Occupational Commitment

Under Conditions of Social Change:

The Case of Professional Marine Engineering in Taiwan

by

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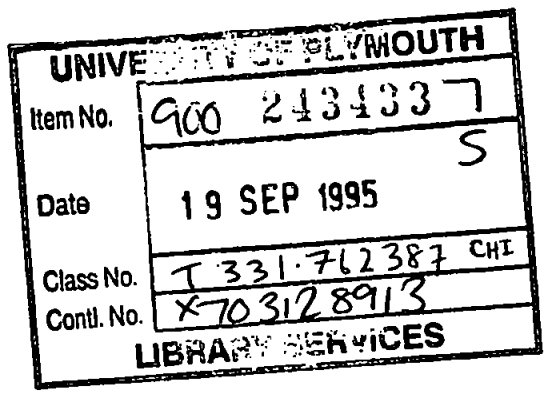

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Abstract

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The thesis is concerned with investigating the area of occupational commitment to marine engineering of students from various levels of higher education in maritime institutions. From a general description of socio-economic change and its relationship to the seafaring profession, the study focuses on the case of Taiwan. A review of literature on commitment demonstrates that commitment may vary as the social-economy changes over time. As technology changes, ships' officers, more specifically marine engineers, are required by shipowners to be educated to degree level. The emphasis in this study is upon the commitment to the shipping industry of young engineering students at university.

The theoretical model established takes individual intentions, willingness to study, and occupational commitment, as the dependent variables while students' demographic backgrounds, personal needs and values are taken as the independent variables. The theoretical model is tested with the aid of data from questionnaires administered to a sample of engineering students from various levels of academic institutions. The SPSS statistical package, including factor analysis and chi-squares, is employed on the data analysis.

One result is that traditional Chinese cultural values, including "studying is superior to all other professions", and the current entrance examination system for Taiwanese universities, predominate in students "willingness to study", which in turn, affects the occupational commitment of engineering students.

Another result shows that the "willingness to study" of students in seafaring-oriented departments is not related to their "occupational commitment". Marine Engineering at sea is not perceived as being able to satisfy the higher level needs of graduates. To overcome this disparity, the job characteristics of ships' engineer officers need redesigning to create a more challenging work context for graduate marine engineers. If, for whatever the reason, the job of the seagoing marine engineer cannot be redesigned to satisfy graduate engineers then the only alternative is to recruit non-graduate seagoing engineers from five year junior colleges.

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Engineering subjects in university have been in favour with school leavers in Taiwan in recent decades, however, marine engineering has developed from a rather competitive occupation to the category of "work unattractive to the Taiwanese". To understand this change was the motive for this study.

I would like to thank the authorities of the National Taiwan Ocean University for their assistance, enabling me to overcome the hardships of finance and interruption of teaching in the university.

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Author's Declaration

At no time during the registration for the degree of Doctor of Philosophy has the author been registered for any other University award.

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External Contacts:

The Ministry of Transport and Communications (ROC), Maritime Institutions and Shipping Companies.

Signed Y. H. Chuang

Date 16th Aug 95

Fig 1.1 A Map of the Far East

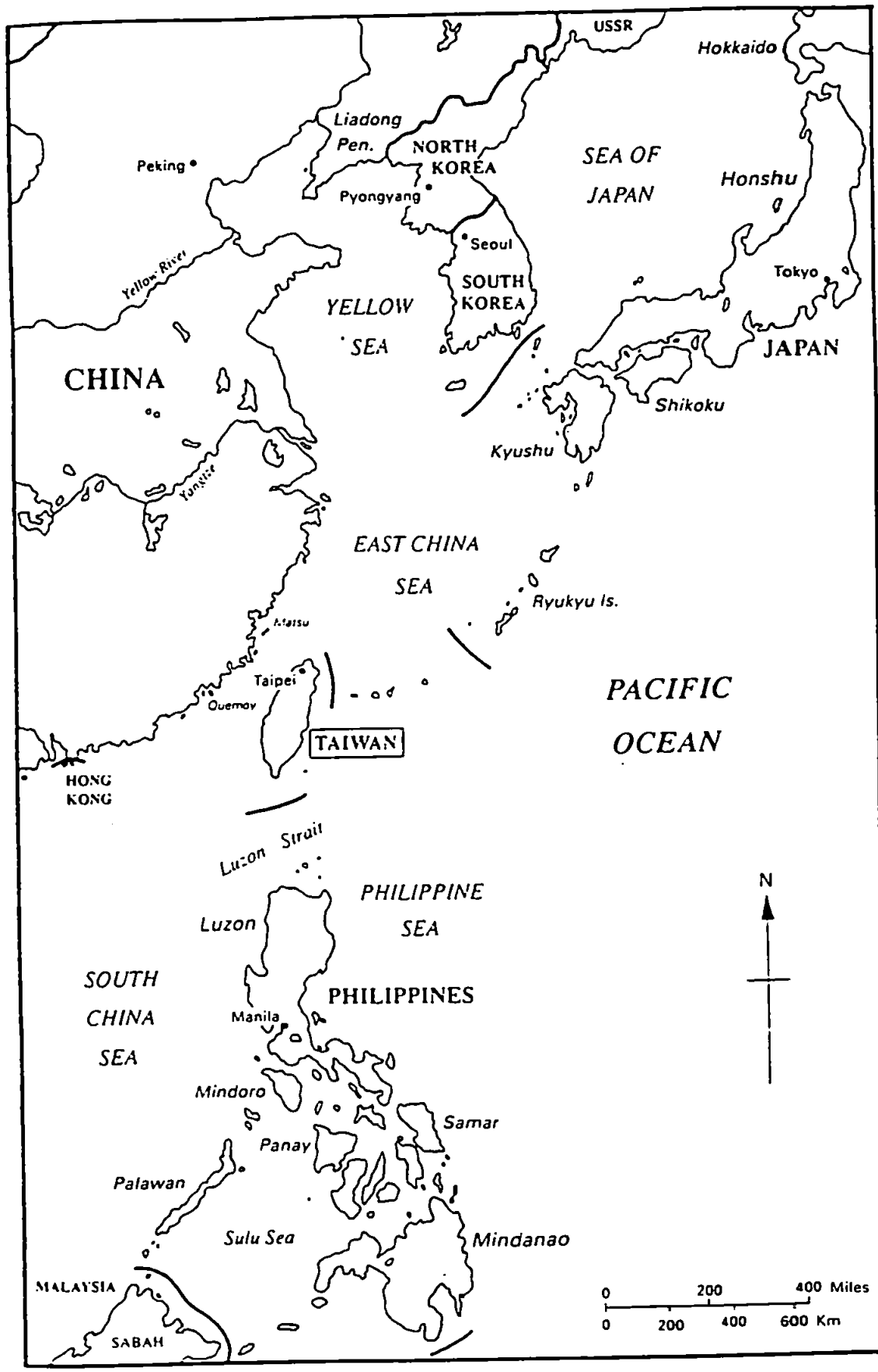
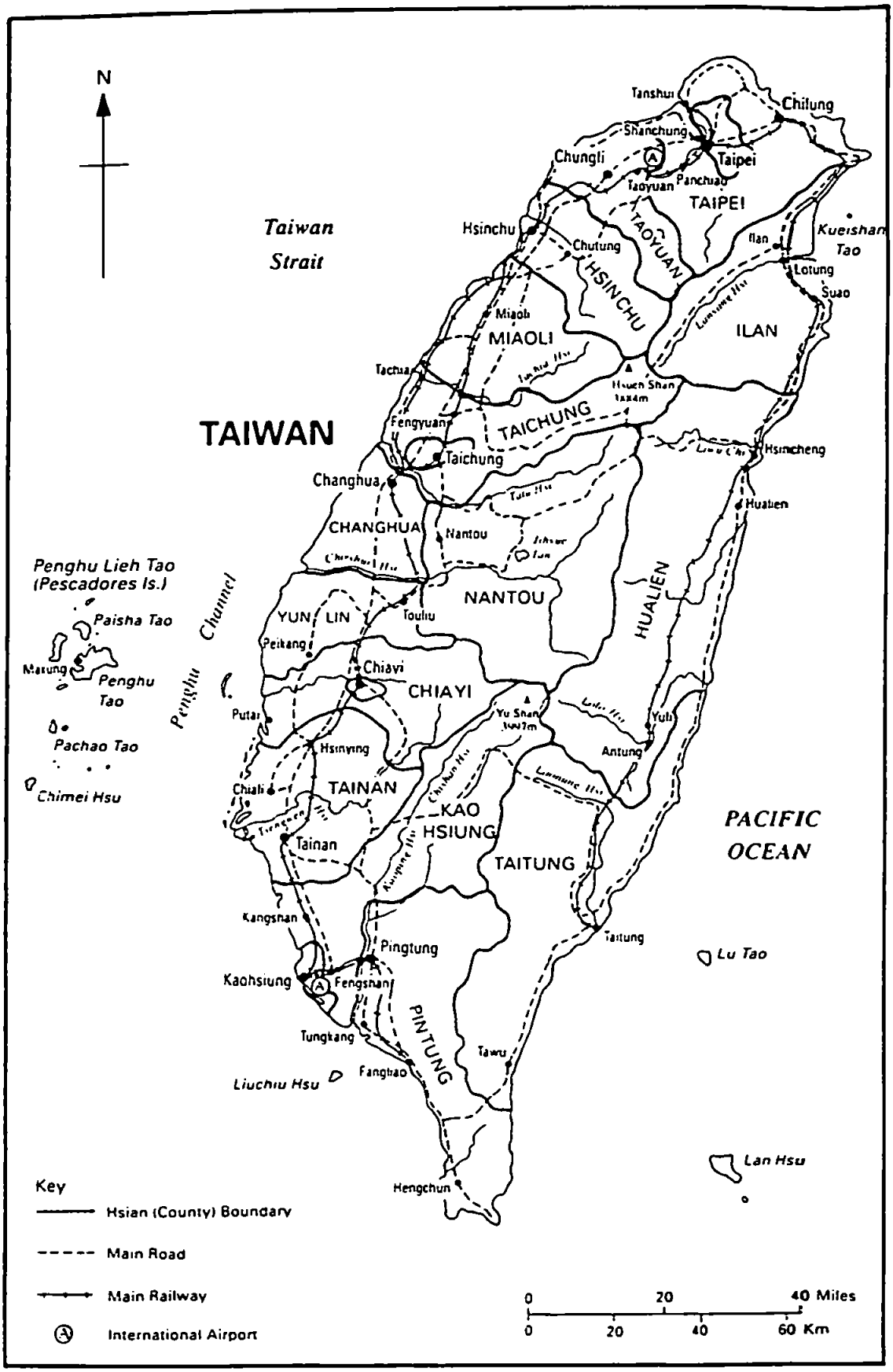


Fig 1.2 A Map of Taiwan



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Chapter 1 Introduction

1.1. A statement of the problem and its background

As a result of the economic development of Taiwan, the demand for shipping increased tremendously. However, human resources for shipping have yet to be well managed. The seafaring profession used to be a rather competitive occupation before 1970s, but it does not attract young people to join ships any longer today. Taiwanese shipping companies are facing a critical shortage of ships' officers. In view of the rapid technological change, the requirement of marine engineers' qualifications to be raised to university level is recognizable universally (Manual, 1990). This research delves into the occupational commitment of engineering students from seafaring oriented departments at colleges and universities under conditions of socio-economic change.

1.1.1. The political context

The territories of the Republic of China cover almost half of the continent of Asia; its neighbours are the former Union of Soviet Socialist Republics to the North, and Vietnam, India and Pakistan to the South, Afghanistan and Iran to the West and the Korean Peninsula to the East. For the time being, however, the Government (the National Government) only effectively governs in Taiwan, and the Penghu, Kimen, Matsu, Tongsha, and Nansha archipelagos, since 1949 when the Communists took over mainland China.

Taiwan is the largest island on the south east coast line of the China mainland. Until the Ming dynasty, Taiwan, actually, was controlled by Chinese pirates and Dutch colonisers, then Mr. Chenng Cheng-Kung[1] ousted the colonial government of Holland in the southern part of island in 1661.

Later, at the end of the seventeenth century, the Ching dynasty government successfully conquered the last outpost of the Ming dynasty. Meanwhile, Ching extended his control on the island both in the political and military spheres. Afterwards, Taiwan belonged to Province of Fuken and it became one province of China in 1885. In 1895, China ceded Taiwan to Japan due to the loss of the Sino-Japanese War in 1894. From that date until 1945 Taiwan was under Japanese colonization for fifty years until Japan unconditionally surrendered at the ended of World War II.

Taiwan is located in the Western Pacific basin, as Fig 1.1 and Fig 1.2 show, an isolated tropical island in the shape of tobacco leaf of about 402 kilometers long and 128 kilometers wide at the broadest point, having limited domestic raw materials for industrial development. The island is heavily dependent on imports from other countries for raw materials such as crude oil, iron and high quality coal. It is about 160 kilometers off the South-east coast of mainland China separated by Taiwan Strait; to the north lies Japan separated by 1120 kilometers of Pacific Ocean; to the south the Philippines islands are 320 kilometeers away. The size of Taiwan, with 85 other minor islands included, is approximately 36,000 square kilometers, which is about the same size of the Netherlands. Nevertheless, three-quarters of the land area is covered by mountains and the highest peak reaches 3952 meters. Only a quarter of its land area is arable, mostly in the west, but with a very narrow strip in the east. Due to the difference of geological characteristics between the east and the west, most of the population is concentrated in the western cities. The density

[1] Chenng Cheng-Kung was one of Ming dynasty officers. His father Chenng Zi-Lung primarily was a pirate occupying Hainan Island, which is situated in the southern coast line of China. He accepted the Ming dynasty's offer to become a military commander and trying to overthrow Ching to re-establish Ming's reign. He was unsuccessful and surrendered, finally being killed by Ching due to his son holding Taiwan supporting to Ming.

of population per square kilometer in Taiwan is in excess of 280 persons, with more than 21 million people living on the island. Nearly 25% of the total population is enrolled in school. The Government of Taiwan has since 1968 provided 9 years of compulsory and free education for its people. This aim is to develop a higher quality of human resource, as part of a strategy of expansion of the economy and development of trade (Nagastsuka, 1987).

1.1.2. The socio-economic context

The economic development of Taiwain can be divided into three stages. In the first, in the 1950s, rapid agricultural expansion provided the basis for the development of highly protected import-substituting industries. In the second, in the 1960s, Taiwan experienced rapid industrialization stimulated by the growth in manufactured exports. The third phase, beginning in the 1970s, saw a second wave of import-substituting industrialization, as Taiwan responded to the erosion of its competitive advantages as a low-cost producer by promoting higher value-added industries.

The successful economic development of Taiwan resulted from the following factors (Li, 1993): stability in the cmmodity prices, high savings and investments, full employment, relatively equitable distribution of income, population change, education and the job market:

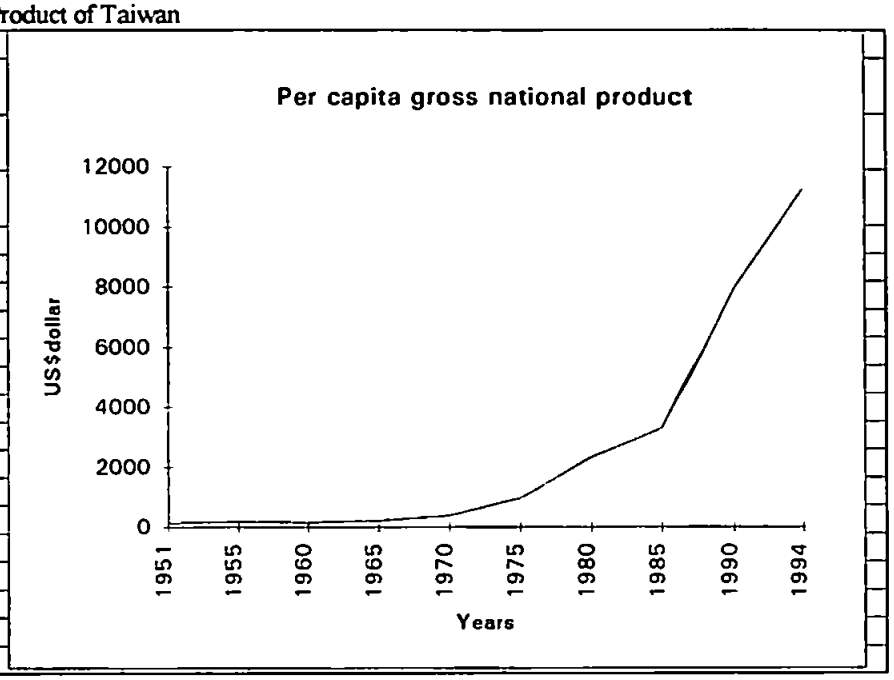
Stability in the commodity prices

During the period of 1960 - 1990, Taiwan's economy has been growing at a rate of 9% annually. Meanwhile the commodity prices for consumers have been rising at an average rate of about 6.3%, which is slightly higher than that of industrial powers but much lower than that of developing countries. In fact, Taiwan was one of the few countries in the world developing its economy at a fast pace while maintaining a relatively stable pricing system. With the growth in the

economy, domestic incomes have increased rapidly as well. In 1960 per capita GNP in Taiwan was US$154, while by 1994, it had reached US$11,296. The growth may be seen from Fig 1.3 below.

Fig 1.3 Gross National Product of Taiwan

1951	145
1955	203
1960	154
1965	217
1970	389
1975	964
1980	2344
1985	3297
1990	7954
1994	11296



Source: Executive Yuan. *Statistical Yearbook ROC*. 1990 and *Quarterly National Economic Trends*. Aug 1994.

As a result Taiwan is ranked among the world's high-income regions. It is also the world's 14th biggest trading nation and a member of East Asia NIC's, that is, newly industrializing countries, which achieve high rates of economic growth and significant increase in per capital income largely through the expansion of export-based industrialization (Knox, *et al*, 1994).

High savings and high investments

In 1960, national savings in Taiwan accounted for only 9.5% of GNP, with investments accounting for 16.5%. Material insufficiency was made up by American aid at that time. After the implementation of the new economic policy with positive measures to encourage saving and investment, domestic savings and investments in Taiwan have increased rapidly. By the 1970s, the average saving rate was already as high as 31.9% and the investment rate had risen to 30.5%, thus

ranking Taiwan among the few countries in the world that boasted a high saving rate while at the same time a high investment rate. As a result, Taiwan no longer had to rely on foreign loans to compensate for a lack in domestic investment. Over the recent years, the saving rate has continued to surpass the investment rate. Such a case, however, has led to problems of imbalance in the economy.

Full employment

The rapid expansion of industry in Taiwan has created enormous opportunities for employment. By absorbing the under employed and unemployed labour forces from the agricultural sector, Taiwan has succeeded in reducing the unemployment rate to the lowest possible. Since 1967, the unemployment rate in Taiwan has been kept under 2%. Indeed, Taiwan has reached the effective level of full employment. In recent years, the unemployment rate in Taiwan has been as low as 1.5%. In fact, Taiwan is facing a shortage of labour, as extensive Government investment in public facilities is demanding more and more labour (Li, 1993).

Relatively equitable distribution of income

There is a serious problem emerging as result of the economic development in developing countries, that is the widening gap between rich and poor. Fortunately, this has not happened in Taiwan. On the contrary, there has been a tendency to narrow the gap between them. In 1970, 20% of the families with the highest income were sampled for comparison with 20% of the families with the lowest income. The comparison revealed that the former were less than five times richer than the latter. Over the years, there has been a tendency towards a more equal distribution of income in Taiwan. In 1980, the ratio was less than 4.17, although the declining tendency was checked and rose back gradually to reach 5.18 in 1990. Considering the fact that only Japan and a very small number of

other countries have maintained a ratio of lower than 5, the distribution of income in Taiwan is relatively comparable. The country is now aiming to achieve an even more equitable distribution.

However, these economic achievements have brought their own challenges. Increasing prosperity has led to rising expectations. Today, the island's populace demands a higher quality of life and more public services than in the past. There is also a great concern about such issues as consumer protection and the prevention of serious environmental pollution from industrialization. To resolve these potential economic problems and satisfy the desire of the people for better lives, the Government has committed itself to a series of changes that should promote the Republic of China into a fully developed nation by the year 2000. These changes, a number of which have already been set up, such as infrastructure improvement, the tightening of environmental regulations the formulation of new trade and industrial policies and the furthering of democratization. Especially, as infrastructure improvement demands a great deal of labour, this pushes the Government to lift the ban for recruiting work labour from outside. Today, alien workers are visible everywhere on the island.

Economic development, demographic change, and education are always mutually influenced. These will be briefly discussed as follows:

Population change

The birth and death rate have both decreased in the last four decades. In 1951, the birth and death rate were 49.98 and 11.58 per thousand respectively. However, by 1993, the two rates had already reduced to 15.59 and 5.30 per thousand. The rate of natural increase in the population had decreased from 38.39 per thousand in 1951 to 10.27 per thousand in 1993. Because the birth and death rates are decreasing, the percentage of persons aged 65 years and over increased among the population. The average life expectancy of males increased from 53.1

in 1951 to 72.02 in 1993. On the other hand, that for females increased from 57.3 to 77.42 in the same period as above.

The Government has enacted many policies encouraging farmers to manage their acquired land under land reform. Farmers not only aggressively engaged in agricultural production reform, but tried to change their social activities in other areas. There were many young farmers who joined manufacturing industry when the industrialization wind blew over the island in the late 1960s and the early 1970s. Most of these young people finally became municipal residents. In addition, the Government introduced labour-intensive industry providing a great number of employment opportunities in the period of 1960 - 1970, and the improvement of technology in farming resulted in a reduction of the labour force required in rural areas. Thus, many agricultural workers flooded into the cities leading to a change in family size.

The number of persons in a family in Taiwan was around 5 to 6 in 1920 - 1940. Compared with Mainland China, there was not much difference (Chu, 1986). After the National Government came to Taiwan, the population increased almost three times of 7,869,247 in 1951 to 20,995,416 in 1993. Following the increase in population, the number of households has also expanded. The rate of population increase is less than the rate of household expansion, and naturally, the number of persons in a family has decreased. The average number of persons in a family reduced from 5.48 in 1951 to 3.82 in 1993. In an agricultural society, everyone works without monetary reward for subsistence. However, in today's family, only parents work; the young children go to school. According to *Taiwan Statistics Yearbook* (1994), the average number of persons who work in a family has already increased from 1 to 1.9 persons. In other words, Taiwanese families are almost dual earners. That may imply that each parent, either father or mother only needs to be responsible for one dependent in a family.

Education

Education is both the antecedent and outcome of economic development. The development of education in Taiwan in the last four decades is outstanding. According to statistics (*Statistics Yearbook*, 1994), the number of schools for various levels of educational institutions was 1504 in 1950; by 1993, it was 6937, 4.6 times that of 1950. Each teacher, in 1950 had to be responsible for 36.35 students while in 1993 the ratio of teacher and students was 1:23.84. The ratio of population and the number of students in school was 139.64 per thousand people in 1950, and reached 253.24 per thousand people by 1993. For children aged 6 to 12, the rate of enrolment has increased from 79.98% in 1950 to 99.72% in 1993. In 1950, there were only 7 colleges and universities with a total of 6,665 students. In 1993, there were 125 colleges and universities, and 566 subjects for postgraduate study. The number of students had increased to 689,185. One thing worth mentioning here is female education. Of the students who graduated from higher education in 1951 1,188 were male, 164 female; while in 1993, there were 79,536 males, and 77,717 females. Female graduates are almost equal in numbers to male (*Statistics Yearbook*, 1994). The following is the summary of percentage among the population aged over six in Taiwan in higher education in the last two decades.

Table 1.1 The percentage of postgraduate, university, five-year college graduates, high school leavers and vocational school leavers among the population aged over six in Taiwan (1946 - 1993)

Years	Postgraduate %	University %	5-year college %	High school %	Vocational school %
1946	—	0.31	—	0.84	—
1951	—	1.09	—	2.29	—
1956	—	0.72	—	2.55	—
1961	—	0.68	—	3.07	—
1966	—	0.82	—	3.67	—
1971	0.02	1.15	—	2.60	2.69
1976	0.04	1.75	0.69	3.40	4.90
1981	0.07	2.54	1.15	4.03	7.78
1983	0.09	2.77	1.35	4.20	8.94
1984	0.11	2.89	1.43	4.29	9.97
1985	0.12	2.99	1.56	4.53	10.19
1986	0.14	3.05	1.68	4.73	10.72
1987	0.15	3.15	1.77	4.84	11.32
1988	0.17	3.23	1.84	4.89	11.86
1989	0.18	3.36	1.99	5.17	12.39
1990	0.19	3.43	2.13	5.45	13.11
1991	0.22	3.50	2.25	5.43	13.69
1992	0.24	3.79	2.59	5.60	14.27
1993	0.26	3.99	2.73	5.82	14.87

Source: author's based on *Statistics Yearbook, the Republic of China*, 1994, p.22.

The job market

The Government formulated and implemented a series of encouraging investment policies in the 1960s. Much foreign and Chinese overseas capital flooded into the Taiwan investment market when American aid ended in 1968. Through the reform policy some landlords became industrialists, acquiring stocks in public industries and selling their lands to tenant farmers either directly or indirectly. These landlords had an opportunity to compete in industry. In the earlier industrialization, the Government emphasized light industry, such as food processing, textiles, electronics, furniture and footwear and so on. Effectively this exploited a lot of well educated disciplined human resources in labour intensive industries. The export processing zones, which were established at Kaohsiung and Taichung in the 1960s and 1970s respectively, also functioned well in attracting much capital from foreigners and overseas Chinese. This led to full employment. Because of full employment in 1970s many Taiwanese housewives were attracted to entering labour market. In fact the number of female labourers, especially married ones, joining the labour market increased greatly in 1980s. As far as educational qualifications were concerned, the higher the educational qualification of female labourers, the stronger the motivation to work. As a result, the number of female labourers with higher educational qualifications is increasing rapidly, and this is a special feature in Taiwan's labour market (Ben, 1985).

As a result of economic growth the number of opportunities for education for female labourers in Taiwan is increasing. As mentioned previously the number of female university graduates is almost equal to the male numbers. The wages for the female labourer have also increased. This encourages females to participate in the Taiwanese job market. The following summarizes female participation in the Taiwanese job market. During the earlier period of post World War II, Taiwan had severe unemployment, in fact female labour force participation in the job market was thwarted. In 1964 the turning point of the economic restructuring of

Taiwan was reached, and the hidden unemployment in the rural areas disappeared. Wages were tending to rise slowly. At the same time, the opportunity for females to enter the job market increased gradually (Ben, 1985). Labour force investigation (Executive Yuen, National Government) revealed that the number of female labourers increased from 966,000 in 1965 to 3,110,000 in 1989. The yearly average growth rate was 8.8%, much higher than that of males at 3.7%.

With full employment, labour markets became "tight". There ceased to be queues of the unemployed at the labour exchanges, labour was in short supply and recruitment became a difficult problem. In the Taiwan labour market it became necessary to attract staff to a firm, instead of picking and choosing, and inducements were used, especially in shipping companies.

1.1.3. The importance of shipping to Taiwan

For geographical, political and economic reasons, an efficient, nationally controlled merchant fleet based in Taiwan is essential for the continued prosperity and survival of the Republic of China (ROC).

The geographical importance of shipping

Taiwan is a relatively small, densely populated island off the Southeast Coast of China. It lacks raw materials and suffers from natural calamities such as typhoons, floods and droughts. Most raw materials in the form of fuels, timber, pulp and ore have to be imported for processing in Taiwan and subsequent export. In the event of war, or for any other reason, the supply could be cut. Events such as the war of late 1950s between the National Government in Taiwan and China Communist on Kimen island[2], the war between the United Kingdom and Argentina on the Falkland island issue and

[2] In August 1958,Taiwanese merchant marine played an important role in sea transport when Communist China attacked Kimen Island; sufficient supply from Taiwan sucessfully protected Kimen from being occupied by Communist.

the Persian Gulf war between Iraq and the Allies, mainly led by US, clearly demonstrate the importance of sea transport in times of national emergency, especially for such an island country as Taiwan.

The political importance of shipping

Political changes in China resulted in the National Government of the Republic of China moving to Taiwan in 1949. While Mainland China itself continues to be governed by the Communist People's Republic of China (PRC). From 1949 until 1968, Taiwan enjoyed a degree of protection from the United States of America and full membership of the United Nations. The benefits of being a full member of the world community of countries ceased in 1971 when the Communist PRC assumed membership of the United Nations following which the ROC was expelled from the United Nations. The United States of America recognised the PRC in 1979 and broke off its official diplomatic relations with Taiwan. Although the US enacted the "Taiwan Special Concern" to keep non-official relations with Taiwan, many affairs can not be discussed by governments, posing difficulties of relationship between America and Taiwan. Although strong business links with companies in Japan, the United States and Europe continue to exist, the diplomatic isolation of the ROC means that Taiwan cannot rely on foreign controlled shipping to serve its import and export trades.

The merchant ship is generally thought of as a territorial extension. A merchant ship with a national flag is always taken as a part of that country by international law scholars. Shipping can increase mutual understanding between cultures, establishing friendship as ships sail from place to place, from country to country. Taiwanese national flag shipping calls at any port of the world, not only for trade, but for the promotion national prestige as well. In

addition, with mutual understanding, and the promotion of friendship, Taiwan hopes to break its diplomatic isolation in the world community.

The economic importance of shipping

As mentioned earlier, the major economic growth of Taiwan is heavily dependent on the expansion of export-led industrialization and multilateral trade. The main trade partners with Taiwan are Hong-Kong (Mainland China included), Japan, USA and the European Community. Taiwan's total export and import trade was valued at NT$1,535 billion in 1992. More than 99% of its total international trade by weight was carried by sea. The low cost/long haul characteristics of maritime transport are well suited to the needs of Taiwan as an island having few raw materials. Thus shipping plays an important role in maintaining the economic prosperity of the country (ROC, 1994).

The relationship between shipping and trade is one of mutual dependence. Without trade shipping can not survive. On the other hand, without shipping, substantial quantities of agricultural and industrial products cannot be transported from one country to another. Hlaing (1984) argued

> "the ability to carry cargoes of various types and descriptions in large quantities in ships over long distances, makes the sea transport system the cheapest way of carrying cargoes from one place to another. Without a low cost reliable and well managed transport sytem, goods or services would not be exchanged. Thus, it would be seriously detrimental to living standard worldwide. This reliable low cost transport service enables goods to be exchanged among countries and sold at competitive prices".

1.2. Supply and demand of ships' officers

Seafaring is an important maritime activity. Seafarers, together with fishermen, sea farmers and coastal settlers, constitute a set of sea-dependent people. Maritime education and training impacts on all these people, but only merchant ships' officers are discussed in this study.

Although ship sizes have increased, the mode of propulsion has changed from steam to diesel driven, or the combination of both, and control from manual to automatic, the manning of merchant ships has remained relatively unchanged for 100 years. Automation has allowed some reduction in crew, but the organisation of the crew, as officers and ratings, together with individual roles, authorities, responsibilities and the exercise of autonomy has remained unaltered since late 19th century. In fact, if any changes have occured they have been in increased personal work loads, and in the reduction of the autonomous powers of senior and junior officers to almost zero.

In Taiwan the demand for shipping has been increasing since the 1960s in parallel with the growth of export trade. To meet this demand the Government has enacted many policies to encourage shipping companies to build up their own fleets. Taiwan has become one of the world's major shipowning nations. By 1994, there were 244 ships flying the national flag, and 103 separate shipping companies as shown in Table 1.2.

Table 1.6 on page 19 indicates the growth of the national fleet over the period 1961 to 1994.

Table 1.2 The number of shipping companies and the number of ships in Taiwan's merchant fleet

Number of ships	Number of shipping companies	Percentage
0	5	5.4
1	53	57.0
2	19	20.0
3	11	11.8
4	1	1.0
5	2	2.2
6-10	9	9.7
11-20	1	1.0
21-30	1	1.0
31 over	1	1.0
Total	103	100

Source: Ministry of Communications, ROC, *Monthly Statistics of Transportation and Communications*, 1991.

Although the demand for shipping has increased, the number of seafarers has reduced from 30,122 in 1978 to 5,956 in 1989. Table 1.3 shows the number of seafarers in the last decade.

Table 1.3 Number of seafarers including ships' officers and ratings 1978 - 1989

	1978	1982	1985	1989
Deck	10,505	7,690	3,543	2,877
Engine	19,617	14,711	3,535	3,079
Total	30,122	22,401	7,078	5,956

Source : National Chiao-Tung University, "Demand for human resource for shipping ", 1988,p.3-42 & p.6-35. National Taiwan Ocean University, "Supply and demand of seafarers and development of shipping", 1990, p.1.

A study of the demand for shipping conducted by National Chiao-Tung University (1988) predicted that the demand for various types of ships will be container 108, bulk carrier 109 - 139, log carrier 2, general cargoes 53 in the year of 2000. This is shown in Table 1.4 below.

Table 1.4 The demand of ships for Taiwanese merchant fleet and flag of convenience

Type / Years	container	Bulk carrier	Log carrier	General cargoes	Oil tanker	Total	Flag of convenience	Grand total
1995	81	85-109	3	127	28	324-348	415-451	739-799
2000	108	109-139	2	147	35	401-431	514-559	915-990

Source: National Chiao-Tung University, "Demand of human resource for Taiwanese shipping", 1988, p.6-24.

This indicates a growing requirement for officers, at all levels of competency, to man Taiwanese owned vessels.

From the statistics of students graduating from various levels of maritime institutions (*Education statistics*, 1994), and passing the examination for the junior ship officers' certificate of competence, the supply of junior officers over last decade and for years 1995 to 2000 is shown in Table 1.5 below.

Table 1.5 Junior officers' supply for the past and predictions for next years 1995 - 2000.

Rank / Years	Maritime Institutions		Navy Transferred		Existing Engineers		Available per year	
	3rd officer	3rd engineer	3rd officer	3rd engineer	3rd officer	3r engineer	3rd officer	3r engineer
1986	334	354	33	35	597	602	964	991
1987	326	390	33	39	578	595	937	1024
1988	358	401	36	40	562	614	956	1055
1989	303	349	30	35	574	633	907	1017
1990	234	331	23	33	544	610	801	974
1991	212	249	21	25	481	584	714	858
1992	186	241	19	24	428	515	633	780
1993	153	234	15	23	380	468	548	725
1994	153	227	15	23	329	435	497	685
1995	153	227	15	23	298	411	466	661
1996	153	227	15	23	280	397	448	647
1997	153	227	15	23	269	388	437	638
1998	153	227	15	23	262	383	430	633
1999	153	227	15	23	258	380	426	630
2000	153	227	15	23	256	378	424	628

Source: Ministry of Education, ROC, Education statistics, 1994. National Chiao-Tung University, "Demand of ship officers for Taiwanese shipping", 1988, p.6-37.

While there is now a growing requirement for ships' officers the supply of qualified junior officers joining the profession is forecast as static. Allowing for natural wastage a shortfall in qualified officers is predicted.

1.3. Purpose of study

Following the socio-economic changes, which reflected on education, demography, gross national product, the job market, and so on, Taiwanese shipping companies are facing a shortage of seafarers, especially marine engineers. By reviewing of the research literature relating to choice of occupation and organizational commitment, the author has investigated the indices of socio-economic change influencing willingness to study, personal needs, and work values, and in turn the occupational commitment of students from various levels of maritime institutions.

1.4. Limitation of study

The subjects of this study are ten important shipping companies, engineering students from various universities, colleges and from seafaring oriented departments at maritime institutions of various levels in Taiwan.

The author's 20 years of service on board the merchant ships and his current teaching post in the National Taiwan Ocean University has relevance.

1.5. Operational definition

Willingness to study The degree of strength at which students from engineering related departments are willing to study the specific subjects relating to the occupation and consistent with individual educational aims.

Occupational commitment The degree of strength at which students from engineering related departments commit themselves to the occupation and consistent with individual educational aims.

Table 1.6 The status of the Taiwanese Merchant Fleet, 1961- 1994.

Years	No. of ships	Gross Tonnage	Deadweight Tonnage	Age	Speed (Knots)
1961	97	431,096.0	636,371.0		
1962	103	485,977.0	691,866.0		
1963	104	533,626.0	761,459.0	16.2	12.7
1964	124	628,547.0	884,632.0	16.2	13.8
1965	145	761,058.0	1,072,678.0	17.23	13.19
1966	143	710,666.0	1,004,531.0	16.57	12.41
1967	145	716,895.0	1,016,904.0	16.00	13.50
1968	164	900,498.0	1,274,085.0	16.00	13.70
1969	174	1,008,697.0	1,464,025.0	14.00	14.00
1970	170	1,129,916.0	1,716,431.0	9.50	15.50
1971	180	1,309,322.0	2,015,248.0	10.80	15.20
1972	180	1,374,066.0	2,142,308.0	9.95	15.40
1973	177	1,377,541.0	2,148,238.0	10.80	15.20
1974	175	1,323,232.0	2,075,571.0	11.50	15.00
1975	168	1,308,683.0	2,045,276.0	9.33	14.11
1976	163	1,297,121.0	2,036,425.0	11.78	14.12
1977	163	1,415,221.0	2,273,036.0	11.73	13.89
1978	169	1,602,858.0	2,610,338.0	12.10	13.90
1979	176	1,614,974.0	2,568,072.0	10.15	13.83
1980	178	1,806,216.0	2,704,909.0	10.67	14.27
1981	167	1,869,997.0	2,798,475.0	11.33	14.32
1982	176	2,480,540.0	3,873,280.0	9.80	14.38
1983	200	3,328,856.0	5,279,274.0	11.02	14.60
1984	217	4,350,735.0	6,935,436.0	10.48	14.75
1985	227	4,267,129.0	6,654,260.0	11.32	13.00
1986	233	4,595,764.0	7,161,238.0	10.75	13.28
1987	240	4,621,031.0	6,996,958.0	11.00	13.28
1988	254	5,182,197.0	7,744,415.0	11.00	15.10
1989	264	5,468,964.0	8,228,512.0	12.55	15.15
1990	258	5,880,646.0	9,029,981.0	——	——
1991	252	6,182,000.0	9,562,716.0	——	——
1992	267	6,543,058.0	10,077,163.0	——	——
1993	278	6,631,095.0	10,269,696.0	——	——
1994	244	5,895,411.0	9,089,614.0	——	——

Source : Department of Aviation and Navigation, Ministry of Communications, 1994.

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Chapter 2 Review of Literature

Occupational Commitment and Related Literature

2.1. Occupation and Career

2.1.1. Theories of Occupation and Career Choice

There are two general groups of theories that influence much of the thinking in career guidance. One is based on the notion that individuals and jobs should be matched with respect to the individual's interests and talents and the job's requirements. This approach is sometimes referred to as job-person matching. The other emphasises the development of career-related abilities rather than simple job-interest matching and includes what are termed developmental models of guidance.

Table 2.1 A job-person matching model based on Holland's coping styles

Type	Characteristics and Interests	Recommended Job Settings
Realistic	Concrete, Mechanically oriented, Motor activity	Gas station construction, Labour, Skilled trade, Farm.
Intellectual	Abstract, Creative, Introverted.	Research, Academic.
Artistic	Subjective, Creative, Intuitive, Emotional.	Performing arts, Visual arts
Social	Extroverted, Socially concerned, High verbal ability, High affiliative needs.	Social work, Teaching, Counselling
Enterprising	Domineering, Adventurous, Impulsive, Extroverted.	Leadership roles, Planning roles, Real estate development.
Conventional	Unimaginative, High self-control, Want social approval, Systematic.	Accounting, Banking, Business/clerical.

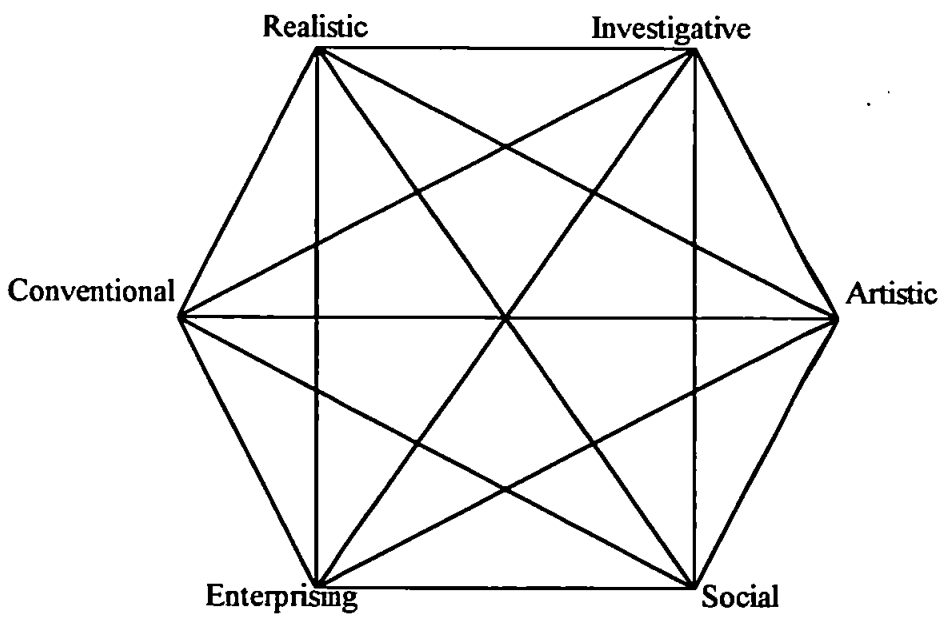
Source :Holland, J.L. *Vocational Preference Inventory* (VPI), 1975.

Guidance counsellors who adopt the job-person matching model attempt to identify talents that are essential for specific occupations, administer batteries of tests to discover talents, and then try to match the two. The matching generally takes into account the individual's interests as well as talents.

One well-known example of this trait-interest, job-matching approach is that of Holland (1975), who developed the Holland Vocational Preference Inventory. It identifies six specific combinations of traits and interests, labelled coping styles: realistic, intellectual, social, conventional, enterprising, and artistic. These styles, and recommended occupations, are summarised in Table 2.1 as above.

Trait-interest matching approaches to career guidance have proved highly useful and continue to be widely used both in schools and in placement and employment offices.

Fig. 2.1 A Hexagonal Model for Defining the Psychological Resemblances among Types and Environment and their Interactions



Source: Holland, J.L. *Making Vocational Choice: A Theory of Vocational Personalities & Work Environments*, 1985. p.29.

In addition to the Trait-interest matching approach, Holland (1985) also developed a Hexagonal Model for defining the psychological resemblances among Types and Environments and their interactions. It is shown in above Figure 2.1. The relations among the psychological types are assumed to be inversely proportional to the distances in the figure. For instance, that the ends of diagonals in the hexagonal which are realistic-social, investigative-enterprising, and conventional-artistic, are far apart. They are very different. In contrast, two adjacent types, such as realistic and investigative, resemble one another.

The functions of hexagonal model are: (1) to define the degree of consistency in a person's personality pattern; (2) to define the consistency of an environment in the same way as one's psychological type; and (3) to define the degree of congruence between person and environment. The greatest homogeneity of a social person would be expressed in a social environment.

Developmental models of career selection are concerned less with matching jobs and persons than with understanding and facilitating the chronological development of career decisions. These models typically view career choices as beginning in childhood and as involving a gradual, decision-making process. Among the best known of developmental guidance models are those advanced by Super (1957) and Ginzberg (1972). Ginzberg's model describes three sequential preadult stages in career development; they are the fantasy period, the tentative period, and the realistic period.

2.1.2. The Social Determinants of Occupational Choice

Up to now the discussion of career choice has tended to focus on theoretical explanation rather than specific empirical evidence relating to what actually happens in the choice process. Before entering this topic, the meanings of career and occupation need to be defined. Referring to the *Handbook of Vocational Psychology* (Osipow, 1983), career means a chosen target which a person expects to pursue in his life. In other words, a career is a life work. An occupation is a group of similar jobs found in different organisations at different times, for example, accountants, engineers, and purchasing agents. The distinction between a job and an occupation is chiefly one of scope. The term job is used more narrowly and implies a within-organisation reference. The term occupation implies an across-organisation reference. A career covers a sequence of positions, jobs, or occupations that one person engages in during his or her working life.

The word determinants chosen for these characteristics tend to be those in the external environment of the individual which suggest that he or she has little or no control over them. Occupational choice for an individual is always influenced by the following determinants.

a) Class culture -

As the analysis of many sociological variables, social class plays an important role in the choosing of an occupation. The social class culture from which an individual comes is possibly the most important external factor affecting his choice of occupation. Research has shown that there is a direct relationship between class level and aspiration level, which is empirically well-backed. The higher the social class level from which an individual comes, the greater the probability that he will aspire to those occupations that society has defined as the most socially prestigious and economically rewarding (Dunkerley,1975). Generally, this relationship can be

identified from the distribution of students in various departments at universities in Taiwan. A good empirical example is of a medical college at university, where most students are from the families which are classified as the high social class level. Because enrolment of medical college is very competitive and the tuition charge is very expensive, ordinary families are unable to afford the cost of children studying in this college. In contrast, education related departments at college or university, most students are from the families which are classified as middle class or lower (Lin, 1989). These students can save a considerable amount of money during their schooling because of free of tuition, housing and board. More importantly, the graduates of this university are often employed in secondary or elementary schools as teachers, by the Government. The social status of teachers in the traditional society is high, though the remunerative reward is low compared with their counterparts in other occupations. However, the social status of medical doctors, both professional and economic, is high.

There is a special characteristic in Taiwan where the federal entrance examination of universities provides opportunities for young people coming from the families of lower social class levels to become upwardly mobile to the higher levels. It is a controversial issue when people are talking of students' willingness to study.

In order to be admitted to a prestigious university, Taiwanese students have studied hard since they are in junior high school even earlier. Students are willing to study in a specific department, however, they are not able to enrol because of their insufficient entrance examination score.

The current system of distribution of places at universities in Taiwan is based on the score that applicants achieve during the federal entrance examinations. The student applicant must select the section in which he wants to enrol before sitting the examination. All departments in universities are grouped into four sections:

a) business and management;

b) engineering and science;

c) medical and pharmacy, agriculture and fishing, and

d) literature and art.

Once the individual scores of student applicants have been collated, the entrance examination committee distributes students to departments, in the section of their choice, according to their scores. As a result, student enrolments in a department are decided first by the selection of section before the examination, and second by the scores achieved in the examination. Because the examination is very competitive, few student applicants are able to get into their ideal university and ideal department.

The effect of this admission policy was studied by Yang in 1991. He took 2249 students from Colleges of Art, Science, Engineering, Law, Business, Agriculture, and Medical from various universities in Taiwan as a sample for research and showed that 72.2% had identified their own ideal department at an ideal university, but only 49.6% of the applications matched of their ideal requirements when the examination scores were received. The result of the distribution, meant that only 32.1% of applicants were assigned to the first priority department; and 20.5% to the ideal university. Only 9.2% achieved both their department and university as their first priorities as shown below;

Table 3.1 Student Distribution - 1991 Unit %

Department / University	The first priority department	Non-first priority department	Row Total %
The first priority Univ.	9.2	11.3	20.5
Non-first priority Univ.	22.9	55.5	78.4
Column Total %	32.1	66.8	98.9

Source: Yang, *et al. Federal Entrance Examination effects on university students in Taiwan*, 1991, p.12.

*Because the missing values are not included, the total percentage is not equal to 100%.

The student applicants seeking admission to a department of their own choice are more motivated to study in their selected departments than elsewhere. As Yang reported, 30.8% and 7.4% of applicants were rather satisfied and totally satisfied respectively with their chosen departments. It means that over 60% of students were not willing to make an effort to study in the particular

departments and universities to which they were assigned. The following shows the percentage of university students satisfied with their chosen departments and universities.

Table 3.2 Student Satisfaction with Placement - 1991 Unit %

Classification / Satisfaction	Rank Percentile	Favoured department	Favoured university	Total percent of the sample
Ex. unsatisfied	7.4	2.7	6.3	4.8
Con. unsatisfied	8.0	3.4	8.8	6.0
Unsatisfied	22.5	15.4	25.3	19.0
Satisfied	42.6	39.7	40.8	40.0
Rather satisfied	16.2	30.8	14.3	23.7
Totally satisfied	3.0	7.4	0.6	5.9

Source: Yang, *et al. Federal Entrance Examination Effects on university students in Taiwan*, 1991,p.14.

Ex. unsatisfied stands for exceptionally unsatisfied.

Con. unsatisfied stands for considerably unsatisfied.

As shown in above, 23.7% of the students in the sample were rather satisfied with their department and university, and 5.9% were totally satisfied those items. Obviously, most university students in Taiwan are not willing to study in their current departments at universities. If the opportunities became available, they would consider transferring to more prestigious departments and universities. The more prestigious the department and university at which a student enrols the greater the opportunities for students to get higher degrees or to achieve higher status in society after graduation. Marine engineering at National Taiwan Ocean University is the only department offering marine engineering education and training at university level in Taiwan. The data show that willingness to study in the sample is lowest in marine engineering. According to university statistics (1993), 20 of 85 students transferred to other departments when the freshmen advanced to sophomore in 1993.

This implies that the educational purpose may not attract young students to engage themselves as a marine engineer in their future career.

In general, the public universities are better provided with equipment, and the ratio of students/teachers is better than that of private ones. Students also enjoy much cheaper tuition charges and fees for utilities than those applying at private universities. As a result, competition for places in public universities is greater than it is for private universities. This may be seen from the entrance examination scores and the ranking of universities in the last two decades (see Appendix 1 page 146). It shows that ranks 1 to 3 are always held by National Universities.

According to *Universities Federal Entrance Examination Statistics*, the minimum entrance examination scores admission to the department of marine engineering at National Taiwan Ocean University fell lower and lower over the years in comparison with their engineering department counterparts at other universities. The rank of marine engineering among the universities' examination scores were median before 1970s. It declined steadily to 1984, since then it has improved a little. This is because the name of department changed, extending educational purpose to the general mechanical engineering area. However, under the pressure from shipping companies, the Government declared that the National Taiwan Ocean University has an obligation to produce ships' officers[1] resulting in a ranking drop in 1987. Afterward, the committee of the department unanimously agreed to make shipboard practice an option. Rank then increased significantly. Now the Marine engineering department has become Marine and Mechanical engineering department. Obviously, seafaring oriented education in university no longer attracts young people in Taiwan.

[1] The Minister of Education, Mr Lee visited NTOU in November 1986, spoke to the reporter. This was recorded in NTOU 40th anniversary publication.

b) Gender-

Traditional ideas "to be an honourable wife with a noble husband" and "to be contented with the man a woman has married" for women in ancient China, have deeply influenced the aspirations of occupational choice for Taiwanese women. Dunkerley (1975) pointed that "it is generally true that the occupational aspirations of woman are lower than those of men. Traditional values stressing the role of the women in the home whether as wife or mother still prevail, although there is acceptance of economic activity by women." The husband's occupation is still the crucial thing for a woman.

However, this phenomenon has changed as the education of females in Taiwan has increased. As previously mentioned, the number of female labourers reached 3,110,000 in 1989 (see page 12), comprising 37.7% of the total number of people employed in Taiwan in the same year. The participation rate of women increased from 33.1% in 1965 to 45% in 1989, which, the male participation rate decreased from 82.5% to 74.8% in the same period. There are many occupations in Taiwan unavailable for women due to traditional cultural constraints. Such as seafaring on merchant ships, fishing boats and in the army.

c) Type of community -

It is easier for the individual coming from an urban area to become acquainted with the opportunities of employment than one from a rural area. Sociological research shows they are likely to have higher aspiration levels than their counterparts in the rural situation. Today, Taiwan has a well developed infrastructure and mass media, and the difference between urban and rural society is reduced; the importance of the type of community from which a person comes, in making a choice of occupation, is less significant.

d) Race -

That race acts as a constraint on occupational choice may be negligible in Taiwan. Recently, the Government spent a large amount of capital on public construction resulting in a shortage of labour. As a result, many aliens from South-eastern Asia are employed as manual workers in high way and express rail road construction. This situation is temporary; as soon as the projects are completed, these alien workers will return their own countries.

2.1.3. Choice of Occupations

Social status

It is a generally agreed that the best way of achieving upwards social mobility is through education (Cheng, 1986). This is a traditional Chinese cultural value expressed by the saying "All professions are inferior to studying", seen for example in the emphasis given to studying as a means of achieving higher rank in government service. Thus from generation to generation, Chinese families have encouraged study, so that today, this philosophy is still deep rooted in the public

mind. As a result, a young person choosing an occupation for when he graduates from a college or university, thinks first of all, "Does the occupation offer the opportunity for further study ? Does the job offer the opportunity for promotion ?". All this is finally associated with social status. Therefore, teaching staff and students always take opportunities for further study, promotion, etc., as one of the criteria for choosing an occupation.

Educational level/Occupation Match

With reference to the previously mentioned job-person matching and congruence between the person and the environment (see page 23), a specific job would be done by a person with specific trait; a specific psychological type of person would be in a congruent environment. In other words, an organisation should recruit the right person to do the right job. While a specific occupation may not need a higher education graduate, there must be a highly educated and trained person in charge of the occupation for safety reasons. Take the air stewardess for example. An air stewardess's job is to serve customers following the safety regulations on board the air craft. In general, this job need not have a professional training, but the air company recruits personnel from college or university. An recent report (*Central Daily News*, 25 February 1995) indicates that college - educated women recruited to such positions move on to other jobs after a short period of time. This may be attributed to inconsistency between studying and occupation or incongruency of personality and environment. This implies that the occupation does not need to recruit college graduates to fill up such vacancies despite the degree dependent society of Taiwan. Nevertheless the degree dependent society fad is a factor influencing young people's occupational choice.

Role of Male in Household

In 1968, Taiwan extended the duration of compulsory education from 6 to 9 years. Female education has become more popular since then. At the present time, the number of female college or university students is almost equal to the number of male ones. Because of the popularity of female education, female participation in the job market has increased greatly. This has also led to the number of so called "dual career or dual earner" families increasing, and to the traditional roles in households of "husband be responsible for external affairs, and wife be responsible for home affairs" being undermined. As a result, married women are unwilling to let their husbands take up occupations away from home (Ben, 1985). This is also a factor influencing the occupational choices of married young people.

Wage Differential

Job satisfaction can be divided into two components, namely, intrinsic and extrinsic. Wage level is an extrinsic reward. To some extent, wage level plays a very important role in occupational choice. However, generally speaking, professionals focus more on intrinsic rewards than extrinsic ones. The wage for shore jobs has been increasing over the years, but the rate of increase for ships' crew wages is far behind that of shore jobs. An ocean-going third engineer's monthly payment was USD$110 in the early 1960s while his monthly payment is USD$2,310(£1,462) today (Taiwan Navigation Company, see page 121 Table 5.11). On the other hand, a shore employee, whose qualifications are equivalent to a third engineer's had a monthly payment of USD$20 in the 1960s and today is paid USD$1,185(£714) (public employees, see page 121 Table 5.12). The ratio of a third engineer/public employee monthly payment in 1960 was 5.5, and today is 1.9. The wage difference between wages at sea and those on shore is getting

closer and closer. Wage differential is also a factor for young graduates in making an occupational choice.

Standard of Living

The central elements of the Maslow (1943) hierarchy of needs are physiological, safety, love, esteem, and self-actualisation; they are arranged in a hierarchy of prepotency. That is, physiological needs, such as, hunger, thirst, and the need for air, have paramount influence until they are relatively satisfied; their satisfaction then reduces their power to motivate. Successively higher needs, from safety to self-actualisation, acquire power to motivate us as they are experienced and remain non-fulfilled. Satisfaction at each level activates a new higher-level need. Following the increase in the gross national product, leading to a raising of the standard of living, people seeking occupations are not only concerned with "earning a living", but also with the satisfaction of unmet higher order needs.

Using the factors discussed above and interviews carried out with academic staff, college and university students, professional institutes and employers, the factors considered to influence the choice of occupations are as follows:

Standard of Living

Size of Family

Social Status of Job

Attitudes of Teaching Staff and University Students towards Occupations

Degree Dependent Society

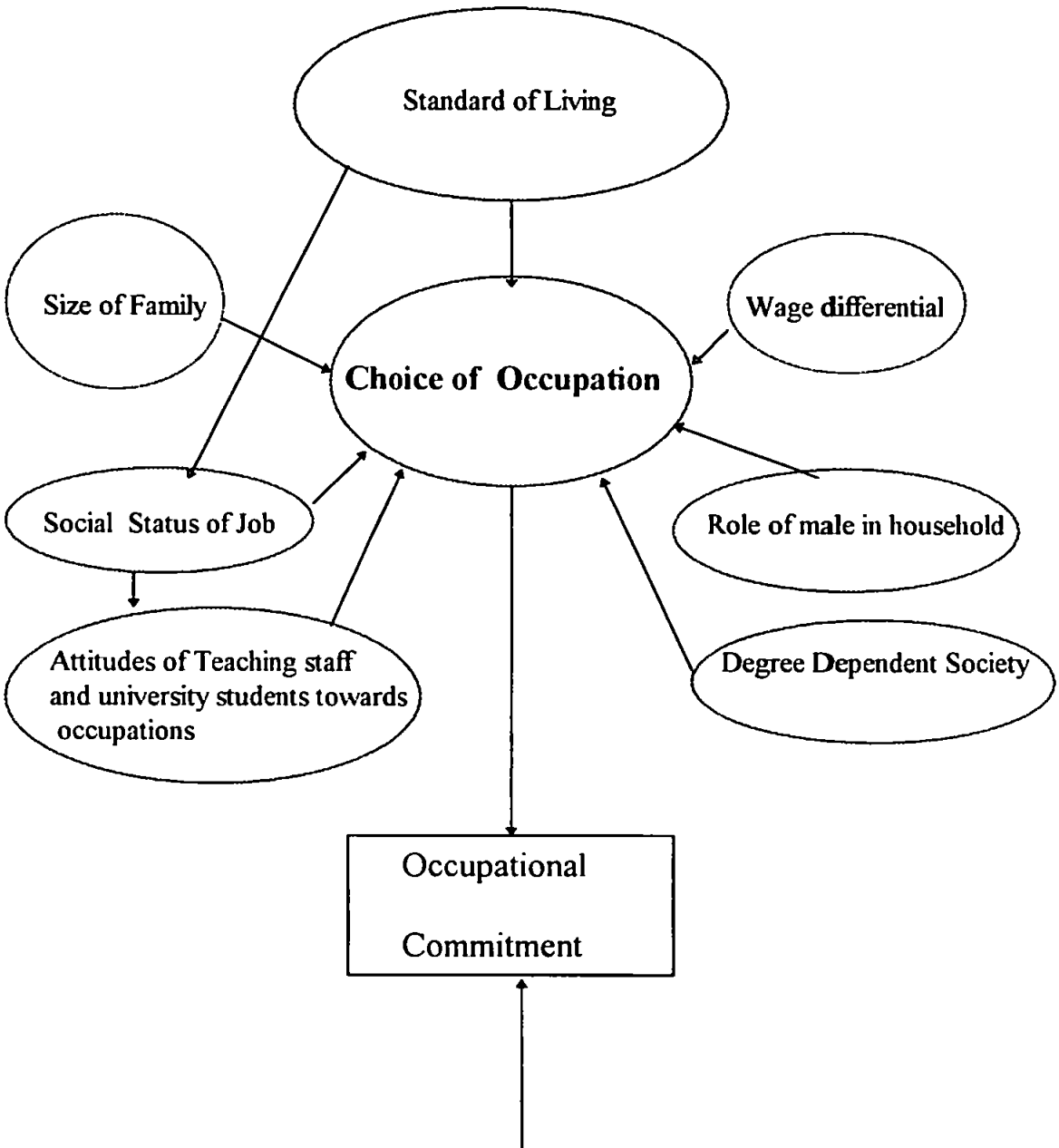
Role of the Male in Households

Females' Educational Level

Wage Differentials

Their relationships, based a foregoing literature review, are shown in Fig 2.2.

Fig 2.2 Social Factors Influencing Choice of Occupation



Source: Author's

2.2. Review of the Commitment Literature

2.2.1. Definition of Commitment

The term "commitment", Becker (1960) notes, enjoys an increasing vogue in sociological discussion. Sociologists use it in analyses of both individual and organisational behaviour. They use it as a descriptive concept to mark out forms of action characteristic of particular kinds of people or groups. They take commitment as an independent variable to predict certain kinds of behaviour of individuals and groups. They also use it in analyses of a wide variety of phenomena: power, religion, occupational recruitment, bureaucratic behaviour, political behaviour, and so on.

The concept of employee commitment to organisations has received increased attention in the research literature over time. Recently managers and organisational analysts have used it to seek ways to increase employee retention and performance. Koch and Steers (1976) find that commitment is often a better predictor of turnover than is job satisfaction. Moreover, findings by Mowday, Porter, and Dubin (1974) suggest that highly committed employees may perform better than less committed ones. However, Angle and Perry (1981) point out that commitment to stay and commitment to work are different constructs. Schein (1970) and Steers (1975) also find that commitment may represent one useful indicator of the effectiveness of an organisation. These findings have important implications for both organisation theory and the practice of management.

When one considers the literature on the topic of organisational commitment, there is little consensus with respect to the meaning of the term. Commitment definitions may differ between authors owing to their differing individual research backgrounds. Mowday, *et al* (1982), reviewed ten different studies on organisational commitment, trying to trace out the difference between

them. Obviously, no real consensus exists among these definitions of commitment. In order to simplify a complicated problem, several researchers have devised various approaches to commitment. The following three approaches, which have been presented by Etzioni (1961a), Kanter (1968), and Staw and Salancik (1977), highlight the nature of the commitment. These three typologies of organisational commitment are shown in Table 2.2.

ETZIONI

Etzioni is the earliest one to attempt to develop a typology of commitment. He suggested a typology based on a larger model of member compliance with organisational directives. He argued that the power or authority that organisations have over individuals is rooted in the nature of employee involvement in the organisation. This involvement or commitment can take one of three forms: (a) moral involvement; (b) calculative involvement; and (c) alienative involvement.

Moral involvement focuses on the individual internalisation of organisation goals, values and norms, which the employees believe are useful to society. This involvement represents an identification with an organisation authority. Calculative involvement, on the other hand, is based on the exchange relationship that develops between members and the organisation. Employees become committed to the organisation because they see a beneficial or equitable exchange relationship between their investment of effort in the organisation and the rewards they receive for service. This is similar to March and Simon's (1958) inducement - contribution theory, in which employees contribute their efforts in exchange for rewards offered by the organisation. Finally, alienative involvement focuses on individual behaviour and is severely constrained.

Table 2.2 Typologies of Organisational Commitment

Author(s)	Typology	Definition
Etzioni (1961)	Moral involvement	A positive and high-intensity orientation based on internalisation of organisational goals and values and identification with authority .
	Calculative involvement	A lower-intensity relationship based on a rational exchange of benefits and rewards.
	Alienative involvement	A negative orientation that is found in exploitative relationships (e.g., in prisons).
Kanter (1968)	Continuance commitment	Dedication to organisation survival brought on by previous personal investments and sacrifices such that leaving would be costly or impossible.
	Cohesion commitment	Attachment to social relationships in an organisation brought on by such techniques as public renunciation of previous social ties or engaging in ceremonies that enhance group cohesion.
	Control commitment	Attachment to organisational norms that shape behaviour in desired directions resulting from requiring members to disavow previous norms publicly and reformulate their self-conceptions in terms of organisation values.
Staw (1977); Salancik (1977)	Organisational behaviour approach	Commitment viewed in terms of a strong identification with and involvement in the organisation brought on by a variety of factors (attitudinal commitment).
	Social psychological approach	Commitment viewed in terms of sunk costs invested in the organisation that bind the individual irrevocably to the organisation (behavioural commitment).

Source:Mowday, *et al., Employee-Organisation Linkage. The Psychology of Commitment, Absenteeism, and Turnover*, 1982, p.22.

Taking a prison, for example, prisoners are held in jail because of committing a crime. They are not "involved" in the organisation "jail". Etzioni suggests that the power to get people involved, normative power, is associated with moral involvement, remunerative power is associated with calculative involvement, and coercive power is used in a situation involving alienative involvement.

KANTER

Kanter (1968) believes that different types of commitment result from the different behavioural requirements imposed on members by the organisation. Three types of commitment to the organisation have been suggested by her; they are: continuance commitment, cohesion commitment, and control commitment. Continuance commitment is similar to Becker's side-bet theory, defined in terms of a member's contribution to the survival of the organisation. Individuals invest time and effort or make personal sacrifices in the organisation so that it becomes costly or difficult for them to leave. Cohesion commitment is defined as an attachment to social relationships in an organisation brought on by such techniques as public disavow, that is engaging in ceremonies that enhance group cohesion. Finally, Kanter identifies control commitment as a member's attachment to the norm of the organisation that shape behaviour in desired directions.

In contrast to Etzioni (1961a), Kanter views her three types of commitment as highly interrelated. That means that an organisation often uses all three approaches simultaneously to develop employees' commitment. Etzioni, on the other hand, tries to develop the approach somewhat differently from Kanter and suggests that influences on employee commitment largely fall into one of his three categories.

Staw and Salancik (1977) argued that it is necessary to differentiate the viewpoints on commitment between organisational behavioural researchers and social psychologists. Organisational behavioural researchers emphasised the process in which employees identified themselves with the goals, and values of the organisation, and attempted to maintain their membership in the organisation. This approach is referred to as attitudinal commitment.

In addition to the notion of attitudinal commitment, Staw, Salancik and other organisational behavioural researchers, have also suggested the concept of behavioural commitment. This concept actually is drawn from Becker (1964) and Kiesler (1971). They focused on the process in which individuals contributed to the organisation. If they leave, they would lose a certain rewards, either intrinsic or extrinsic or both. As a result, they are obliged to stay in the organisation. This approach is referred to as behavioural commitment.

Although the distinction between attitudinal and behavioural commitment is useful one, it does not mean that one is superior to the other. Rather, both concepts are useful (Mowday, *et al.*, 1982, p.26).

In addition to the above discussion, later, Reichers (1985) also sorted definitions of commitment into three approaches: (1) Side-Bets, (2) Attributions, and (3) Individual/organisational goal congruence. They are shown in Table 2.3.

Table 2.3 Definitions/Operationalizations of Organisational Commitment

1. Side-Bets	Commitment is a function of the rewards and costs associated with organisational membership; these typically increase as tenure in the organisation increases. This approach, and variations of it, has been used by Alutto, Hrebiniak, & Alonso (1973), Rusbult & Farrell (1983), and Sheldon (1971).
2. Attributions	Commitment is a binding of the individual to behavioural acts that results when individuals attribute an attitude of commitment to themselves after engaging in behaviours that are volitional, explicit, and irrevocable. This approach, and variations of it, has been used by Kiesler & Sakumura (1966), O'Reilly & Caldwell (1980), and Salancik (1977).
3. Individual/organisational goal congruence	Commitment occurs when individuals identify with and extend effort towards organisational goals and values. The Organisational Commitment Questionnaire (OCQ), developed by Porter and his colleagues, is the primary operationalization of this definition. This approach, and variations of it, has been used by Angle & Perry (1981); Mowday, Porter, and Steers (1982); Mowday, Steer, & Porter (1979); Porter, Crampon, & Smith (1976); Porter, Steers, Mowday, & Boulian (1974); Steers (1977); Stevens, Beyer, & Trice (1978); Stumpf & Hartman (1984); and Welsch & La Van (1981).

Source:Reichers, A.E., "A Review and Reconceptualization of Organisational Commitment", *Academy of Management Review*, 1985, Vol. 10, 3, p.468.

Table 2.3 reveals that the definitions of commitment vary from one another. The first one, Becker's (1960) side-bets, was mentioned before; however, it is more detailed than aforementioned. The second definition of organisational commitment that appears in the table focuses on the behaviour that result in attribution of commitment. Attributions that are made, partly, in order to keep consistency between one's behaviours and attitudes. O'Reilly and Caldwell (1980) have provided partial support for this approach. The third definition of commitment focused the process of identification and the dedication of one's own efforts to the organisation goals and values. One of the most popular measures of organisational commitment developed by Porter, *et al.*,(1974) was based on the congruence of individual willingness to work towards and organisational goals.

The Porter *et al.*(1974), Organisational Commitment Questionnaire (OCQ) mainly includes: (a) a belief in and acceptance of organisational goals and values; (b) the willingness to make an effort towards organisational goal accomplishment, and (c) a strong desire to keep membership in the organisation.

MEYER AND ALLEN

More recently, Meyer and Allen (1991) identified three distinct themes in defining commitment: commitment as an affective attachment to the organisation, commitment as a perceived cost associated with leaving the organisation, and commitment as an obligation to remain in the organisation. They referred to these three approaches as affective, continuance, and normative commitment, respectively. They also referred to these as the *Three-Component Model of Organisational Commitment.* Their common view among these approaches is a psychological state. They all identify the employee's relationship with the organisation and have implications for the decision to continue or give up membership in the organisation. Except for this common viewpoint, the nature of the psychological state for each form of commitment is quite different. Employees with a strong affective commitment remain with the organisation because they want to remain. Those who with a strong continuance commitment remain with the organisation because they need to remain; and those with a strong normative commitment remain with the organisation because they ought to remain. Meyer and Allen suggested that one can have a better understanding of an employee's relationship with an organisation when all three forms of commitment are considered together. Therefore, they developed this three-component model of organisational commitment. By this model, employees can experience varying degrees of all three forms of commitment. Meyer and Allen hypothesised that each

component develops as a result of different experiences and different implications for on-the-job behaviour.

Extension of the Model to Occupational Commitment

Meyer, *et al.*, (1993) argued that although the three-component model of commitment was developed in the context of organisational commitment, it is reasonable to expect that it might be available for other domains. Previous researches on occupational commitment were all in unidimensional perspective (e.g. Aranya *et al.*, 1981; Blau, 1989; Morrow & Wirth, 1989). In the earlier research on organisational commitment, occupational commitment has been conceptualised as a typical affective attachment to the occupation.

It should be noted that occupation, profession, and career were interchangeable in the commitment literature. For this study occupation, instead of profession, has been chosen, because the word "profession" has overtones which can be misunderstood. Occupation covers both professionals and non-professionals, both of which may experience commitment to the work they do.

Because the participants in Meyer, *et al.*(1993) research, were nurses and nurse students, (according to definition provided by Kerr, Von Glinow and Schreisheim (1977), nurses would be professionals), profession was employed in the measures which they developed. If it was used to measure commitment to other occupations, "profession" could be replaced by a more appropriate term. This study does not use career commitment either because of the ambiguity meaning of "career". Career can be defined as a pattern of work from entry into work force to the retirement in life. Because this study deals with commitment to a particular type of work, the term occupation is more appropriate. As in the case of organisational commitment, the multidimensional approach to the study of occupational commitment provides a more complete understanding of a person's

tie to his or her occupation. Although all three forms of commitment might be related to an individual's likelihood of remaining in an occupation, the nature of the person's involvement in that occupation might be quite different. It depends on which form of commitment is predominant.

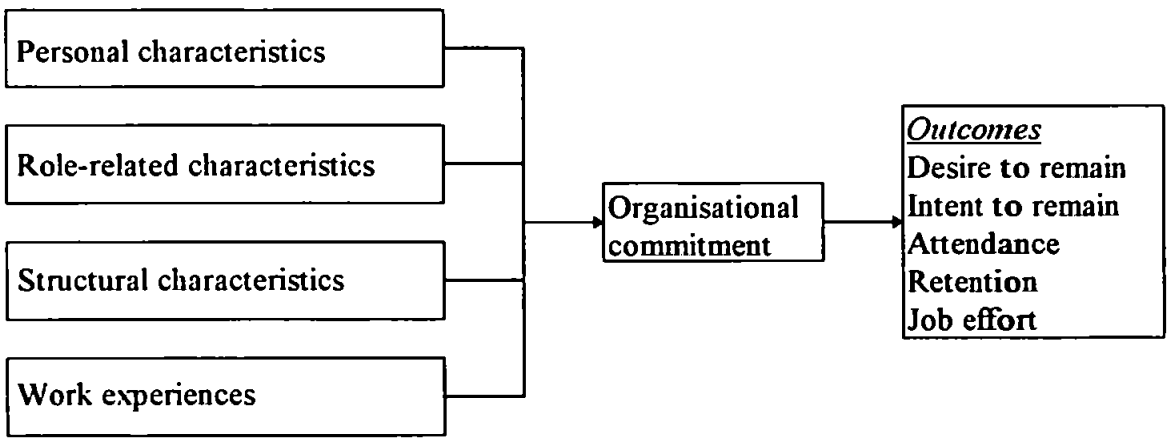
A person who has a strong desire to remain in an occupation might be more likely than someone who is not so attached, to keep up with developments in the occupation; he joins and participates in the relevant associations, and so on. The same might be true that individuals who have a strong normative commitment. On the other hand, persons who have a strong continuance commitment might be less inclined than those who remain for other reasons to involve themselves in occupational activities. Continuance commitment to the occupation might be expected to correlate negatively with the tendency to engage in behaviours that are beneficial from the standpoint of the occupation or profession as the case with organisational commitment as has been found by Meyer, *et al.*, (1989).

Meyer, *et al.*,(1993) expected the antecedents of the three components of occupational commitment to differ, as was true in the case of organisational commitment discussed earlier. Affective commitment was expected to develop when involvement in the occupation proved to be a valuable experience. Continuance commitment should have developed as individual invested effort that would be lost in value if he or she were to change occupations. Finally, normative commitment was expected to develop as the result of the internalisation of normative pressures to pursue a course of action, and receipt of benefits that created a sense of obligation to reciprocate.

2.2.2. Antecedents and Outcomes of Organisational Commitment

Mowday, *et al.*,(1982), point out that the major factors influencing organisational commitment have been grouped into three categories: (a) personal characteristics including age, tenure, educational level, gender, race, and various personality factors; (b) job/role characteristics including job scope/challenge, role conflict, and role ambiguity; and (c) work experience including employee interests, expectations, the organisational reward's system and personal worth to the organisation. The importance of these factors to the organisational commitment was supported by Steers (1977). Later, Stevens, *et al.*,(1978) and Morris & Steers (1981), added an additional category of : (d) structural influences including organisational size and control systems. These categories of antecedents, coupled with hypothesised outcomes of commitment, are shown in Fig 2.3. The following reviews of literature concerning organisational structure are intended to provide some correlation to organisational commitment.

Figure 2.3. Hypothesised antecedents and outcomes of organisational commitment



Source: Mowday et al., *Employee - Organisation Linkages : The Psychology of Commitment, Absenteeism, and Turnover* (adapted from Steer, 1977), 1982, p.30.

Mottaz (1986, 1988) categorised antecedents of commitment to two main groups: individual characteristics and organisational characteristics. The latter includes role characteristics.

Individual Characteristics

Many researchers have examined the effects of various personal characteristics on organisational commitment. Personal characteristics have included age, tenure, educational level, gender, race, and various personality factors. Lydka(1991) has grouped these characteristics into biographic data and personal characteristics.

Biographic Data

Many studies have found positive correlations between age/tenure and organisational commitment (Angle & Perry, 1981; Hrebiniak, 1981; Meyer and Allen, 1984; Morris and Sherman, 1981). However, one of these findings showed that only tenure was correlated with commitment when Stevens, *et al.*,(1978), carried out on the study of federal government managers. On the contrary, Reichers (1986) found that tenure was not significantly related to commitment although she argued that this may be the result of the low average tenure of her sample.

Whether the commitment leading to employees remaining with an organisation, or the time invested with the organisation, that causes employees to stay, is uncertain. The correlation between commitment and tenure was supported by Becker's side-bets theory (1960). Employees recognise that they have accumulated investments that would be lost if they were to leave the organisation. Reichers (1986) did not find a correlation between tenure and commitment

because of low average age of her sample. She finally concludes that Becker's side-bets theory may only be available for those who have a longer tenure in the organisation.

Education

That education is negatively related to organisational commitment has been accepted by many studies (Angle and Perry, 1981; Hrenbiniak and Alutto, 1972; Morris and Sherman, 1981; Steers, 1977). In addition to the above discussions, findings in Mottaz (1986), Meyer and Allen (1988) also support this theory. Mottaz (1986) argued that education has a direct negative effect when work rewards are held constant, while Meyer and Allen (1988) found that those with higher degrees were less committed than those with lower degrees after eleven months of employment.

The workers with higher level of education have greater opportunities for alternative employment than less educated ones, and are in turn, less committed (Angle and Perry, 1981). However, those employees, who perceive themselves to have alternative job opportunities, but choose to remain, may be more committed to their organisation than others because their attitudes are in compliance with their behaviours.

Another issue is that better educated workers normally have higher job expectations. They are more easily frustrated when their expectations are not realised. Some researchers (Mowday, *et al.*,1982; Steers, 1977) suggest that some organisations may have difficulty in providing sufficient rewards to highly educated employees, and, as a result suffer low commitment rates among these employees.

Another controversial issue is that the highly educated workers may have a professional commitment which competes with, or even overrides, their organisational commitment (Lydka, 1991). However, Lachman and Aranya (1986) found that organisational commitment is congruent with, and affected by, professional commitment. This result is consistent with some other findings which also report that the two commitments are positively related (Bartol, 1979; Flango and Brumbaugh, 1974; Lachman & Aranya ;1986).

Mottaz (1986) argues "the nature of the relationship between education and organisational commitment is largely a result of work experiences and not simply a function of the individual's opportunities for alternative employment or the degree to which a person is committed to a profession or trade".

The central theme of Mottaz's and other organisational commitment related findings, is the notion of exchange. Education, his paper finds, can have an indirect positive effect on organisational commitment through intrinsic rewards. If the organisation provides opportunities for intrinsic rewards, commitment will increase among the better educated workers.

Organisational commitment has also been correlated with educational aspirations. Hrebiniak and Alutto (1972) found those who had not planned any further formal education were more committed than those who had, in their study of nurses and teachers. This finding was supported by Alonso, *et al.*, (1973) "respondents with lower educational aspirations expressed higher organisational commitment than those with higher educational aspirations".

Personality variables

Organisational commitment has been found to relate positively to a certain styles of personality. High commitment has been correlated with those who have a strong work ethic (Buchanan, 1974; Kidron, 1978) and with those who take work as a central life interest (Dubin, Champoux and Porter, 1975).

The positive correlations between organisational commitment and the need for achievement have been found by Steers (1977), and correlations of commitment with high order needs based on individual values have also been found by Morris and Sherman (1981) and Steers (1977) respectively. These findings support the exchange theory that employees tend to be committed to organisations because they want realisation of self-actualisation needs. The relationships between commitment and intrinsic and extrinsic needs will be discussed in greater detail below.

Intrinsic/Extrinsic Values/Rewards

From the exchange point of view, the key determinants of organisational commitment are work rewards (Steers, 1977; Mowday *et al.*,1982; Angle, 1983). However, work rewards vary in terms of their effect. The importance of work rewards to the organisation depends on individual work values. Mottaz (1988) defined work values as *"what the worker wants, desires, or seeks to attain from work"*. He also defined work rewards with reference to the intrinsic and extrinsic benefits that worker receive from their jobs (Herzberg, 1966; Kalleberg, 1977). On

this basis he hypothesised that "the greater the perceived congruence between work rewards and work values the greater the commitment". This is similar to Holland's congruence between person and environment (see page 21). Mottaz tended to exemplify exchange theory by linking individual characteristics (work values) with organisational characteristics (work rewards). One particular advantage of this reward/value (exchange) model is that it attracts attention to both individual characteristics and organisational characteristics. As aforementioned, organisational characteristics have received little attention in the commitment literature.

In the Mottaz study, values/rewards are divided into three sub-groups:

a) intrinsic, including task autonomy, task significance and task involvement;

b) extrinsic social, including supervisory and co-worker assistance; and

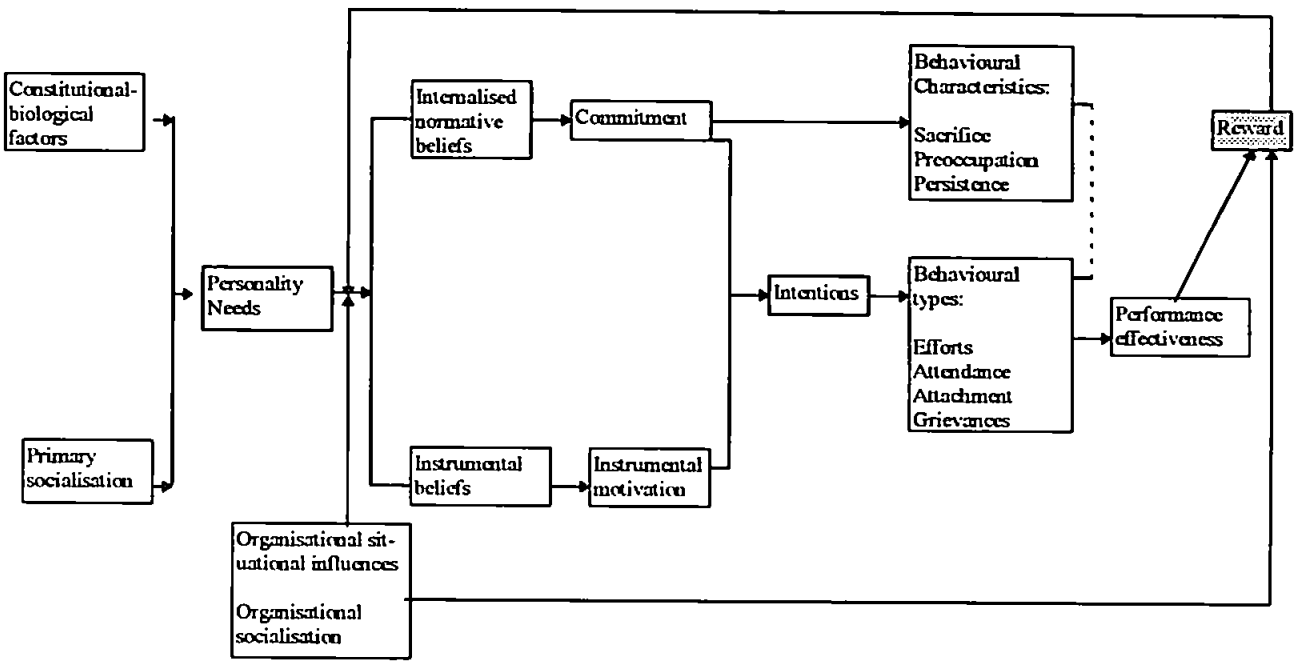
c) extrinsic organisational, including working conditions, salary, promotional opportunity and fringe benefits.

In order that employees may tend to be committed to organisations, the rewards offered by organisation have to be balanced with individual desired work values.

The potential antecedents of commitment discussed above mainly focused on the instrumental processes as determinants of commitment, however, Wiener (1982) argued that the immediate determinants of commitment are the internalised normative beliefs held by members. He categorised the internalised normative beliefs into two types: (1) generalised loyalty and duty, and (2) organisational identification. Identification can be affected by the process of socialisation or social learning. However, loyalty and duty may be affected only by recruiting process. Therefore, personal predispositions and organisational interventions are

two factors which influence commitment. Wiener believed that commitment was a function of internalised normative beliefs as shown in Fig 2.4.

Fig 2.4 A Model Representing Relationships Between Organisationally-Related Behaviours, Beliefs Concerning These Behaviours, and Commitment and Instrumental Motivations

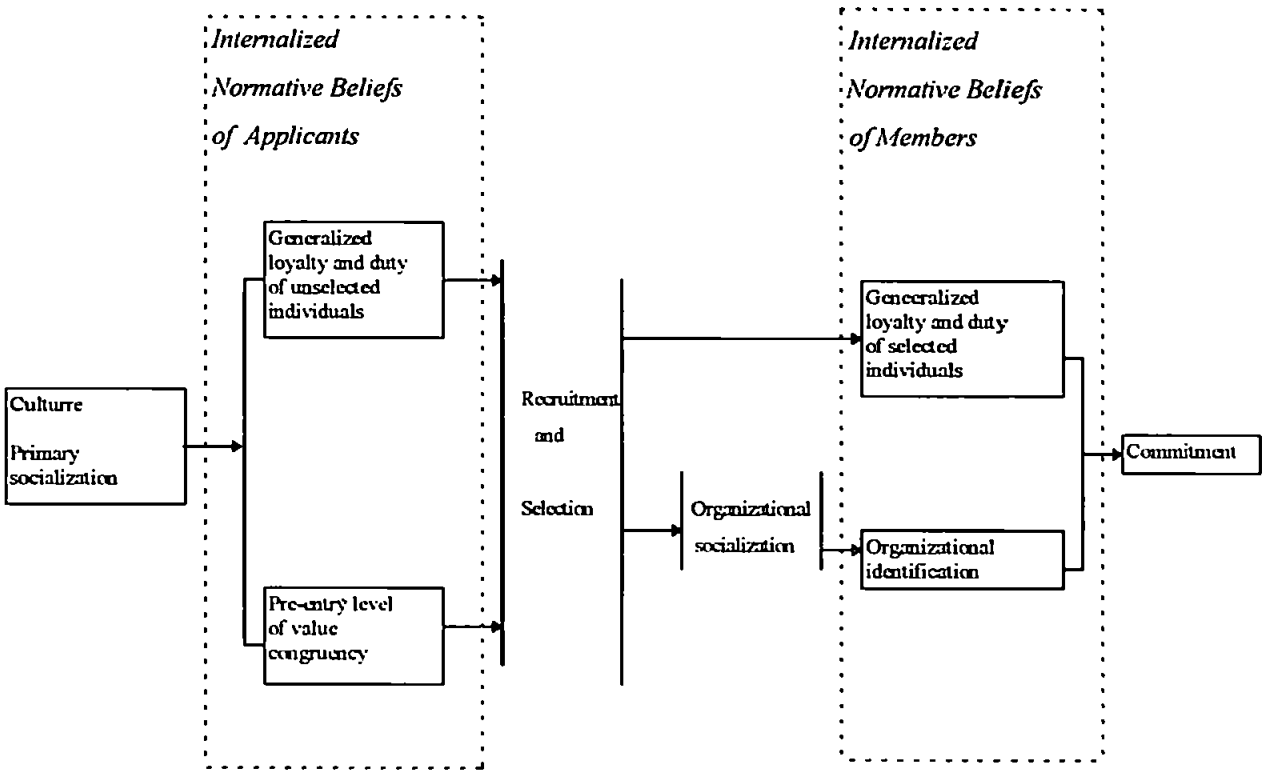


Source:Wiener, Y.,"Commitment in Organisations: A Normative View", *Academy of Management Review*, 1982, Vol. 7, No.3, p.420.

These normative beliefs may consist of two distinct types. First is the belief held by individuals that they have a moral obligation to engage in a correct behaviour. This reflects loyalty and duty in all social situations. Such persons tend to believe that it is "right" to be loyal, for example, to family, country, friends, and work organisation as well. This type of normative pressure is defined as generalised loyalty and duty. The second type of normative belief includes any type of internalised beliefs held by a person. These beliefs are consistent with organisational mission, goals, policies, and style of operations. Such a value congruence of individual-organisation reflects the process of "organisational

identification" (Hall *et al.*,1970). In effect, the two-type beliefs can be thought of as immediate determinants of organisational commitment. The processes and events that may lead to commitment in organisation conceptualised by Wiener are shown in Fig 2.5.

Fig 2.5 A Flow Diagram of Processes and Events Leading to Commitment



Source: Wiener, Y., "Commitment in Organisations : *A Normative View", Academy of Management Review* 1982, Vol. 7, No.3, p.422.

In the review of the organisational literature, Meyer and Allen (1991) identified three distinct themes in the definition of commitment as mentioned previously. Here, they argued that the differences in the antecedents of the three components of commitment are as follows.

Affective commitment Mowday, *et al.*,(1982) noted that personal characteristics, structural characteristics, job-related characteristics, and work experiences in the antecedents of commitment, in effect can be categorised into

personal characteristics, organisational structure and work experiences. Structural characteristics do not influence commitment directly, but through work experiences, such as employee/supervisor relations, role clarity, and feelings of personal importance.

Work experiences Meyer and Allen referred to the Herzberg (1966) hygiene/ motivator theory, which divided work experience variables into two categories: 'those that satisfied employees need to feel comfortable in the organisation, both physically and psychologically, and those that contributed to employees' feeling of competence in the work life". Variables in the comfort category, such as equity in reward distribution, organisational dependability, organisational support, role clarity and freedom from conflict have been found to correlate with affective commitment. Another category, competence - related experiences include accomplishment, autonomy, fairness of performance-based rewards, job challenge, job scope, opportunity for advancement, opportunity for self-expression, participation in decision making, and personal importance to the organisation.

Continuance commitment Because this reflects the recognition of costs associated with leaving the organisation, anything that increases perceived costs can be referred to as an antecedent of commitment. The most frequently studied antecedents include side-bets, and opportunities for employment. Many findings, as previously mentioned, show that age/or tenure have been correlated with commitment in some studies but not in others. Meyer & Allen (1984) questioned that side-bets accumulate with age and tenure, therefore, they did not include age and tenure as antecedents of continuance commitment in the model.

Normative commitment Basically, this component is cited from Wiener (1982) as mentioned earlier in this section.

Outcomes of organisational commitment

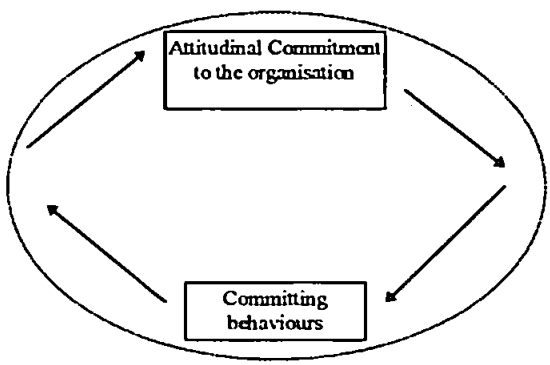
At least five outcomes of organisational commitment have been studied (Mowday, *et al,* 1982). These may include job performance, tenure with organisation, absenteeism, tardiness, and turnover. These outcomes to a student appear to be meaningless. This is because most students except those in the departments of navigation and marine engineering technology in the sample in this study, do not have work experiences; the outcomes such as job performance, tardiness and so on, to them do not make sense. This paper simply discusses "turnover"; because this may be interpreted in terms of "not go" or "not commit" to the occupations consistent with individual department educational purposes when they graduated. Or those students tend to transfer to other departments or universities by re-taking the federal entrance examination for universities when they finish the first year of study.

In order to determine the extent of commitment/turnover relationship hold, a series of research studies has been undertaken. Most research has found significant inverse correlations (Angle & Perry, 1981; Mowday et al, 1979; Steers, 1978). Mowday, *et al,* (1982) pointed out that possibly there are some intermediate variables between commitment and turnover, such as desire to stay and intention to search for another job. Stumpf and Hartman (1984) did not find significant relationship between organisational commitment and turnover. They suggested the economic conditions and job market at the time of their study might explain the phenomenon. This implies that the "commitment to stay and commitment to work are different constructs" as was mentioned previously.

2.2.3. The Process of Commitment

In spite of different theoretical orientations resulting in different research traditions of behavioural and attitudinal commitment, understanding the process of commitment is facilitated by studying the reciprocal influence of these two (Mowday, *et al*, 1982). They argued that no matter what the causal linking directions between commitment, attitudes and behaviours one from one or the other, it is more important to consider the mutual influence over time between them. The mutual influence relationships are shown in Fig 2.6.

Fig 2.6 Reciprocal influences between attitudinal and behavioural commitment



Source:Mowday *et al., Employee - Organisation Linkages : The Psychology of Commitment, Absenteeism, and Turnover*, 1982, p.48.

They have divided the research on the process of commitment into three main stages:

1) anticipation, that is, pre-entry stage;

2) initiation, that is, early employment stage; and

3) entrenchment, that is, Middle and later career stages, as shown in Fig 2.7.

Fig 2.7 Stages in the development of Organizational commitment

Pre-entry stage	Early employment stage	Middle and late career stages
Anticipation	Initiation	Entrenchment

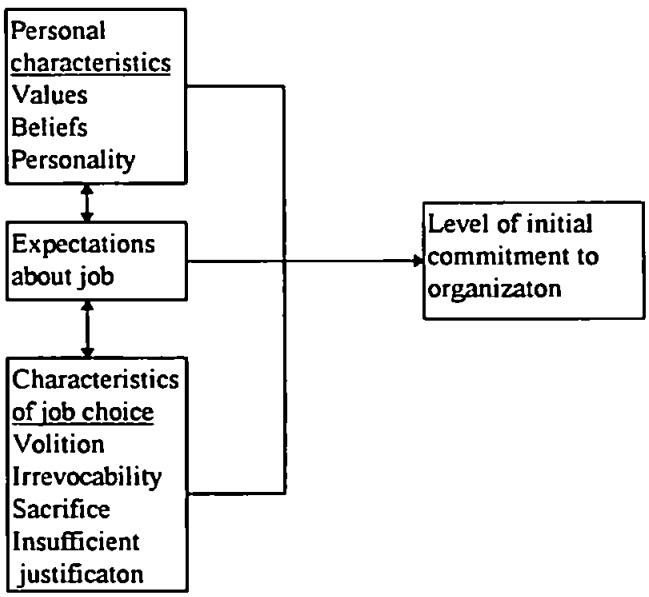
Source: Mowday *et al., Employee - Organisation Linkages : The Psychology of Commitment, Absenteeism, and Turnover*, 1982, p.46.

These stages will be employed to examine some of the relevant literature research carried out in this area.

Anticipation

Mowday *et al*, (1982) pointed out that "new employees entering the organisation with high levels of commitment, for example, may be more likely than uncommitted employees selectively to perceive positive features of the job and work environment". What is the type of new employees with high level of commitment? They suggested several factors influence the level of commitment of new employees when they enter the organisation. The factors are shown in Fig 2.8.

Fig 2.8 Major determinants of initial commitment to the organisation.



Source: Mowday *et al., Employee - Organisation Linkages : The Psychology of Commitment, Absenteeism, and Turnover*, 1982,p.49.

Pre-employment factors include personal characteristics, job expectations and job choice circumstances.

Personal characteristics

People may have different propensities towards commitment to different organisations due to understand socialisation both in the family and through educational experiences. Wiener (1982) suggested that parental and educational influences may be reflected in personal value systems and beliefs, which, in turn, lead to different propensities to commitment. New employees are likely to enter organisation with different work-related values, for example, the beliefs in the Protestant work ethic and work as a central life interest. These values appear to result from the early socialization of the individual. Dubin, *et al.*, (1975) suggested that employees who have a strong belief in the value of work are also more likely to become committed to the organisation. However, Mowday, *et al.*, (1982) argued that "although such a general relationship is likely to hold, it is important to recognise that new employees with a strong personal work ethic may become more attached to their jobs than to the organisation in which they are employed". Such attachments are often referred to as characteristic of professions where individuals identify themselves more strongly with the profession than with the organisation in which they are employed. Accountants and lawyers, for example, are typical professionals who are less committed to a firm/corporation than to the professions of their own.

Job expectations

When a person decides to select a job from several alternatives he or she may increase expectation of the chosen alternatives relative to the others. Some

studies have demonstrated unmet expectations resulting from over inflated expectations prior to employment (Mabey, 1983), or unmet expectations because of actual work experiences (Nicholson and Arnold, 1989).

Evidence relating met expectations to Organizational commitment is complex. Pre-entry expectations appear to be related to commitment. Meyer and Allen (1988) found that one of the best predictors of commitment was confirmation of pre-entry experiences in their longitudinal study of graduates in their first year of employment. However, there are no results in their longer term effects. Mowday, *et al.*,(1982) argued that compared with initial expectations, actual job experiences may be more influential on continued commitment during the early employment period, however, employees who enter organisations with high expectations may have a greater propensity to become committed. Wanous (1980) found that those with more realistic expectations were more likely to remain with their organisations.

Job choice

Individuals may have spent some time selecting an organisation when they complete their studies in educational institutions, such as colleges or universities. They decide to work and feel committed before the employment begins.

Vroom and Deci (1971) found that graduate students from business school re-evaluated job alternatives following their choice. After the decision of job choice had been made, the graduates valued highly the chosen job as more attractive and more likely to lead to the attainment of goals than before the decision. On the other hand, unchosen job alternatives were evaluated more negatively following the choice than before. This study implied that the act of selecting a job may enhance the new employees' attitudes toward the job over time.

O'Reilly and Caldwell (1981) using 108 MBA graduates, investigated the effects of postdecisional justifications on the job satisfaction and commitment. They found that the graduates who had freedom of job choice expressed more positive attitudinal commitment and satisfaction six months later. The graduates had several job offers and perceived that the job they chose as irrevocable. O'Reilly and Caldwell concluded that this is consistent with Salancik's theory of behavioural commitment, in which he suggested that although this job choice decision made voluntarily and free from external pressure, once the job was chosen it should be perceived as difficult to revoke.

Contrary to O'Reilly & Caldwell (1981) and Salancik's theory, Mowday and Mcdade (1979) found that commitment of new employees was positively related to the accuracy of information about the job. They also found that high initial commitment was more related to revocability of job choice than with irrevocability.

The seagoing situation exemplifies these facts. In order to recruit sufficient marine engineers, most Taiwanese shipping companies enhance their salary scales, provide high standard social amenities (for example accommodation), and use high technology propulsion systems. In their job descriptions they omit any mention of task variety, autonomy, work environment or social activity, factors which applicants may assume to be provided given their educational backgrounds and the attractions the companies have emphasised. Thus newcomers may be effectively misdirected in their expectations about the job at sea. Once at sea their misconceptions are revealed by their experience of day to day work in the engineroom, the short periods spent in port, and the scarcity of co-workers. This last produces feelings of isolation from human society. Together these factors soon produce a desire to leave the sea, though they are kept there by contractual conditions.

Initial commitment to the organisation appears to be influenced by the

personal characteristics of new employees, expectations about the job, and circumstances associated with the decision to join the organisation.

Initiation

Initiation includes the early stage of employment when the socialization process commences; at the same time, employees face the actual work experiences instead of expectations. Many of the studies are concerned with the initial period covering the first few months of employment which is arguably too short period for commitment to be built up. However, Buchanan (1974) and Mowday, *et al.*, (1982), have identified that the early months of employment as a particularly important period in the development of work attitudes.

Wanous (1980) found that new employees enter organisations with naive optimism. When these employees found that their expectations were not consistent with their actual work experiences, their Organizational commitment and job satisfaction promptly declined. As a result, high rates of turnover happened during early employment.

Dunnette, *et al.*, (1973) found that employees, particularly university educated employees, are disappointed with the intrinsic aspects of jobs, such as challenge, responsibility and opportunity for growth. Keenan & Newton (1986) investigated graduate engineers' work aspirations and experiences during their first year of employment. They found that few of the graduates' in their initial work experiences felt that their aspirations were being met particularly the levels of autonomy and influence, and that the development of their abilities was hardly satisfied.

The examination of effects of positive and negative work experiences on commitment is important since these experiences may replace unconfirmed expectations. Meyer and Allen (1988) found that the influence of work experience on commitment during the first year to employment is consistent

with the "time lagged effect of work experiences on commitment". This evidence was not found by Bateman and Strasser (1984) nor Curry, *et al.*,(1986). Meyer and Allen (1988) suggested that this discrepancy may have been due to the length of tenure in their studies.

Entrenchment

This stage covers Organizational commitment during the later periods of employment. This stage has attracted less attention in comparison with the early period. As Mowday, *et al.*,(1982) pointed out "most of the longitudinal studies of commitment have focused on the early employment period, there is a need to consider the development of commitment at mid and late career stages as well".

Tenure is a strong predictor of Organizational commitment in the later periods of employment (Angle and Perry, 1981; Morris and Sherman, 1981), Lydka (1991) argued that, however, "it is unclear whether tenure is sufficient to significantly influence commitment or whether it does so in conjunction with other factors".

Mowday, *et al.*, also argued that tenure may lead to jobs with greater rewards both intrinsic and extrinsic. However, only few employees reach the levels to which they aspire. Another explanation may be that employees may increase their commitment by adjusting their expectations over time in line with their experiences in organisation.

Becker's side-bet theory (1960) may also provide an explanation for the relation of tenure and commitment. Employees accumulate investments over time, which would be lost when they leave the organisation. Longer tenure employees may also perceive themselves to have little or no likelihood of employment alternatives. Salancik (1977) has suggested "interpreting relationships between Organizational commitment and tenure is difficult

because so many factors may co-vary with length of service". In the aforementioned brief discussion, the length of service may be associated with increasing investments and social involvements, decreased mobility, and sacrifices. Each of these factors, alone or in combination, may serve to enhance commitment to the organisation.

2.3. Empirical studies of the Commitment Process

2.3.1. Longitudinal Studies

As previously mentioned in this chapter, the process of becoming committed to an organisation may include relationships among attitudes, perceptions, and behaviours that grow stronger over time. This process may be interpreted by increasing consistency among attitudes, perceptions, and behaviours as length of service in the organisation increases. Some of the empirical evidence on reciprocal relationships among these variables will be discussed in the following.

Crampon *et al.* (1978)

Crampon *et al.* (1978) examined the relationship between organisational commitment and performance on the longitudinal data collected by Porter *et al.* (1976). Participants in the study were retail-management trainees. The result of examination showed that the reciprocal relationship between the organisational commitment and performance exists. However, the study focused on the early stages of employment only and the sample size (n=46) was relatively small. Further study is needed in this area to confirm these findings.

O'Reilly and Caldwell (1980, 1981)

O'Reilly and Caldwell (1980, 1981) conducted a longitudinal study. They examined the effects of postdecisional justifications on the job satisfaction and commitment. The study was conducted on 108 MBA's graduates job choice immediately after making the decision and then again six months later. In a further study, turnover data were collected after 24 months.

They found that individuals, who had made the original decision volitionally, that is, from a number of offers and free from external constraints, and who had perceived the choice to be irrevocable, were more satisfied and committed six months later than others. They also found perceived irrevocability of job choice and behavioural commitment were negatively correlated with turnover after two years of employment.

Mabey (1983)

Mabey (1983) confirmed the inflated and over optimistic expectations in his longitudinal study of engineering graduates over their six months of employment. The vital factor influencing satisfaction and commitment is the mismatch between expectations and actual work experiences in their initial stage of employment. Like O'Reilly and Caldwell (1980, 1981), he also found that individuals who had made the decision volitionally were more satisfied and committed than others six months later.

Rusbult and Farrell (1983)

Rusbult and Farrell (1983) conducted a longitudinal study from the sample of 88 newly hired junior accountants and registered nurses. This investigated the relationships among the determinants of job satisfaction, job commitment and turnover by using the investment model. In general, high job rewards and low job costs led to a greater job satisfaction. A strong job commitment was produced by high rewards and low costs, poor alternative quality, and large investment size. Job reward included both extrinsic and intrinsic factors (e.g. variety and salary) and job costs included factors, such as inadequate resources, heavy workload and unfair promotion practices. All the longitudinal studies discussed previously use the same measure of organisational commitment developed by Porter *et al.* (1974). Rusblut and Farrell (1983) use

global items to measure commitment which are primarily concerned with behavioural commitment. They are *"how long would you like to stay at this job? (1=short period of time, 9=long period of time); how likely is it that you will quit this job in the near future? (1=extremely likely, 9=not at all likely); how committed are you to staying at your current job? (1=not at all committed, 9=extremely committed); how attached are you to your current job? (1=not at all attached, 9=extremely attached); and on the average, how many hours per month have you spent attempting to find a different job? (____hours per month on the average)".* Another thing should be noted that Rusbult and Farrell use the term job commitment instead of organisational commitment. Probably, this phraseology may have better response.

Curry *et al.* (1986)

Curry *et al.* (1986) had questioned Bateman and Strassers (1984) findings that satisfaction precedes commitment, particularly on methodological grounds. They conducted a study on employees in the nursing departments of five voluntary, short-term, general hospital in western state. The population was selected to replicate as closely as possible the population used by Bateman and Strasser (N=508). Data collection in January and August 1981 provided measures of satisfaction and commitment at time 1 and time 2 respectively. The data were analysed with the LISREL statistical package. They did not find that commitment had a causal effect on satisfaction nor that satisfaction had a causal effect on commitment.

Meyer and Allen (1988)

Meyer and Allen (1988) conducted a longitudinal study of 73 recently hired university graduates to determine link between work experiences and organisational commitment during the first year of employment. They used

structural regression analyses to examine the time-lagged influence of work experiences on commitment, and of commitment on work experiences. The results revealed the importance of the effects of employees' work experiences in the first month of employment on commitment measured after six and eleven months. They found that the strongest predictors of commitment were the confirmation of pre-entry expectations and the opportunity for self-expression. They also found that prior commitment is a significant predictor of subsequent commitment. Some evidence, although weaker, was also provided for time-lagged effects of commitment on perceived work experiences, particular in six-eleven month lag.

Nicholson and Arnold (1989a; 1989b)

Nicholson and Arnold (1989a; 1989b) pointed out that most organisations invest much time and effort in the selection, induction and socialisation processes for the sake of developing new employees to meet corporate goals but usually with limited success. They conducted a longitudinal study of new and recent graduates at British Petroleum. The respondents consisted of a core sample of 98 graduates and a secondary sample of 70 graduates stratified by year of entry (over five years) and department (two technical and two commercial). Data were collected at three points in time over one year by questionnaires and in-depth interviews with the core sample. The questionnaires were administered to the secondary sample by mail. They found about 30% of their sample expressed a primary commitment to themselves while others either expressed multiple commitments or conditional commitments. Nicholson and Arnold found that expressed commitment became more complex and more conditional over the year of their study.

2.3.2. Empirical studies

Reichers (1985) have summarised much of the previous empirical research on organisational commitment as an independent and a dependent variables respectively. Its brief discussions are shown in Table 2.4 and Table 2.5.

Table 2.4 Commitment as an Independent Variable

Researcher(s)	Years	Sample	Outcomes (correlate)
Angle & Perry	1981	Transit workers	Tardiness, turnover
Bateman & Strasser	1984	Nurses	Job satisfaction
Hom, Katerberg, & Hulin	1979	Military personnel	Turnover
Koch & Steers	1978	Public employees	Absenteeism, turnover
Larson & Fukami	1984	Unionized, newspaper employees	Absenteeism, turnover, performance
Marsh & Mannari	1977	Japanese electrical workers	Turnover[a]
Mowday, Steers, & Porter	1979	Public employees	Absenteeism, turnover
Porter, Crampon, & Smith	1976	Management trainees	Turnover
Porter, Steers, Mowday, & Boulian	1974	Psychiatric technicians	Turnover
Steers	1977	Scientists and Engineers	Attendance, turnover
Van Maanen	1975	Police Recruits	Performance
Blau & Hall	1989	Bank employees	Turnover *
Cotton & Tuttle	1986	Integrated analysts	Turnover *
Shore & Thornton	1989	School employees	Turnover *

Source: 1.Reichers, A. E. "A Review and Reconceptualization of Organisational Commitment", *Academy of Management Review*, 1985, Vol. 10, No.3, 466.
*2.Ko, H. L. "The study of Relationships among personal characteristics, Career development environment, and Organisational Commitment", Unpublished PhD thesis, Taiwan National Chen-Chi University, 1993, p.67.
[a]No effect

Table 2.5 Commitment as a Dependent Variable

Researcher(s)	Years	Sample	Antecedents (correlates)
Alutto, Hrebiniak, & Alonso	1973	Teachers, nurses	Investments (age, education, etc.)
Batrol	1979	Computer Specialists	Job satisfaction
Brown	1969	Public employees	Need satisfaction
Buchanan	1974	Public/private sector managers	Group norms, job challenge, met expectations, self-image reinforcement, feelings of personal importance
Farrell & Rusbult	1981	Students, industrial workers	Investments, rewards, costs, alternatives
Fukami & Larson	1984	Unionized, newspaper employees	Tenure, job scope, job stress (-), supervisor relations, social involvement
Grusky	1966	Private sector managers	Rewards, costs
Hall, Schneider, & Nygren	1970	Foresters	satisfaction of affiliation and security needs
Hrebiniak & Alutto	1972	Teachers, nurses	Role stress(-), job satisfaction, tenure
Kiesler & Sakumura	1966	Students	Extrinsic rewards (-)
Lee	1969	Scientists	Tenure, personal/organisational goal congruence, professional prestige
Morris & Sherman	1981	Mental health workers	Role stress (-), self-efficacy, age, education
O'Reilly & Caldwell	1980	MBAs/new employees	Volitionality and irrevocability of job choice, job satisfaction
Rusbult & Farrell	1983	Accountants, nurses	Rewards, costs, alternatives
Schneider, Hall, & Nygren	1974	Foresters	Self image/organisational goals congruence, tenure
Sheldon	1971	Scientists	Age, tenure, position

Steers	1977	Scientists, Engineers	Need for achievement, job characteristics, group norms
Stevens, Beyer, & Trice	1978	Public sector supervisors	Role overload (-), tenure, job involvement
Stumpf & Hartman	1984	Students/new employees	person/job fit, performance, job satisfaction
Wiener & Gechman.	1977	Teachers	Involvement, job satisfaction
Welsh & LaVan	1981	Hospital employees	Role stress (-), job satisfaction, age, tenure

Source:Reichers, A. E., "A Review and Reconceptualization of Organisational Commitment", *Academy of Management Review*, 1985, Vol. 10, No. 3, p.467.

Recently, many researchers have been interested in the study of commitment to the organisations. Some of them are briefly discussed in the following.

Oliver (1990)

Oliver conducted a study on 121 employees in a large producer co-operative. In terms of education, forty eight percent of the sample possessed higher or further education qualifications; fourteen percent had no qualifications. Commitment could be function of rewards, investments and alternatives. The study was explored using a range of attitudinal indices of commitment. Results revealed that multiple regression analysis did not provide support for the full model. Factor analysis of the multiple commitment indices also provided little evidence of a general organisational commitment construct. The findings of this study support the view that there are conceptual problems with the organisational commitment construct.

Dubinsky *et al.* (1992)

Dubinsky, *et al.*, (1992) took the salespeople of America, Japan, and South Korea as sample to study the influence of role stress on organisational commitment, job satisfaction and work performance. Results revealed that there are significant difference in role ambiguity, role conflict, work performance, job satisfaction, and organisational commitment among the countries' salespeople as shown in Table 2.6.

Table. 2.6 Comparisons of American, Japanese, and South Korean sales people on role ambiguity, role conflict, work performance, job satisfaction and organisational commitment.

Role Ambiguity	Role Conflict	Work Performance	Job Satisfaction	Organisational Commitment
American<Japanese American<S. Korean Japanese>S. Korean	American<Japanese Japanese>S.Korean	American>Japanese American>S. Korean	American>Japanese American>S. Korean Japanese>S. Korean	American>Japanese American>S. Korean

Source:Dubinsky *et al.*, "Influence of Role Stress on Industrial Salespeople's Work Outcomes in United States, Japan, and Korea", *Journal of International Business Studies*, 1992, 23, p.88.

A particular notion showed in Dubinsky, *et al.*, (1992) is to be discussed here. In general, the points of view of people in the western countries are that commitment in terms of loyalty, identity, and involvement should be stronger of people in Asia than that of people in the Western due to the influence of Confucianism. Clegg *et al.*, (1986) pointed out that the economic success of East Asian countries like Japan, Hong Kong, Singapore, South Korea, and Taiwan is as a result of Confucian traditional culture. The use of long-standing and pervasive cultural attitudes and institutions which are identified as the source of East Asian success. This explanation to the East Asian case has been

called the post-Confucian hypothesis. Herman Kahn (1979) was the first one to explicate the term. Kahn proposed that the success of organisations in Japan, Korea, Taiwan, Hong Kong and Singapore was due to certain key traits shared by most employees and were attributable to the teaching of the Confucian tradition. The traits stressed are those of familism and obedience. The general argument of a common post Confucian heritage can be found in Redding (1980; 1990) on the "overseas Chinese", Silin (1976) on Taiwan and Saha (1989 - 1990) on Japan.

A key notion of Confucianism was that *Chun-tzu,* in terms of English, are loyalty and pardon. The meaning of these two is a concern for the courteous and correct conduct of one' duties , particularly towards the family, based on the key principles of Confucianism. "Confucianism was not an organised religion, nor did it contain any conception of a deity or an absolute being" as Clegg (1991) says. The progenitor of Confucianism, Confucius was a Chinese sage, a human being. Confucianism was purely concerned with the rules of conduct which were the essential attributes of the feudal lords in ancient China. For them Confucianism provided the basis of an appropriate education. Confucianism, with its concern with "loyal to feudal lord, king", and "love their country" was much enjoyed by the ruling class.

During the thirteenth century, elements of indigenous Taoist and foreign Buddhist belief became fused into a Chinese religious synthesis. Western sociologists defined this synthesis as neo-Confucianism.

Neo-Confucianism developed in Tokugawa Japan between 1600 and 1868 under the patronage of the Shogunate. Neo-Confucianism emphasised on social order, harmony and loyalty. The ruling class was happy with this sort of things and used it to pacify the country. Consequently, neo-Confucianism was naturalised as an indigenous movement, despite its roots in China. Some authorities argued that neo-Confucianism was re-invented or at least re-discovered after Meijei restoration of 1868 when Tokugawa was overthrown.

Because of the emerging conflict fostered by rapid capitalist industrialisation, industrialists were seeking an ideology to conciliate the said conflict. As a result, neo-Confucianism was adopted as a solution to this demand. After World War I existing conflicts were aggravated by the emergence of socialism and labour unionism. Entrepreneurs, both moral and industrial once more pressed neo-Confucianism into service because of which stress on a family spirit and harmonious social relations. Following the defeat of World War II, as a result of some Japanese elites' adversity to Confucianism, and modernising managerialism imposed by the victorious occupying US forces, the influence of Confucianism on Japanese organisations is declining. It is this post-war variant, initially in Japan and latterly elsewhere in East Asia, which has been termed post-Confucianism. The research results of Dubinsky should not cause surprise.

Banai and Reisel (1993)

Banai and Reisel (1993) conducted a research programme on the sample of employees in six multinational corporations (banks) in UK. The study investigated the organisational commitment of managers in main offices, expatriate managers, and local branch managers. The nationalities of participants included Israeli, Dutch, American, and British. Organisational commitment was measured by Porter, *et al.*, (1979) *Organisational Commitment Questionnaire*. Commitment was grouped into two factors, loyalty/identification, and involvement by factor analysis. They found that there is no significant difference in organisational commitment among the managers in UK main offices, expatriate managers, and local branch managers. However, there is a significant difference in involvement commitment. Managers in local branches are more strongly committed than are managers in main offices and expatriates, while the loyalty/identification commitment of managers in UK main offices is higher than that of other managers. As far as nationality is

concerned, there is no significant difference in organisational commitment among these three categories of managers, however, British managers' involvement commitment is higher than that of other managers. This is consistent with the finding that the local managers' involvement commitment is higher than that of managers in UK offices and of expatriates, because banks are situated in UK, and most managers in UK offices are British. The study also found that age, tenure, and position are positively related to organisational commitment (loyalty/identification). However, they are not related to involvement commitment.

Meyer, *et al.* (1993)

The authors conducted a study to test the generalizability of the Meyer and Allen (1991) three component model of organisational commitment to the domain of occupational commitment. The participants involved in this study were a single occupation, nursing. The first sample consisted of student nurses; the second sample was composed registered nurses, who had considerable experience in the nursing profession. They developed measures for affective, continuance and normative commitment to occupation. Hypotheses concerning their differential relations with antecedent and outcome variables were tested by measures they developed. They used confirmatory factor analyses (CFAs) on the data obtained from one another. Results of correlation and regression analyses were generally consistent with predictions made based on the 3-component model.

Hackett, *et al.* (1994)

This study was to assess 3-component model of organisational commitment developed by Meyer and Allen (1991). Although there were large error

components associated with some of the items from Meyer and Allen's study the existence of 3 facets of commitment was generally supported by a confirmatory factor analysis (CFAs) of data from 2,301 nurses. Some of the expected differential relationships of these facets to antecedents and outcomes of commitment were supported in both the nurse sample and a sample of 80 bus operators.

2.3.3. Empirical studies in Taiwan

Recently, organisational commitment has been given Taiwanese researchers' attention. However, it seems to use western approach to predict the variables related to organisational commitment, like job satisfaction, turnover, work attitudes and so on. Conceptualisation appears to be little discussed. Some of the empirical studies are briefly discussed below.

Lu (1981)

Lu took employees of gas stations in Taipei area as sample to investigate the relationship between organisational commitment and job satisfaction. Results revealed that the job satisfaction is positively correlated to organisational commitment.

Yang (1982)

Yang examined the relationships among personal characteristics, organisational climate, and organisational commitment. The findings showed that they are related among work attitudes, organisational climate, and organisational commitment. Participants were professionals and managerial employees in electronic companies.

Cheng (1985)

Cheng investigated the relationships among organisational commitment, personal needs, and boss authorities. The findings revealed that personal need and organisational commitment are not related while authority is negatively related to organisational commitment. Participants were white collar career women.

Iyn (1988)

Iyn investigated the relationships between computerisation and antecedents and outcomes of organisational commitment by a longitudinal study. Data were collected from JUN-TAI industrial employees. The findings revealed that computerisation would influence organisational commitment, and confirm the relationships among recognition of organisational environment, antecedents, and outcomes of organisational commitment.

Lin (1989)

Lin (1989) conducted a research study into commitment to teaching with 2265 students from nine normal colleges in Taiwan. Results found that willingness to study, expectation on teaching, role perception and socio-economic status of family, predicted commitment to teaching with 33% of total variance. Participants were from the families of middle or lower level of socio-economic backgrounds. Students enrolled in these colleges mainly because of economic reasons, and trying to reduce parental economic load. The reasons for commitment to teaching were job security, and the long period of holiday. The reasons for non-commitment to teaching were the difficulty of achieving further study to get higher degrees, and the lack of opportunity to develop oneself. Lin took attribution of enrolment, the strength of expectancy to teaching, role perception of teacher, socio-economic background, as independent variables to

predict a dependent variable "commitment to teaching". However, it did not account for commitment to teaching having a high percentage of variance.

Shyu (1990)

Shyu examined the influence of culture on organisational commitment. He found that culture (culture may be thought as a potential social control system) is positively related to organisational commitment. There are significantly difference in organisational commitment by different industries and different position of employees. The participants in the research were employees in private enterprises.

Ru (1982)

Lu took employees in banks, both foreigners' owned and indigenous ones in Taiwan, as sample to investigate the relationships among personal characteristics, job characteristics, job experiences, and organisational commitment. The findings revealed that job characteristics are positively related to organisational commitment.

Shu (1987)

Shu conducted a study on employees of American electronic factories in Taiwan to examine organisational commitment. He found that willingness to make effort, intent to stay, and goal identification were significantly different by different demographic backgrounds. Sex, marital status, and tenure were of little influence on organisational commitment. Age, and internal recognition were positively related to organisational commitment. Age, tenure can be predictors of organisational commitment. Ko (1993) has summarised the

commitment as dependent variable and independent variable as shown in Table 2.7 and Table 2.8 respectively.

Table 2.7 Commitment as independent variable for empirical studies in Taiwan

Researchers	Years	Sample	Outcomes (correlate)
Yu, A. P.	1980	Private industrial employees	Turnover
Huang, K. I.	1984	Engineers in research institutions	Turnover
Lin, L. F.	1984	Inspector in account corporation	Turnover
Liu, Y. Y.	1988	Researchers in high technology institution	Career development strategies
Chang, J. C.	1989	Inspectors in account corporation	role conflict

Source:Ko, H. L., "Personal characteristics, career development environment, and organisational commitment". Unpublished PhD thesis, Taiwan national Cheng-Chi University, 1993, p.73.

Table 2.8 Commitment as dependent variable for empirical studies in Taiwan

Researchers	Years	Sample	Antecedents(correlates)
Ru, C. C.	1982	Employees of banks	Personal characteristics, Job characteristics, job experience.
Yu, A. B.	1980	Employees of private enterprise	Personal characteristics, job characteristics, job satisfaction
Lin, L. F.	1984	Inspector in account corporation	Personal characteristics, job satisfaction
Huang, K. Y.	1984	Engineers in research institutions	Personal characteristics, job characteristics, leadership, job satisfaction
Lu, P. C.	1981	Employees of gas stations	personal characteristics, job satisfaction
Chenng, D.C.	1985	Employees of public and private enterprise	Personal characteristics, leadership, role stress, personal interest
Park, Y. P.	1989	Korean employees, electronic industries	Personal characteristics, work values, leadership, job satisfaction
Lin, S. T.	1987	Inspector in account corporation, and accountant in public & private corporation	personal characteristics, work values, achievement, role of sex, leadership
Huang, K. L.	1986	High school teachers	Personal characteristics, values, achievement, role of sex, leadership
Lin, R. C.*	1989	Students from normal colleges	Expectation to teaching, willingness to study, role perception of teacher, belief of teaching, job security.
Liu, Y.Y.	1988	Researchers in high technological industries	personal characteristics
Iyn, Y. L.	1989	Employees of textile factory	Organisational innovation
Lin, S. C.	1992	Employees, information technology industries	Equity reward
Tin, H.	1988	Employees, private enterprise	Enterprise culture

Source: Ko, H. L., "Personal characteristics, career development environment, and organisational commitment". Unpublished PhD thesis, Taiwan National Cheng-Chi university, 1993, p.70 - 72.
*author's

2.4. Summary

In the literature review for this research, there are two main theories of career guidance: (i) matching individual and job (i.e. job-person matching) and (ii) the development of career related ability (i.e. the developmental model of guidance). The latter is closest to this study.

An important issue is the relationship among socio-economic class level, the social prestige of certain jobs and occupational choice. The social prestige given by Taiwanese students to marine engineering is discussed in this study.

The Chinese cultural value "all professions are inferior to studying" which places studying above all professions must influence the experience of occupational choice by Taiwanese young people, particularly for young males. No further study is required for marine engineering after the professional First Class Certificate is obtained. It is an issue that may need to be addressed by educational institutions, and shipping companies.

Another factor influencing occupational choice for young male college graduates which has been given little attention in research is the change in Taiwanese society giving females further educational opportunities. This characteristic of the higher education of females coupled with the strong Chinese value on studying and the absence of further study in marine engineering may have an important influence on young males of marriageable age.

The negative effect of education to organisational commitment has been reported in the literature but is not yet fully understood. It is claimed in the literature, that the workers with higher levels of education have greater job alternatives than less educated workers, but they also have higher expectations

from a particular job. This might be thought to lead to more highly educated workers having lower organisational commitment; it can be argued that a more highly educated worker knowing that he or she has job alternatives and yet choosing to stay in a particular organisation, is more committed than a lesser educated person "locked into" a particular organisation through lack of job alternatives. This issue is particularly important in the Taiwanese merchant shipping environment now that the trend "maritime education and training to degree level"[1] is to be re-addressed.

While the process of commitment falls into three stages of anticipation (pre-entry), initiation (early employment), and entrenchment (mid career), this research focuses mainly on the first stage.

Commitment has been used as an independent variable to predict turnover, and job satisfaction by many studies, however, commitment has been employed as a dependent variable by many authors as well. This research uses commitment as the dependent variable and predicts the relationships of willingness to study in specific subjects by different demographic background of students' families in the changing society.

In the context of research into commitment as a dependent variable already conducted in modern Taiwan, this present study extends the work of Lin (1989) on commitment to teaching of the students from normal colleges in Taiwan.

[1] Manual, K., and Bereiweriso, L.,"Use of modern technology in ships and maritime operations:Strategy for education and training in developing countries", proceeding of 6th IMLA conference. This paper argued that maritime education and training should advance to degree level.

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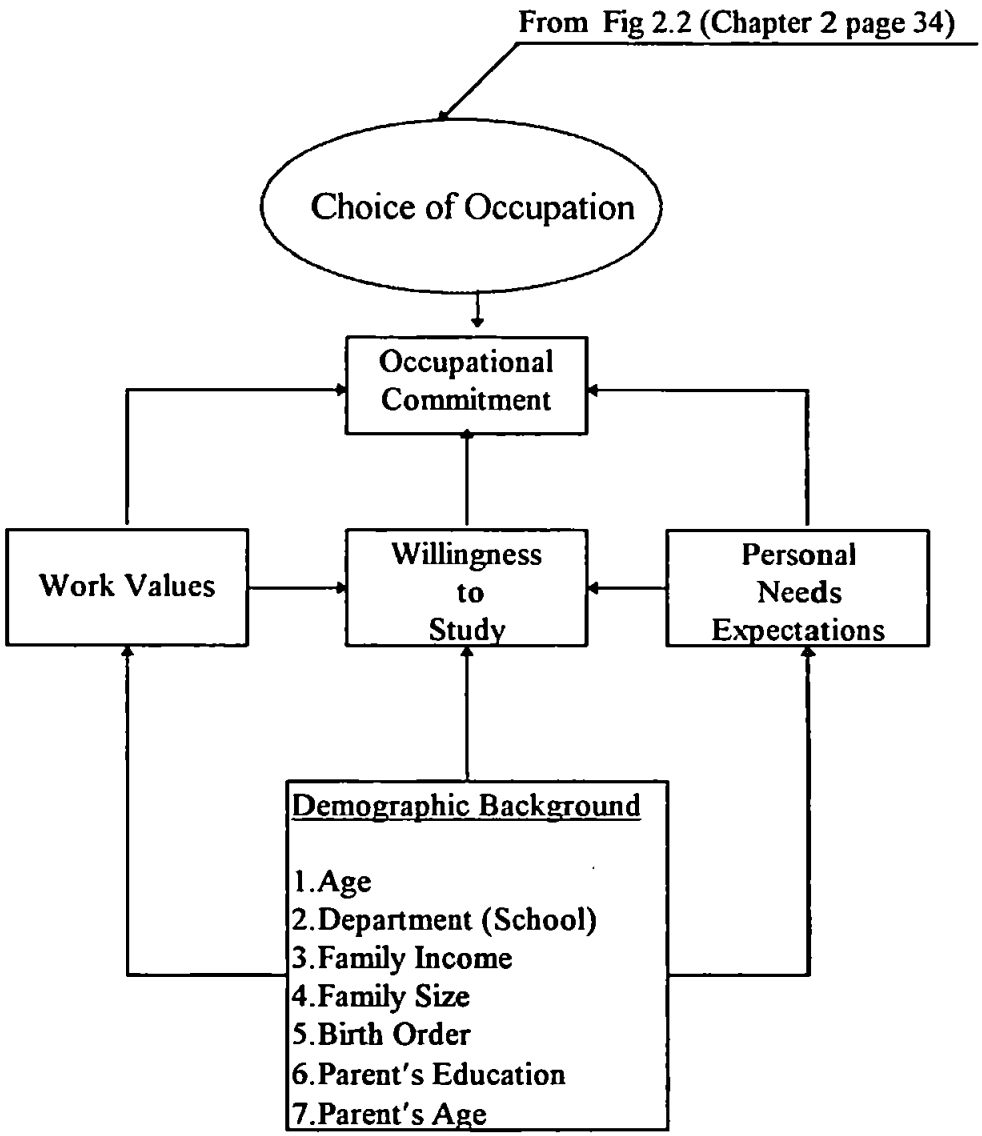
Chapter 3 Research Hypotheses

3.1 Theoretical Model

With a planned approach to the research based on the literature survey, a theoretical model was developed which would relate the earlier considerations of occupational choice (Fig 2.2 page 34) to the concept of occupational commitment. The theoretical model on which the present research is based is shown in Fig 3.1. This Figure (3.1) flows on from the earlier part of the model shown in Fig 2.2 (page 34).

Fig 3.1 Antecedents of Students' Occupational Commitment



Source: Researcher's Theoretical Model

3.2 Hypotheses

3.2.1. [Hypothesis 1]

The educational system of Taiwan has adopted from America 6-3-3-4[1] system since the end of the World War II. The process of education is divided into three stages; they are primary, middle, and higher education. The compulsory education is nine years in this country.

Higher education is offered by junior colleges, independent colleges, universities, and graduate schools. The junior college offers courses in applied sciences, with the aim of turning students into technicians after graduation. The independent college, the university, and the graduate school offer education which is principally focused on advanced study in order to train students to become specialists and researchers. At the end of 1994, the total number of higher education institutions is 125, which includes 13 state-owned universities, 15 independent colleges, 14 5-year colleges, and private 8 universities, 15 independent colleges, 60 5-year colleges (*ROC Statistics Yearbook*, 1994). There are three institutions in higher education related to maritime education and training, namely National Taiwan Ocean University, private China Maritime College, and National Taiwan Kaohsiung Institute of Technology.

Each department of various colleges or universities has its own educational purpose. Taking marine engineering, for example, the objective is to educate and train students to be marine engineers. Hence, when a young student decides to enrol in a department he should know what subjects the department offers and what human resource the department will supply for the society. Therefore, the decision made for enrolment in the department can be thought of the initial commitment to an occupation. As a result, the willingness to study in a specific

[1] The school system basically, is 6 years for elementary school, 3 years for junior high school, 3 years for high school, and 4 years for university.

subject must have correlation to occupational commitment. This leads to the Hypothesis 1 ***"The respondents' willingness to study in a specific subject is positively related to their occupational commitment"***.

3.2.2. [Hypothesis 2]

Super (1951) defined self-concept as that "occupational choice represents an attempt to implement one's self concept in an occupation, and that this is done by matching one picture of oneself against one's picture of people in occupations that one knows and in which one is interested". People always try to make their needs come true through hard work in occupations. A series of studies have examined various personality factors related to commitment. Commitment has been found to be related to achievement motivation, sense of competence, and other higher-order needs. Although the scheme of psychological needs proposed by Maslow (1954) has not received strong empirical support by western researchers (Cook and Wall, 1980), old Chinese sayings "well fed, well bred" and "one has not even enough to live on, let alone other things" are similar to that conceptualisation of hierarchical needs, and have been accepted by Chinese for long time. It would appear that commitment to the organisation, in turn, to the occupation can be sustained to the extent that employees see the organisation as a source of need satisfaction. Hence, an exchange relationship between the individual and the organisation in which commitment attitudes are "exchanged" for desirable outcomes for the employees. This leads to Hypothesis 2 ***"The satisfaction of personal needs in job characteristics is positively related to occupational commitment"***.

3.2.3. [Hypothesis 3]

Students' values in work may be related to occupational commitment. In this regard, there is evidence to show that individuals with a strong personal work ethic tend to be highly committed to the organisation. Dubin, *et al.*, (1975) discovered that workers with a work-oriented central life interest were also highly committed to the organisation. This leads to the Hypothesis 3 ***"Work values held by students are positively related to occupational commitment"***.

3.2.4. [Hypothesis 4]

In general, commitment has been found to be positively related to both age and tenure (Angle & Perry, 1981). Normally, students are from 15 to 21 years old in college, whilst at university, they are from 19 to 23 years old in Taiwan. This cohort of young people, as far as their self-concept is concerned, tend to be developed. Their preferences in job choice are related to occupational commitment. The older the respondents, the more they are willing to study in their individual department, in turn, the higher they commit themselves to the occupations relating to the educational purpose of their chosen department. This argument leads to Hypothesis 4 ***"The respondents' age is positively related to willingness to study"***.

3.2.5. [Hypothesis 5]

In Chinese traditional culture, the eldest boy in birth order has to be responsible for whole family when he has grown up. Hence, the birth order of male students will affect their responsibility in household and thus, in turn, to their

commitment to their occupation. This leads to Hypothesis 5 *"The first born son has higher occupational commitment than second or later born sons"*.

3.2.6. [Hypothesis 6]

Family size as a variable in the vocational development of college students has attracted little attention in Taiwan. As the socio-economic situation changed change rapidly in recent decades when the average Taiwanese family size reduced from 6 in 1940 to 4 in 1994. The parents are more able to afford their children studying in school. A higher level of education will have more employment alternatives. Thus the children in the smaller size of family have higher freedom in occupational choice than that of the children in the bigger sized of families. Therefore, family size will affect young students' preference in job choice, thus in occupational commitment. The bigger the family size is, the less freedom in occupational choice. This can lead to Hypothesis 6 *"The respondent's family size is positively related to occupational commitment"*.

3.2.7. [Hypothesis 7]

Socio-economic background is the most commonly research variable and has variously been related to level of choice or aspiration, field or type of choice, occupational attitudes and values and decision making. Family income, parental level of education, and parental age are frequently included in socio-economic status as variables to predict occupational commitment. However, under the traditional cultural pressures, parental level of education still prevails upon their children's occupational choice. This leads to hypothesis 7 *"Parental level of education is positively related to occupational commitment"*.

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Chapter 4 Research Method and Implementation

4.1. Population and Sample

The data for this study were obtained from students of six academic institutions, personnel managers from ten shipping companies, and thirty practising marine engineers in The Master Association for upgrading training. They are discussed below.

4.1.1. Academic Institutions

a) National Taiwan Ocean University The only university operated by government to educate and train young people for marine science and technology is National Taiwan Ocean University. This university was established in 1953. Primarily, the students' intake in the department of marine engineering were high school leavers. There were three years of study and one year of shipboard practice. This university was renamed from the Taiwan Provincial Maritime College. The duration of study also increased from three years of study to four years and six months of shipboard practice. Because of economic recession in 1985, shipping demand was greatly reduced. The Government instructed that the number of students in the marine engineering department reduce from double classes to a single one (50 students). At the same time, the shipboard practice was also changed into selective. Furthermore, in January 1995, the department was renamed as Mechanical and Marine Engineering by the departmental committee.

Marine Engineering Technology was established when seafaring oriented education departments in other general universities were closed down in 1984. This department enrols students from graduates of 5-year junior colleges. The duration of study is 2 years and B.S. degree in engineering is

awarded when they graduate. The educational aims are for sea-going engineers' re-education to meet the demand for advanced marine technology.

b) Private Tam-Kang University The Tam-Kang University was established in the early 1950s. It was an English major Junior college. The college was promoted as a general university in 1960s. The number of students, including postgraduates is about 20,000. Today, it is one of the largest university in Taiwan.

c) Kaohsiung Institute of Marine Technology This is a five-year junior college. It is a pure maritime education and training institution. The objective of education of marine engineering at this college is to educate students to be specialists serving as chief engineer and engineers of ocean going vessels to undertake the specific duties of operation, control, inspection and maintenance of ships' equipment.

In order to enable Taiwanese seafarers to meet the requirements set forth in the International Convention on Standards of Training, Certification, and Watchkeeping for seafarers (STCW) by the Intergovernmental Maritime Consultative Organisation in 1978, this college also accepted the commitment of the Ministry of Communications in 1980 to undertake the first phase seafarers' training. Training items include survival at sea, survival craft, fire fighting, and first aid. In the beginning of 1982, a merchant ship seafaring training centre was established to provide the second and third phase training of specialised subjects such as Radar Observation, Radar Simulator, Tanker Operation, etc. There is a tendency for this Institute to replace the position in the shipping industry which used to be held by National Taiwan Ocean University.

d) Private China Maritime Junior College This college was established in 1966 to meet the demand for maritime personnel due to rapid growth of shipping in 1960s. During this period, the world economy boomed; the demand for shipping was tremendous. Many universities, such as Tam-Kang, Chinese Cultural, and Chiao-Tung also operated maritime related education and training subjects. However, they were closed down in the Act of Maritime Education and Training in 1984[1]. The private China Maritime Junior College has three departments relevant to the shipping industry, namely, navigation, marine engineering, and maritime administration.

e) Private Sin-Pu Institute of Technology This is a five year college. It was established in the earlier 1960s. To meet the demand for human resources in economic development, the Taiwanese government encouraged industrialists to establish schools to educate young people for society by giving them tax exemptions and government subsidies. Sin-Pu was born in this policy. Today this college is a prestigious one among the five year colleges by the eminent performance of students.

f) Private Kuang-Wu Institute of Technology The characteristics of this college are similar to that of Sin-pu.

g) Provincial Tansui Industrial and Commercial College This is a young college which was established in the earlier 1980s. It is famous for its scenic beauty of campus and advanced equipment both for teaching and experimentation. In addition to the traditional mechanical and electrical engineering, the college also offers horticultural subjects.

[1] In order to prepare establishment of National Mercantile Marine Academy, all maritime education and training related department in various universities closed down since then under the act of Maritime Education and Training 1984.

4.1.2. Taiwanese Shipping Companies

An in-depth interview was carried on the personnel managers of ten shipping companies in Taiwan. These ten shipping companies are discussed briefly below.

a) Yangming Marine Transport Corporation This corporation was established in 1972. The government stock share is over 51%. Primarily, this company ran multi-purpose vessels to transport cargoes mainly for the government. In 1980, the company entered container shipping with the Far East-America liner service was inaugurated with a fleet of seven full-container vessels servicing the route. Today, this company owns 22 containerships, 5 oil tankers, 3 bulk carriers, 2 ore carriers, and 4 multi-purpose vessels. The shore staff of this company must pass the examination held by the government to get the qualification of being a civil servant. In other word, they are civil servants who are under the government supervision. Certificates for deck and engineer officers are recognised as qualified for shore staff by the company, therefore, many staff in the marine department are from deck and engineer officers. Seafarers of this company have lifetime employment.

Because this is a semi-state-owned company which is supervised directly under the Ministry of Communications of the Republic of China, as a matter of course, it is an acceptor of students from various levels of maritime institutions for shipboard practice. Therefore, many students have been oriented to this company. When vacancies are available, these oriented students would apply for it. In addition, the lifetime employment attracts many young people who seek a career with job security. In general, there is no shortage in the number of deck/engine officers in this company. Sometime, there are redundancies in senior level of officers, such as master, chief engineer and so on. The master and chief engineer may be transferred to the office ashore as assistant managers if they have good performance during their

service on board ships. Because of the lifetime employment system, the turnover of deck/engine officers is very low; however, quite a lot of junior deck officers left in the earlier 1990s. Probably, the opportunities for promotion are limited.

b) Taiwan Navigation Co., Ltd. This was established right after Japanese returned this island to the Government of the Republic of China when Japanese unconditionally surrendered to the Allies in 1945. The company included all Japanese shipping companies and its properties in Taiwan. It belongs to Taiwan Provincial Government. There 22 vessels in operation which includes 6 self-owned ships and 16 state-owned ships. The ship types are mainly bulk carrier, oil tanker, container and multi-purpose vessels.

The shore staff are civil servants of the Provincial Government. Seafaring officers were able to enjoy shore/sea mobility, however, the newly recruited seafarers are on contract employment according to *The Maritime Law of the Republic of China*. Meanwhile, the mobility system is also in annulment. Young seafarers no longer enjoy lifetime employment.

c) Evergreen Marine Transport Corp. Ltd. The Corporation was established in 1968. Although starting with just a second-hand cargo vessel for a "go-anywhere" tramp service, Evergreen had a strong desire to provide its customers with regular marine transportation services. Consequently, Evergreen introduced its first regular liner service on the competitive Middle East trade route one year after its foundation.

In light of the new trends in liner shipping, Evergreen launched its first full container service in 1975, sailing from Far East to the US East Coast. The inauguration of this venture was successful despite an oil crisis hitting the world economy and, in turn, the marine transportation market.

Following this first move into container transport, Evergreen systematically containerised all of its major liner routes and successfully made its Round-the-World full container service.

Evergreen now owns a fleet of 54 full container vessels, making it the world's largest containerised liner operator.

In addition to shipping, Evergreen has developed airways corporation, hotels and resorts, heavy industrial, construction and computer information corporation. Nowadays, Evergreen has grown from a single used ship company into a multi-industry international enterprise that offers service on land, at sea, and in the air.

d) U-Ming Marine Transport Corp. U-Ming was established in 1980 with a single shipping vessel named "No.1 Asia Cement" which transported cement from Taiwan to Southeast Asia and Middle East area. Nowadays, this company owns eighteen vessels. The average age of ships is 3.5 years old. The company is also from single cargo to multi-purpose management. The company continues to grow, from cement carrier, to grain loading and bulk carrier. A couple of ship construct projects are under negotiation. In order to reduce ship operation cost, ship automation is inevitable to introduce on newly constructing vessels. Therefore higher standard marine engineers are to be recruited in this company. This results in shortage of high qualified marine engineer.

e) Uniglory Marine Corporation This is Evergreen joint venture company.

f) Chinese Maritime Transport Ltd. The history of Chinese Maritime Transport is rather long comparing with the other shipping companies in Taiwan. The founder of this company is Mr C. Y. Dong. There are six vessels in operation, three container ships and three bulk carriers. In addition to the management of self-owned ships, this company is a manning agent of OOCL (Oriental Overseas Container Line) as well.

It was very competitive company for graduates or school leavers of various levels of maritime institutions in 1960s. The company had his own

seamen's training centre from which many ship officers and ratings were educated and trained for Taiwanese shipping industries.

Because of low turnover rate of seafarers and the reduction of ships, this company does not face shortage of seafarers, especially, the senior ship officers. As a result, the average age of seamen is over forty. The junior deck/engine officers are in shortage. If this company can not recruit sufficient number of junior deck/engine officer from Taiwan, usually the company does not provide seafarers for OOCL. Because OOCL need not employ Taiwanese seafarers. The source of junior deck/engine officers are mainly from private China Maritime College and National Kaohsiung Institute of Marine Technology.

g) Wan Hai Steamship Co., Inc. Being established in 1965, this company has accumulated much professional experience in container transportation which turns Wan Hai into a leading carrier in the Asian Pacific.

Currently, this company operates a fleet of 16 vessels. Seven vessels are under construction and will be delivered soon. Total capacity is over 15,000 TEU. These vessels mainly sail in the ports of Hong Kong, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Thailand, and Taiwan.

Many of company vessels are with the flag of convenience and hiring their seafarers from Philippines, Indonesia and Cambodia.

The employment of Taiwanese seafarers is in compliance with *The Maritime Law of the Republic of China* while the FOC vessels have individual contracts with their local agencies.

h) Hsin Chien Marine Co., Ltd. This company primarily was shareholder of Evergreen Marine Corporation. In the early 1970s, the company was meted out 6 general cargo ships from Evergreen. Meanwhile Hsin Chien Marine Co., Ltd was established. Currently, the company owns a fleet of 10 ships. This consists of 2 Taiwanese flag and 8 with flag of convenience.

The employment of Taiwanese seafarers is in compliance with *the Maritime Law of the Republic of China.* The other FOC vessels' seafarers employment makes individual contracts with their local manning agencies.

The trading area is mainly in Japan, America and sometimes sailing Europe.

i) Nan Tai Line Ltd. This company was established in the mid 1960s. The trading area was primarily in Southeast Asia and South Pacific islands. Today, the company extends its route to South Africa. The company owns a fleet of 8 ships.

j) Glory Navigation Co., Ltd. This company was established in 1969. Most ships are log carrier. The trading area is mainly from Indonesia, Malaysia, and Philippines to Taiwan. It was a very popular shipping company to Taiwanese seafarers during the 1970s because of its considerable high payment and short trip. Today, its payment is very low comparing to the other shipping companies in Taiwan. The crew of this company are mainly from Indonesia, Malaysia, and Philippines. This company owns a fleet of 8 ships in total, 2 with the flag of the Republic of China, 6 with the flag of convenience.

A notion to be addressed is that most seafarers of this company are over 60 years old; the personnel manager expects the young students studying in the maritime institutions with certificate of competence to relieve them for short leave during the summer vacation. These companies are summarised as follows:

Items / Companies	Number of Ships	Number of ship's Officers/Engineers	Average age of Seafarers
Yang Ming	32	359	--
Taiwan	22	198	--
Evergreen	54	486	39
U-Ming	18	133	40
Uniglory	18	162	45
Chinese	6	154	44
Wan-Hai	18	162	40
Hsin-Chien	10	48	40
Nan-Tai	8	60	53
Glory	8	60	50

4.1.3. Thirty practice marine engineers These were newly recruited college or university graduates other than maritime academic institutions. Maritime education and training for them were two years, i.e. six months of study in National Taiwan Ocean University (NTOU), six months of practical knowledge of seafaring profession study in the Master Association of the Republic of China, and one year of shipboard practice. They had completed the course in NTOU about to work on board ships. Housing and tuition charges were free. In fact, they were employees of shipping companies.

4.2. The Survey Instrument

The data collected for this study were questionnaires administered to the students of previously mentioned academic institutions, interview carrying on ten shipping companies in Taiwan, and thirty practising marine engineers when they were studying in the upgrading course held by The Master Association of the Republic of China. The measurements are discussed as follows.

4.2.1. Questionnaires (see Appendix 2)

There are six measurements in the questionnaire:

a) ***Occupational Commitment*** Commitment to the occupation was measured by a modified version of Porter's organisational commitment index (9- item short form). Cook and Wall (1980) used it to measure organisational commitment for blue-collar British working populations. The phrasing of items is not appropriate for Taiwanese engineering students. Some of phraseology are re-written. The measurement uses a 7-point Likert type format; the response categorise for each item ranged from strongly agree to strongly disagree. The responses for each item are then summed and averaged to yield an occupation commitment score. There is substantial evidence regarding the

reliability and validity of this measure (Mowday & Steers, 1979). The reliability of this scale was assessed here by cronbach's α program in SPSS which produced a reliability coefficient of 0.84 as shown in Table 4.2 (see page 107).

Because some of items in the measure are rephrased, factor analysis for this scale was run by SPSS. The results were as follows. KMO=0.83
KMO (Kaiser-Meyer-Olkin) is an index for comparing the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients. A good scale the KMO measure is close to 1. Small values for KMO measure indicates that a factor analysis of variables may not be a good idea. Kaiser (1974) characterises in KMO values as follows:

0.90 Marvellous

0.80 Meritorious

0.70 Middling

0.60 Mediocre

0.50 Miserable, and below 0.5 unacceptable (Spss+statistics ™ 4.0, p.B-29). After factor analysis this measure categories for two factors. Factor 1 includes items 7, 4, 6, 9, and 1 while the other consists of items 3, 2, and 8.

b)***Personal Need measurement*** There are sixteen items in this measurement. This basically also employed Cook & Wall (1980) personal need non-fulfilment scale. Which was derived from the Maslow hierarchy of needs as a conceptual guide to its construction. Primarily, the item phrasing was suitable for manual workers. The researcher re-phrased it for Taiwanese engineering students. The response format requires the respondent to make a single response regarding how much more of a given job characteristic he would like in the present job and work life than the job at present has. The job mentioned here, which is consistent with the individual department educational aim. This format uses 7-point Likert scale from 1 point "I have more now than I really

want" to 7 points "I would like very much more". The response is influenced by both the qualities of the present job in consistency with the individual educational objective and by the individual's level of need strength.

The factor analysis for personal need measurement showed that KMO=0.86 is seen to be sound. Table 4.3 (see page 108) shows the results of analysis rotated to a varimax of four factors which accounts for 58.1% of the total variance. The cronbach α of this scale is 0.87.

c) ***Willingness to Study*** Little research on "willingness to study" have been studied. The researcher referred to Lin (1989) commitment to teaching and Cook & Wall (1980) organisational commitment measure and modified their measurements as "willingness to study" scale. Factor analysis shows that KMO=0.88, and rotated to a varimax criterion on the item of content of the scale, limited to three factors, which accounts for 61% of the total variance. The data used were those obtained in the first 69 respondents from National Ocean University. The results are shown in Table 4.4 (see page 109). The cronbach α is 0.79.

d) ***Work Values Measurement*** The most widely used approach categorizes work values as intrinsic and extrinsic rewards. Elizur (1984) analyzed the work values domain systematically. He defined work values in two basic facets: types of outcome and relation to task performance. Type of outcome may consist of material or instrumental nature, such as pay, benefits, hours of work, work condition, etc. Relation to task performance, the second concerns the relationship of outcome to task performance. Managements of organisations recognise the necessity of motivating individuals to join the organisation and attend to work. Therefore, they provided various encouragements and inducements usually given before task performance and not conditional on its outcome. These include benefit plans, work conditions, various services, such

as transportation, subsidised meals, and other resources provided by the organisation. Certain other outcomes are usually provided after task performance and in exchange for it, such as recognition, advancement, status. Elizur's two basic facets of work values have many similarities to Mottaz's (1988) work rewards. Yang (1987), based on Elizur's concept of work values, coupled with Chinese traditional culture, developed a 40 item work values measurement. This study employed Yang's measurement.

Respondents were asked to rate each of 40 items in terms of how important it was to them. Responses ranged from 1 point "Not important at all" to 7 points "Very important". The higher the score is, the greater the importance. Responses to corresponding individual work values' items were then summed and averaged to yield a score for work values measurement.

The measurement was factor analyzed into eight factors; each accounts for 31.7%, 5.5%, 4.8%, 4.2%, 3.9%, 3.2%, 2.7%, and 2.6% for measurement. KMO is 0.93 and Cronbach α is 0.94 as shown in Table 4.5 (see page 110).

e) ***Demographic Background*** Ten demographic variables were included in the questionnaire. They are age, level of school, department, family income, number of brothers and sisters, birth order, father's education, mother's education, father's age, and mother's age.

f) Social Status measurement In order to understand the status of marine engineering profession, 40 occupations were listed in the measurement. Respondents were asked to rate each occupation in terms of what score it was to them. Responses ranged from 1 to 7. The higher the score is, the greater the prestige. Responses to corresponding individual occupation were then summed up and averaged to yield a status score to each occupation.

4.2.2. **Interview** (see Appendix 3)

A set of structural questions was designed to interview personnel managers of shipping companies and practising engineering and staff in the Master Association of the Republic of China. The questions are listed below.

Q1. Are you experiencing a shortage of seafarers ? If yes, when ? What level of seafarers ?

Q2. What reason causes this level of seafarers' shortage ?

Q3. What is your wage scale of seafarers ?

Above three questions are only carrying on personnel managers of shipping companies.

Q4. How long do you plan to work for this company ? 3 years, 5 years or 7 years ?

Q5. If your employer provides opportunity for further study, would you like to extend the period of service as a sea-going marine engineer ?

Question 4 & 5 are only available for practising marine engineers.

The following questions are global for personnel managers, practising engineers, and staff in the Master Association of the Republic of China.

Q6. Do you agree with that education would influence the choice of occupation ?

Q7. What level of education of marine engineers is suitable for ship operation and maintenance ? Why ?

Q8. Do you agree with that the popularisation of female education would influence engineering students' choice of occupation ?

Q9. What do you think about the current maritime education and training in Taiwan ?

Q10. Do you agree with that 2-child policy influences the motivation to work on board merchant marine ?

4.3. Sample Size

The questionnaires administered to the engineering related students in these institutions are shown in Table 4.1 below.

Table 4.1 The distribution of questionnaires to engineering related students in various institutions

Academic Institutions	Number of Questionnaires distributed
Taiwan Ocean University	400
Tam-Kang University	100
Kaohsiung Institute of Maritime Technology	100
China Maritime College	100
Sin-Pu Institute of Technology	100
Kuang-Wu Institute of Technology	100
Tansui Industrial and Commercial College	100

The total number of questionnaires administered to various institutions was 1,000.

Win (1985) derived a formula from *Tchebysheff Inequality* to estimate sample size by sample proportion. Its formula is as follows:

$$n = 1/4 (z_{\alpha/2}/d)^2 / \{1 + [1/4 (z_{\alpha/2}/d)^2 - 1]/N\}$$

Where

n sample size
N population size
α level of significance
d allowable error

$Z_{\alpha/2}$ can be found from statistics table Unit-Normal (z) Distribution.

α	$\alpha/2$	$Z_{\alpha/2}$	CI	P
0.10	0.050	1.645	90%	95.0%
0.05	0.025	1.960	95%	97.5%
0.01	0.005	2.576	99%	99.5%

Source : Glass, G.V. and Hopkins, K.D. *Satistical Methods in Education and Psychology.* Prentice-Hall, Englewood Cliffs, New Jersey, 1984, pp. 524 - 525.

There were 238,829 engineering, and technology students in colleges and universities in Taiwan (*Statistics Year Book*, 1994). The sample size to stand for this population for level of significance α=0.1, α=0.05, α=0.01 and various allowable errors, are calculated in the followings;

α \ d	0.01	0.02	0.03	0.04	0.05	0.06
0.10	6579	1679	749	422	270	188
0.05	9233	2377	1062	***599****	384	266
0.01	15512	4077	1829	1032	662	460

The population of 238,829 engineering students can be interpreted by sample size of 6,579 in 90% of confidence, and with an error no more than 0.01. A sample size of 348 can interpret students population in 95% of confidence, and with an error no more than 0.05.

When the questionnaires returned, the incomplete ones and blank were ruled out. 568 questionnaires were available for statistics. If level of significance set α=0.05 (0.05 is the most commonly chosen value for α, see Glass and Hopkins, 1984, p.205), this can interpret the population of engineering students in the colleges and universities in a 95% level of confidence with an error no more than 0.05.

4.4. Implementation

The draft of questionnaire was completed in October 1994. Seventy questionnaires were administered to students of Mechanical and Marine Engineering at NTOU for pre-test. The final revision of questionnaire was made in November 1994. The number of copies was sent and posted to the academic institutions as mentioned previously and shown in Table 4.1. The questionnaires sent to Sin-Pu, Kuang-Wu, and Kaohsiung were collected by author; the other sent back by mail. Questionnaire collection was completed in

mid January 1995. All data were key in PC computer treated by SPSSPC statistics package.

Appointments were made by Fax or telephone before interview on personnel managers of shipping companies was carried on. All conversations of interview were recorded by author's tape recorder. These interview were completed in the end of April 1993. Interview carrying on thirty practising engineers were in the Master Association of the Republic of China in May 1993 when they were in the lecture.

The following tables 4.2 to 4.5 have been used to test the reliability and validity of the variables in the questionnaire, and for that reason appears in this chapter on methods. The variables have been discussed in the foregoing pages, 99 - 105.

Table 4.2 Factor Analysis for Occupational Commitment Measurement

Factor Matrix

Items \ Factors	Factor 1	Factor 2	Communality	Cronbach α
Commit 5	.78059*	-.18501	.64355	.81
Commit 6	.76553*	-.18373	.61980	.81
Commit 7	.72049*	-.34735	.63975	.81
Commit 3	.67836*	.50076	.71093	.82
Commit 9	.63570*	-.15722	.42883	.82
Commit 4	.61898*	-.45833	.59321	.83
Commit 1	.61895*	.01552	.38334	.83
Commit 2	.61716*	.47522	.60668	.82
Commit 8	.51034	.54161*	.55379	.84
R^2	3.98	1.19	5.18	
Variance %	44.30	13.30	57.60	

Rotated Factor Matrix

Items \ Factors	Factor 1	Factor 2
Commit 7	.78690*	.14333
Commit 4	.77017*	-.00614
Commit 5	.73992*	.30994
Commit 6	.72700*	.30211
Commit 9	.60644*	.24711
Commit 1	.49121*	.37690
Commit 3	.25360	.80413*
Commit 2	.21913	.74744*
Commit 8	.09373	.73824*

*Stands for factor belongingness.

Commit 1. I am quite proud of telling people what my occupation is.
Commit 2. I sometimes feel like to change my mind to change my future occupation.
Commit 3. I am not willing to put myself getting involved in the occupation which the department designed.
Commit 4. Even if the pay of this occupation were not very high, I would not consider changing my mind.
Commit 5. I feel myself to be a member of carrying this occupation.
Commit 6. Making effort in my occupation not only is good for myself but for the society.
Commit 7. The better pay of other occupation I would not seriously make me think of changing my future job.
Commit 8. I would not recommend a close friend to join our staff.
Commit 9. To know that my own work had made a contribution to the good of the organization would please me.

Table 4.3 Factor Analysis for Personal Needs Meaurement

Factor Matrix

Factors / Items	Factor 1	Factor 2	Factor 3	Factor 4	Communality	Cron α
Need 15	.71518*	-.14798	.16383	-.34134	.67673	0.86
Need 4	.68144*	-.16476	.31599	-.13018	.60830	0.86
Need 7	.63080*	.36462	.10711	.01814	.54266	0.86
Need 16	.62802	-.03134	-.06884	-.54008*	.69182	0.86
Need 5	.62128*	-.41227	-.23166	.28531	.69102	0.86
Need 11	.61815*	.23253	-.40869	.18414	.63711	0.86
Need 10	.60821*	-.14051	-.39603	.37008	.68346	0.86
Need 8	.60265*	.37853	-.08980	.11577	.52794	0.86
Need 14	.59435*	-.36282	-.11731	.17299	.52858	0.86
Need 6	.59186*	-.32054	.34098	.03451	.57050	0.86
Need 3	.58495*	-.40270	-.07673	.19480	.54817	0.86
Need 12	.56148*	.18270	.25107	.05979	.41524	0.86
Need 2	.53227*	.29569	.46283	.31129	.68186	0.86
Need 1	.52245*	-.08719	.32439	.04409	.38773	0.87
Need 13	.51205*	.38399	.26142	.24113	.53612	0.87
Need 9	.38968	.53222*	.12719	.35316	.57601	0.87
R^2	5.60	1.53	1.13	1.05	9.31	
Variance %	35.00	9.50	7.10	6.50	58.10	

Rotated Factor Matrix

Factors / Items	Factor 1	Factor 2	Factor 3	Factor 4
Need 15	.70340*	.19391	.10540	.36503
Need 4	.69879*	.23694	.21634	.13055
Need 6	.67560*	.31589	.11610	-.02835
Need 1	.55143*	.15710	.24095	.03014
Need 5	.23521	.78474*	.06671	.12423
Need 10	.00011	.74484*	.25075	.25650
Need 3	.34466	.64947*	.05438	.06785
Need 14	.32033	.63773*	.06627	.12198
Need 9	-.0159	.05082	.75468*	.06031
Need 13	.23349	.07786	.68781*	.04953
Need 7	.30269	.09205	.58413*	.31836
Need 8	.11905	.20280	.57604*	.37527
Need 12	.39619	.11791	.48003*	.11809
Need 2	.04633	.13434	.18838	.79131*
Need 11	.09911	.25804	.25662	.70346*
Need 16	.54961	.07523	-.00517	.61973*

*Stands for factor belongingness.

Need 1. The opportunity to meet challenge in the work. **Need 2.** The prestige that your job carries at work. **Need 3.** The opportunity to talk with others. **Need 4.** The chance to use more of your skills and abilities. **Need 5.** The opportunity to make friends. **Need 6.** The chance to learn new things. **Need 7.** Making decisions about how you do the work. **Need 8.** Having influence over opinions of others at work. **Need 9.** Independence from other people's control. **Need10.**Being part of a social group. **Need11.**The status your work carries in your social life. **Need12.**The opportunity to discuss or question instructions about work.**Need13.**To be able to work without constant supervision. **Need14.**Friendly contact with other people. **Need15.**To be able to extend your abilities further. **Need16.**Recognition received for your achievements.

Table 4.4 Factor Analysis for Willingness to Study Measurement

Factor Matrix

Factors / Items	Factor 1	Factor 2	Factor 3	Communality	Cronbach α
Willingness 6	.73007*	.16558	-.21245	.60556	.76
Willingness 1	.70979*	-.12182	.01008	.51874	.76
Willingness 3	-.67930*	.36006	.18311	.62463	.76
Willingness 2	-.66631*	.42023	-.17079	.64973	.77
Willingness 8	-.64273*	.34841	.21838	.58217	.77
Willingness 9	.63249*	.33230	-.27096	.58389	.77
Willingness 4	.53150*	.39892	.23002	.49454	.78
Willingness 5	.50352	.61641*	-.00830	.63356	.79
Willingness 7	.46225	-.03995	.76191*	79578	.79
R^2	3.50	1.20	0.86	5.49	
Variance %	38.90	12.40	9.70	61.00	

*Stands for factor belonging.

Rotated Factor Matrix

Factors / Items	Factor 1	Factor 2	Factor 3
Willingness 3	.77569*	-.14284	-.05027
Willingness 8	.75077*	-.13598	-.00499
Willingness 2	.70724*	-.03287	-.38531
Willingness 1	-.60174*	.31996	.23296
Willingness 5	-.00411	.78684*	.12012
Willingness 9	.34380	.67799*	.07763
Willingness 6	.50224	.59421*	.01520
Willingness 4	.09296	.59405*	.36470
Willingness 7	.16458	.12309	.86807*

Willingness 1. I am quite proud to be able to tell people which subject I study for.
Willingness 2. If I had an opportunity to select department (subject) by myself, I would not choose this department any longer.
Willingness 3. I won't work hard on the subjects which the department offers.
Willingness 4. Even if the job market relating to this department is not quite good, I will not change my mind on studying in this department.
Willingness 5. I feel myself to be a member of this department.
Willingness 6. Working hard on the specific subject the department offers, is not only good for employment but promoting prestige for the department as well.
Willingness 7. My entrance examination scores can enrol a higher prestigious school, I choose this one for enrolment.
Willingness 8. I definitely not recommend a close friend to enrol this department.
Willingness 9. To know that my work had made a contribution to the good of the department would please me.

Table 4.5 Factor Analysis for Work Values Measurement

Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Factor8	Remark
V35	V40	V3	V14	V6	V25	V20	V1	
V34	V37	V11	V13	V7	V24	V19	V2	
V36	V38	V9	V22	V5	V18			
V31	V10	V27	V8	V4	V16			
V29	V30	V28						
V39	V23	V15						
V33		V26						
V32		V17						
V12		V21						
12.67	2.21	1.93	1.69	1.56	1.72	1.08	1.03	R^2 23.89
31.70	5.50	4.80	4.20	3.90	3.20	2.70	2.60	Variance 55.4%

V 1.Sufficient time to stay with family
V 2.Job security
V 3.Challenge in the work, and achievement when work alone.
V 4.Refrain from stress
V 5.Working environment(such as light, space, ventilation, etc.,)
V 6.Boss respect subordinates
V 7.Equality to everyone.
V 8.Perormance can be recognized by boss.
V 9.Considerable autonomy in doing work by your own way.
V10.Congenial colleague.
V11.Being able to work without constant supervision.
V12.Good prestigious company.
V13.High pay.
V14.High bonus.
V15.Job characteristics compliance with your own interest.
V16.Good fringe benefit.
V17.The opportunity for training and self-growth.
V18.Entrepreneur to be your own relative.
V19.Be able to be off duty on time.
V20.Working place not far away from home.
V21.Contribution to society.
V22.The opportunity for promotion.
V23.The organization full of friendship.
V24.Sufficient time for taking rest during the work.
V25.Giving present to employee during during festivals.
V26.Being able to extend your ability further.
V27.Task variety.
V28.Task identity.
V29.Definite instructions about work.
V30.The opportunity to make friends.
V31.Objective criteria for evaluation of performance.
V32.Close relationship between performance and reward
V33.Sufficient authorization.
V34.Rigorous organizational structure.
V35.Highly working standard.
V36.High working standard.
V37.Friendly colleavue
V38.Kind supervisor.
V39.Being able to use more of your skills and technology.
V40.Coorperation among colleagues.

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Chapter 5 Data Analysis

In order that the narrative text in this chapter can focus on the analysis, the extended tables of statistics of questionnaire responses are given towards the end of the chapter in Table 5.0 (see page 131-132) and the detailed chi-square test results are given in Table 5.1A (see page 133-134) and 5.1B (see page 135-136). Distributions of students in the sample from different demographic background are briefly discussed as follows.

Age

Students age are grouped into 19 and below, 20 - 22, 23 - 25, 26 - 28, and 29 and over five groups. Entrance level of student age for 5-year college, generally, is fifteen years old, and 19 for university. The group of students age 19 and below has 264 students; it is 46.6% of the sample. Groups of 20 - 22, 23 - 25, 26 - 28, and over 29 have students of, 170, 103, 25, and 4 respectively. Their valid percents are 30.0%, 18.2%, 4.4%, and 0.7%. Some are too small, these groups of students age are re-grouped into three categories; they are 19 and below, 20 - 25, and over 26.

Level of school

Schools participating this research are college and university. 332 students are from universities, and 236 students from junior colleges. Their percentages are 58.5% and 41.5% respectively.

Department

There are five departments participating in this study. The number of students distributed to each department is 132 for Marine Engineering

Technology (MET), 165 for Electrical Engineering (EE), 159 for Mechanical Engineering (ME), 53 for Marine & Mechanical Engineering (MME), and 52 for Navigation. Their valid percentage is 23.5 for MET, 29.4 for EE, 28.3 for ME, 9.4 for MME, and 9.3 for Navigation of the sample.

The distributions of students based upon demographic variables, family income, family size (number of brothers and sisters), birth order, parental education, and parental age are listed in Table 5.0 (see page 131-132) as mentioned previously.

5.1. Willingness to study and occupational commitment

Different departments have produced in different level of willingness to study, leading to different degrees of strength of occupational commitment. The results are shown in Table 5.1 as below. The relationship between willingness to study and departments is tested by Chi-square; the significant $p<0.05$, therefore, willingness to study and departments are related. Concerning with the commitment and departments, the significant $p<0.05$, therefore, commitment and departments are also related.

Table 5.1 Relation of willingness to study, occupational commitment and departments tested by Chi-squares

Relation of willingness to study and departments									
Department	Marine Engineering Technology			Electrical Engineering			Mechanical Engineering		
Willingness	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*
Disagree	38(49.6)	-11.6	2.71	57(64.1)	-7.1	0.79	65(62.2)	2.8	0.13
Uncertain	6(6.7)	-0.7	0.07	7(8.6)	-1.6	0.29	10(8.3)	1.7	0.35
Agree	82(69.8)	12.2	2.13	99(90.3)	8.7	1.92	83(87.5)	4.5	0.23
Department	Marine & Mechanical Engineering			Navigation					
Willingness	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	Sig/Crit		
Disagree	41(20.5)	20.5	20.50	15(19.7)	-4.7	1.12	0.00000		
Uncertain	2(2.7)	-0.7	0.18	4(2.6)	1.4	0.75	D.F.8		
Agree	9(28.8)	-19.8	13.61	31(27.7)	3.3	0.39	15.51		
Relation of commitment and departments									
Department	Marine Engineering Technology			Electrical Engineering			Mechanical Engineering		
Commit	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*
Disagree	81(54.2)	26.8	13.25	34(69.7)	-35.7	18.28	51(66.7)	-15.7	3.69
Uncertain	5(3.5)	1.5	0.64	7(4.5)	2.5	1.39	1(4.3)	-3.3	2.53
Agree	40(68.3)	-28.3	11.73	121(87.8)	33.2	12.55	103(84)	19.0	4.29
Department	Marine & Mechanical Engineering			Navigation					
Commit	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	Sig/Crit		
Disagree	29(22.4)	6.6	1.94	40(22)	18.0	14.72	0.00000		
Uncertain	2(1.4)	0.6	0.25	0(1.4)	-1.4	1.40	D.F.8		
Agree	21(28.2)	-7.2	1.83	11(27.6)	-16.6	9.98	15.51		

Table 5.1 shows that 82 students are willing to study among 132 students from the sample of department of Marine Engineering Technology (MET). The difference of observed and expected number, which is residual $(O - E)$, of students willingness to study is 12.2, and the chi-square value, $(O - E)^2/E$, 2.13 for this department. This can be certained that MET students are willing to study. So are Electrical Engineering students (EE); because the chi-square value 1.92 is big enough. 83 students are willing to study in Mechanical Engineering (ME) among 159 students in total sample of this department, however, residual value -4.5 and the chi-square value 0.23 are not big enough; it can not be certained that the sample of ME are willing to study. Similarly, neither is Navigation department; because the chi-square value is not big enough. Regarding to Marine & Mechanical Engineering (MME), 41 students are not willing to study among 53 students sample from this department. Because the chi-square value 20.50 is quite big, clearly shows that students are not willing to study in this department.

For occupational commitment, 81 students show that they are not committed themselves to the occupation consistent with the department aims, and the chi-square value 13.25 is big enough to show that MET students are not committed. Neither are MME and Navigation students. However, Students from EE and ME are committed. Their chi-square values are 12.55, 4.29 for EE and ME respectively.

The relation of willingness to study and occupational commitment of students sample from various departments is summarized as below.

	MET	EE	ME	MME	Navigation
Willingness	Yes	Yes	No	No	Uncertain
Commitment	No	Yes	Yes	No	No
Intention	Stay	Stay	Stay	Transfer	Uncertain

The summary shows that all seafaring related departments are not committed themselves to their future occupations consistent with their individual department aims. EE, has positive willingness to study and positive occupational commitment. ME has negative willingness to study, but positive

occupational commitment. MME both willingness to study and commitment are negative. This may be interpreted that students of this department are trying to transfer to other departments in other university. MET has positive willingness to study, but negative occupational commitment. Navigation has uncertainty of willingness to study, negative occupational commitment. Because 204 students are committed themselves to the occupation consistent with their educational aims among 303 students who are willing to study in their specific subjects, 130 students are not committed themselves to the occupation related to their educational aims among 209 students who are unwilling to study their specific subjects in the entire population, the variables, willingness to study and commitment are related to the significant level. This can be seen from Table 5.2 shown as below.

Table 5.2 Relation of willingness to study and occupational commitment by entire population

	Unwill			Uncertain			Will		
Commit	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*
Disagree	130(89.4)	-40.6	18.43	12(12)	0	0.00	89(129.6)	-40.6	12.72
Uncertain	5(5.8)	-0.8	0.11	0(0.8)	-0.8	0.80	10(8.4)	1.6	0.30
Agree	74(113.8)	-39.8	13.92	16(15.2)	0.8	0.04	204(165)	39.0	9.22
Sig/Critic	0.00000	D.F.4	9.49						

P<0.05 shows that, for the entire sample population, Hypothesis 1 is proved that is "The respondents' willingness to study in a specific subject is positively related to their occupational commitment". However for subgroups of the entire population (i.e. Departments) the number of students entering the electronic manufacturing industry is increasing whilst those entering seafaring is decreasing.

5.2. Personal needs and occupational commitment

Although it had been thought that the satisfaction of personal needs at work would be positively related to occupational commitment, the fact that p>0.05 (see Table 5.3, page 116) shows that these two variables are unrelated to each other so that Hypothesis 2 can be rstated as "The satisfaction of

personal needs in job characteristics is not related to occupational commitment".

Table 5.3 Results of chi-square test for relation of personal needs and occupational commitment

	Unimportant			Important				
Commit	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*Sig*	
Disagree	1(0.4)	0.6	0.9	233(233.6)	-0.6	0.00154	0.25	
Agree	0(0.6)	-0.6	0.6	308(307.4)	0.6	0.00117		

5.3. Work values and occupational commitment

It had been thought that work values and occupational commitment would be related. However, the analysis in Table 5.4 below shows they are not related so that Hypothesis 3 can be restated as "The work values held by students are not related to occupational commitment".

Table 5.4 Results of chi-square test for relation of work values and occupational commitment

	Unimportant			Important				
Commit	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*Sig*	
Disagree	1(0.4)	0.6	0.9	225(225.6)	-0.6	0.00159	0.25	
Agree	0(0.6)	-0.6	0.6	288(287.4)	0.6	0.00125		

5.4. Student age and willingness to study

Referring to Table 5.5 as below, the chi-squares test for the relation of students' age and willingness to study shows that significance is 0.00117, $P<0.05$, confirming that these two variables are related.

Table 5.5 Results of chi-square test for relation of students' age and willingness to study

	19 and below			20 - 25			26 and over		
Willing	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*
Disagree	79(102.2)	-23.2	5.27	122(103.4)	18.6	3.35	16(11.4)	4.6	1.85
Uncertain	14(13.7)	0.3	0.01	13(13.8)	- 0.8	0.05	2(1.5)	0.5	0.17
Agree	168(145.1)	22.9	3.61	129(146.8)	-17.8	2.16	11(16.1)	-5.1	1.61
Sig	0.00117								

Further analysis of Table 5.5 shows that the younger students i.e. those aged 19 and below are willing to study whilst the older students in the age groups 20-25 and 26 and over are not willing to study. Thus Hypothesis 4 can be restated as "The respondents' age is negatively related to willingness to study" or, in other words, willingness to study declines with increasing age.

5.5. Birth order and occupational commitment

The relation of birth order and commitment is tested and the results are in Table 5.6 as below.

Table 5.6 Results of chi-square test for relation of birth order and occupational commitment

	First born boy			Non-1st born boy			
Commit	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*Sig*
Disagree	129(136.4)	-7.4	0.40	105(97.6)	7.4	0.56	0.039
Uncertain	5(8.7)	-3.7	1.57	10(6.3)	3.7	2.17	
Agree	183(171.9)	11.1	0.72	112(123.1)	-11.1	1.00	

Because $p<0.05$, birth order and occupational commitment are related. As Table 5.6 shows that the residuals (O - E) in row "agree" is 11.1 for first born boy students and -11.1 for non-first born boys (i.e. for boys with older brothers) this shows that first-born boy students are committed to the occupation consistent with the aims of their chosen department of study while later-born boy students are not. Thus, the wording of Hypothesis 5 can be strengthened and restated as "First-born male students have higher occupational commitment than male students with older brothers".

5.6. Family size and occupational commitment

The relation of family size (number of brothers and sisters) and occupational commitment is tested by chi-squares. The results are shown in Table 5.7 as below. As stated earlier in paragraph 3.2.6 (see page 89) it was originally considered that declining family sizes in Taiwan increased the opportunities for children of these smaller families to enter higher education

Table 5.7 Results of chi-square test for relation of family size and occupational commitment

	2 and below			3 - 4			5 and over		
Commit	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*
Disagree	102(102.7)	-0.7	0.01	113(118.7)	-5.7	0.27	22(15.5)	6.5	2.78
Uncertain	3(6.5)	-3.5	1.88	10(7.5)	2.5	0.83	2(1.0)	1.0	1.00
Agree	133(128.8)	4.2	0.13	152(148.8)	3.2	0.06	12(19.5)	-7.5	2.88
Sig	0.044								

and have greater employment alternatives (i.e. higher occupational choice) leading to higher occupational commitment. Table 5.7 with $p<0.05$ shows the variables of family size and occupational commitment are related. Furthermore, as the residual in row "agree" is 4.2 for families of 2 or fewer children, and -7.5 for families of 5 or over children, Hypothesis 6 can be restated as "The respondents' family size is negatively related to occupational commitment" or, in other words, the larger the family the less committed are the children to their occupations.

5.7. Parental level of education and occupational commitment

The relation of parent's education and occupational commitment is tested; the results are shown in Table 5.8 as below.

Table 5.8 Results of chi-square test for relation of parental level of education and occupational commitment

	Father education			Mother education		
Elementary and below						
Commitment	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*
Disagree	72(70.4)	1.6	0.04	137(118.8)	18.2	4.52
Uncertain	2(4.5)	-2.5	1.39	5(7.1)	-2.1	0.62
Agree	89(88.2)	0.8	0.01	134(150.1)	-16.1	1.73
Junior high						
Commitment	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*
Disagree	54(60.0)	-6.0	0.60	38(56.4)	-18.4	6.0
Uncertain	3(3.8)	-0.8	0.17	5(3.4)	1.6	0.75
Agree	82(75.2)	6.8	0.61	88(71.3)	16.7	3.91
High						
Commitment	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*
Disagree	59(60.9)	-1.9	0.06	43(40.9)	2.1	0.11
Uncertain	8(3.9)	4.1	4.31	3(2.4)	0.6	0.15
Agree	74(76.3)	-2.3	0.07	49(51.7)	-2.7	0.14
College and over						
Commitment	*O(E)*	*(O - E)*	*$(O - E)^2/E$*	*O(E)*	*(O - E)*	*$(O - E)^2/E$*
Disagree	40(38.4)	1.6	0.07	17(18.1)	-1.1	0.06
Uncertain	1(2.4)	-1.4	0.82	1(1.1)	-0.1	0.01
Agree	48(48.1)	-0.1	0.0002	24(22.8)	1.2	0.06
Sig/Critical val	**0.06 /15.51**			**0.02 /15.51**		

It had been considered that the educational levels of the parents would be positively related to occupational commitment. It was decided to treat the educational level attained by father and mother separately. Table 5.8 with $p>0.05$ shows that the father's educational level is not related but that the mother's educational level is related to occupational commitment. Thus Hypothesis 7 can be restated as "The educational level of his father is not positively related while the educational level of his mother is positively related to a male student's occupational commitment".

5.8. Social status measurement

Table 5.9 (see page 137), the social status of various occupations in Taiwan, shows that white collars, like judges, ministers of government, university chancellors, professors, physicians are in leading positions in Taiwanese society. The rank of ship master and chief engineer is No.16. In a comparison which the author investigated social status in 1993 using 148 teaching staff and students at maritime institutions the result is almost the same. In the 1993 investigation, the rank of ship master and chief engineer was ranked 17. The engineer's rank, No.9 was exactly the same as in the last investigation. The social status of ship's masters and chief engineers is lower than that of engineers in the point of view of respondents. A university graduate in Taiwan, normally, is 22 years old. The graduate must enlist for one year and ten months for military service by law upon graduation. The average duration of an engineering graduate's service on board merchant ship as a junior officer is three years. Another three years of service as chief mate or second engineer is required to sit for the certificate of competence of master/chief engineer examination. In other words, a master/chief engineer with a university degree must have at least eight years of training before holding this position according to the current examination system.

Jackson (1970) defined the criteria of professionalization as below:

A professional utilized fully a common set of professional expertise and techniques.

professional personnel have been through a lengthy programme of training courses.

professional personnel are to a large degree autonomous.

professional personnel are able to regulate themselves by ethical rules of their own community.

professional personnel continually engage in on the job training (0JT).

That the ship's officer, especially, master/chief engineer meeting the criteria of professionalization is without question. Medical doctor, lawyer and engineer are typical professionals in Taiwanese society. A marine engineering graduate can be a mechanical engineer, a production engineer, and a manufacturing engineer with 4 or 5 years of training in their individual fields after graduation. Compared with the social status of engineer ashore, seagoing occupation does not enjoy social status equivalent to their qualification as professionals.

5.9. Interview

With structural questions, author visited personnel managers, and related staff of ten important shipping companies in Taiwan. The answers from various companies are summarized as follows:

Table 5.10 Summary of interview of ten important Taiwanese shipping companies

Question 1,2 / Shipping co.	Are you experiencing a shortage of seafarers ?			What reason causes shortage?	
	Yes or No	When	What level	low wage diff	source reduce
Yangming	Yes	1988	Junior officer	Yes	Yes
Taiwan	Yes	1987	Junior officer	Yes	Yes
Evergreen	Yes	1987	Junior officer	No	Yes
U-ming	Yes	1986	All levels	No	Yes
Uniglory	Yes	1988	Junior officer	No	Yes
Chinese	Yes	1988	Junior officer	Yes	Yes
Wan-Hai	No	---	---	---	---
Hsin-Chien	Yes	1987	Junior officer	Yes	Yes
Nan-Tai	Yes	1986	All levels	No	Yes
Glory	Yes	1986	All levels	No	Yes

Q3. What is your wage scale of seafarers ?

Table 5.11 shows the summary of wage of seafarers for various companies. (see Appendix 5)

Table 5.11 Wage scale of ship's officer in Taiwanese companies Sterling pound £/month

Companies / Position		Yangming	Taiwan	Evergreen	U-ming	Uniglory	Chinese	Wan-Hai	Nan-Tai	Glory
Master	Max	4,000	—	5,042	4,300	—	—	2,700	—	2,450
	Min	3,437	3,175	3,877	3,450	3,400	4,515	2,500	2,725	2,000
Chief E.	Max	3,802	—	4,817	4,400	—	—	2,625	—	2,450
	Min	3,312	3,047	3,705	3,250	3,250	4,226	2,425	2,550	2,000
C/O &	Max	2,780	—	3,317	2,725	—	3,225	1,882	—	1,625
2/E	Min	2,340	2,132	2,550	2,275	2,425	3,070	1,787	1,850	1,500
	Max	2,317	—	2,667	2,175	—	—	1,500	—	1,550
R/O	Min	1,912	1,767	2,050	1,955	1,875	2,362	1,325	1,650	1,200
Senior	Max	2,255	—	2,667	2,175	—	2,480	1,487	560	1,550
officer	Min	1,887	1,715	2,050	1,925	1,800	2,362	1,400	(alien)	1,250
Junior	Max	2,012	—	2,272	2,025	—	2,040	1,337	439	1,425
officer	Min	1,725	1,462	1,474	1,800	1,675	1,942	1,250	(alien)	1,125

Source : Courtesy of ten important shipping companies, 1993.
The exchange rate of Taiwan currency to Sterling pound is based on 40:1.

The shore employees equivalent to ship's officers, based on level of education and period of service, wage scales are summarized Table 5.12 as follow. (see Appendix 4)

Table 5.12 Wage scales of shore staff, who are equivalent to ship's officers based on level of education and period of service, in public and private sectors. Unit:£/month.

Ship's officers / Shore employee		Public	Private		
		Teacher/Civ.	Management	Technician	Designer
Master/Chief E	Asso. prof. Manager Chief staff	1,500.	1,887.	1,236.	2,361.
Chief officer/ 2nd engineer	S. lecturer Ass. manager	1,162.	1,578.	1,217.	2,020.
Radio officer	Lecturer, Staff head	909.	1,375.	898	1,660.
Senior officer	Civi servant with passed higher exam's certificate	909	954	797	1,377
Junior officer	Initial elementary school teacher Junior staff	714	808	567	1,079

Source: Communique of Taiwan Provincial Government, No.73, 1993 and courtesy of Da-Dong Co.
The exchange rate of Taiwan currency to pound is based on 40:1.

When Q4. How long do you plan to work for this company ? 3 years, 5 years or 7 years ? was administered to 30 practicing engineers during their upgrade training in the Master Mariner's Association, their answers were as follows.
18 persons answered that they would work for their employing company for 3 years, and 12 answered that would work for their employing company for 5 years.
Another question Q5. If your employer provides opportunity for further study, would you like to extend the period of service as a sea-going marine engineer? 22 answered yes, while 8 answered No. Among yes answers, 16 were those who would work for their employing company for 3 years, and 6 were primarily for 5 years.

Q6. Do you agree that education would influence the choice of occupation? Almost all interviewees, personnel managers, staff in the Master Mariner's Association, and practising engineers agree that education would influence the choice of occupation. In addition to traditional cultural value, the purpose of education is to offer people a continuous process of growth and development of mind. In other words, education offers people knowledge for life, and preparation for employment. The more knowledge the people achieve, the more job alternatives they have. This is their point of view on education.

Q7. What level of education of marine engineers is suitable for operation and maintenance of merchant ship? Why? This question is very controversial as a staff of Master Mariner's Association said to the interviewer. The point of view from this Association is that advanced marine technology makes ship's operation easier and more reliable than before. Many sophisticated monitor systems are installed on board to help ship's officers in running the ships. Should an equipment be out of order, the standby one would take over automatically. The defective one can be left on board and fixed by shore hands when the ship calls at a port. It is not necessary to keep highly educated

engineer on board the ship. The college graduated level is competent enough for engine operation and routine maintenance. However, personnel managers of shipping companies realized that the more advanced technology, the more complicate is, for example, in control system, and the more the educated engineers are needed. They would not deliver the highly advanced ship to the hand of the insufficient educated engineers.

As far as the operation and routine maintenance is concerned, the practising engineers think that they are confident to be competent for the job.

Q8. Do you agree that the popularization of female education would influence engineering student's choice of occupation?

Most interviewees, personnel managers, staff of the Master Mariner's Association, and practising engineers agree that the popularization of female education would influence young people choice of occupation. They think that occupation is not only for personal interest, but also an agent through which a person contributes his or her knowledge and labour, in turn, achieves appropriate reward to support his or her ownself or family. Following the popularization of female education, the possibility for a young man to marry a young educated female has increased greatly. Part of the educational purpose is "to offer the preparation for employment". According to statistics, college level or over educated females are mostly employed or running their own business; few go into catering. These females have their own economic power. When they are married, they contribute their family income. The traditional role in the family, "male responsible for external, and female for home affair", no longer exists.

Q9. What do you think about the current maritime education and training in Taiwan?

Most interviewees agree that the seafaring profession reflects Taiwanese socio-economic change. Their conversation concluded as such in 1960s, many universities established seafaring oriented departments, and many high schools

also had seafaring related subjects to meet the demand of market. These were closed in 1984. Although they were in compliance with the project of maritime education and training from the Ministry of Education of the Republic of China, actually, this reflected the demand of school leavers. Private universities faced the difficulty of intake, while the national universities feared that their reputation would be undermined by low scores in the federal entrance examination to universities because of few competitors. Obviously, seafaring oriented education and training does not attract school leavers who are longing for university education. On the other hand, the current federal entrance examination for universities system provides impartiality for students to accept higher education though, it can not enrol the right student for future employment, particularly, for seafaring education. Students who are ambitious for enrolment in university have studied hard since they were in junior high school. In addition to the regular subjects offered by school, students always go to supplementary school to enhance subjects which are to be examined when student tries to enrol a prestigious high school. A student leaves home for schooling at 7:00 in the morning; probably, he or she comes home after 10:00 in the evening. So does a high school student. The aim in doing so is to go to a university to honour their parents and their family. If the opportunity is available, students will continue their studies as postgraduates. Those who have an intention to work on board merchant ships, might be unable to pass entrance examination because of lack of chance or ability to afford go to supplementary school. Today, attending supplementary school has spread over the campus of universities. Many engineering students do not work hard in their specific subjects and instead to supplementary school to prepare their subjects, such as engineering mathematics, fluid mechanics, and so on for postgraduate study. The federal entrance examination for universities provides the opportunity for young people to become upward mobile, however, it prevents many potential youngsters from developing themselves both in interest and talent.

Q10. Do you agree with that 2-Child policy influences the motivation to work on board merchant ship?

The success of birth control resulted in negative growth of population in Taiwan. Today, the Government no longer talks of the 2-Child policy. However, this policy does influence young people's motivation to work on board merchant ship, personnel managers believed. They declared that the young people aged around 30 today, were born in 1960s. It was the time when the 2-child policy was carried on. These young people are free from the pressure of poverty. In many families, both father and mother work; they can afford their limited children continuing to study instead of encouraging children to go far away from home on merchant ships. This influences deeply young people's motivation to work on board merchant ship.

5.10. Summary of findings

The social security welfare system in Taiwan has not been well established yet; traditional thought "raising children to provide against old age" still prevails; coupling this with the education of school and family emphasizing filial piety, grown up children perceive that their ageing parents can not work as hard as when they were young to afford them staying at school. They would study hard to have a job by examination or other method. Hopefully, they can feed back their parents in return. However, referring to Table 5.1A (see page 133), students' age is related to willingness to study. The older the students are, the less they are willing to study their specific subjects relating to future occupation, and attending the supplementary school for preparation of postgraduate studies instead. This may result from unconscious influence of the old saying "studying is superior to all professions". Under this cultural value, parent may also encourage their children to continue to study to get higher degree in the degree-dependent society. As Table 5.0 shows (see page 131) that 56.4% of students in the entire population whose father's age

are under 50; if father's age 51 - 55 is included, 83.7% of entire population whose father's age are under 55. On the other hand, 95.5% of mother's age are under 55. If the group of 51 - 55 is deducted, 78.7% of mother's age are under 50. They may think they are still young. They can work and provide their children staying in the school.

Almost all Taiwanese university students have worked hard since they were in elementary school 5 or 6 grade in order to be able to enrol in a university. Due to long time of working hard, once the aim is achieved, a student is likely to slacken in study. Schools participating in this research are colleges and universities. University students are less willing to study their specific subjects relating to their future occupation than colleges'. In turn, university students have less strength of commitment than colleges'. Therefore, the level of school is related to willingness to study and commitment (see page 133 Table 5.1A, page 135 Table 5.1B).

Different departments have different degrees of willingness to study. In some departments, willingness to study is related to occupational commitment, and some are not. The Departments of Electrical Engineering, willingness to study is related to their future occupational commitment while those seafaring oriented departments are not related. Obviously, students from marine engineering departments do not commit themselves to seagoing occupation.

78% of students are from family income below £1,500/month, and 22% of students are over this amount. This does not make any difference of students' willingness to study and occupational commitment. This may be interpreted that parents of college and university students can afford their children studying in either college or university with these level of family income. As a result, family income is not related to willingness to study and occupational commitment significantly.

In traditional culture, the first born boy must share the burden of family subsistence. Today, this idea has declined though, the first born boy has

privilege in some customs. For instance, the first born boy has an extra share of inheritance from his ancestors, father or grandfather. The first born boy is responsible for more duty such as taking care of younger brothers or sisters, and to stay with parents when they are old. As a result, birth order is related to occupational commitment significantly (see page 133 Table 5.1A, page 135 Table 5.1B). However, it is not related to willingness to study.

Parents' levels of education are not related to willingness to study and occupational commitment significantly. Before the 1960s, gross national product was low; many families were unable to afford their children's enrolment in higher education. However, the cultural value of studying is deeply rooted in public mind. When they are capable of providing their children with higher education, no matter what level of education they have, they are willing to pay for their children's education. Therefore, level of parents' education is not related to willingness to study. However, mothers' education is related to commitment.

Taiwanese engineering students in the sample have a very high need for autonomy, self-esteem, social activity, and self-actualization. Their work values to their future occupation are very high on organizational reward. When they have experienced real work, they realize that their needs expectation, and work values on future occupation are not met, their willingness to study is thwarted. Taking shipboard practice for example, students of seafaring oriented departments with high values and expectations on sea life enrol in these departments when they join ships for two or three months for cruising training, and realize what seafaring is, they are always dispatched to do routine work, such as cleaning floor, sort tools, help bunkering and so on. Their self-esteem need, autonomy need, self-actualization need are unmet, and expectations and work values on job disappoint. Unconsciously influenced by experienced students, the newcomers also show no intention to their future occupation. As a

result, personal needs and work values are not related to willingness to study and occupational commitment either.

Level of school is both related to willingness to study and occupational commitment (see page 133 Table 5.1A, page 135 Table 5.1B). This implies that college graduates are more suitable for seagoing marine engineering than university graduates.

In addition to attitudes and values held by students from seafaring oriented engineering departments, the following social factors also result in shortage of seagoing marine engineers.

a).Traditional cultural values have strongly influenced the choice of occupation. The white-collar workers are always in the leading positions in Taiwanese society. These leading position holders are mostly qualified with higher degrees. As a result, Taiwan becomes a degree-dependent society. Whichever occupation is able to offer opportunity for further study leading to higher degree, it is welcomed by young people. Seagoing marine engineering occupation will not offer this benefit.

b). Seagoing marine engineering does not enjoy social status reflecting the level of professionalism.

c). Female education has resulted in role changes in the family in which the traditional role of male "responsible for external" no longer exists. In other words, a husband may work for family affairs instead of going far away from home for subsistence.

d). Table 5.11 and Table 5.12 (see page 121) clearly show all seafaring wages much higher than ashore so something other than wages is causing the shortage.

e). The 2-child policy has influenced Taiwanese family size. Parents are able to take care of their grown up children; they do not encourage their children to work far away from home for too long.

f). Low entrance examination scores influences the attitudes of teaching staff to seafaring oriented education.

g). Federal entrance examination of universities predominates in students' willingness to study. This results in students' willingness to study in seafaring oriented departments being not related to a commitment to seagoing marine engineering.

h). The higher the students' level of school, the lower the students are committed themselves to seagoing marine engineering.

All of these mentioned above can be briefly presented by Fig 5.1.

Fig 5.1 Influencing factors of commitment to seagoing marine engineering

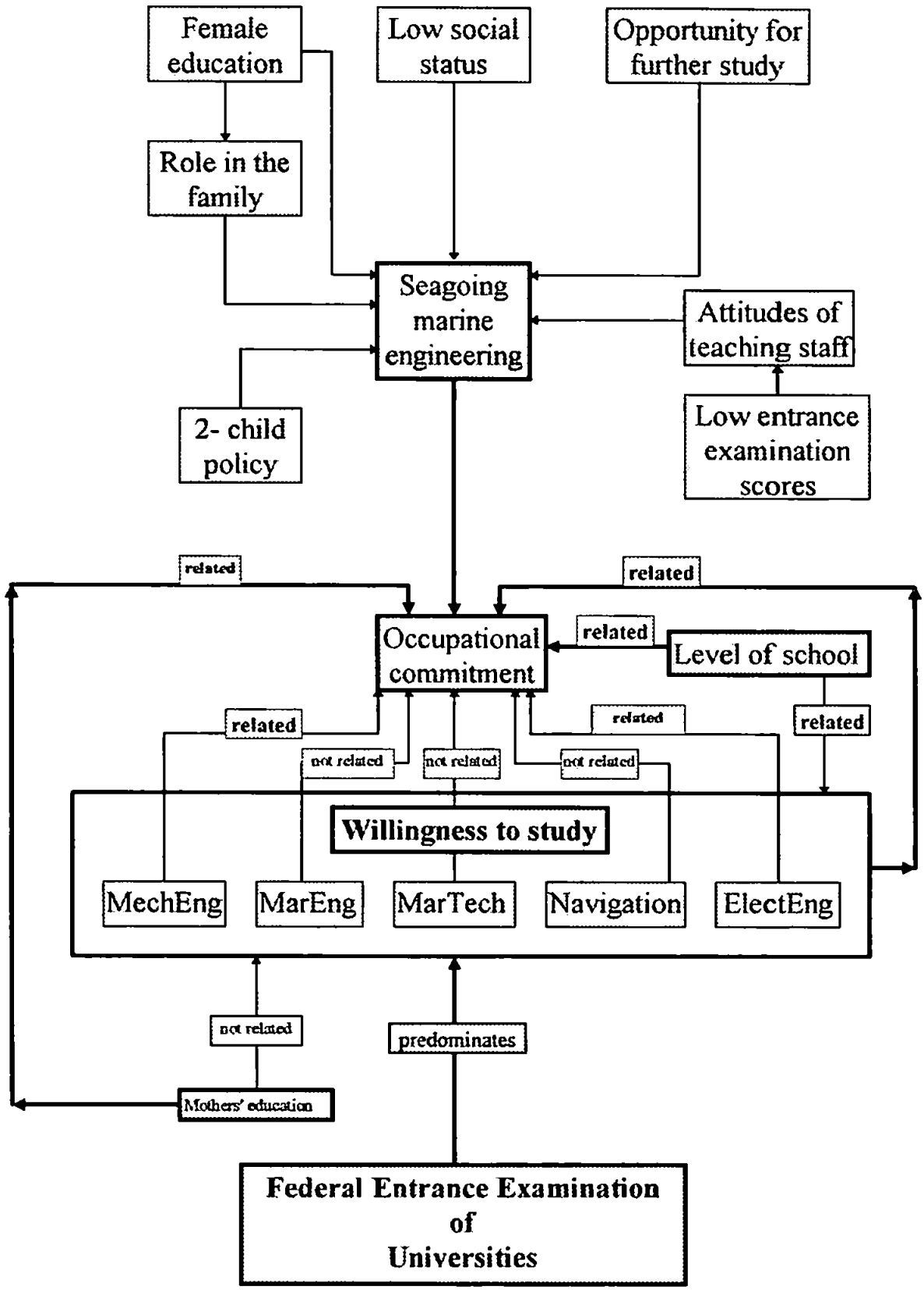


Table 5.0 Statistics data of respondents' demographic background

Demographic Background	Classifications	Number of Students	Percent %	Valid Percent %	Cumulative %
Age	19 or below	264	46.5	46.6	46.6
	20 - 22	170	29.9	30.0	76.7
	23 - 25	103	18.1	18.2	94.9
	26 - 28	25	4.4	4.4	99.3
	29 or over	4	0.7	0.7	100.0
	Missing value	2	0.4		
	Valid Cases=566	568	100.0		
School	University	332	58.5	58.5	58.5
	Junior College	236	41.5	41.5	100.0
	Valid Cases=568	568	100.0		
Department	Marine Engineering Technology	132	23.2	23.5	23.5
	Electrical Engineering	165	29.0	29.4	52.9
	Mechanical Engineering	159	28.0	28.3	81.3
	Marine & Mechanical Engineering	53	9.3	9.4	90.7
	Others	52	9.2	9.3	100.0
	Missing Value	7	1.2		
	Valid Cases 561	568	100.0		
Family Income	$/month				
	Under $500.	44	7.2	7.5	7.5
	$501 - 1,000.	193	34.0	35.3	42.8
	$1,001 - 1,500.	192	33.8	35.2	78.0
	$1,501 - 2,000.	70	12.3	12.8	90.8
	over $2,001.	50	8.8	9.2	100.0
	Missing Value	22	3.9		
	Valid cases 546	568	100.0		
Number of Brothers & Sisters					
	One	61	10.7	10.8	10.8
	Two	183	32.2	32.6	43.4
	Three	196	34.5	34.9	78.3
	Four	87	15.3	15.5	93.8
	Five or over	35	6.2	6.2	100.0
	Missing Value	6	0.9		
	Valid Case 562	568	100.0		
Birth Order	First	325	57.2	58.1	58.1
	Second	141	25.2	25.2	83.4
	Third	64	11.4	11.4	94.8
	Fourth	18	3.2	3.2	98.0
	Girl	11	2.0	2.0	100.0
	Missing Value	9	1.6		
	Valid Case 559	568	100.0		
Father Education	Died	19	3.3	3.4	3.4
	Below Elementary	166	29.2	29.6	33.0
	Junior high	142	25.0	25.3	58.3
	High School	146	25.7	26.0	84.3

continued	College or above	88	15.5	15.7	100.0
	Missing Value	7	1.3		
	Valid Cases 561	568	100.0		
Mother Education	Died	2	0.4	0.4	0.4
	Below Elementary	283	49.8	50.7	51.1
	Junior high	135	23.8	24.2	75.3
	High school	97	17.1	17.4	92.7
	College or above	41	7.2	7.3	100.0
	Missing Value	10	1.8		
	Valid cases 558	568	100.0		
Father's age	Under 35	5	0.9	0.9	0.9
	36 - 40	25	4.4	4.5	5.4
	41 - 45	125	22.0	22.4	27.8
	46 - 50	159	28.0	28.5	56.4
	51 - 55	152	26.8	27.3	83.7
	56 - 60	49	8.6	8.8	92.5
	61 or over	42	7.4	7.5	100.0
	Missing value	11	1.9		
	Valid cases 557	568	100.0		
Mother's age	Under 35	8	1.4	1.4	1.4
	36 - 40	69	12.1	12.3	13.8
	41 - 45	219	38.6	39.2	53.0
	46 - 50	144	25.4	25.8	78.7
	51 - 55	94	16.5	16.8	95.5
	56 - 60	16	2.8	2.9	98.4
	61 or over	9	1.6	1.6	100.0
	Missing value	9	1.6		
	Valid cases 559	568	100.0		

Table 5.1A Relation of willingness to study and students demographic background tested by Chi-squares

Student age	19 and below			20 - 25			26 and over			
Willingness	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid*	
Unwill	79	-23.2	5.27	122	18.6	3.35	16	4.6	1.85	0.00117
Ambiguity	14	0.3	0.01	13	-0.8	0.05	2	0.5	0.17	9.49
Will	168	22.9	3.61	129	-17.8	2.16	11	-5.1	1.61	
Total	261	0	8.88	264	0	5.56	29	0	3.63	χ^2=18.07

Sig=0.00117, P<0.05, χ^2=18.07 >9.49, they are related.

School	University			College						
Willingness	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Sig/Critic
Unwill	150	23.3	4.28	67	-23.3	6.01				0.00019
Ambiguity	16	-0.9	0.05	13	0.9	6.69				5.99
Will	158	-22.4	2.78	151	22.4	3.90				
Total	324	0	7.11	231	0	16.6				χ^2=23.71

Sig=0.00019, P<0.05, χ^2=23.71>5.99, they are related.

Department	Marine Engineering Technology			Electrical Engineering			Mechanical Engineering			
Willingness	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Sig/Critic
Unwill	38	-11.6	2.71	57	-7.1	0.79	65	2.8	0.13	0.00000
Ambiguity	6	-0.7	0.07	7	-1.6	0.29	10	1.7	0.35	15.51
Will	82	12.2	2.13	99	8.7	1.92	83	-4.5	0.23	
Total	126	0	4.91	163	0	3.00	158	0	0.71	

Department	Marine Engineering			Others (Navigation)			
Willingness	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	
Unwill	41	20.5	20.5	15	-4.7	1.12	
Ambiguity	2	-0.7	0.18	4	1.4	0.75	
Will	9	-19.8	13.61	31	3.3	0.39	
Total	52	0	34.29	50	0	2.26	χ^2=44.10

Sig=0.00000, P<0.05, χ^2=44.10>15.51, they are related

Family income

	Low			Medium			High			
Willingness	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Sig/Critic
Unwill	80	-7.1	0.57	78	5.1	0.76	49	2.0	0.08	0.78525
Ambiguity	12	0.2	0.00	10	0.1	0.00	6	-0.4	0.02	9.49
Will	134	6.9	0.37	101	-5.1	0.24	67	-1.6	0.04	
Total	226	0	0.94	189	0	1.00	122	0	0.14	χ^2=2.08

Sig=0.78525, P>0.05, χ^2=2.08<9.49 ∴They are independent.

Number of brothers and sisters

	2 and below			3 - 4			5 and over			
Willingness	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Sig/Critic
Unwill	94	0.9	0.00	106	-1.9	0.03	15	1.0	0.07	0.77204
Ambiguity	15	2.9	0.70	11	-3.1	0.68	2	0.2	0.22	9.49
Will	130	-3.8	0.10	160	4.9	0.15	19	-1.2	0.07	
Total	239	0	0.81	277	0	0.86	36	0	0.36	χ^2=2.03

Sig=0.77204, P>0.05, χ^2=2.03<9.49, they are independent.

Birth order	First born			Non-first born						
Willingness	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*				Sig/Critic
Unwill	124	0.3	0.007	89	-0.3	0.001				0.95174
Ambiguity	17	0.7	0.03	11	-0.7	0.04				5.99
Will	176	-1.1	0.006	129	1.1	0.009				
Total	317	0	0.04	229	0	0.05				χ^2=0.09

Sig=0.95174, P>0.05, χ^2=0.09<5.99, they are independent.

Father education

	Died			Under elementary			Junior high school			
Willingness	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Sig/Critic
Unwill	10	2.5	0.83	59	-3.1	0.15	56	0.6	0.01	0.03000
Ambiguity	0	-1.0	1.00	17	8.7	9.12	7	-0.4	0.02	15.51
Will	9	-1.5	0.21	82	-5.6	0.35	78	-0.2	0.00	
Total	19	0	2.04	158	0	9.63	141	0	0.03	

	High school			College and above			
Willingness	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	
Unwill	53	-2.8	0.14	38	2.7	0.21	
Ambiguity	3	-4.5	2.70	2	-2.7	1.55	
Will	86	7.3	0.67	50	0.0	0.00	
Total	142	0	3.51	90	0	1.75	χ^2=16.96

Sig=0.03000, P<0.05, χ^2=16.96>15.51, they are related.

Mother education

	Died			Under elementary			Junior high			
Willingness	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Sig/Critic
Unwill	1	0.2	0.05	102	-5.6	0.29	52	-0.4	0.00	0.43187
Ambiguity	0	-0.1	0.10	21	6.4	2.80	5	-2.1	0.62	15.51
Will	1	-0.1	0.00	152	-0.8	0.00	77	2.5	0.88	
Total	2	0	0.15	275		3.09	134	0	1.50	

	High school			College and above		
Willingness	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*
Unwill	39	2.2	0.13	20	3.6	0.79
Ambiguity	3	-2.0	0.80	0	-2.2	2.20
Will	52	-0.2	0.00	22	-1.3	0.07
Total	94	0	0.93	42	0	3.06	χ^2=8.73

Sig=0.43187, P>0.05, χ^2=8.73<15.51, they are independent

Father age	Under 45			46 - 55			Over 56			
Willingness	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Sig/Critic
Unwill	49	-9.5	1.54	120	1.1	0.01	43	8.3	1.98	0.16638
Ambiguity	7	-1.0	0.13	18	1.7	0.18	4	-0.7	0.10	9.49
Will	94	10.5	1.32	167	-2.9	0.05	42	-7.6	1.16	
Total	150	0	2.98	305	0	0.24	89	0	3.24	χ^2=6.46

Sig=0.16638, P>0.05, χ^2=6.46<9.49, they are independent.

Mother age	Under 45			46 - 55			Over 56			
Willingness	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Sig/Critic
Unwill	100	-12.8	1.45	99	6.6	0.47	16	6.2	3.92	0.00695
Ambiguity	14	-0.7	0.03	11	-1.0	0.08	3	1.7	2.22	9.49
Will	173	13.5	1.14	125	-5.6	0.24	6	-7.9	4.48	
Total	287	0	2.62	235	0	0.79	25	0	10.62	χ^2=14.03

Sig=0.00695, P<0.05, χ^2=14.03>9.49, they are related.

Table 5.1B Relation of occupational commitment and students demographic background tested by Chi-squares

Student age	19 and below			20 - 25			26 and over			
Commit	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Total
Disagree	70	-41	15.14	149	34.6	10.46	18	6.4	3.53	237
Ambiguity	8	1	0.4	5	-2.2	0.67	2	1.3	2.41	15
Agree	180	40	11.4	112	-32.3	7.25	7	-7.7	4.03	299
Total	258	0	26.97	266	0	18.37	27	0	9.97	531

Sig=0.00000, χ^2=55.00. P<0.05, χ^2=55.00>9.49, they are related.

School	University			College			
Commit	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Total
Disagree	193	53.1	20.15	45	-53.1	28.74	238
Ambiguity	5	-3.8	1.64	10	3.8	2.33	15
Agree	127	-49.3	13.78	173	49.3	19.65	300
Total	325	0	35.57	228	0	50.72	553

Sig=0.00000 χ^2=86.3. P<0.05, χ^2=86.3>5.99, they are related.

Department	Marine Engineering Technology			Electrical Engineering			Mechanical Engineering		
Commit	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*
Disagree	81	26.8	15.5	34	-35.7	18.28	51	-15.7	3.69
Ambiguity	5	1.5	0.64	7	2.5	1.39	1	-3.3	2.53
Agree	40	-28.3	11.73	121	33.2	12.55	103	19	4.29
Total	126	0	25.62	162	0	32.22	155	0	10.52

Department	Marine Engineering			Others (Navigation)			
Commit	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Total
Disagree	29	6.6	1.94	40	18	14.72	235
Ambiguity	2	06	0.25	0	-1.4	1.40	15
Agree	21	-7.2	1.83	11	-16.6	9.98	296
Total	52	0	4.03	51	0	26.10	546

Sig=0.00000, P<0.05, χ^2=98.49>15.5, they are related.

Family income

	Low			Medium			High			
Commit	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Total
Disagree	91	-6.3	0.40	77	-2.5	0.08	59	8.8	1.54	227
Ambiguity	5	-1.4	0.30	6	0.7	0.09	4	0.7	0.15	15
Agree	133	7.8	0.48	104	1.7	0.03	55	-9.5	1.40	292
Total	229	0	1.18	187	0	0.19	118	0	3.09	534

Sig=0.33837, χ^2=4.5. P>0.05, χ^2=4.5<9.47 there are independent.

Number of brothers and sisters

	2 and below			3 - 4			5 and over			
Commit	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Total
Disagree	102	-0.7	0.01	113	-5.7	0.27	22	6.5	2.78	237
Ambiguity	3	-3.5	1.88	10	2.5	0.83	2	1.0	1.0	15
Agree	133	4.2	0.13	152	3.2	0.06	12	-7.5	2.88	297
Total	238	0	2.01	275	0	1.17	36	0	6.67	549

Sig=0.04386, χ^2=9.85. P<0.05, χ^2=9.85>9.49, they are related.

Birth order	First-born			Non-first-born			
Commit	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Total
Disagree	129	-7.4	0.40	105	7.4	0.56	234
Ambiguity	5	-3.7	1.57	10	3.7	2.17	15
Agree	183	11.1	0.72	112	-11.1	1.00	295
Total	317	0	2.69	227	0	3.73	544

Sig=0.03868, P<0.05, χ^2=6.42>5.99, they are related.

Father education

	Died			Under elementary			Junior high school			
Commit	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	
Disagree	12	4.7	3.03	72	1.6	0.04	54	-6.0	0.60	
Ambiguity	1	0.5	0.5	2	-2.5	1.39	3	-0.8	0.17	
Agree	4	5.2	2.94	89	0.8	0.01	82	6.8	0.61	
Total	17	0	6.47	163	0	1.44	139	0	1.38	

	High school			College and above			
Commit	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Total
Disagree	59	-1.9	0.06	40	1.6	0.07	237
Ambiguity	8	4.1	4.31	1	-1.4	0.82	15
Agree	74	-2.3	0.07	48	-0.1	0.00	297
Total	141	0	4.44	89	0	0.89	549

Sig=0.06326, P>0.05, χ^2=14.62<15.51, they are independent.

Continued

Mother education

	Died			Under elementary			Junior high		
Commit	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*
Disagree	0	-0.9	0.9	137	18.2	4.52	38	-18.4	6.00
Ambiguity	0	-0.1	0.1	5	-2.1	0.62	5	1.6	0.75
Agree	2	0.9	0.74	134	-16.1	1.73	88	16.7	3.91
Total	2	0	1.74	276	0	6.87	131	0	10.66

	High school			College and above			
Commit	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Total
Disagree	43	2.1	0.11	17	-1.1	0.06	235
Ambiguity	3	0.6	0.15	1	-0.1	0.01	14
Agree	49	-2.7	0.14	24	1.2	0.06	297
Total	95	0	0.40	42	0	0.13	546

Sig=0.02089, P<0.05, χ^2=18.06>15.51, they are related

Father age	Under 45			46 - 55			Over 56			
Commit	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Total
Disagree	37	-27.8	11.93	151	20.1	3.01	45	7.7	1.58	233
Ambiguity	3	-0.9	0.21	9	1.1	0.15	2	-0.2	0.02	14
Agree	111	28.7	10.00	145	-21.3	2.73	40	-7.4	1.15	296
Total	151	0	22.15	305	0	5.89	87	0	2.75	543

Sig=0.00000, P<0.05, χ^2=30.78>9.49, they are related.

Mother age	Under 45			46 - 55			Over 56			
Commit	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	*O*	*Resid*	*(Resid)²/E*	Total
Disagree	98	-27.5	6.02	122	22.8	5.24	15	4.7	2.14	235
Ambiguity	8	0.0	0.0	6	-0.3	0.01	1	0.3	0.13	15
Agree	185	27.5	4.80	102	-22.5	4.06	8	-5.0	1.92	295
Total	291	0	10.82	230	0	9.32	24	0	4.19	545

Sig=0.00000, P<0.05, χ^2=24.3>9.49, they are related.

Table 5.9 The rank of social status of 40 occupations in Taiwan

Occupations	Mean	STD DEV	CASES
1.Judge, Supreme Co.	6.0936	1.1500	502.0
2.Minister, Gover't	5.8665	1.3087	502.0
3.Judge, Distr. Cot	5.7131	1.1792	502.0
4.Chancellor	5.6574	1.2833	502.0
5.General	5.5637	1.3896	502.0
6.Professor	5.5598	1.1229	502.0
7.Physician	5.5319	1.2341	502.0
8.Architect	5.4462	1.1530	502.0
9.Engineer	5.4303	1.1170	502.0
10.Lawyer	5.4124	1.2759	502.0
11.Minister, prov.	5.1733	1.3358	502.0
12.Congressmen	4.9223	1.7094	502.0
13.Dean, high school	4.8526	1.2277	502.0
14.Dentist	4.8327	1.1786	502.0
15.Accountant	4.7849	1.3001	502.0
16.Master, Chief/E	4.6912	1.3807	502.0
17.Air pilot	4.6534	1.3341	502.0
18.Headmister	4.6016	1.2951	502.0
19.News reporter	4.3765	1.1666	502.0
20.Teacher, High sch	4.3347	1.2184	502.0
21.TV Star	4.3227	1.6679	502.0
22.Major, Army	4.3227	1.3431	502.0
23.Father	4.2590	1.5823	502.0
24.Civil servant	4.2311	1.1242	502.0
25.Manager, Dept stor	4.2251	1.2345	502.0
26.Painter	4.1892	1.4276	502.0
27.School teacher	4.1873	1.3376	502.0
28.Nurse	4.0259	1.3527	502.0
29.Police	3.9382	1.5065	502.0
30.Air steward	3.8187	1.2656	502.0
31.Banker	3.8028	1.2083	502.0
32.Farmer	3.7112	1.6925	502.0
33.Artisan	3.7072	1.3986	502.0
34.Librarian	3.4143	1.2963	502.0
35.Tourist guide	3.3904	1.3189	502.0
36.Postman	3.3645	1.4424	502.0
37.Hair dresser	3.1215	1.3280	502.0
38.Car driver	3.0259	1.2876	502.0
39.Clerk	2.8884	1.3191	502.0
40.Dancing girl	1.8984	1.2823	502.0

Chapter 6 Conclusion and Discussion

6.1. Introduction

Through four decades of a combination of state interventionism, entrepreneurial initiative, external financial assistance, and the exploitation of abundant human resources, Taiwan has been a success in economic development. By the 1980s, it was already one of the most prosperous of all developing countries, and in 1990s, today, takes it place in the ranks of the industrialised nations.

However, this economic achievement has brought its own challenges. Increasing prosperity has led to rising expectations. Today, the island populace demands a higher quality of life and more leisure time than in the past.

Shipping plays a very important role in economic development, however, the job characteristics of seafaring do not satisfy the life style aspirations of young people, leading to the shortage of ship's engineer officers. The following are the findings of this study.

6.2. Findings and discussion

Each department, either at college or university, has its own educational aims; it is written in the catalogue or brochure of each individual college or university. As such, "willingness to study" may be seen as an initial commitment to the occupation consistent with the educational purpose. When a student applies for admission to a department, he or she has expectations about an occupation as mentioned above. Marine engineering cognate departments educate and train sea-going marine engineers; students enrolling in these departments are supposed to be intending sea-going marine engineers. Although "willingness to study" is related to "occupational commitment" for

the entire population, the results of this research show that "willingness to study" for seafaring oriented departments is not related to occupational commitment, the result becoming a shortage of ship's junior officers.

The students from maritime colleges have six months of shipboard practice as cadets; some of them have experience as junior engineers on board merchant ships for two or three years. Many of those from 5-year colleges have a period of time service in the industry as technicians. They left their jobs, either from the shipping industry or a manufacturing factory, mainly to take a degree, not for accepting of education or re-education in marine engineering technology. When they complete their study, they will not go back to sea and instead may go for postgraduate study. As a result, "willingness to study" for them is not related to occupational commitment; even though they have a very strong "willingness to study".

Personal needs and expectations about jobs lead to a level of initial commitment (see page 55), however, personal needs and occupational commitment are not shown to be related in this research. This may be attributed to the federal entrance examination policy. Students are placed in departments by their scores in the examination, not by personal characteristics, such as values, beliefs, and personality. Students enrol in a university only for degree, not for that department which offers knowledge for future employment. As a result, student's work values are also not related to occupational commitment. Secondly, students now have very high social, autonomy, self-esteem, and self-actualisation needs. Engineering students from seafaring oriented departments have an opportunity for experiencing shipboard practice as cadets. When they come on board a merchant ship, in addition to on the job training, they are also responsible for routine cleaning work under the guidance of second engineer or chief engineer. Their personal higher level needs cannot be satisfied, and their expectations are unmet under the conditions of a ship's

environment. As a result, "The respondent's personal needs are not related to occupational commitment".

Traditionally, the first born son is responsible for a greater proportion of duty to his family. Today, this idea has declined though, the first born son has privileges in some customs. For instance, the first born son has an extra share of the inheritance from his ancestors, father or grandfather. Certainly, the first born son is responsible for more duty than later younger brothers. He has to take care of younger brothers and sisters, and to stay with parents when they are old. As a result, birth order is related to "occupational commitment" significantly, however, it is not related to "willingness to study".

In spite of the changing organisation of young couple's families, traditional values stressing the role of the female in the home, whether as wife or mother, still prevail, although there is acceptance of economic activity by women (see page 29). Children are growing up mostly by their mothers' care. Attitudes and values held by mothers influence their children tremendously. As a result, the level of mother's education is related to "occupational commitment". However, mother's education is not related to "willingness to study" because of a strong influencing factor, the federal entrance examination of universities, overriding the level of mother's education.

The shore engineer's social status is high in Taiwanese society as shown in many studies. A marine engineering graduate can be a mechanical engineer, a production engineer, and a manufacturing engineer with 4 or 5 years of training in their individual fields after graduation. Comparing the ship master/chief engineer with the shore employee whose level of education and length of service is equivalent, show that the ship master/chief engineer does not enjoy social status as high as their qualification as professionals.

Nine of the ten shipping companies interviewed have been facing the shortage of junior ship's officers since the late of 1980s. The reasons for the shortage mostly agree with reduction of sources where the ship officers are educated and trained. All seafaring related departments in universities were closed down in 1984. At the same time, the departments of Marine Engineering Technology and Navigation Technology were established at National Taiwan Ocean University to assume the re-education of ship's officers to meet the demand for advanced marine technology. The source has been reduced, however, as ship's engineers enrolling in NTOU never go back to sea when they earn their degree. This increases the shortage of marine engineers.

Despite ship officers' wages being much higher than that of shore employees' (see page 121 Table 5.11 & 5.12), comparison between the ratio of ship's officer/shore employee wages today with those of the past, clearly shows that the sea/shore wage differential has reduced (see page 32). However, wages are not the main point to encourage young people to go to sea. Something other than wages is causing the shortage.

The interview shows that 60% of newly recruited practising engineers plan to work onboard merchant ship for 3 years, and 40% are willing to work for their employing company for 5 years. If their employer provides an opportunity for further study, 73% would like to extend the period of service as a sea-going marine engineer for 5 years. Thus, the cultural value "studying is superior to all professions" still predominates in Taiwanese society.

All interviewees agreed that education would influence the choice of occupation. The more knowledge the people achieve, the more job alternatives they have. This is consistent with the outcome of the field investigation that the level of school is negatively related to occupational commitment (see page 135

Table 5.1B). This has been accepted by many studies. Meyer and Allen (1988) found that those with higher degrees had less commitment than those with lower degrees (see page 46).

The competency level of education of marine engineers for the operation and maintenance of merchant ships is very controversial. The more advanced the technology used in an equipment, and the more reliable the equipment is, the easier it is for people to operate it. On the other hand, for the drastically competitive sea trade, the enterprising ship owners would make greater use of advanced ship technology in order to fight for economic survival. Modern ships are equipped with advanced degree of computerisation, automation, and instrumentation and control engineering. This demands a high level of training not only to understand theoretical and operational aspects of such systems, but to be able to locate faults and malfunctions and rectify them. The level of this training must go through a lengthy period of education and training. Maritime education and training to degree level is necessary.

A strong factor influencing engineering students' "willingness to study" and "occupational commitment" is the federal entrance examination of universities in Taiwan. More than 120,000 school leavers compete for 48,000 first year places in universities each year. 40% are admitted to the universities while 60% are kept out of the university door. They may retake the examination next year. On the other hand, those students who are admitted to universities are not always satisfied with their placement in departments or universities because of their examination scores; students age 19 and below can keep their student's status, and go to the supplementary schools to prepare for next year examination to achieve a satisfactory department at a satisfactory university. However, those unsatisfied students whose age over 20 are reluctant to stay in the placed departments and are not willing to study hard. The boys whose ages are over 20 must go to military service for 2 or 3 years

by law if they are not in schooling. Actually, they are not interested in the occupation which is consistent with the department aims. On the other hand, teaching staff in the lower percentile rank departments at universities, have a strong desire to promote department prestige by redesigning popular subjects to attract school leavers. Such subjects as those seafaring related, are facing the fate of being ruled out. This further reduces "willingness to study" marine engineering related subjects, leading to adverse commitment to the seafaring marine engineering profession.

The 2-Child policy influences the motivation to work on board merchant ships. Taiwanese family size has changed dramatically since the 2-Child policy was enacted in 1960s. The children who were born in that time are in their 30s today. Many families are dual earners, that is, both father and mother work, and they can afford the opportunity for their grown up children to continue to study. This is one of reasons that 25% of the population in Taiwan are students (see page 5). Taiwanese shipping companies have faced the shortage of junior ship's officers since the late of 1980s. Because this cohort of young men born in 1960's is either in universities or serving in the military.

In order to understand the commitment of seagoing engineers to their employment a wide spectrum of probable influencing factors was taken into account. They are illustrated in Fig 5.1 (see page 130). The research results show that the correct spectrum of influences on occupational commitment was used with a possible weakness in not giving sufficient weight to the distortion in choice of study area at university level caused by the Federal entrance examination system.

6.3. Conclusions

Seafaring has existed for hundreds of years. The job characteristics of this occupation have remained almost the same over the years. However, society has been changed, and is changing. This has led to demands for a higher quality of life. People demand for more aspiration, more leisure time. It was a rather competitive profession in 1960s which no longer attracts young engineering students in Taiwan today.

The literature survey, the interviews and the analysis of data collected via the questionnaires leads the author to the following conclusions:

1. As shown in the interview data, the shortage of Taiwanese seagoing marine engineers emerged in the late 1980's and is likely to continue.

2. Significant improvements in standards of living in Taiwan with higher wages ashore and an erosion of the differential between sea and shore wages has meant that seafaring is less attractive from a purely monetary point of view.

3.Whilst the "2-child policy" has succeeded in controlling the size of the population of Taiwan, it has had the effect of changing parents' attitudes which have led to a consequential discouragement for their sons to go to sea.

4. The recruitment of an increased number of highly educated females, both married and single, into the labour force has resulted in a changed role for husbands in the dual earners' family in which both parents work(see page 9), with a consequential discouragement by wives for their husbands to go to sea.

5. Higher family incomes enabling young Taiwanese people to remain in higher and post-graduate education coupled with the traditional Chinese cultural values of "Studying is superior to any profession", and coupled with a "degree and diploma dependent society" has resulted in school leaver students competing for enrolment in higher education, and university graduates for postgraduate studies, leading to a reduction in the number of young people wanting to go to sea.

6. One effect of the importance given to degrees, and diplomas in Taiwan is that students compete strongly to enter the more prestigious universities. Great importance is attached to the ranking of universities by their entrance examination scores (see page 28). A consequence of this is that academic staff in the lower ranking universities come under pressure to widen and improve the attraction of their courses in order to achieve higher numbers of applicants with a consequential raising of their entrance examination scores. One result of this particular set of social forces was the evolution of courses from operational marine engineering into more theoretical mechanical engineering (see page 91).

7. It is clear from the analysis of collected data via questionnaire that the students with higher level schooling have less "willingness to study" in their specific subjects than those with lower level schooling, and are in turn, less committed. This implies that students of college are more willing to study marine engineering, and are in turn, more committed themselves to the sea-going profession than university ones.

8. Finally, the analysis of data collected via the questionnaire, shows that the "willingness to study" by students in seafaring oriented departments is not related to their "occupational commitment". When young people are originally recruited by maritime educational institutions, they have a desire to go to sea, but the research shows that whilst in college they are not committed to their maritime oriented studies. Marine Engineering at sea is not perceived as satisfying their higher level needs. To overcome this disparity, the job characteristics of ship engineer officers needs redesigning to create a more challenging work context for the graduate marine engineer. If, for whatever the reason, the job of the seagoing marine engineer cannot be redesigned to satisfy graduate engineers then the only alternative is to recruit non-graduate seagoing engineers from college.

Appendices

Appendix 1

The Entrance Examination Scores and its Rank of Mechanical Engineering, Marine Engineering of Universities 1971- 1993

University / Years	NTU	Cheng Kung	Chung Hsing	NTOU	Chung Yuen	Tam-Kang	Hong Chia	Ta-Tung	Ching-Hua
1971	482(1)	453(2)	442(3)	413(5)	410(6)	397(7)	380(8)	416(4)	---
1972	446(1)	407(3)	396(4)	369(6)	366(7)	354(8)	340(9)	377(5)	430(2)
1973	482(1)	429(3)	413(5)	370(8)	371(7)	367(9)	338(11)	392(6)	463(2)
1974	415(1)	366(3)	349(5)	311(8)	315(7)	311(8)	286(10)	334(6)	400(2)
1975	476(1)	429(3)	411(5)	361(9)	374(7)	371(8)	345(11)	393(6)	458(2)
1976	412(1)	391(3)	373(4)	315(9)	337(7)	331(8)	305(11)	353(6)	400(2)
1977	447(1)	401(4)	384(5)	325(10)	346(8)	341(9)	315(12)	364(7)	429(2)
1978	411(1)	359(4)	342(5)	281(11)	300(8)	297(9)	275(12)	318(7)	392(2)
1979	422(1)	372(4)	357(5)	293(11)	315(8)	314(9)	290(12)	332(7)	405(2)
1980	398(1)	351(4)	338(6)	279(12)	303(9)	301(10)	277(13)	318(8)	386(2)
1981	426(1)	369(4)	355(6)	287(13)	319(9)	316(10)	290(12)	334(8)	412(2)
1982	414(1)	364(4)	351(7)	293(14)	323(10)	321(11)	296(13)	337(8)	403(2)
1983	403(1)	358(4)	344(7)	281(14)	315(9)	314(10)	291(12)	331(8)	396(2)
1984	404(1)	352(4)	339(7)	276(14)	305(10)	306(9)	287(12)	331(8)	395(2)
1985	406(1)	357(5)	335)8)	308(12)	316(10)	316(10)	305(13)	337(7)	396(2)
1986	423(1)	382(2)	360(7)	338(10)	336(11)	327(12)	326(13)	357(8)	409(2)
1987	419(1)	369(4)	346(9)	318(12)	321(11)	353(8)	300(14)	341(10)	406(2)
1989	405(1)	385(4)	364(6)	306(11)	334(10)	335(9)	292(13)	348(6)	402(2)
1991	449(1)	387(4)	368(6)	301(11)	325(9)	338(7)	269(15)	336(8)	431(2)
1992	421(1)	350(4)	331(7)	279(10)	287(9)	296(8)	233(12)	292(9)	401(2)
1993	447(1)	394(4)	376(8)	339(11)	337(12)	341(10)	291(14)	339(11)	431(2)

Continue

University / Years	Chinese Cultura	Chiao Tung	Central Univer	Chung Shan	Yuan Chi	Hua Fann	Chinese I.T.	Ta-Yet I.T.	Kao Hsiung
1971									
1972	found	MarE							
1973	346(10)	419(4)							
1974	295(9)	353(4)							
1975	353(10)	412(4)							
1976	313(10)	368(5)							
1977	325(10)	375(6)							
1978	284(10)	326(6)							
1979	301(10)	338(6)	founded						
1980	287(11)	321(7)	340(5)						
1981	302(11)	336(7)	360(5)	founded					
1982	310(12)	336(9)	357(6)	359(5)					
1983	308(11)	331(8)	351(6)	354(5)					
1984	303(11)	Closed	347(6)	351(5)					
1985	317(9)	M.E.	353(6)	363(4)					
1986	340(9)	400(3)	370(6)	378(5)					
1987	315(13)	380(3)	354(7)	367(5)	founded				
1989	297(12)	400(3)	377(5)	377(5)	337(8)	founded	founded	founde	founde
1991	273(14)	407(3)	378(5)	378(5)	313(10)	282(12)	267(16)	277(13)	277(13)
1992	234(11)	373(3)	342(5)	338(6)	263(13)	228(14)	217(15)	224(17)	225(16)
1993	291(14)	410(3)	384(6)	379(7)	314(13)	276(15)	264(18)	270(17)	271(16)

Source : Ministry of Education, ROC, Universities Federal Entrance Examination Statistics, 1971 - 1993.
The data are the minimum examination scores to admission to the departments of mechanical engineering, marine engineering at various universities. The number in the parenthesis is the rank of individual departments among the universities.
NTU=National Taiwan University
Ching Hua=National Ching Hua University
Chiao Tung=National Chiao Tung University
NTOU=National Taiwan Ocean University

Appendix 2

Questionnaire administered to Engineering Students.

Covering Letter

Dear sirs;

This is a questionnaire to investigate the engineering students' willingness to study in their individual departments, and understand the commitment to their future occupation consistent with individual educational aims.

Except personal demographic background, the questionnaire includes five measurements. They are,

personal needs non-fulfilment and expectations,

willingness to study,

work values to their future occupation,

occupational commitment. and

social status measurement for forty occupations.

Before each measurement, there is an instruction telling you how to answer the questions. Please carefully read it and answer the questions honestly.

Thank for your co-operation.

Yours faithfully,

Chiang, Yan-Nan

Note: The following questionnaire is a translate from Chinese.

Appendix 2 (continued)

Questionnaire administered to engineering students

(A). Demographic background

Instructions : The following items are related to your personal background; please tick ✓in the proper ☐

1. Age :

☐1. 19 and below
☐2. 20 - 22
☐3. 23 - 25
☐4. 26 - 28
☐5. over 29

2. The school you are attending :

☐1. University
☐2. Five year College

The department is:

☐1. Marine Engineering Technology
☐2. Electrical Engineering
☐3 .Mechanical Engineering
☐4. Marine & Mechanical Engineering
☐5. Other (Navigation Technology)

3. Family income(NT$ per month):

☐1. Under 20,000
☐2 20,001 - 40,000
☐3 40,001 - 60,000
☐4 60,001 - 80,000
☐5 over 80,001 dollars

4. How many brothers and sisters do you have?
☐1 1 ☐2 2 ☐3 3 ☐4 4 ☐5 over 5

Appendix 2(continued)

5. The birth order in your brothers is:

- ☐ 1 First
- ☐ 2 Second
- ☐ 3 Third
- ☐ 4 Fourth
- ☐ 5 Other

6. Parent's education:

Father:

- ☐1 Below elementary school level
- ☐2 Junior High school
- ☐3 High or vocational school
- ☐4 College level or above

Mother:

- ☐1 Below elementary school level
- ☐2 Junior High school
- ☐3 High or vocational school
- ☐4 College level or above

7. Parent's age:

Father:

- ☐1 35 and below
- ☐2 36 - 40
- ☐3 41 - 45
- ☐4 46 - 50
- ☐5 51 - 55
- ☐6 56 - 60
- ☐7 over 61

Appendix 2 (continued)

Mother:

☐1 35 and below
☐2 36 - 40
☐3 41 - 45
☐4 46 - 50
☐5 51 - 55
☐6 56 - 60
☐7 over 61

(B) Strength of willingnes to study

Instruction : The following items are regarding to your willingness on studying the current department. These epress what students might feel about themselves as one of their department. There are seven scales for each item. Will you please indicate on this scale how much you agree or disagree with each statement.

☐1 No. I strongly disagree.
☐2 No. I disagree quite a lot.
☐3 No. I disagree just a little.
☐4 I'm not sure.
☐5 Yes, I agree just a little.
☐6 Yes, I agree quite a lot.
☐7 Yes, I strongly agree.

☐☐☐☐☐☐☐1 I am quite proud to be able to tell people which subject I study for.
☐☐☐☐☐☐☐2 If I had an opportunity to select department (subject) by myself, I would not choose this department.
☐☐☐☐☐☐☐3 I won't work hard on the subjects which the department offers.
☐☐☐☐☐☐☐4 Even if the job market relating to this department is not quite good, I will not change my mind on studying in this department.
☐☐☐☐☐☐☐5 I feel myself to be part of this department.

□□□□□□□6 Working hard on the knowledge the department offers, not just for employment but for the promoting prestige for the department as well.
□□□□□□□7 My examination scores can enrol a higher prestigious school, I choose this one for enrolment.
□□□□□□□8 I definitely not recommend a close friend to enrol this department.
□□□□□□□9 To know that my own work had made a contribution to the good of the department would please me.

(C) Personal Needs and Expectations:

Instructions: People have different needs and expectations getting from different areas of their lives. Please think about the work that you will do and, because most jobs are not perfect, consider what would make it a better job from your point of view.

I shall write out a list of characteristics which a job might have, and the question I would like you to answer about each is 'do you have as much of this characteristic in your job and work life as you would like, ideally?' There are seven squares in front of each characteristic from □. I have more now than I really want to, and it is not important at all. 7. I would like very much more, and it is very important. Please tick ✓in the proper □

Very important □7_ _ _ _ _ _□1. Not important at all.

□□□□□□□1 The opportunity to meet challenge in the work.
□□□□□□□2 The prestige that your job carries at work.
□□□□□□□3 The opportunity to talk with others.
□□□□□□□4 The chance to use more of your skills and abilities.
□□□□□□□5 The opportunity to make friends.
□□□□□□□6 The chance to learn new things.
□□□□□□□7 Making decisions about how you do the work.
□□□□□□□8 Having influence over opinions of others at work.

□□□□□□□9 Independence from other people's control.
□□□□□□□10 Being part of a social group.
□□□□□□□11 The status your work carries in your social life.
□□□□□□□12 The opportunity to discuss or question instructions about work.
□□□□□□□13 To be able to work without constant supervision.
□□□□□□□14 Friendly contact with other people.
□□□□□□□15 To be able to extend your abilities further.
□□□□□□□16 Recogition received for your achievements.

(D) Social Status:

Instructions: There are 40 occupations in the following table. Please evaluate their social status based on your recognition. There are 7 squares □in front of each occupation; it indicates from the highest 7 to the lowest 1. Please tick ✓in the proper □

Highest □7_ _ _ _ _ _ □1 Lowest

□□□□□□□Nurse
□□□□□□□President (university)
□□□□□□□News reporter
□□□□□□□Lawyer
□□□□□□□Major
□□□□□□□Painter
□□□□□□□Physician
□□□□□□□Banker
□□□□□□□Police (Sheriff)
□□□□□□□Schoolmaster of Junior high school
□□□□□□□Teacher (Junior high school)
□□□□□□□General
□□□□□□□Air stewardess

Appendix 2 (continued)

□□□□□□□Congressmen
□□□□□□□Engineer
□□□□□□□Dancing girl
□□□□□□□Master & Chief Engineer
□□□□□□□Minister of Central Government
□□□□□□□Headmister
□□□□□□□Clerk
□□□□□□□Postman
□□□□□□□Judge (district court)
□□□□□□□Professor
□□□□□□□Architect
□□□□□□□Farmer
□□□□□□□Tourist guide
□□□□□□□Minister of Provincial Government
□□□□□□□Teacher of Primary school
□□□□□□□Father (Catholic)
□□□□□□□Hair dresser
□□□□□□□Manager, departmentstore
□□□□□□□Artisan
□□□□□□□Car driver
□□□□□□□Dentist
□□□□□□□Judge, Supreme Court
□□□□□□□Accountant
□□□□□□□TV star
□□□□□□□Civil servant
□□□□□□□Air pilot
□□□□□□□Librarian

(E) Work Values :

Instructions: Everyone expects to get an ideal job. There are 40 items in the following relating to your future occupation; please base on your own personal preference to show whether it is important or not and tick ✓in the proper □in each item.

Appendix 2 (continued)

Very important ☐7_ _ _ _ _ _ ☐1. Not important at all.

☐☐☐☐☐☐☐1.Sufficient time to stay with family
☐☐☐☐☐☐☐2 Job security
☐☐☐☐☐☐☐3 Challenge in the work, and achievement when work done
☐☐☐☐☐☐☐4 Refrain from stress
☐☐☐☐☐☐☐5 Working environment (Such as light, space, ventilation, etc.,)
☐☐☐☐☐☐☐6 Boss respect subordinates
☐☐☐☐☐☐☐7 Equality to everyone
☐☐☐☐☐☐☐8 Performance can be recognized by boss
☐☐☐☐☐☐☐9 Considerable autonomy in doing work by your own way
☐☐☐☐☐☐☐10 Congenial colleague
☐☐☐☐☐☐☐11 Being able to work without constant supervision
☐☐☐☐☐☐☐12 Good prestigious company
☐☐☐☐☐☐☐13 High pay
☐☐☐☐☐☐☐14 High bonus
☐☐☐☐☐☐☐15 Job characteristics compliance with your own interest
☐☐☐☐☐☐☐16 Good fringe benefit
☐☐☐☐☐☐☐17 The opportunity for training and self-growth
☐☐☐☐☐☐☐18 Entrepreneur to be your own relative
☐☐☐☐☐☐☐19 Be able to be off duty on time
☐☐☐☐☐☐☐20 Working place not far away from home
☐☐☐☐☐☐☐21 Contribution to society
☐☐☐☐☐☐☐22 The opportunity for promotion
☐☐☐☐☐☐☐23 The organization full of friendship
☐☐☐☐☐☐☐24 Sufficient time for taking rest during the work
☐☐☐☐☐☐☐25 Giving present to employee during festivals
☐☐☐☐☐☐☐26 Being able to extend your ability further
☐☐☐☐☐☐☐27 Task variety
☐☐☐☐☐☐☐28 Task identity
☐☐☐☐☐☐☐29 Definite instructions about work
☐☐☐☐☐☐☐30 The opportunity to make friends
☐☐☐☐☐☐☐31 Objective criteria for evaluating performance
☐☐☐☐☐☐☐32 Close relationship between performance and reward
☐☐☐☐☐☐☐33 Sufficiently authorization

Appendix 2 (continued)

□□□□□□□34 Rigorous organizational structure
□□□□□□□35 Highly systematic
□□□□□□□36 high working standard
□□□□□□□37 Friendly colleague
□□□□□□□38 Kind supervisor
□□□□□□□39 Being able to use more of your skills and technology
□□□□□□□40 Coorperation among colleagues

(F) Commitment:

Instructions:There are nine items in the following to test your commitment to an occupation and there are 7 squares in front of each item. It indicates Strongly agree 7 to Strongly disagree 1. Please tick ✓in the proper □

Strongly agree □7_____ □1 Strongly disagree.

□□□□□□□1 I am quite proud to tell people what my occuaption is.
□□□□□□□2 I sometimes feel like to change my job.
□□□□□□□3 I'm not willing to put myself getting involved in the occupation.
□□□□□□□4 Even if the pay this occupation were not very high, I would not consider changing my occupation.
□□□□□□□5 I feel myself to be a member of carrying this occupation.
□□□□□□□6 Making effort in my occupation, not just for myself but for the society as well.
□□□□□□□7 The better pay of the other occupation I would not seriously make me think of changing my job.
□□□□□□□8 I would not recommend a close friend to join our staff.
□□□□□□□9 To know that my own work had made a contribution to the good of the organization would please me.

Appendix 3

Interview with personnel managers of ten important shipping companies

Interviewee: Captain Chao, Assistant Manager, **Yang Ming Marine Transport Co., LTD.**

Date : 10:00 18th May 1993

Question: How many ships do you have? How many ships are under construction?

Answer: This company belongs to the Central Government of the Republic of China (Taiwan). There are 32 vessels in operation.

Question: How many crew do you have on each vessels? Officers (deck and engine)? Rating?

Answer: We provide the number of crew depending on the ship's size and equipment, oil tanker 23, bulk carrier 24, container ship 22 and M.0. ship 18. Generally, 9 key officers are required according to the regulation. The rest are ratings.

Question: What is the ratio of crew members and work-leave?

Answer: We must reserve seafarers 20 per cent of the total number of crew working on board the ships by law. These seafarers can earn reserve pay from NT$3,000 to NT$6,000 depending on what their rank are. The 20 per cent reserve limits us to recruit more seafarers.

Question: Are you experiencing in faced a shortage of seafarers? If yes, when?

Answer: We faced seafarer's shortage in 1988 to 1990. For the present time being, we only lack of junior engineers and mess-boys.

Question: What caused the shortage?

Answer: The main reason for shortage is that the difference of income between that of shore job and seafaring is shortened due to social change. For example, a college graduate junior engineer earns NT$60,000 per month on board this company vessel and a same qualification young person with an equivalent job

ashore earns NT$30,000. The ratio is only 2:1.This figure does not attract young people going to sea.

Question: What is meant by 'shortage'? Shortage of recruits? Or high wastage?

Answer: Shortage means insufficient number of right people to do the right job. We can not recruit sufficient junior engineers to man our ships. For junior deck officers are high wastage. There were 6 third mates left this company for the stock exchange market last year.

Question: What is meant by 'good quality'? Correct attitudes or competence on the jobs?

Answer: 'Quality' include the correct attitudes and professional knowledge. The working attitudes and professional knowledge of young people in this company are below the standard.

Interviewee:Mr Chang, Assistant Manager of Navigation Department.**Taiwan Navigation Company.**

Date: 10:00 6th May 1993

Question: How many ships do you have? How many ships are in construction?

Answer: There are 22 ships run by this company, 6 self-owned. 16 owned by **China Petroleum Corporation** and **Taiwan Power Company respectively.**

Question: How many crew do you have on each vessel? Officers (deck and engine)? Rating?

Answer: The number of crew is different from one ship to another. It depends on the size and purpose of the vessels, for example. oil tanker and general cargo 23, container 22, and ore and bulk carrier 23.

Question: What is the ratio of crew members and work-leave?

Answer: Because this is a state-owned company and is to be audited by **The Provincial Government**. The number of seafarers' reserve is limited to one sixth of total crew members on company vessels. According to quota the reserve crew

members should be 84 men whereas there are only 64 men reserved. There are still 20 persons required to recruit in the company.

Question: Are you experiencing in faced a shortage of seafarers? If yes, when?

Answer: Some officers, such as chief mate, second engineer, chief engineer and captain are not experiencing shortage in number; they are in redundancy. But some officers in these ranks from mainland China occupying the quota are not suitable to work on board ships. Sometimes it appears to be tight when some officers in these ranks applying for leave. However, after 1987 junior officers both deck and engine are experiencing faced in shortage and these are replaced by higher level of competence of certificate's holders.

Question: What caused the change?

Answer: As above-mentioned. this is a state-owned company. The salary of shore staff and seafarers is to be approved by the Government. The seafarers' salary are normally higher than that of shore staff in the Government. It is difficult to pass when the salary-raising proposal submits to the council. In general. a college graduate employed as a staff in the Government earns NT$27,000; a junior engineer on board ship same qualification as the former earns NT$60.000 in this company. This earning is lower compare to Evergreen and Yang Ming shipping companies. The limited number of junior officers from maritime institutions are already recruited by them.

Question: What is meant by 'shortage'? Shortage of recruits? Or high wastage?

Answer: Shortage means insufficient number of recruitment in junior officers. whereas high wastage in higher level of officers.

Question: What is meant by 'good quality'? Correct attitudes or competence on the jobs?

Answer: For this question. it is difficult to answer by a simple sentence. The university graduated officers' competence on the jobs are positive. but their attitudes on the jobs are disapproved. On the contrary, the maritime vocational school leaver officers' are opposite to the former.

Interviewee: Mr Sun, Assistant Manager of Navigation Department, **Evergreen Motorship Corporation.**

Date: 14:00 6th May 1993

Question: How many ships do you have? How many ships are under construction?

Answer: Evergreen has owned 51 ships. There are 3 ships under construction. It will receive 3 ships every year. One ship is going to be 20 years old.

Question: How many crew do you have on each vessel? Officers (deck and engine)? Rating?

Answer: The number of crew is different from one ship to another. It depends on the size and equipment of the vessels; its detail are as follows:

20 conventional ships.....21 crew

16 reduced crew ships.....16 crew

11 general purpose ships.....14 crew

The new ships will provide 14 crew.

Question: What is the ratio of crew members and work-leave?

Answer: The regular seafarers' reserve is one third of total number of crew, i.e. reserve 17 persons for each rank of seafarers in this company.

Question: Are you experiencing in faced a shortage of seafarers? If yes, when?

Answer: Since 1987, this company has experienced in lack of junior officers both deck and engine, however, ratings are in redundancy. Senior officers are just make due to carrying out shore staff and seafarers' mobility. Therefore, there is no redundancy.

Question: What caused the change?

Answer: The source of junior officers (deck and engine) reduced. For example, the graduates from Taiwan Ocean University who get the certificate of competence have not joined this company for a couple of years.

Question: What is meant by 'shortage'? Shortage of recruits? Or high wastage?

Answer: Shortage means insufficient number of recruitment. It is very common of that the junior officers join this company for a couple of months then left because personal reasons.

Question: What is meant by 'good quality'? Correct attitudes or competence on the jobs?

Answer: Good quality should include correct attitudes and competence on the jobs. The young people lack of correct attitudes; some have insufficient professional knowledge and tamper with the equipment when they work aboard ships.

Interviewee: Mr Lee, Assistant General Manager, **U-Ming Navigation Company.**

Date: 14:00 12th May 1993

The number of seafarers in this company is quite sufficient;however, the quality of seafarers is unsatisfactorily. This may result from the value of people change. In addition, the difference of income that shore staff and seafarers is shortened. Seafaring profession does not attract the young people going to sea. The babies born in the past two-child policy now are in their mid twenties. No parents allow young people to go far away from these families. The mean age of seafarers in this company is over 40 years old. Said Mr Lee when I talked to him.

Question: How many ships do you have? How many ships are under construction?

Answer: This company has 15 ships, 10 M.O. and 5 traditional control vessels. The average age of ships is 3.5 years old. We have other 3 vessels are under construction.

Question: How many crew do you have on each vessel? Officers (deck and engine)? Ratings?

Answer: We provide 17 crew on M.O. ships and 22 crew on traditional control ships.

Question: What is the ratio of crew members and work-leave?

Answer: There are 302 men working on board vessels, officers 133 and rating 169. The work-leave seamen are 28 officers, and 30 ratings. The ratio of crew members and work-leave is 21 per cent for officers, and 17.8 percent for ratings.

Question: Are you experiencing in faced a shortage of seafarers? If yes, when?

Answer: We did not have a shortage of seafarers in number as mentioned above. We lack of competent seafarers, especially, the junior officers both deck and engine are in shortage even in number since 1989.

Question: What caused the change?

Answer: After 1986, the shipping in Taiwan boomed gradually. Most ships in this company are built after the booming; many officers both deck and engine are required to man ships. However, the source of officers reduced since 1984. Because the departments related to maritime education in the university, such as Chiao-Tung, TamKang and Cultural Universities were closed since then. The departments of Navigation and Marine Engineering in National Ocean University were forced to change name and educational purpose. Therefore, it is difficult to recruit sufficient and satisfactory young people to man our ships.

Question: What is meant by 'shortage'? Shortage of recruits? Or high wastage?

Answer: Shortage means insufficient competent personnel in senior officers' level, but insufficient recruitment in junior officers' level. As to 'wastage', once the young people come to this company and then leave are not many.

Question: What is meant by 'good quality'? Correct attitudes or competence on the jobs?

Answer: 'Good quality' in this company means competence on the jobs. In general, the seafarers in this company are satisfactorily in working attitudes.

Interviewee:Assistant general manager Mr. Lin and assistant manager Mr. Liu of Navigation department, **UnigloryMarine Corporation.**

Date:0900 8th May 1993

Question:How many ships do you have? How many ships are in construction?

Answer:There are 18 ships in running; another one will be delivered in the latest future. There will be 19 ships this year.

Question:How many crew do you have on each vessel?

Officers(deck and engine)? Rating?

Answer:We have 20 crew on board the conventional ships, i.e. 9 officers (deck and engine). and 11 ratings. For M.O. ships. there are 14 crew members. 8 officers and 6 ratings.

Question:What is the ratio of crew members and work-leave ?

Answer: The company policy is to reserve seafarers one fourth of the total crew members on board the company ships. However, the current situation is less than this figure.

Question: Are you experiencing in faced a shortage of seafarers? If yes. when?

Answer:This company is established in 1985 when the world shipping slumped to the nadir. Many shipping companies closed down, therefore. seafarers were in redundancy. This company easily recruited sufficient seafarers to man the ships. After 1988. we faced a shortage of recruitment in junior officers (deck and engine).

Question: What caused the change?

Answer: All vessels of this company are registered as ocean going (deep-sea) ships. Maritime vocational school leavers are not qualified to sit for examination for competence of certificate on working on board the ocean going ships according to STCW convention. In addition. the difference of income ashore and afloat is insignificant due to Taiwanese society change. Thisresulted in young people having low commitment to seafaring profession.

Question: What is meant by 'shortage'? Shortage of recruits? Or high wastage?

Answer: Shortage means that there are not enough appropriate people to man the ships. As previously mentioned, maritime vocational school leavers are not allowed to work on deep-sea ships and university graduates have low commitment to seafaring profession, the remain only few maritime college graduates enter into shipping industry. Therefore, the reason of shortage is the insufficient source from maritime institution.

Question: What is meant by 'good quality'? Correct attitudes or competence on the jobs?

Answer: The exiting officers (deck and engine) of this company are mainly from two maritime colleges. Their basic knowledge are good. If they had strong commitment to this company, the competence on the jobs would be positive.

Interviewee: Mr Liu, Assistant Manager, Seafarer's Department.

Chinese Maritime Transport LTD.

Date: 14:00 18th May 1993

Question: How many ships do you have? How many ships are under construction?

Answer: This company has owned 6 national flag ships; 3 bulk carriers and 3 container ships. This is a manning agent of OOCL shipping company.

Question: How many crew do you have on each vessel? Officers (deck and engine)? Rating?

Answer: We provide crew depending on the ship type and size; 19 for the container ships, 22 for the Panamax.

Question: What is the ratio of crew members and work-leave?

Answer: We reserve the number of seafarers 30 per cent of total number of crew members working on board company owned and OOCL ships.

Question: Are you experiencing in faced a shortage of seafarers? If yes, when?

Answer: Only junior officers are in shortage; the other rank of officers and ratings are under control. This condition has been happened since 1988.

Question: What caused the change?

Answer: Because Maritime vocational school leavers are not allowed to join the ocean going vessels since STCW implemented and Ocean university graduates have low commitment to shipping industry. The source of deck officers and engineers are mainly from National Kaoshiung and Private China Maritime Colleges. Low commitment of Ocean University graduates is due to Taiwan social change. Because the difference of shore staff and seafarers' income is shortened, seafaring profession no long attracts young people. In addition, the opportunity of job for women increases, young ladies do not expect their husband leave family when they are married.

Question: What is the average age of seafarers of this company?

Answer: 38 years old.

Question: What is meant by 'shortage'? Shortage of recruits? Or high wastage?

Answer: The meaning of shortage to this company is shortage of recruits. Once the young people join this company, they would work here for long time. Because this company has good communication with their seafarers.

Question: What is meant by 'good quality'? Correct attitudes or competence on the jobs?

Answer: For the present time being, good quality should be more emphasized on 'attitudes'. Because incorrect attitudes result in unsatisfactorily competence on the jobs.

Interviewee: Captain Fu, Assistant Manager, Navigation Department, **Wan-Hai Steamship Co., INC.**

Date: 10:00 12th May 1993

Question: How many ships do you have? How many ships are under construction?

Answer: This company has 7 Taiwanese flag ships and 9 Panamanian flag ships. There are 7 ships under construction. The average age of ships is 5.5 years old.

Question: How many crew do you have on each vessel? Officers (deck and engine)? Rating?

Answer: There are 18 crew on Taiwanese flag vessels. The flag of convenience ships equip 12 Taiwanese officers and 6 Indonesian or Cambodian ratings.

Question: What is the ratio of crew members and work-leave?

Answer: There is no reserve policy of this company; generally, we reserve 16% of total number of Taiwanese crew without reserve pay. The local agents, Cambodia or Indonesia, recruit ratings for the flag of convenience ships. There is no problem of seafarer's shortage of those area.

Question: Are you experiencing in faced a shortage of seafarers? If yes, when?

Answer: There is no shortage problem of this company. Most deck officers of this company are college graduated, whereas engineers are mainly from maritime colleges.

Question: Almost all shipping companies in Taiwan are facing a shortage of junior officers both deck and engine; you enjoy the rich human resource. Could you mind telling me what personnel management strategies you employed?

Answer: Because I spent a lot of time to communicate seafarers and build up good relation with them.

Question: What is meant by 'good quality'? Correct attitudes or competence on the jobs?

Answer: For my opinion, 'good quality' should include correct attitudes and competence on the jobs. If a capable man without correct attitudes, he will not justify as a 'good quality' seafarer. He must not be a competent person on the jobs.

Question: How do you think your seafarers both Taiwanese and foreigner regarding their 'quality'?

Answer: They are satisfactorily to these respects.

Interviewee: Mr Chen, Assistant Manager, **Nan Tai Line LTD.**

Date: 16:00 15th May 1993

Question: How many ships do you have? How many ships are under construction?

Answer: This company has 6 ships. There are 2 ships under construction.

Question: How many crew do you have on each vessel? Officers (deck and engine)? Rating?

Answer: We provide 21 crew for Taiwanese flag vessel, 18 crew for flag of convenience.

Question: What is the ratio of crew members and work-leave?

Answer: We have no reserve seafarers.

Question: Are you experiencing in faced a shortage of seafarers? If yes, when?

Answer: Yes, we faced a shortage of seafarers since 1986.

Question: What caused the shortage?

Answer: The certificating policy of this country causes the shortage of seafarers. The school leaver of maritime vocational school can not sit for examination for competence of oceangoing (deck) and powered over 3000kwvessels. The college graduates have low commitment to shipping industry. These cause the shortage of seafarers.

Question: What is meant by 'shortage'? Shortage of recruits? Or high wastage?

Answer: Shortage means insufficient number of seafarers of this company. Sometimes it is high wastage. Because the young people join this company no more than one year and left for other jobs.

Question: What is 'good quality'? Correct attitudes or competence on the jobs?

Answer: 'Good quality' means correct attitudes and competence on the jobs.

Interviewee: Mr Huang, Personnel Coordinator. **Glory Navigation Co., LTD.**

Date: 16:00 12th May 1993

Question: How many ships do you have? How many ships are under construction?

Answer: This company has 6 ships in total. 4 with the flag of the Republic of China, the other 2 with the flag of convenience. There are two ships are under construction. The average age of these ships is 13.5 years old. The trade area of this company is mainly loading log from The Philippines, Indonesia and Malaysia. Sometimes load general cargoes sail Singapore, Indo China, Vietnam and Mainland China.

Question: How many crew do you have on each vessel? Officers (deck and engine)? Rating?

Answer: We provide 15 to 22 crew dependent on ship's tonnages. The total number of seafarers in this company is 290 men, 129 for officers, and 161 crew for three nationalities. There are 77 Taiwanese officers and 46 ratings among these figures. The average age of Taiwanese seafarers is 50 years old.

Question: What is the ratio of crew members and work-leave?

Answer: It is difficult to recruit sufficient seafarers for reserve. The existing seafarers of this company are employed for one year contract though, actually, it is equivalent to non-contract employment. We do not fire any seaman as long as he is willing to work on board the ship.

Question: As my personal understanding, this company used to bea very attractive shipping company in the late 1960s. What caused the change?

Answer: As above-mentioned, the average age of seafarers of this company is 50 years old. This data shows that there are no young people to join this company for many years. The main reasons for this change are: the attitudes of owner. The wages of Taiwanese is too high compare to that of the Filippino, Indonesia, Thailand and Cambodia. This company already employed them as ratings and is trying to change Taiwanese crew with Indochina people on Taiwanese flag ships if possible. inappropriate maritime education and training. The university graduates have low commitment to join ships. The maritime vocational school leavers can not sit for competence of junior officers both deck and engine. The source of seafarers in this company is mainly from maritime vocational school's leavers:

therefore we employ retirement navy and aged seafarers because of source shortage.

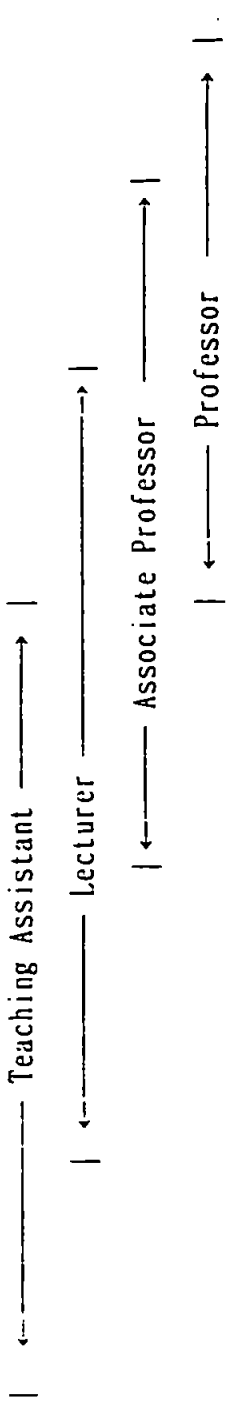
Question: What do you think about foreigner's (Indonesia, Cambodia or Filippino) work attitudes and competence on the jobs?

Answer: The vessels of this company sail around the Southeast Asia. The longest trip never over 4 days: the maintenance can be helped by shorehand. Generally speaking, they have strong desire to work with Taiwanese company. Because they can go home for every two weeks and earn rather high wages compare with their local living cost.

Appendix 4 Wage scale of teaching staff in University 1993

Unit:NTS

Rank	Wage
770	40,915
740	40,395
710	39,875
680	38,320
650	37,280
625	36,245
600	35,205
575	34,165
550	33,130
525	32,090
500	31,055
475	30,015
450	27,940
430	27,160
410	26,380
390	25,605
370	24,825
350	24,045
330	23,270
310	22,490
290	21,710
275	20,935
260	20,155
245	19,375
230	18,595
220	18,080
210	17,560
200	17,040
190	16,520
180	16,000
170	15,485
160	14,965
150	14,445
140	13,925
430	13,405
120	12,890
110	12,370
100	11,850
90	11,490



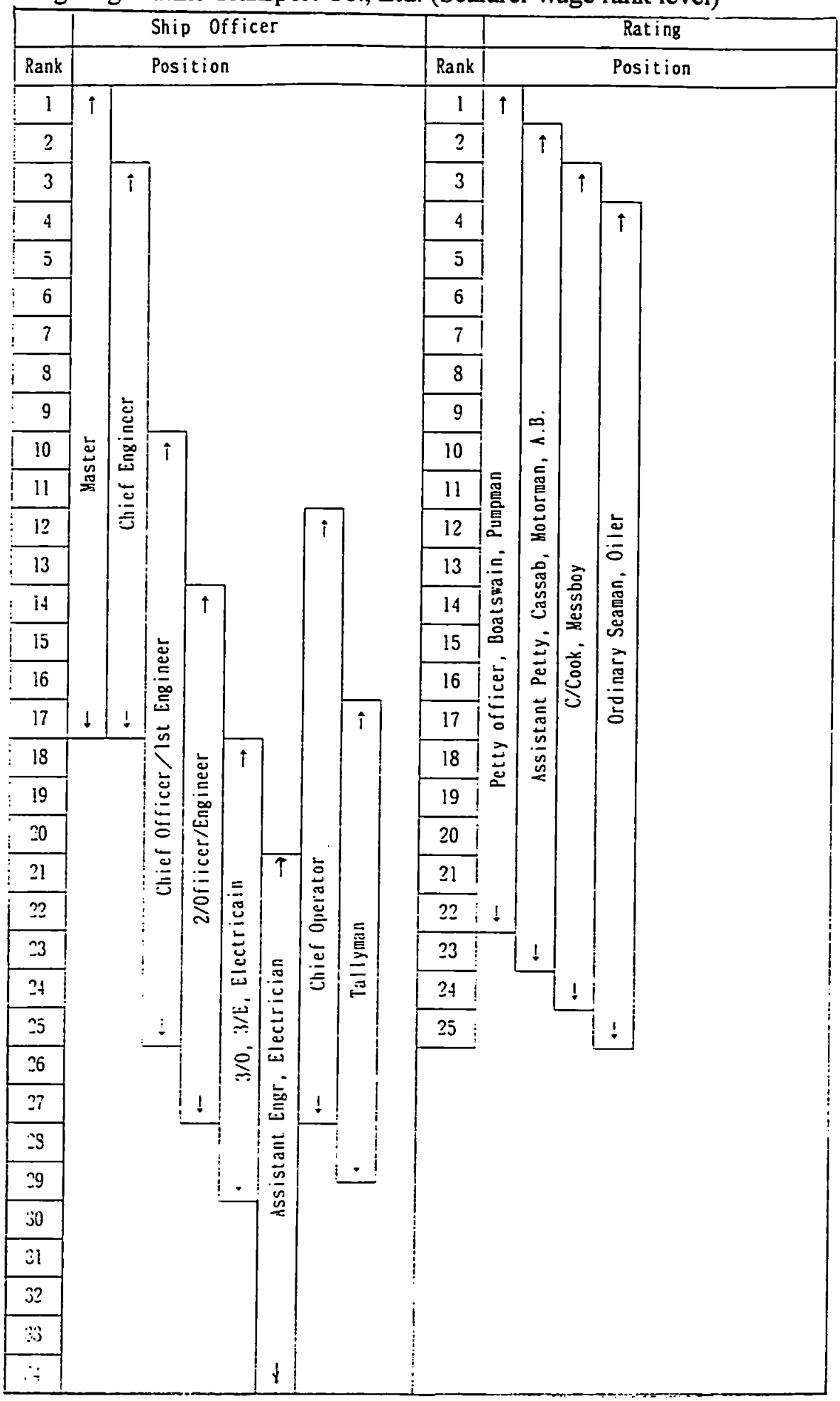
Research allowance

Teaching Assistance	16,640
Lecturer	24,000
Associate Professor	36,330
Professor	44,240

Source: Executive Yuen, ROC, File No.25000, 1993.
*Rank and wage are identical for civil servants.

Appendix 5: Shipping Company Wage Scales

Yangming Marine Transport Co., Ltd. (Seafarer wage rank level)



Yangming

Work Allowance Scale

Unit:NT$ Dollar

Position	Work allowance monthly payment				Remark
	Grade 2	Grad 3	Grade 4	Grade 5	
Master	70,500	72,000	73,500	75,000	1.This allowance will not cover in the persion of retire, die and injury. 2.Two years of service and satisfaction by individual superior is to be upgraded for one grade of seniority 3.Coast liner is paid 90% of this Table. 4.Ocean going ship is paid of 100% of this Table.
Chief Engineer	67,000	68,500	70,500	71,500	
C/O, 1/E	44,500	46,000	47,500	49,000	
C/Operator	32,500	34,000	35,500	36,500	
2/O, 2/E	32,000	33,500	35,500	36,500	
3/O, 3/E, electrician	28,000	29,500	30,500	31,500	
Petty Officer	28,500	29,000	30,000	31,000	
Assistant Petty Officer Ass. Engineer, ASS, Elect	25,500	26,500	27,500	28,500	
Boatswain, No.1 C/Cook, pumpman	25,000	25,500	26,000	26,500	
Technician	24,000	24,500	25,000	25,500	
Cassab. Carpenter, Fitter	23,500	24,000	24,500	25,500	
A.B. Motorman	22,500	23,000	23,500	24,000	
O.S. Oiler, Messboy	19,500	20,000	20,500	21,000	

Appendix 5 (continued)

Yangming Seafarer Wage Scale

	Rank	Monthly wage		Rank	Monthly wage		Rank	Monthly wage
Ship's officers	1	57,500	Ship's officers	26	33,500	Ratings	17	25,100
	2	56,300		27	33,000		18	24,800
	3	55,100		28	32,500		19	24,500
	4	53,900		29	32,000		20	24,200
	5	52,700		30	31,500		21	23,900
	6	51,600		31	31,000		22	23,600
	7	50,500		32	30,500		23	23,300
	8	49,400		33	30,000		24	23,000
	9	48,300		34	29,500		25	22,700
	10	47,200	Ratings	1	32,900	Remark: 1. Monthly wage is the criteria for pension of retire, die and injury of seafarers based on the Maritime Law of ROC. 2. Payment for cadet is separate.		
	11	46,200		2	32,300			
	12	45,200		3	31,700			
	13	44,200		4	31,100			
	14	43,200		5	30,600			
	15	42,200		6	30,100			
	16	41,300		7	29,600			
	17	40,400		8	29,100			
	18	39,500		9	28,600			
	19	38,600		10	28,100			
	20	37,700		11	27,600			
	21	36,900		12	27,100			
	22	36,100		13	26,700			
	23	35,400		14	26,300			
	24	34,700		15	25,900			
	25	34,100		16	25,500			

Appendix 5 (continued)

Yangming Overtime level for Seafarer

Unit:NTSDollar

Position	Monthly Payment	Remark
Master	27,500	The payment listed will not pay when relire, die, or injury.
Cheif Engineer	25,500	
Cheif Officer/1st Engineer	15,000	
Chief Operator	11,000	
2nd Officer/Engineer	10,500	
3rd Officer/Engineer	9,500	
Electrician	7,500	
Petty Officer	9,500	
Assistant Petty Officer	8,000	
Technician	7,000	
Assistant angineer	7,500	
Boatswain No.1	7,500	
Pumpman Electrician	7,500	
Chief Cook	8,000	
Cassab.	4,800	
Carpenter, Fitter	4,500	
A.B. Motorman	4,500	
O.S. Oiler Messboy	3,800	

Appendix 5 (continued)

Taiwan Navigation Company Wage Scale for Seafarer

Unit:NTSDollar

Positiion	Basic wage	Allowance	Fox Overtime	Total
Master	27,400	77,400	22,200	127,000
Chief Engineer	27,400	73,700	20,800	121,900
C/O, 1/E	24,200	49,300	11,800	85,300
2/O, 2/E	23,600	36,000	9,000	68,600
3/O, 3/E	23,000	31,300	4,200	58,500
Junior Engr/Ch. COOK	22,400	27,600	3,200	53,200
Pumpman Boatswain	16,200	27,000	6,100	49,300
Motorman/Electrician	16,200	26,000	3,200	53,200
Carpenter/2 COOK	16,200	26,000	3,200	45,400
Able Seaman	16,200	24,400	3,200	43,800
Steward	16,200	22,800	2,700	41,700
Oiler/O.S./Mess Boy	16,200	21,200	2,700	40,100
Operator	23,600	37,600	9,500	70,700

The above list is basic pay. The actual pay depends on the trade areas; they are different from one to another. They are as follows:

Home trade 75% Of allowance
Containership basic×1.15
Oil Tanker basic×(1.10~1.20)
Ore basic×1.10

Appendix 5 (continue)

Wage scales of seafarer for Evergreen Motorship Corporation

Unit:NT$Dollar

Position	Basic wage	Class	Allowance	Vacation Pay	Fix overtime	Total
Master	68,000.	A_a	27,200.	12,693.	47,207.	155,100.
		A_b	27,200.	12,693.	75,807.	183,700.
		B_b	27,200.	12,693.	83,707.	191,600.
		Bc	27,200.	12,693.	87,607.	195,500.
		C_b	27,200.	12,693.	90,007.	197,900.
		C_c	27,200.	12,693.	93,807.	201,700.
Chief Engineer	63,500	A_a	25,400.	11,853.	47,447.	148,200.
		A_b	25,400.	11,853.	47,447.	175,500.
		B_b	25,400.	11,853.	82,247.	183,000.
		Bc	25,400.	11,853.	85,947.	186,700
		C_b	25,400.	11,853.	88,247.	189,000
		C_c	25,400.	11,853.	91,947.	192,700.
C/O 1/E	45,000.	A_a	18,000	84,00.	30,600.	102,000.
		A_b	18,000	84,00.	49,400.	120,800.
		B_b	18,000	84,00.	54,600.	126,000.
		Bc	18,000	84,00.	57,200.	128,600.
		C_b	18,000	84,00.	58,800.	130,200.
		C_c	18,000	84,00.	61,300.	132,700.
2/O 2/E	36,000.	A_a	14,400.	6,720.	24,880.	82,000.
		A_b	14,400.	6,720.	40,080.	97,200.
		B_b	14,400.	6,720.	44,180.	101,300.
		Bc	14,400.	6,720.	46,280.	103,400.
		C_b	14,400.	6,720.	47,580.	104,700.
		C_c	14,400.	6,720.	49,580.	106,700.
R/O	32,000.	A_a	12,800.	5,973.	19,127.	69,900.
		A_b	12,800.	5,973.	31,927.	82,700.
		B_b	12,800.	5,973.	35,527.	86,300.
		Bc	12,800.	5,973.	37,327.	88,100.
		C_b	12,800.	5,973.	38,327.	89,100.
		C_c	12,800.	5,973.	40,127.	90,900.
3/O 3/E	25,000.	B_b	10,000.	4,667.	42,473.	82,140.
		Bc	10,000.	4,667.	44,173.	83,840.
		C_b	10,000.	4,667.	45,173.	84,840.
		C_c	10,000.	4,667.	46,873.	86,540.
Class 1 G.P.	25,000.	B_b	10,000.	4,667.	32,633.	72,300.
		Bc	10,000.	4,667.	34,033.	73,700.
		C_b	10,000.	4,667.	35,033.	74,700.
		C_c	10,000.	4,667.	36,433.	76,100.
Boatswain	25,000.	C_b	10,000.	4,667.	42,700.	82,440.
		C_c	10,000.	4,667.	42,700.	83,940.
Class 2 G.P.	25,000.	A_a	10,000.	4,667.	24,173.	63,840.
		A_b	10,000.	4,667.	35,973.	75,640.
		B_b	10,000.	4,667.	39,273.	78,940.
		Bc	10,000.	4,667.	40,873.	80,540.
A.B.	25,000.	A_a	10,000.	4,667.	17,593.	57,260.
		A_b	10,000.	4,667.	28,093.	67,760.
		B_b	10,000.	4,667.	30,993.	70,660.
		Bc	10,000.	4,667.	32,493.	72,160.
Motorman	25,000.	A_a	10,000.	4,667.	22,673.	62,340.
		A_b	10,000.	4,667.	34,273.	73,940.
		B_b	10,000.	4,667.	37,373.	77,040.
		Bc	10,000.	4,667.	38,973.	78,640.

Appendix 5 (continued)

Cassab	23,000.	A_a	9,200.	4,293.	15,307.	51,800.
		A_b	9,200.	4,293.	24,807.	61,300.
		B_b	9,200.	4,293.	27,407.	63,900.
		Bc	9,200.	4,293.	28,707.	65,200.
O.S.	20,800.	A_a	8,320.	3,883.	12,417.	45,420.
		A_b	8,320.	3,883.	20,817.	53,820.
		B_b	8,320.	3,883.	23,117.	56,120.
		Bc	8,320.	3,883.	24,217.	57,220.
Oiler	20,800.	A_a	8,320.	3,883.	15,317.	48,320.
		A_b	8,320.	3,883.	24,217.	57,220.
		B_b	8,320.	3,883.	26,717.	59,720.
		Bc	8,320.	3,883.	27,917.	60,920.
Cook	30,000.	B_b	15,200.	5,000.	43,600.	93,800.
	12,000.	Bc	6,000.	2,000.	9,100.	29,100.
	15,000.	C_b	7,500.	2,500.	6,600.	31,600.
	12,000.	C_c	6,000.	2,000.	5,200.	25,200.

A_a Regular coastship
A_b Regular oceangoing ship
B_b Reduced crew ocean going ship
Bc Reduced crew around world ship
C_b G.P. ocean going ship.
C_c G.P. around world ship.

Appendix 5 (continued)

U-Ming Navigation Compant

Unit:NT$Dollar

Position	Basic wage	Class	Allowance	Vacation pay	Fix overtime	Total
Master	62,000.	A	24,800.	11,573.	39,627.	138,000.
		B	31,600.	12,480.	58,920.	165,000.
		C	31,600.	12,480.	65,920.	172,000.
Chief Engineer	58,000.	A	23,200.	10,827.	37,973.	130,000.
		B	30,400.	11,787.	56,313.	156,500.
		C	30,400.	11,787.	63,813.	164,000.
C/O I/E	40,000.	A	16,000.	7,467.	27,533.	91,000.
		B	22,400.	8,320.	33,780.	104,500.
		C	22,400.	8,320.	38,280.	109,000.
2/O & 2/E	33,500.	A	13,400.	6,253.	23,847.	77,000.
		B	14,500.	6,400.	29,100.	83,500.
		C	14,500.	6,400.	32,600.	87,000.
Chief operator	31,500.	A	13,400.	6,253.	25,047.	78,200.
		B	14,500.	6,400.	29,100.	84,000.
		C	14,500.	6,400.	32,600.	87,000.
3/O & 3/E	31,500	A	12,600.	5,800.	22,020.	72,000.
		B	13,800.	6,040.	17,160.	78,500.
		C	13,800.	6,040.	29,660.	81,000.
Class 1 G.P.	23,800.	C	13,700.	5,000.	28,500.	71,000.
Class 2 G.P.	21,000.	C	13,500.	4,600.	24,400.	63,500.
Boatswain	23,800.	A	9,520.	4,443.	21,437.	59,200.
		B	13,700.	5,000.	22,500.	65,000.
Cassab	21,000.	A	9,520.	3,920.	20,680.	54,000.
		B	13,700.	4,600.	18,900.	58,000.
Motorman	20,500.	A	8,200.	3,827.	18,473.	51,000.
A B		B	12,500	4,400	17,600	55,000
Oiler	15,900.	A	6,360.	2,968.	15,772.	41,000.
O.S.		B	10,500.	3,520.	13,080.	43,000.
Fitter	20,800.	A	9,520.	4,443.	20,237.	58,000.
Chief cook		B	13,700.	5,000.	20,500.	63,000.
		C	13,700.	5,000.	27,500.	70,000.
Messboy	18,200.	A	7,280.	3,390.	14,123.	43,000.
		B	11,410.	3,948.	13,942.	47,500.

A Stands for coast container ship.

B Stands for ocean going container ship.

C Stands for reduced crew ocean going container ship.

Appendix 5 (continued)

Uniglory Marine Corporation (Ocean Going Vessels Wage Scale)

Unit: NTS Dollar

Position	Basic Wage	Navigation Allowance	Work Allowance	Total
Master	46,800	46,800	42,400	136,000
Chief Engineer	44,200	44,200	41,600	130,000
C/O	31,200	31,200	34,600	97,000
1/E	31,200	31,200	34,600	97,000
2/O	22,400	22,400	27,200	72,000
2/E	22,400	22,400	27,200	72,000
3/O	22,400	22,400	22,200	67,000
3/E	22,400	22,400	22,200	67,000
Chief/Operator	22,400	22,400	30,200	75,000
Electrician	22,400	22,400	27,200	72,000
Boatswain	17,250	17,250	18,500	53,000
Carperter	17,250	17,250	14,500	49,000
A.B.	16,000	16,000	12,600	44,600
A.B.	16,000	16,000	12,600	44,600
A.B.	16,000	16,000	12,600	34,600
A.B.	16,000	16,000	12,600	44,600
O.S.	15,000	15,000	11,000	41,000
Fitter	17,250	17,250	18,500	53,000
Motorman	16,000	16,000	12,600	44,600
Motorman	16,000	16,000	12,600	44,600
Motorman	16,000	16,000	12,600	44,600
Oiler	15,000	15,000	11,000	41,000
C/Cook	17,250	17,250	18,500	53,000
Messboy	15,000	15,000	11,000	41,500

a)Provision Fee: USDS6.50 per head per day.

b)Extra allowance NTS2,000 to every one in G.P. System.

c)Messboy and Wiper to be presented and helped when berthing and leaving.

d)Extra payment NTS5,000 for messboy to help C/COOK

Appendix 5 (continued)

Uniglory Marine Corporation (Coast Vessels Wage Scale)

Unit: NTS Dollar

Position	Basic Wage	Navigation Allowance	Work Allowance	Total	a)Provision Fee
Master	32,900	32,900	14,200	82,000	(1)homeward NTS150 per head per day.
Chief Engineer	32,400	32,400	13,900	78,700	
C/O	23,400	23,400	13,900	60,000	(2)Ocean going NTS180 per head per day
1/E	23,400	23,400	13,200	60,000	
2/O	17,900	17,900	12,700	60,000	(3)NTS 3,000 allowance for messboy to help cooks.
2/E	17,900	17,900	12,700	48,500	
3/O	16,400	16,400	12,700	45,500	
3/E	16,400	16,400	12,700	45,500	
C/Operator	17,900	17,900	13,200	49,000	
Electrician	17,100	17,100	12,700	47,000	
Boatswain	14,100	14,100	9,300	37,500	
Carperter	14,100	14,100	7,800	36,000	
A.B.	13,100	13,100	7,800	34,000	
A.B.	13,100	13,100	7,800	34,000	
A.B.	13,100	13,100	7,800	34,000	
A.B.	13,100	13,100	7,800	34,000	
O.S.	12,100	12,100	7,800	32,000	
Fitter	14,100	14,100	9,300	37,500	
Motorman	13,100	13,100	7,800	34,000	
Motorman	13,100	13,100	7,800	34,000	
Motorman	13,100	13,100	7,800	34,000	
Oiler	12,100	12,100	7,800	32,000	
C/Cook	14,100	14,100	9,300	37,500	
Messboy	11,850	11,850	7,800	31,500	

Appendix 5 (continued)

Chinese Maritime Transport Ltd.

RANK	BASIC WAGES NTD	SEA ALLOW USD	OVER TIME ALLOW USD	HOLI-DAY ALLOW NTD	ANNUAL BONUS NTD	TAX ALLOW NTD	MONTHLY WAGES (A) MTD	MONTHLY LEAVE PAY (B) NTD	MONTHLY CONTR ALLOW (C) NTD	GRAND TOTAL (A)+(B)+(C) NTD
MASTER	77,400	1,214	910	3,870	6,450	12,900	154,800	12,900	12,900	180,600
SC C/O	55,283	867	619	2,765	4,607	9,214	110,665	9,214	9,214	128,993
C/O	52,650	826	590	2,632	4,388	8,775	105,300	8,775	8,775	122,850
SC 2/O	42,525	667	476	2,126	3,544	7,088	85,050	7,088	7,088	99,225
2/O	40,500	635	454	2,025	3,375	6,750	81,000	6,750	6,750	94,500
SC 3/O	34,965	546	392	2,748	2,914	5,828	69,930	5,828	5,828	81,585
3/O	33,300	522	373	1,665	2,775	5,550	66,600	5,550	5,550	77,700
R/O	40,500	635	454	1,025	3,375	6,750	81,000	6,750	6,750	94,500
C/E	72,460	1,136	812	2,623	6,038	12,075	144,900	12,075	12,075	169,050
SC 2/E	55,283	867	619	3,765	4,607	9,214	110,565	9,214	9,214	128,993
2/E	52,650	826	590	2,632	4,388	8,775	105,300	8,775	8,775	122,850
SC 3/E	42,525	667	476	2,126	3,544	7,088	85,050	7,088	7,088	99,225
3/E	40,500	635	454	2,025	3,375	6,750	81,000	6,750	6,750	94,500
SC 4/E	34,640	548	392	1,748	2,914	5,828	69,930	5,828	5,828	81,585
4/E	33,300	522	373	1,665	2,775	5,550	66,600	5,550	5,550	77,700
E/E	46,600	635	454	2,025	3,375	6,750	81,000	6,750	6,750	94,500
CADET		300 /600								

SOURCE: Courtesy of Chines Overseas Navigation Company
1. SEA ALLOWANCE, OVERTIME IS PAYABLE BY USD EXCHANGE REATE USD1.00=NTD25.5
2. TOUR OF DUTY UNDER THIS PAY SCALE IS 9 MONTHS ON WITH 1.5 MONTHS OFF.
3. LEAVE PAY (B) & CONTRACT ALLOWANCE (C) IS PAYABLE IN LUMPSUM AT END OF TOUR.
4. CONTRACT ALLOWANCE IS PAYABLE AFTER COMPLETION OF CONTRACT.
5. STANDBY PAY IS 50% OF BASIC WAGES.
6. CADET ALLOWANCE USD300 FOR FIRST THREE MONTHS AND USD600 FOR SUBSEQUENT MONTHS.

RANK	BASIC WAGES NTD	SEA ALLOW USD	OVER TIME ALLOW USD	HOLI-DAY ALLOW NTD	ANNUAL BONUS NTD	TAX ALLOW NTD	MONTHLY WAGES (A) MTD	MONTHLY LEAVE PAY (B) NTD	MONTHLY CONTR ALLOW (C) NTD	GRAND TOTAL (A)+(B)+(C) NTD
BOSUN	26,325	413	310	1,317	2,193	4,388	52,650	4,388	4,388	61,425
SR.AB	24,300	381	286	1,315	2,025	4,050	48,600	4,050	4,050	56,700
AB	22,725	356	268	1,136	1,894	3,787	45,450	3,788	3,788	53,025
OS	20,475	321	240	1,024	1,706	3,413	40,950	3,413	3,413	47,775
FITTER	26,325	413	310	1,317	2,193	4,388	52,650	4,388	4,388	61,425
1 MEC	26,325	413	310	1,317	2,193	4,388	52,650	4,388	4,388	61,425
MEAC	22,725	356	268	1,136	1,894	3,787	45,450	3,788	3,788	53,025
C/COOK	25,200	395	296	1,260	2,100	4,200	50,400	4,200	4,200	58,800
C/BOY	21,825	342	257	1,091	1,819	3,637	43,650	3,638	3,638	50,925

SOURCE: Courtesy of Chines Overseas Navigation Company
1. SEA ALLOWANCE, OVERTIME IS PAYABLE BY USD EXCHANGE REATE USD1.00=NTD25.5
2. TOUR OF DUTY UNDER THIS PAY SCALE IS 12 MONTHS ON WITH 2 MONTHS OFF.
3. LEAVE PAY (B) & CONTRACT ALLOWANCE (C) IS PAYABLE IN LUMPSUM AT END OF TOUR.
4. CONTRACT ALLOWANCE IS PAYABLE AFTER COMPLETION OF CONTRACT.

Wan-Hai Steamship Co., INC.

Position	Basic wage	Navigation Allowance	Fix Overttime	Vacation Pay	Total	Seniority	Year Bonus
Master	50000	23000	15000	12000	100000	800/10	73000
C/O	35750	14250	10000	11500	71500	760/5	50000
2/O	28000	12000	8000	8000	56000	700/5	40000
3/O	25000	9000	7000	9000	50000		34000
Chief Operator	26500	10500	7800	8200	53000	700/10	37000
Chief Engineer	48500	23500	14500	10500	97000	800/10	72000
1/E	35750	14250	10000	11500	71500	760/5	50000
2/E	28000	12000	8000	8000	56000	700/5	40000
3/E	25000	9000	7000	9000	50000		34000
Electrician	25500	11500	7500	6500	51000	700/10	37000
Boatswain	23750	10250	7000	6500	47500	600/10	34000
Carpenter Fitter	21500	9500	6500	5500	43000		34000 31000
A. B. Oiler	19500	8500	5800	5200	39000		28000
C/Cook	22250	7750	6550	8000	44500		30000
2/Cook	17500	7500	5200	4800	35000		25000

Appendix 5 (continued)

Nan Tai Navigation Company

Unit:NT$Dollar

	Home trade Vessels		Ocean Going Vessels		Remark
Position	National flag	FOC	National flag	FOC	
Master	87,100.	80,000.	125,000.	110,000.	
Chief Officer	60,000.	56,500.	80,100.	74,000.	
2/O	56,000.	48,300.	65,700.	22,410.	
3/O	56,300.	45,500.	61,200.	17,550.	
Operator	51,000.	48,300.	70,900.	66,000.	
Chief Engineer	85,800.	79,000.	114,800.	102,000.	
1/E	60,000.	56,500.	80,100.	74,000.	
2/E	56,000.	48,300.	65,700.	22,410.	
3/E	47,400.	45,500.	61,200.	17,550.	
Boatswain	37,300.	36,300.	50,200.	12,420.	
Carpenter	36,500.	7,830.	47,900.	10,800.	
Able Seamen	34,900.	7,830.	45,600.	10,800.	
Able Seamen	34,900.	7,830.	45,600	10,800.	
Able Seamen	34,900.	7,830.	45,600	10,800.	
Able Seamen	34,900.	7,830.	45,600		
Able Seamen		7,830.			
No.1 Fitter	37,300.	36,300.	50,200.	12,420.	
Motorman	34,900.	35,500.	45,600.	12,420.	
Motorman	34,900.		45,600.		
Motorman	34,900.				
Chief Cook	37,300.	36,300.	50,200.	12,420.	
2nd Cook	34,900.	34,000.	45,600.	10,800.	

Source: Courtesy of Nan Tai Navigation Company

Appendix 5 (continued)

Glory Navigation Co., Ltd.

Unit:NTDS Dollars

Postition	Basic Wage	Home trade Allowance	Ocean going Allowance	Total	
Master／C/E	72,000	8,000	18,000	90,000 80,000	Ocean going home trade
C/O. 1/E	54,000	6,000	15,000	69,000 60,000	Ocean home trade
2/O. 2/E	45,000	5,000	12,000	57,000 50,000	Ocean home trade
3/O. 3/E	40,000	5,000	12,000	52,000 45,000	Ocean home trade
C/Opr	44,000	4,000	14,000	58,000 448,00	Ocean home trade
Boatswain No.1 Fitter	31,000	4,000	6,000	37,000 35,000	Ocean home trade
CASSAB Carpenter	29,000 28,000	3,000	6,000 6,000	35,000 32,000	Ocean home trade
A.B. Oiler	28,000	3,000	6,000	34,000 31,000	Ocean home trade
C/COOK	31,000	1,000	6,000	37,000 32,000	Ocean home trade
2/COOK	30,000	1,000	6,000	36,000 31,000	Ocean home trade

Source:Courtesy of Glory Navigation Company

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