourism.

5. This research created the model of tourism effects happened to the people in the community. This can be applied to test another groups of people in another areas in order to generate this model to be universal model in the future. In addition, for Hua Hin municipality area according to the primary data analysis of the researcher teams, it was found that the elderly had more tendency than the younger to think that tourism had effects in a negative way. Hence, this is the interesting point that should be studied to find out the reasons towards the issue.

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*Senior Citizen Education - Active Aging Learning Resource Centers in Taiwan as
Example*

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Abstract:

With seniors age 65 and older accounting for 10.9% of the total population in 2012, the speed of population aging in Taiwan will surpass Western countries, and the new generation of senior citizens will become the society's primary demographic group. In the 21st century, learning is the key conduit for mankind's pursuit of advancement; hence, the government has established Active Aging Learning Resource Centers to advocate "aging in place", to uphold seniors' right to learn, to provide the knowledge and new skills for life, to incorporate toy workshops and intergenerational activities, to augment family affection, to build a volunteer service network and to foster the spirit of service, enabling senior citizens to re-experience the meaning of life so that successful aging is accomplished. Research pointed out that participants of Active Aging Learning Resource Centers showed a greater sense of happiness, a higher level of satisfaction with their lives, a better mental and physical status, and higher extent of self-realization and social participation and, through Active Aging Learning Resource Centers, also passed down their experiences and imparted their knowledge and skills, giving back to the society to facilitate the further enhancement and utilization of the elderly.

Senior Citizen Education - Active Aging Learning Resource Centers in Taiwan as Example

In recent years, the aging of the population of the wave sweeping the world, with the rising living standards, health care, technological advances, the population is aging problems faced by many countries, 10.63% of the total population of elderly people over 65 years of age in Taiwan in 2010, a new generation of senior citizens (Senior), will become the main population in the twenty-first century learning is an important pipeline of human pursuit of progress, live to old schoolold is not only a slogan, Taiwan to face the impact of an aging society and knowledge economy must forward planning, urgent policy and related policies of the past, the elderly more emphasis on social welfare and health care, however, aging overtakes physiologicalthe phenomenon of the recession, and continuing the process of creation or construction, learning to contribute to Ageing to develop their potential and the pursuit of life self-realization is an important way to promote active aging.

Many advanced countries, and promote lifelong income security for the elderly and the elderly lifelong learning as the dual goals of social policy related to the welfare of the elderly, and develop to meet their needs for senior citizens learning style and course characteristics from learning related to new knowledge and skills, and continued his career learning to adapt to the changing living environment, in order to reduce the reliance on family or social, to promote self-realization, therefore, our study development trends and challenges exist for Senior Citizens who won the dignity and worth, how should Ageing.

Taiwan in 2006, published by the Ministry of Education towards the oldest old policy White Paper, the implementation of the interests of the elderly to learn, to allow the public to understand aging, aging with a positive attitude to face value, set the senior learning the purpose of the Resource Centre, in advocating "aging in place, providing the public with opportunities for lifelong learning, drive learning in the community to show the vitality of the community learning, the implementation of localization to construct a learning community geriatric education can give full play to the potential of community elderly, follow the trends in international educational innovation, set up the resources of seniorcenter, combined with the toy workshop, to increase elderly participation in community work will also promote inter-generational inter-emotion, retired senior citizens who can by active participation in the course of action, to pass along their own expertise and contribute to the feedback to the community to set the senior resource center to the attitude to face the post-retirement personal hygiene, in

addition to the spirit of lifelong learning, knowledge of the life of the elderly and new skills, to train senior citizens who have the attitude of the volunteer service and literacy, re-inspire the elderly experience the meaning of life. In this study, a literature analysis, the use of related files for data and to share the experience and achievements of Taiwan set up the senior center, studies have shown that participation in senior center activities better sense of happiness, social participation and high life satisfaction interpersonal the relationship between physical and mental health and self-realization are better, the satisfaction of the students of the senior resource center for curricular activities, curriculum design for the new generation needs of the elderly participants, timely adjustment programs, specifically to enhance the depth and breadth of the curriculum, so that senior citizens education is not only limited to a casual friendship, to better take into account the enhancement of knowledge and intellectual, taking into account the needs and creative fusion of tradition and diversity to help students learn the fun, to grow intellectually, intergenerational learning objects as well as the salt of the earth elements of the young learn from each other elderly professional heritage and contribution to learning, to promote senior citizens education on senior lifelong learning system, senior citizens, people can contribute to "successful aging", the promotion of the elderly human and then upgrade and re-use.

Taiwan has gradually entered the aging society, old age education is the education of the countries for the implementation of the Lifelong Learning rights and enhance the value of life and the dignity of life for the elderly, announced by the Ministry of Education, 2006 "Towards an aging society and elderly education policy White Paper" to lifelong learning, health and happiness, autonomy and dignity and social participation for the four policy vision, and actively planning to promote educational activities for the elderly since 1997 in cities and counties, cities, towns and villages set Ageing study resource Center "in order to integrate the educational resources and the establishment of community learning base, and encourage the elderly out of the home to the community to learn, in order to establish a dynamic aging, lifelong learning healthy communities and senior citizens social, and thus to achieve the United Nations for the elderly Programme by exposing the independence to participate in care of self-realization with the dignity of the five major goals. Ageing word source cited in Singapore for the honorific title of the elderly (Senior family), to encourage elderly people to "Happy learning and forgetting age" based on "Ageing" name as a learning resource center logo, "Leage" read also "Learning homonym, the Acrobatics branches created by the Ministry of Education, the national senior learning resource center logo, its vibrant leaves, said the growth of education

for the elderly, health promotion and diversity learning, heart-shaped refers to care for the elderly, living incarnation of the soul and forever preserve green happy heart, English e denotes a life-long learning, experience, heritage, sustainable development, the grandparents happy smile refers to the happiness of senior citizens to learn music and forget the age.

World Health Organization (WHO) in 2002 put forward the concept of active aging, and the definition of active aging three basic principles: a health promotion to enhance the quality of life of people in old age period to achieve the most appropriate health community involvement and safe procedure; social participation, 3. security, maintenance, and the importance of community involvement is to maintain social relationships, to maintain physical and mental health, and promote the consolidation of society, from generation to generation fusion of positive energy, "senior learning resource center" is compiled learning resources, education and learning, and promote intergenerational a harmonious relationship, to encourage senior citizens to participate in volunteer service, four Senior members have had the place to learn and services, will not feel any pressure, but will be learning service is very easy very happy thing.

Fisher & Wolf (2000) pointed out that education and learning ways to not only be able to handle the possible problems arising from an aging society, and also beyond the social problems, the power of play to guide society; learning to help the elderly to face a positive attitude and proper response to lifetasks and issues, such as changes in physiological function and possible recession, self-integration, the pursuit of self-worth and meaning of life, acceptance of death and beyond, community involvement, the successful arrangement of life and so on, and secondly, learning can enhance elderly crystalline intelligence (crystallized intelligence) and the wisdom to carry out the intelligence of crystal response experience and learning from the mental abilities, including general knowledge, language and vocabulary to understand the mathematical ability and the ability to cope with the social conditions, this part of the capacity required continued accumulation can rely on learning experience continued growth, help the elderly integrated life experience and knowledge sharing to conduct their own wisdom, moving towards the goal of successful aging, third, social links and to participate, learn to provide the elderly community support the opportunity to meet the demand, the necessary knowledge and with the times continued to participate.

Nine 17 years, China's retirement age and the elderly participants and learning preferences of the research report pointed out that the learning needs of senior citizens is more important to health care "and" family relationships "and" Recreation ",

retirement planning and adaptation"and" self-realization and life significance "is than the second, participants felt learning disabilities and problems by up to moderate intensity and above by the majority, a higher" message obstacles "and" heart management of obstacles ", this study found that senior citizensthan hope the teachers to teach mainly the teaching methods followed for the actual operation, travel to learn with students to discuss whether the teaching mode, the elderly preference of learning locations for community activity center and elderly activities center; two common features for place of study in the livingnear elderly preferences for place of study, the primary consideration in learning activities when planning for senior citizens, should pay attention to the needs of this nearly convenience of the nearly convenience. 99 years in the national life in the older sense of happiness research, participation in learning to make the elderly living become happier as volunteers will make elderly life more pleasant, elderly favorite activities for leisure travel and participation in learning activities.

Yonghe Taipei District Elderly, new Learning Center uphold the "joyful learning · forget the spirit of the age", learning to feel at home, happy, happy "vision for education, to create a comfortable environment, to serve the elderly, the elderly experience the warmth of home,make senior enthusiasts, fun learning environment; Centre for life, fitness, practical course designed for senior citizens who own life at the same time, the use of science, their talents, such as composition Chitose String Orchestra Dance Companyand learning outcomes to show the willingness of retirement before the public, in order to enrich the elderly, and actively promote intergenerational education, activation history to contribute to the school, and organize regular activities and unite the centripetal force of the elderly, but also can stimulate enthusiasm for learning, the activation of the elderly to participate in services, and thus to encourage senior students into the class as a volunteer to organize the joint concert of the school, performances, puppet shows Troupe, grandparents and grandchildren, Family Fun and other activities to his own experience and life story, to play the strength of the intergenerational education, driven by classlearning ability of students grandparents Yonghe District elderly Centre volunteers organized, often combined communities to organize activities related to the elderly elderly, classy unit of the Ministry of Education evaluation study by Yonghe District senior Center view the current senior Educationthe current status and to reflect on the issues, to encourage States to create new courses for the elderly to meet the diverse needs, and promote a positive contribution to the knowledge and experience of senior citizens talent, wealth of lecturers and students seniors life.

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