

Direction for Manpower Development for Long-Term Industrial Development

Executive Summary

December 1998



Office of Industrial Economics
Ministry of Industry

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**Task force for the study on
“Direction for Manpower Development for
Long- term Industrial Development”**

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EXECUTIVE SUMMARY

In the past decade, the industry sector of Thailand has developed from unskilled labour oriented to skilled labour and technological intensive industries. One important question, arising from this evolution, is how the Thai educational system responds to the employment demand in those industries and how those industries adjust to the labour shortage problem.

The 1997 economic and financial crisis has sparked an unprecedented critical unemployment problem. Within the next 5 to 10 years, the key questions are, therefore, what will be the employment situation and which fields of studies for graduates will face an unemployment problem.

The main objective of this study is to answer the preceding questions by forecasting the demand and supply of manpower in the industrial sector as well as analyzing the imbalance of demand and supply for labour force. However, given the limitation on the data, the forecast will be made only at the macro level. The second objective is to study the problem of employment and manpower database and to recommend efficient management for manpower data in the industrial sector. The third objective is to assess manpower need and changes in skill composition of six main industries, i.e. textile and garments, food processing, electronics, petrochemical products, plastics, automotive and auto-parts as well as to provide direction for future policies on the manpower development in the industrial sector.

PART ONE : MACRO FORECAST OF DEMAND AND SUPPLY OF LABOUR

MANPOWER REQUIREMENTS FORECAST

The manpower requirement forecast, classified by economic sector is based on past trend data and begin with the projection of the participation rate by sex and age which is derived from the population projection. The manpower requirement forecast utilized the "Parnes" or "Mediterranean Regional Project Approach" which calculates manpower demand from GDP per worker.

The break-down of manpower requirement by occupation is based on the average of occupational composition during the 7th National Plan. In addition, the manpower demand can be divided into 2 parts i.e. "Stock" and "Additional requirement". "Stock" means the number of manpower required at a point in time and "additional requirement" represents change in requirement of manpower caused by an expansion or contraction of business and reduction of employment from attrition.

Data used for the forecast of manpower requirement comes from Population Cencuses, Labour Force Survey and National Income Account, from the National Statistic Office, and NESDB.

The forecast of manpower requirement is divided into two scenarios: "Base scenario" with the assumption of GDP growth approximately 1.4 per cent per annum during the 8th Plan (1997-2001) and 4.9 per cent per annum during the 9th Plan (2002-2006) and "Low Scenario" with the assumption of GDP growth approximately 0.7 percent and 3.6 percent per annum during the 8th and the 9th Plans, respectively.

The forecast result shows that, for the base scenario total employment gradually increase approximately 0.72 and 0.42 per cent per annum during the 8th and 9th Plans. The result for the low scenario indicates a slight decline in employment due to an the assumption of high unemployment rate of 6 per cent during the 8th Plan (1997-2001)

Since the interest of this study is on the demand for manpower in the manufacturing sector, we forecast the manpower requirements of this sector by looking at its occupational structure as shown in table 3. The results of this study indicate that over 80% of the workforce in the manufacturing sector works as the technicians or the production workers. During the 8th Plan, the demand for this group of workers moderately declines, but subsequently improves in the 9th Plan. Still, the total demand is lower than the level in 1996. (Refer to table 3).

Finally, the demand for Professional/technical workforce and for the managers and executives accounts for 3 percent and 4 percent in 1996, respectively. It is anticipated that the workforce in these two groups will increase slightly.

TABLE 1 Employment by economic sector during the 8th and 9th Plans : Base Case

Unit : '000 Persons

	Employment 1996	Employment 2001	Employment 2006
Agriculture	16,128	17,051	16,144
Mining	47	39	35
Manufacturing	4,334	4,515	4,732
Construction	2,171	2,180	3,048
Utilities	143	140	165
Commercial	4,343	4,259	4,320
Transportation and Communication	955	790	834
Services and Others	4,115	4,424	4,818
Total	32,235	33,398	34,096

Note : Forecast unemployment are 2.5 % and 2 % in 2001 and 2006 respectively. Real GDP growth rates are 1.4 % and 4.9 % per annum during 1997-2001 and 2002-2006 respectively.

Source : Table 5.1 and 5.2 final report.

TABLE 2 Employment by economic sector during the 8th and 9th Plan : Low Case

	Unit : '000 Persons		
	Employment 1996	Employment 2001	Employment 2006
Agriculture	16,128	16,468	16,015
Mining	47	35	31
Manufacturing	4,334	4,177	4,412
Construction	2,171	2,125	2,860
Utilities	143	132	136
Comercial	4,343	3,985	3,816
Transportation and Communication	955	756	730
Services and Others	4,115	4,521	5,054
Total	32,235	32,199	33,054

Note : Forecast unemployment are 6 % and 5 % in 2001 and 2006 respectively. Real GDP growth rates are 0.7 % and 3.6 % per annum during 1997-2001 and 2002-2006 respectively.

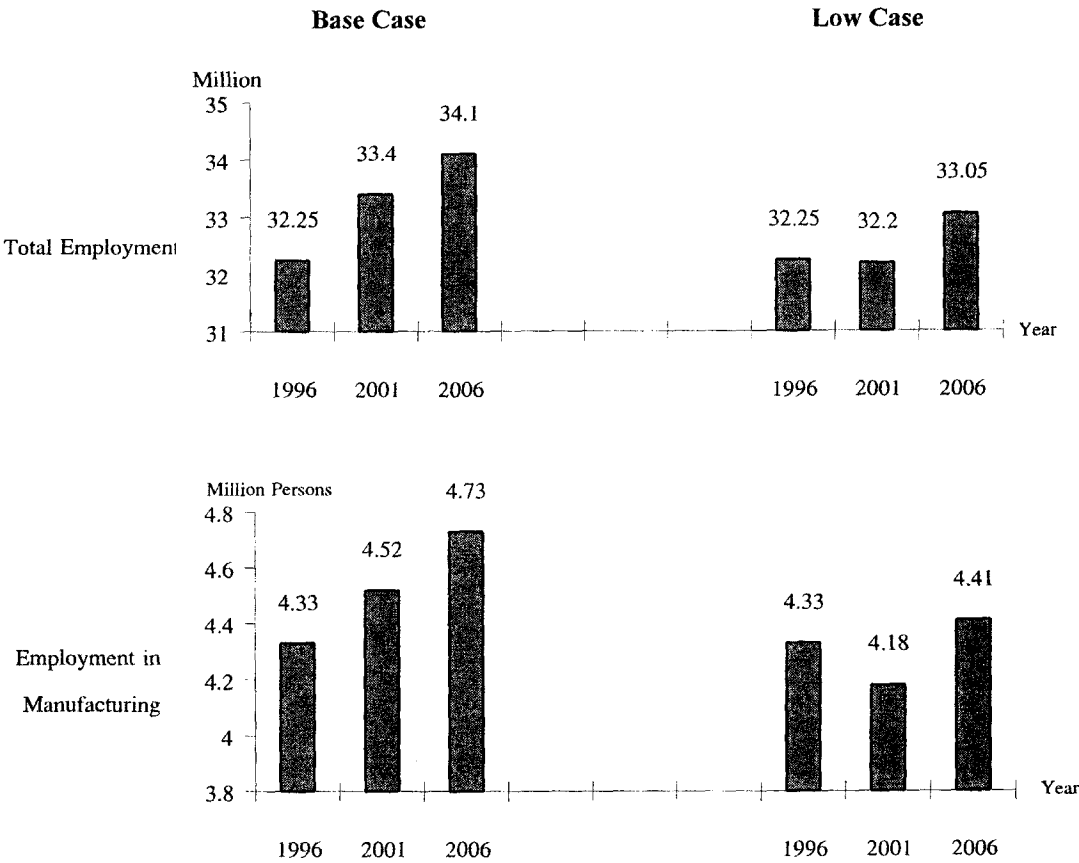
Source : Table 5.3 and 5.4 final report.

Table 3 Demand for labour in manufacturing in 1996, 2001 and 2006

	Unit : '000 Persons		
Occupation	1996	2001	2006
Total	4333.5	4515.0	4732.0
Professional /Technical	1531.2	1589.6	1622.8
Engineering and Architect	41.6	42.9	45.4
Scientists and Other Technical Engineering	61.2	63.6	64.9
Chemists, Physicists and Physical Scientists	1.2	1.6	3.3
Biologists, Agriculturers and Veterinarians	7.3	7.9	9.7
Others	1419.9	1473.6	1499.5
Administrative, Executive and Managerial Workers	153.5	149.3	156.5
Craftsmen and production process workers	3512.7	3364.4	3526.1
Mechanics, Welders, etc.	704.3	670.8	684.8
Carpenters	704	670.6	684.6
Construction Workers	677	644.9	658.4
Dressmakers	482.5	459.6	469.2
Electricians and Electronics	428.1	407.8	416.3
Others	537.1	502.2	1029.1

Source : TDRI

FIGURE 1 Employment Forecast During the 8th and 9th Plan



Source : TDRI

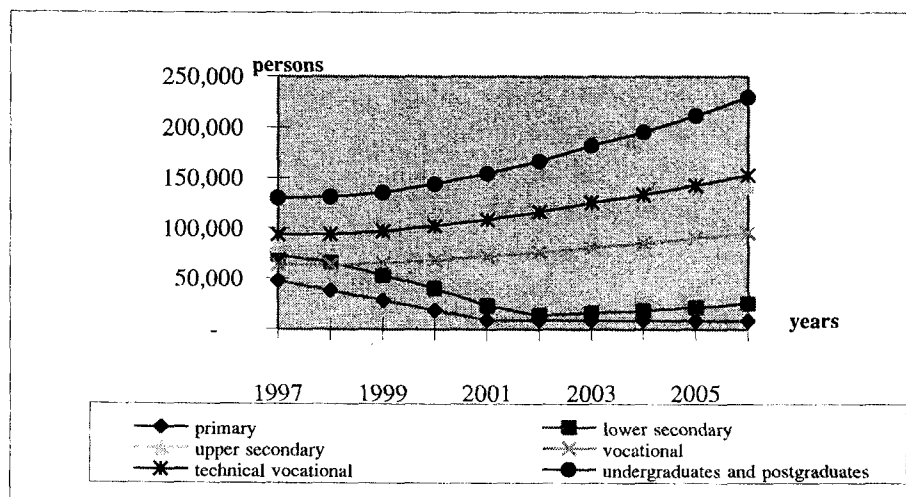
LABOUR SUPPLY FORECAST

The labour supply forecast by educational levels are derived from the following methodology, 1) number of graduates by fields of study from a regression analysis of the number of graduates and the Gross National Product 2) number of graduates to enter the labour force is calculated from the total number of graduates multiplied by the rate of students not continuing to higher level. The underlying assumption is, thus, the rate of student continuing higher education steadily increases throughout the 8th and the 9th Plans.

Figure 2 depicting the labour supply forecast, leads to the following conclusions:

FIGURE 2 Expected Graduates Entering the Labour Market by Educational Level.

1997-2006



Source : table 4.14 from final report

First, the number of graduates in the primary level will be on the declining trend throughout the 8th and the 9th National Development Plans. It is expected that the average number of graduates from primary schools is 0.94 millions of individuals per annum and decrease to 0.87 million of persons during the 9th plan. The expected primary graduates to enter work force is also expected to decrease substantially at the rates of -33.76 percent and -1.57 percent throughout the 8th and the 9th Plans, respectively.

Second, despite the rapid increase of 13.3 percent in the number of graduates from secondary schools throughout the 7th Plan, in the 8th Plan, this figure declines to 9.4 percent due to the country's economic contraction. However, in the 9th National Development plan, it is expected to rebound and to grow by 16.8 percent per year, with total graduates of 9.4 millions. The underlying reasons include 1) the forecast economics recovery, 2) the Government's policy to promote equal educational opportunities as well as the latest announcement in the new constitution for 12 year schooling provision by the Government. Nevertheless, in terms of secondary graduates participating in the labour market, the projected number is surprisingly on the downward trend. During 1997-2001, it is expected to decline by -24.87 per year and by -16.77 percent throughout 2002-2005.

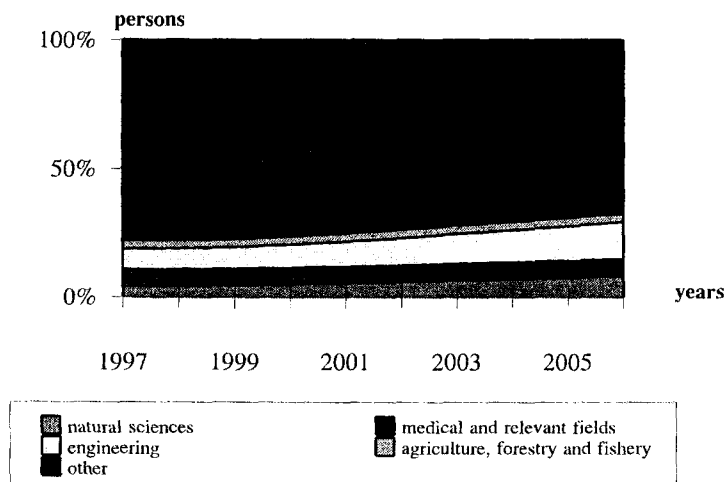
Third, the number of graduates from vocational training and upper secondary levels are expected to increase steadily. In addition, the proportion of vocational students relative to the secondary students is expected to rise further, since vocational education becomes more interesting. Moreover, among the vocational fields it is expected that students in technological fields will increase faster than those of other vocational fields.

Accordingly, the number of graduates from the upper secondary education expecting to enter the labour force will surge from 446,601 persons during the 8th National Development Plan to 619,592 persons during the 9th National Development Plan, whereas that of vocational training will grow from 334,116 persons to 430,870 persons over the same period of time. In term of number, potential workforce with upper secondary education will be higher than those with vocational education. Hence, a crucial implication is that both public and private organizations should cooperatively organize training courses to develop specific skills needed by the markets for graduates from academic fields.

Fourth, at the college level, it is expected that the graduates at the diploma in technical education and college diploma will increase from 723,375 million persons from the 8th plan to 977,463 million persons in the 9th Plan. In terms of participation in the labour force, during the 8th and the 9th Plan, graduates from both technical and academic areas are 93,674 persons (19.05 percent) for vocational or technical training and 152,583 persons (23.32 percent), for diploma in Art/Science respectively. Moreover, the graduates at the Bachelor degree level are expected to reach 130,100 persons (26.45 percent), and those of graduate level are 299,903 persons (35.13 percent), accordingly. Nonetheless, the majority of vocational graduates is from non-technological field. The ratio of graduates from technological to non-technological fields accounts for 1:3.9. Hence, the key policy implication is that the state should attempt to raise the number of graduates in the technological field. It is also essential to note that the ratio of graduates from the vocational relative to those of undergraduate and higher study levels is on the decreasing trend from 50 percent in the 8th National Development Plan to 48 percent in the 9th National Development Plan. Therefore, the rate of growth in Bachelor degree graduates is relatively faster than that of graduates from the vocational level.

Fifth, there will be a sharp increase in the number of university graduates entering the workforce. Out of 745,365 of graduates, 695,241 persons will participate in the labour market in the 8th Plan. In the 9th Plan, this number is expected to reach 986,348 persons out of 1,057,459 graduates. Nevertheless, the main weakness of the structure of graduates at the Bachelor level is that the majority of graduates are in Social Science or Humanity. As a result, the number of graduates from technological fields, despite the surge of 29% in the 9th Plan from the 23% in the 8th Plan, is still relatively low, in comparison with other neighboring countries.

FIGURE 3 Proportion of university graduates expected to enter the labour market during 1997-2006



Source : Table 4.15 Final Report.

Sixth, a critical issue capturing the attention of manpower policy makers is the number of graduates in such fields as industrial work, technology and engineering. To throw light on this issue, this study attempts to forecast the number of potential workforce from the three fields during the 8th and the 9th Plan. For this purpose, we subdivide the number of these graduates to three level : 1) Vocational level (cert. in vocational education), 2) Technical level (dip. in vocational/technical education), and 3) Bachelor and/or higher degrees.

1) Vocational Level: the corresponding forecast indicates the rise in graduates in industrial craft and technological fields from 69,874 persons in 1997 to 101,620 persons in 2006. The top five fields of study at the vocational training include Electric, Electronics, Automotive, Construction and Machine Workshop. (Refer to table 4)

2) Technical Level: the estimated number of vocational/technical graduates will increase from 39,280 persons in 1997 to 67,253 persons in 2006. The majority of potential workforce is from the following fields : Electric, Electronics, Automotive or Mechanic, Construction workers, Production technicians, Metal engineering and Industrial technicians.

3) Bachelor and Post-graduate Levels: In the 8th and the 9th Plans, the number of Science and Technology graduates accounts for 130,100 persons and 229,903 persons, respectively. Thus, the potential workforce will increase from 10,362 persons in 1997 to 32,632 persons in 2006. This rapid rise is indeed in line with the government policy to promote the workforce in Science and Technology fields.

Of all graduates in engineering fields, the major proportion of the potential workforce constitutes those from Electrical engineering, Civil engineering, industrial engineering and Electronics Engineering. (table 4)

MANPOWER DEMAND AND SUPPLY GAP

The calculation of labour supply by educational level is based on the following methods: 1) the expected labour supply¹ equals to the past labour supply plus the new labour force and subtracts by those that leave the labour market. 2) The past labour supply is derived from the number of unemployed persons who are looking for jobs during the survey period. The new labour force is estimated from the number of graduates expected to enter the labour market, as mentioned earlier.

In addition, the projection of the supply of workforce from vocational and higher degree levels is further classified by the occupational structure. The estimation method is based on the assumption that graduates of their major field of study will pursue their academic professions. It is necessary to mark that the above approach aims to estimate the flow of the labour supply in each year, as contrast to the estimation of the stock of the overall labour supply. As a result, this method is still subject to several weaknesses.

Under this study, the projection, made for particular time interval, attempts to answer whether the supply of manpower classified by educational levels balances with the demand for labour during the corresponding period. Another point to address is the extent to which the manpower capacity from various educational institutions is in accord with the level of employment demand arisen in the labour market. Therefore, the key assumption is that graduates will work in their academic or their training fields. Finally, this study does not attempt to determine the equilibrium of demand and supply in the labour market.

1) A comparative analysis of new workforce from each educational level indicates that there is an obvious mismatch in the labour market, suggesting that there will be an excess labour supply of manpower at the intermediate and the higher educational levels. The underlying reason is that industrial and service sectors could employ only 1.31 million of persons from the total number of graduates from these educational levels, whereas the potential labour force under the 8th National Development Plan records 2.2 million of persons. (table 6)

¹ The expected labour supply, the new labour force and the non-labour force are all classified by the educational levels.

TABLE 4 Number of Vocational/technical/engineering Graduate Expected to Enter the Labour Market, during the 8th and 9th Plans

Vocational				
	Number of expecting to enter the Labour market (Persons)		Growth (%)	
	8 th Plan	9 th Plan	8 th Plan	9 th Plan
Construction workers	21,665	27,295	3.01	5.24
Automotive	24,776	31,215	3.01	5.24
Machine workshop	20,158	25,396	3.01	5.24
Electricians	27,678	34,870	3.01	5.24
Electronics	26,398	33,257	3.01	5.24
Welding	15,875	20,001	3.01	5.24
Ship Builders	385	484	3.01	5.24
Others	7,188	9,056	3.01	5.24
Total	144,123	181,575	3.01	5.24
Technical Vocational				
Construction Workers	16,989	23,720	4.37	7.64
Automotive	22,779	31,805	4.37	7.64
Electricians	30,137	42,077	4.37	7.64
Electronics	25,658	35,823	4.37	7.64
Architectural	1,047	1,462	4.37	7.64
Metal Engineering	11,999	16,752	4.37	7.64
Civil Engineering	1,235	1,724	4.37	7.64
Others	40,986	57,224	4.37	7.64
Total	150,829	210,588	4.37	7.64
Undergraduates and Postgraduates				
Machine Engineering	9,820	20,114	9.51	16.93
Electrical Engineering	16,614	34,029	9.51	16.93
Electrical and System Engineering	13	27	9.51	16.93
Electronic Engineering	3,708	7,595	9.51	16.93
Construction Engineering	780	1,597	9.51	16.93
Ship Builder Engineering	59	121	9.51	16.93
Computer Engineering	2,090	4,280	9.51	16.93
Others	26,939	55,177	9.51	16.93
Total	60,023	122,940	9.51	16.93

Source : TDRI

One of the key concerns in fact lies on the employment situation in the agricultural sector, which usually employ workers of primary or lower education levels. However, the previous level of unemployed workers is approximately 0.91 million persons. When added the number of new graduates, the expected labour supply will not exceed 1.05 million persons. Unless the graduates from secondary or higher levels, together with unemployed labour are willing to work in agricultural sectors, the agricultural sector will still be affected by the labour shortage problem.

2) In the 8th Plan, there is expected to be insufficient demand to absorb graduates from higher educational levels. However, this mismatch problem will be less up in the 9th National Development Plan. For instance, the total labour supply for industrial and service sectors accounts for 3.23 millions of persons, compared to 2.93 millions of persons new secondary education graduates combined with post lobar supply available (table6). In effect, the unemployment rates would subsequently decrease. However, there exists a minor employment problem for graduates of intermediate and advanced levels.

3) A lesson drawn from a broad comparison of the demand and the supply labour force, is that it is indeed critical for every economic sector to adjust the employment structure towards employing higher level graduates to keep manpower supply and demand in balance in each manufacturing sector. Without this restructuring to absorb workforce of advanced educational levels, the corresponding unemployment rate would steadily rise, resulting in massive losses of national resources.

4) In aggregate, the demand for skilled workers in the manufacturing sector is to 304,353 persons during the 8th Plan, whereas the potential graduates from tertiary institutions will be 741,554 persons. Hence, the labour supply in technical training should be ample to satisfy the demand of the sector with some excess for other economic sectors.

Nonetheless, a detailed examination of graduates classified by specific fields of vocational training indicates a severe imbalance between demand and supply. For instance, the excess labour supply of Electricians and Electronics accounts for 94,000 persons, while those of such fields as factory engineers, metal-non-metal mechanics and automotive amount to 11,000, 19,000 and 32,000 persons respectively. Other technical training fields also incur an excess labour supply of 300,000 persons. (table 7). In addition, such investigation reveals an interesting finding. During the economic boom, the most popular field in vocational or technical training or tertiary institutions appear to be electronics and electric. However, most of the Thai factories do not require graduates with specialized training at all, and that they can easily employ students from general studies. This substitution effect occurs because most of the Thai factories are mainly the assembling plants or the manufacturing plants for low-tech products. As a result, vocational or technical graduates are not advantageous relative to the students from academic fields. Furthermore, the minimum number of academic graduates not continuing higher education is 400,000 persons; the level which is more than enough to fill up the gap in the labour market.

5) As for the 9th Plan, the overall situation in the labour market for vocational or technical graduates shows a slight improvement, in comparison to that of the 8th Plan. Although the total vocational graduates increase by 36% in the 9th Plan, the excess labour supply is in fact lower than the level in the 8th Plan. That is because the excess manpower will pursue their career in non-industrial areas and hence, this reduces the excess supply of labour.

A comparison between the demand for technicians by their major field of studies and the potential supply of corresponding graduates indicates that the supply of manpower could quantitatively meet the demand in every technical field, except in the construction area. In such sector, during the 9th Plan, there is an excess demand of 170,885 persons, which could be met by manpower from other technical fields or graduates of general studies, specifically trained on construction. In effect, such substitution would help lessen the mismatch problem to a certain extent.

6) In case of degree graduates and their professions, the labour market for *Professional/technical workers* is relatively small and unchanging in manufacturing.

Generally speaking, during the 8th and the 9th National Development Plans, the demand for degree graduates not only remains unchanged, but also tends to decline. Besides, the industrial sector will not absorb the degree workforce, resulting in the excess supply of 465,408 and 688,456 persons in the 8th and the 9th Plans, respectively. Unless this group of workforce joins the service or the other manufacturing sectors, a severe unemployment problem is highly possible. (table 8).

7) Having examined these figures by fields of study, we found that the Faculties of Social Studies and of teacher training will produce a large number of graduates during 8th and the 9th Plans. It is relatively difficult for them to work in the production industry. Other areas as Agricultural and Fishery are worrisome as well. Even if the number of graduates from such fields is relatively small, these sectors occupy only insignificant shares in the manufacturing industries. Hence, these employment capacity in agricultural and fishery couldn't possible accommodate all graduates. As a results, a large number of graduates in this field will eventually become the excess labour supply to replace the high level of demand in other economic fields.

8) During the 8th and the 9th Plans, the demands for bachelor degree graduates in such fields as Science, Medical Science, and Engineering will sharply contract. As shown by the labour market forecast, excess supplies in the mentioned fields of study are 20,000 persons per year and double to 40,000 persons in 8th and the 9th Plans, respectively. Despite the past forecast of a severe personnel shortage in Science or Engineering fields, the above findings signal a gloomy outlook of the labour market for degree graduates. That is to say, these graduates will not be able to choose their target professions at least over the next 5 to 10 years, unless other economic sectors besides from the manufacturing sector help absorb the excess labour supply.

TABLE 5 Comparison of Demand and Supply during the 8th and 9th Plan

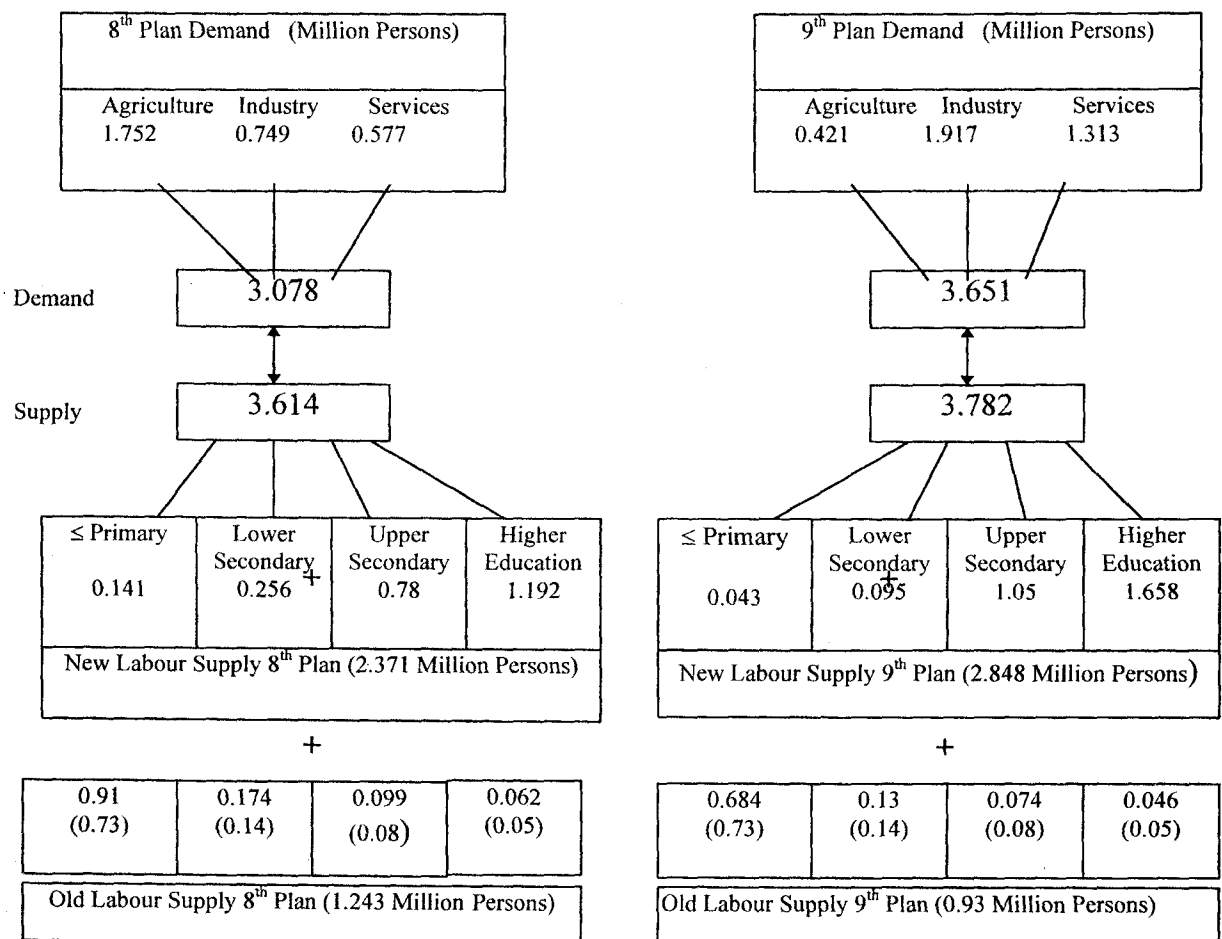
Unit : Persons

8 th Plan	Primary and Lower	Lower Secondary	Upper Secondary	University	Total
Additional Demand	523,260	800,280	831,060	923,400	3,078,000
Excess Supply	1,051,616	430,825	879,717	1,254,200	3,616,359
New	141,616	256,825	780,717	1,192,200	2,371,359
Old	910,000	174,000	99,000	62,000	1,245,000
Over Supply (shortage)	528,356	(369,455)	48,657	330,800	538,359
9 th Plan	Primary and Lower	Lower Secondary	Upper Secondary	University	Total
Additional Demand	109,530	1,131,810	949,260	1,460,400	3,651,000
Excess Supply	727,706	225,861	1,124,467	1,703,865	3,781,900
New	43,706	95,861	1,050,467	1,657,865	2,847,900
Old	684,000	130,000	74,000	46,000	934,000
Over Supply (shortage)	618,176	(905,949)	175,207	243,465	130,900

Note: Additional Demand by Educational Level, calculated from proportion of labour flow year 1995-1997

Source: TDRI

TABLE 6 Comparison of Demand and Supply during the 8th and 9th Plans



Source: TDRI

TABLE 7 Comparison of Demand and Supply of Skilled or Workers in Production Process in the industry sector during 8th and 9th Plans

Unit : Persons

	8 th Plan (1997-2001)			9 th Plan (1997-2001)		
	Demand	Capacity ^{1/}	Increasing Demand (+/-)	Demand	Capacity	Increasing Demand (+/-)
Electricians and Electronics	21,449	115,865	-94,416	70,343	154,698	-84,055
Machine Workshop	17,465	29,196	-11,731	57,277	37,951	19,326
Metal and Non Metal Makers	11,612	30,797	-19,185	38,081	40,754	-2,673
Automotive	17,818	50,097	-32,279	58,435	66,366	-7,931
Construction Workers	69,193	42,392	26,801	226,919	56,034	170,885
Others ^{2/}	166,816	473,206	-306,390	547,070	656,251	-109,181
Total	304,353	741,554	-437,201	998,125	1,011,754	-13,629

Note : 1/ In this context, capacity means expected graduates in vocational and technical vocational level with industrial and engineering majors.

2/ Including drawing and design workers, cloth and leather, shoes, bag and remaining groups that are not classifiable., this definition covers expected Graduates with upper secondary level who do not continue studying in the higher level, amounting to 446,601 and 619,592 persons in the 8th and 9th plans.

Source : TDRI

TABLE 8 Comparison of Demand and Supply of Professional, Technical Expected Under Graduates and Postgraduates during the 8th and 9th Plans

Unit : Persons

	8 th Plan (1997-2001)			9 th Plan (2002-2006)		
	Demand	Capacity ^{1/}	Increasing Demand (+/-)	Demand	Capacity	Increasing Demand (+/-)
Education and teacher training	97,663	212,080	-114,417	124,212	272,145	-147,933
Laws	4,670	28,424	-23,754	6,947	30,856	-23,909
Social science	16,434	267,808	-251,374	23,255	355,213	-331,958
Natural science	10,634	32,836	-22,202	15,224	70,865	-55,641
Medical and Relevant	25,127	45,210	-20,083	35,586	65,023	-29,437
Engineering	7,552	60,023	-52,471	12,019	122,940	-110,921
Agriculture, Forestry, Fishery	1,589	21,777	-20,188	3,350	31,924	-28,574
Others ^{2/}	66,164	27,084	39,080	77,299	37,382	39,917
Total	229,833	695,241	-465,408	297,892	986,348	-688,456

Note : 1/ Manpower in education and teacher training, excluding graduates with degree lower than Bachelor level accounting for 94,444 and 116,160 persons during the 8th and 9th plans respectively.

2/ Other fields of study include humanity, religion studies, fine arts and applied arts and the remaining fields which are unable to classified

Source : TDRI

PART TWO : LABOUR DATABASE

The provision of labour market information in Thailand remains problematic. By and large, the system is deficient of accurate and timely statistics of industry specific demand-supply. Some of these deficiencies include the lack of 1) estimates or precise data on unemployed persons, 2) the labour demand, specifying educational or skill requirements as classified by industries, 3) the number or the demand for illegal workforce, etc. As the economic crisis hit Thailand in 1997, unemployment rates have skyrocketed. Hence, the need for accurate and timely provision of labour market

information has become more evident than ever. To address this immediate issue, the government requires detailed and up-to-date databases to facilitate policy makers in formulating contingency plans to deal with such issues.

At present state agencies in charge of monitoring the labour market find that the available statistical records limit their implementation of the intended courses of action. Therefore, as the unemployment situation continues to deteriorate, Thailand needs to establish a central database system to supply essential information on labour markets. The major role of this center is primarily to gather disperse data from various organizations. In turn, it will also serve as the brainstorming unit for policy makers and for academicians to monitor the employment situation and to determine appropriate policies to resolve particular labour problems. In effect, this central unit will finally lead to further development in the present labour information system. Further, the labour database system will provide a useful framework for educational institutions to tailor their educational programs to suit the level of employment demand.

The establishment of the central information unit should follow two phases. In the short run, relevant state agencies will set up minor information unit in their department to create an effective information network. The relevant state agencies include the Department of Labour Protection and Welfare, the Ministry of Labour and Social Welfare, the Ministry of Industry, the Ministry of Education, the Ministry of University Affairs, the Ministry of Science, Technology and Environment and the National Statistical Office.

Prime responsibilities of minor information units are 1) to identify and to specify types of data to gather from network institutions within specified time-frame, 2) to provide accessible information for interested public and to develop computer system, 3) to collect disperse data from each office to provide current conditions in the labour market for better policy implications, 4) to prepare and to disseminate Thai labour market reports, and 5) to update relevant pieces of information. In short-term, the most suitable organizations to fulfill these roles are either the Office of the National Economic and Social Development Board, or the Ministry of labour and Social welfare. These two institutions are appropriate because they deal directly with labour issues and possess qualified personnel and well-equipped facilities than the remaining potential organizations.

To activate this center, executives of relating organizations must arrange an initial meeting to designate roles and responsibilities, to appoint qualified personnel to join the committee board of this center. Then, the secretary division prepares a proposal to the government through the Office of National Committee for Labour Development and Training or through the approval of the Industry Minister or the Labour Minister. In addition, the establishment of this central information system should be completed within 6-15 months since it is not the center for keeping piles of information. Furthermore, it does not require high investment in computer system. In the end, it will serve as a

brainstorming unit that brings together scattered pieces of information from various state divisions to evaluate the actual condition of the labour market.

The process of short-term establishment of this center will also reflect the possibility for long-term implementations. Given the success in immediate plans, the project shall be extended in a more long-term oriented manner.

PART 3 : LABOUR DEMAND AND SKILL COMPOSITION IN 6 MAJOR INDUSTRIES.

Having provided an overview of employment in industrial sectors, this part examines differences in the level of demand for unskilled and skilled labour forces in six industries to identify the potential changes in skill composition. These six industries include 1) Automotive and Auto-parts, 2) Electronics, 3) Textiles, 4) Plastics, 5) Food Processing, and 6) Petrochemical industry.

The study's industrial survey of company executives in these six industries reveals that the labour shortage and the quality of the labour force seemed to have been the most serious problems during the export boom of 1992-1996. In addition, these problems are industry-specific. For instance, due to poor working environment, companies in such industries as food processing, textile and garment, and plastics, experienced high turnover of unskilled workers. As for automotive and auto-parts, manufacturers encountered the shortage of qualified workers in the face of rapid changes in production technologies. For example, electronic manufacturers frequently experienced the difficulty in recruiting engineers, and the over-abundance of unqualified skilled labour. Finally, petrochemical manufacturers seemed to have encountered minimal employment problems.

Among these six industries, manufacturers deal with their labour shortage problem differently. As for the food processing and the electronics industries, manufacturers modify their recruitment criteria as their solution for the shortage of unskilled labour. For instance, they accept younger workers, with lower educational qualifications, as well as appointing employment agencies to recruit workers in rural provinces. In the plastics industry, producers do not place educational requirements in recruiting workers for two main reasons. The first reason is that most of plastic plants are small-size. Then, the production process is so uncomplicated that even uneducated workers could easily adapt to working environment and production process within 1-2 weeks. Another commonly used approach is to sub-contract certain parts of their manufacturing processes. This method is especially popular for food processing, textile and garments industries.

Manufacturers in particular industries decide to substitute labour with advanced machinery, but such substitution remains limited in various senses. In addition to these methods, petrochemical and electronic producers employ vocational or technical graduates to fill the shortage of engineers. However, by lowering the educational

requirements, they find that their technicians do not possess sufficient engineering fundamentals. In the end, they must organize training courses, provide scholarship for part-time educational programs, and rotate these technicians to various functions to upgrade technicians' performance to reach engineer's standards.

As the preceding examples show, manufacturers tend to deal with skill improvement of their workers and technicians on a short-term basis. As a result, since the proportion of technicians to the total employees remain unchanged, manufacturers would be able to maintain its productivity, not improving it. Besides, an obvious drawback of hiring employees with poor Science and Engineering background is that in they will not be able to increase their manufacturing efficiency, nor to innovate new product in the long-run.

Only three industries attempt to address the issues of the workforce quality through long-term skill development programs. They are automotive and auto-parts, petrochemical and electronic industries. For example, manufacturers jointly arrange the training programs with educational institutions or sponsor employees' representatives for advanced practical sessions abroad. In turn, these representatives will be in charge of an in-house training for other workers.

In conclusion, most manufacturers in the industrial sector tend to address labour shortage problems with contingency solutions to maintain their current level of productivity. Only a few manufacturers in certain industries begin implementing long-term oriented strategies such as development of manufacturing systems or skill improvement. Such findings imply that personnel recruitment and training activities are heavily influenced by the conditions of the labour market, as well as the pressure of labour shortage during 1990-1997.

Suppose labour shortage persisted for a certain period of time, a mounting pressure on manufacturers would provoke a new chapter of changes in the manufacturing sector. However, this scenario is definitely ruled out by the domestic economic slump in 1997, which consequently turned labour shortage to excess labour problem.

Labour demand in six industries: key industries of Thailand depend primarily on unskilled or primary-level educated workers. For example, in such industries as food processing, plastics, and textile and garments, the ratio of workforce with primary certificates is as high as 40-60 percent, and that of the unskilled labour varies from 50-70 percent. In the event that these unskilled labour continue working in certain factories for relatively long period of time, they have an opportunity to develop their skill and knowledge from working processes and training. Yet our industrial survey indicates that there are high turnover rates among unskilled labour in particular industries, such as, textile and garment, and plastics industries. This high turnover reduces manufacturers' incentives to implement skill development schemes for their workers. Besides, these workers do not yearn for such training either. That is because they can easily work at

other factories with better working environment, at the same wage rates. This situation is common in the electronic industry.

Labours' skill development: Manufacturers' training course can be divided into two groups, being 1) on-the-job training and 2) intensive and systematic training programs. In the following industries food processing, textile and garment, plastics and certain types of auto-parts, manufacturers employ on-the-job training program, whereas they use systematic training for their supervisory-level employees with diplomas of vocational or technical training. Most of these training courses are organized by companies' headquarters, machinery distributors or sales agents. Secondly, manufacturers of electronics, automotive and petrochemical products provide an intensive and systematic training programs for every level of employees since their minimum educational requirement is the lower secondary level. Furthermore, these manufacturers heavily invest in human resources in response to an intense global competition, a rapid change in production technologies and a consumers' influence in changes of products designs, i.e. automotive.

Transformation in Skill Composition: A survey by the National Statistical Office uncovers that the workforce in the industrial sector generally possesses higher educational qualifications. For instance, the proportion of primary-graduated workforce in 1976-1977 of 78.5% decreased to 65.4% in 1986-1987, signifying an increase in the employment of higher educational level labour force. When focusing on smaller pictures, educational levels of overall workforce indeed differ among industries. For example, the share of bachelor degree graduated employees rose during 1976-1977 in the following industries; beverages and tobaccos, chemical, oil and charcoal, paper and printing materials, machinery and equipment. Employing bachelor-level employees tends to increase in Plastics, Automotive, Metal and non-metal industries. However, such industries as machinery, beverage, leather, rubber and other metal exhibits only slight changes in employment patterns. On average, every industry seems to have raised their employment of secondary-level workers.

The findings from executive interviews in six industries are indeed consistent with the preceding survey results of the National Statistical Office. It is therefore clear that the employment of primary-graduated workers decreases substantially in export-oriented plastics, textile and garment industries, which demand high quality labour to manufacture value-added products.

Rationale for slow changes in Thai skill composition: Labour intensive industries have long been in the fore front of Thai manufacturing sector since Thailand once possessed a natural and strong comparative advantage in this area. Even though we are losing our competitive edge in labour intensive oriented industries in terms of cost and quality to other low-cost neighbouring countries, we still strongly adhere to traditional production methods. The main reasons for sluggish shift in skill composition could be traced back to mistakes and distortions of incentives in industrial sectors and educational systems. These flaws are caused by the interacting forces of demand, supply and state policies. That is past policies and the pattern of employment demand and supply

seem to have created higher profits for manufacturers who employ unskilled workers, rather than those who utilize advanced production technologies.

Problems in labour demand

For decades, certain industries have been over protected by Thai import substitution policies, resulting in several destructive consequences in the Thai manufacturing sector. First, local producers take advantage of such protection by producing low-quality products to serve the domestic market when imported goods are virtually not price-competitive. In addition, small size of the local market has kept the size of manufacturing plant relatively small, resulting in high cost per unit. Besides from these protective measures, generous fiscal privileges, coupled with liberalized private flows at low interest rates have indeed motivated the expansion in capital intensive industries, instead of developing industries that would help improve skill and knowledge of workers.

Problems in labour supply

There are three main issues concerning the quality of labour supply. First, students do not have sufficient incentives to continue higher education, i.e. Bachelor/Diploma of Vocational or Technical since expenses for higher education are relatively high. Second, various educational institutions are too slow to adapt to employment demands in the labour market. In effect, they end up producing a large number of graduates in outdated fields. For instance, the proportion of students taking Science major to that of Social Studies is 21:79. Even though there are a large number of students in vocational streams, chosen fields of studies are not in line with market's demands either. The final limitation is that the rapid expansion of the non-tradable sector brought about a severe shortage of technicians, engineers and bachelor-graduated. As previously mentioned, manufacturers resolve this problem by training primary or vocational graduated employees to work in the position of engineers, resulting in low product quality. Because of such unqualified workforce, foreign investors are reluctant to use advanced manufacturing technologies in Thailand.

Asides from these labour force quality problems, basic infrastructures remain a key obstacle to future expansion of the Thai industrial sector. As a result, foreign investors tend to exclude Thailand from their potential production bases for international industries, when neighboring nations have been more well-quipped and more prepared in terms of the quality and the adequacy of labour force.

Industrial adjustment during the economic downturn

The impact of the currency crisis of 1997 is indeed two-dimensional from the perspective of the Thai industrial sector. On the one hand, industrial manufacturers experienced dramatic drops in total sales, huge excess capacities, massive financial losses, and business failures. Many companies have to reduce their production costs by

cutting employees' salaries, and to lay off workers. On the other hand, a large currency depreciation has proved beneficial to export-oriented manufacturing sectors, making Thai products more competitive in the world market. In addition, many industries such as electronics, automotive and auto-parts resort to domestic inputs to cut their production costs. In effect, the increased usage of domestic inputs help revive some labour intensive industries, i.e. garment, and shoes, whose markets have long been stolen by imported items. Such rising employment of local inputs also re-stimulate further development in the Thai industrial sector. The improved local industrial conditions would in turn increase the demand for skilled labour force.

Furthermore, the crisis has helped alleviate the labour shortage in almost every industries. Accordingly, manufacturers begin to provide intensive training programs for their employees to improve their productivity, to lower production costs, as well as to produce value added products. In addition, they restructure their manufacturing process to meet international standards, such as ISO 9002 and ISO 14000, which will help improve the standards of Thai exports. Such development implies that the demand for well-educated and skilled workforce will increase in the future. At the moment, thanks to the continual depreciation of the baht, Thai labour intensive industries will be able to survive for the next few years. Therefore, the government now needs to implement industrial policies that advocate industrial restructuring towards the increase employment of well educated and skilled labour force.

RECOMMENDATION

Three main recommendations, drawn from this study, are 1) contingency policies to address rising unemployment, 2) policy recommendations for future industrial restructuring and for development manpower quality in the industrial sector, and 3) direction for manpower development to accommodate the long term industrial development.

A. Resolution of unemployment issue in the industrial sector

During the 8th Plan, the excess labour supply will record 2.44 millions of persons. Out of the 2.44 millions excess supply, 20% is workforce from an academic stream, while another 20% is graduates from technical and production worker. Furthermore, engineering graduates will also suffer from possible unemployment problems. Accordingly, it is critical that the government launches policies to manage the arising unemployment problem.

- A. The government should decelerate the participation rate in labour market in the favor of knowledge and skill development of manpower, as listed below:
- It should inject social purposed loans to grant scholarship to primary and lower secondary students from poor families. Such financial

rewards will help them continue their study through to the higher secondary level.

- The scholarship and living allowances should also be awarded to individuals, attending the military service to upgrade their educational levels.
- Both public and private training institutions should co-organize the short-occupational training courses for unskilled or poorly educated workers.
- Public universities should arrange short courses that will support the bachelor-degree graduates, encountering employment problems. Recommended courses range from foreign languages, computer, to business law, etc.

B. Special recruitment program during the economic crisis

- The government permits manufacturers to pay lower wage rates than the minimal wage requirement over a certain period of time. It should also allow certain wage expenses to be deductible from income taxes.
- Graduate Volunteer is the program available to graduates with educational level of at least vocational or technical diploma. These volunteers will be teaching in schools in rural areas or working as public officers for state divisions, but the wage rate is slightly below that of the minimal wage level.

C. Expansion of export markets to other regions, excluding Asia.

D. Social and Economic Recovery Plan for sustainability in rural villages. This plan aims to 1) promote self-dependence, 2) articulate sufficient and sustainable economic concepts for general public and Non-Governmental Organizations, 3) to lessen the social impacts on rural and urban people, and 4) to strengthen Thai community.

E. Revolution of news and information system on the labour market: To accurately formulate policy and corrective measures for unemployment problems, there is a strong need for detailed and timely data on available positions, and prospective job-searching people.

B. Labour Skill Development Plan and Industrial Restructuring.

A. Obstacles to industrial restructuring

The upgrading of Thai industrial sector, with respect to the employment of skilled workers, are impeded by the following problems: 1) wrong incentives, 2) low productivity, caused by the production of low value added products or

services, and the lack of qualified workforce, 3) organization failure in public agencies and in state enterprises that are in charge of setting industrial and science and technological policies, 4) governance and coordination failure among various public organizations, 5) service failure, caused by the lack of market driven mechanism, 6) deficiencies in the provision of timely, accurate and complete data set as the basis for policy formulation, 7) manufacturing obstacles i.e. high transportation costs relative to competitors, traffic problem, bureaucratic customs procedures, etc., and 8) the lack of well-educated and skilled labour force. These make foreign investors shift the production base of high-tech products especially electronics to our neighboring countries, and thus making the economic structure of Thailand suitable for low-tech industries.

B. Seven Strategic Policy Recommendation

1. Revise incentive provision systems and reduce operational obstacles
This plan involves 1) restructuring the Customs Tariff structure, 2) revising fiscal incentives granted through the Board of Investment, 3) adjusting incentives system in favour of industrial revolution and improvement in productivity, 4) eliminating current operational or business obstacles, i.e. changes the customs procedures and expedition of the duty refund.
2. Revolution in Educational and Training systems
 - Increase the number of students attending secondary schooling through granting incentives to students and upgrading the schooling standards in rural areas.
 - Adjust the proportion of academic and vocational students in Social Studies relative to Science field from 70:30 to 55:45 within the next 10 years.
 - Rebalance the number of vocational students in low-demand field, relative to that of the high-demand field. For instance, students in the following majors must be reduced : Automotive, Construction, Agricultural and Home Economics.
 - Improve the quality of instructors via re-organization of personnel management system and revise incentives at every level of educational institutions.
 - Change the roles of public and private organizations in educational management and training systems. Private institutions should play a

more active role and cooperate with state agencies in educational management and training programs.

3. Strategies for long term improvement in quality and skill of graduates

- Reconstruct the current curriculum in University and Vocational streams to focus on producing skilled graduates to correspond to the employment demand in the industrial sector. To achieve, this goal, educational institutions must invite representatives from various manufacturing sectors to participate in modifying the syllabus.
- Re-organize the state training institutions. Private institutions have access to teaching aids at low prices to support their training courses. Besides, the state should amend skill development rules and regulations so as to motivate private institutions to play a more active role in organizing training programs.
- Arrange a complete quality improvement program for teachers. Such complete project should cover restructuring in management, improving incentive systems, and offering teacher training. An alternative solution is to hire senior workers and employees from private firms to join the lectureship in vocational training institutes. At the same time, full-time instructors should be allowed to work in manufacturing sites to gain more experience in their fields.
- Promote students to study Science through initiating the Science Society, and the Museum of Science. This scheme will help support intellectual property, create copyright and promote further competition in the science field.
- Promote revolutionary forces in education from the private sector.

4. Restructure the organizing body of science and technology policy makers.

- Transform state enterprises so that they become self-dependent. They should be pressured to operate under market-driven conditions so that they generate revenue from the private sector, rather than from the state subsidy.
- Arrange regular external assessments by independent private companies and make public the evaluation results of these science and technology organizations.

- Improve the strategies of state-owned research institutes towards innovation, which should initially takes the form of creative imitation with the private sectors.
 - State and public entities should join hand to stimulate the innovation era.
5. Expedite the development of information system for industrial and labour markets.
- Establish the manpower information center within 6-15 months to gather dispersed statistics in various organizations for monitoring and for evaluating labour market conditions. In turn, such information will become a crucial source for policy formulation to deal with unemployment problems. Also, educational institutions can use the database as the fundamental frameworks to adjust its education policy to conform with the employment demand.
 - Hire information database specialists to design an appropriate system for maintaining database for such units as the Ministry of Industry, the Ministry of Commerce, the Ministry of Labour and Social Welfare, and the Board of Investment. In addition, the specialist must train the personnel in the respective units to independently operate the system. The ultimate goal of this scheme is to create a small information network.
6. Raise production productivity in the industrial sector. Private manufacturers will benefit from the productivity improvement through reduction in production costs. For this reason, private sector should shoulder potential restructuring costs arisen from this process. The only role of the government is to catalyze further improvement in productivity or to subsidize only those activities that would result in social externality.
7. Technological Strategies and Innovation The prime technological development engine of Thailand should follow a creative imitation route, through which technological imitators employ their research and development capability to stimulate subsequent innovation. Such creative imitation should not breach the intellectual property of the producers. The target industries to adopt creative imitation are 1) monopolized industries, characterized by supernormal profits. In this case, the creative imitation will help narrow trade deficits with foreign partners, 2) technological licensing industries which must pay high royalty fees to the licensor. Since this type of industry could suffer from the slow process of technological transfer, the creative imitation can

help increase the bargaining power in accelerating the technological adoption process. More importantly, it can serve as the milestone for future technological advancement of Thailand. 3) OEM (Original Equipment Manufacturing) subcontracting industries severely suffer from the production and marketing limitations. This scheme will enable Thai companies to expand their production base, to utilize the adopted technology for further product development, and to open up new markets.

C. Potential Policy for manpower development to accommodate the long-term industrialization.

Under this framework, there are three main policy issues; 1) the scheme for employment demand in industrial sectors, 2) the plan for supply of industrial workforce, and 3) the information database of industrial labour market.

Industrial employment demand

- Rectifying incentives system and facilitating the market environment. In the short run, the adjustment of incentive system will raise the competitiveness in the industrial sector. This can be achieved through the procedural improvement in bureaucratic administration of fiscal incentive systems, that currently hinder efficient business operations. In the longer term, the state's industrial policy should support high-tech manufacturers, promote networking industries, and abolish existing protective measures. Such industrial policies will help enhance the competitiveness of Thai manufacturers, and curtail the capital and the production costs. Furthermore, such policy will automatically foster innovation-oriented manufacturers, focusing on research and development activities in increasing their productivity.
- Improvement of industrial productivity aims to enable manufacturers to cut production costs, to use machinery and equipment effectively, and to lower the energy usage. Short-term measures include financial subsidy, advisory services on improving manufacturing processes.
- Technological and innovative development: In the short term, the state should advocate technological development processes among manufacturers and encourage other research institutes as well as educational institutions to create indigenous technology, which would eventually help lower the technological dependence on foreign countries. In long-run, the evolution of this indigenous technology should be continual and intensive so as to better serve the market with high quality products based on local technology. Also, the creative

imitation should be encouraged to an extent that international copyright laws are not violated.

- Re-organization of policy making body of industrial, science and technological policies to promote productivity. In the near future, private and independent state agencies are the key in productivity improvement through granting financial aids. However, over the long-term period, these state enterprises should no longer be entitled to government subsidy so that they are pressured to become operationally independent. To support this plan, performance should be regularly assessed so that they will be eventually governed by market mechanism.

Industrial Labour Supply

Educational Plan

- Reform the secondary schooling system in the academic stream.

In the immediate term, the government should raise the number of upper secondary graduates to attend university level. Given that the upper secondary level is the minimum educational qualifications of workforce, the industrial restructuring towards advanced technology and employment of skilled labour will become easier. As for the long term plan, the state should increase the ratio of Science and Arts students in upper secondary schooling. The focus of curriculum should be on mathematics, science and foreign languages. The changes in students at the secondary schooling directly contributes to the resultant increase in science students in the university.

- Reform vocational schooling streams

In the short term, the relevant organisation should improve the vocational syllabus by 1) placing strong emphasis of fundamental courses on mathematics, science and communicable language skills, 2) allocating up-to-date teaching supplements and instruments, 3) inviting special lecturers with high experience in industrial or manufacturing sectors, i.e. employees of a particular company, or 4) allowing vocational students to join basic on-the-job training course so that they could develop practical skills for the latest manufacturing technology. However, in the long-term, it is essential that the whole curriculum be revised to provide students with greater flexibility and self-adjustment to work in diverse fields. At the same time, narrowly focused courses

should be gradually abandoned, and the educational management should be supported by the private organizations.

- Reform the University education

In the short term, educational institutions should produce graduates in the fields that are demanded by the labour market. They can decrease students in low-demand fields of study and enlarge those in the highly needed fields. In addition, they should reconsider their quality assessment to focus more on practical skills in working environment rather than on academic records. As with other policies, the long-term focus is on raising the graduates in science and on modifying the educational curriculum to balance manpower development with industrial needs.

- Encourage Science community.

This community will implant the science framework of thoughts for Thai students, and further improve the innovation culture of Thailand. In the future, learning environments should be more orientated towards Scientific approaches.

- Change current educational beliefs to promote life-time education concept.

This scheme will create plentiful opportunities for general public to enrich their skills and knowledge. There should also be a lecturer development and improvement in language, mathematics, and science instruction systems in every institutions to implant the learning norms and habits. Educational centers for working people or non-labour should be established for them to gain more knowledge.

- Develop and heighten the quality of lecturers for all schooling levels.

In the short term, teachers should be trained to understand the external forces and the dynamism of industrial technology through the on-the site training. Also, private employees should be allowed to fulfill part-time lectureship. This tactic will help change the teaching culture, which is more responsive to changes in economic situations. In the long term, the quality improvement projects should help enhance lecturers' qualifications.

- Decentralization of educational management.

In the long term, educational policies should be decentralized to each administering body in rural areas, so as to let them manage their

own resources, collect taxes and independently determine their curriculum. Decentralization of responsibility will help strengthen the rural group to participate in improving educational systems.

- Institutional budgetary policy and sources of finance must be altered so that schools have extra sources of finance, besides from the state's allotted budget.

This plan suggests that this rural schools could mobilize funds from people in the same villages by educational donation, so that they can improve their facilities. Also, the state should allow them to offer higher level of education so that they could become self-independent and flexible.

Training plan

- The immediate plan for skill and quality development for labour force.

Various institutions should arrange training courses to enhance their curriculum and to increase their training quality to match the market demand. Besides, the state should impose a minimum educational requirement of the lower secondary certificate. Manufacturers could then promote their workforce to acquire higher educational levels through the non-formal education and through workshop. From manufactures' viewpoint, expenses of such items should be tax-deductible. By allowing tax-deductible expenses, manufacturers will have more incentives in providing scholarships to their workers. Furthermore, the intensive training courses for specialized labour could be arranged in response to the market demand and development in supporting services such as freelance or subcontracting.

- Increase the roles of the private sector in manpower development.

In the short term, the state should provide ample fiscal incentives to manufacturers so that they can arrange employee training courses and should increase the roles of private sectors to establish labour skill enhancement program in industrial sectors and in manufacturing site. Some of the crucial private units include the organization of employees and employers, private professional development institute, and the coordination between the skill development. Further, it should import specialists from developed countries to pressure private and public sectors for workforce training.

- Administration improvement and complete services for labour skill and knowledge development.

To eliminate redundancy of unemployed resources, the state and the private institutions should formulate a labour development plan with broader scope from provincial to national levels. This plan should blend together the lecture and the training components. In the long term, the technological network system should be developed to encourage data interchange.

- Determine an appropriate direction of labour training and development to conform with the National and Social Development Plan

Every government unit, related to skill development should cooperatively set an annual budget under the strategic framework of national labour workshop proposed by the National Committee of Labour Development and Professional Coordination Services. The allocated budget should be reduced in Home Economics, Commercial and Agriculture to fit economic and social changes particularly in the industrial and the service sectors.

- Personnel Development

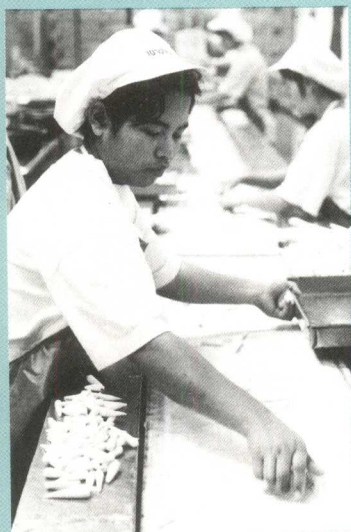
To enhance lecturers' credentials, the state should revise its incentive system for the teachers to undertake extra courses. These incentives include 1) providing scholarship, 2) improving vocational regulations, and 3) permitting industrial technicians or private employees to become part-time teachers.

- Create the learning culture for local community.

The government should support the establishment of learning organizations at the village level, so as to let them exchange information, jointly develop skills of workforce, as well as shape attitudes of rural people towards additional profession training.

Labour Database System

- In short term, the state should establish the manpower center and search for a steering committee to commence the data collection process. Such process involves gathering, standardizing, and defining the information base from relevant units within a limited time frame. In the long-term, the manpower center should be permanently established.



*Direction for Manpower Development for
Long-Term Industrial Development*

Executive Summary



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