

**THE FACTOR IN THE IDEALLY QUALIFIED FACTOR OF ENGINEERING
PROFESSION AFFECTING A TENDENCY TOWARDS DEMAND
OF INDUSTRIAL EMPLOYMENT IN AMATA CITY
INDUSTRIAL ESTATE, CHON BURI, AFTER
THE ASEAN FREE TRADE AREA**

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ABSTRACT

In the researched entitled " The Factor in the Ideally Qualified Factor of Engineering Profession that Affects a Tendency towards Demand of Industrial Employment in Amatacity Industrial Estate, Chonburi, after the Asean Free Trade Zone", the sample group consisted of 110 people involving in recruiting personnel of automotive industrial factories. The instrument was questionnaires. The statistics used in the study consisted of frequency, mean, standard deviation, One-way Analysis of Variance, and Regression Analysis. The findings were as follows:

Ideally Qualified Factor of Engineering Profession was generally perceived at the high level. The first qualified factor was financial management capability. Next were business expertise, capability to manage changes in business world, teaching and coaching skills, capability to analyze and solve problems, communication and interpersonal skill respectively.

The tendency towards demand of industrial employment in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone was generally at the high level. The first aspect was the field of study the automotive industry was interested in, and the next aspect was the engineers' nationality.

From hypothesis testing, it was found that different types of business had difference in the tendency towards demand of industrial employment in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone. Professional engineers' ideally qualified factor concerning teaching and coaching skills, capability to analyze and solve problems and financial management capability had an effect on the tendency towards demand of industrial employment. Engineers' nationality and financial management capability had an effect on the tendency towards demand of industrial employment concerning the field of engineering which interested the automotive industry in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone

Keywords: Personnel recruitment, ideal qualifications, engineers

Background and Rationale

Thailand has transformed from an agricultural society to an industrial society in a dramatic proportion. In developing countries, they have become service society. Thailand has also been transformed from an agricultural society to an industrial society. There has been industrial development in Thailand. Up to now, there have been continuous changes in the direction of the government's industrial development policy. The industrial policy has had a key role to the changing structure of the economy toward more industrialized countries.

The development to industrial society and the importance of engineering profession itself made the domestic industry undergo an acceleration of development of production process in order to be competitive in the global market. In addition, employment for engineers is still widely available. As a result, there has been demand for engineers in the labor market. This has been consistent to condition of the economic growth of the country. The expansion of various factories and production process development made government agencies, departments, and enterprises need engineers who could check the manufacturing machinery and equipment and could do research and plan the development in order to reduce the time and costs. Meanwhile the government has had the policy to develop qualified manpower, especially in science and technology. However, from the research to explore attitudes towards the free mobilization of engineers in Thailand, it was found that Thai engineers could not compete with overseas engineers. One of the problems was that the businesses didn't focus on the development and ongoing staff training. Thai engineers also lacked language and communication skills (Atsawa dilokrit, 2005, pp. 150-152). Some other researches had shown that those skills were important. For example, a survey which was sponsored by EMCI (Engineering Management Certification International) and conducted by Deloitte and Touche found that nearly half of the engineers interviewed stated that their jobs required management skills. And over 55 percent indicated that they planned to receive management training such as project management,

general management, strategic planning, marketing, finance and accounting (Marino, 2009, p. 32). This was consistent with the findings of the Sainsbury Management Fellows Foundation which had surveyed a group of professional engineers in the UK. They found that 72 percent of respondents stated that they had been in additional administrative trainings (Ask PE Readers, 2006, p. 16) In addition, the results from a survey on manpower needed in the future for 14 industries revealed that industrial sector required workforce that had three qualifications which were 1) necessary basic knowledge and skills, 2) professional knowledge and skill, and 3) work ethics (Office of the Education Council, 2006).

From the above information, workforce in engineering group needed multidisciplinary skills because only technical knowledge was not sufficient for the current global competition. If engineers wanted to have long-term success, they had to integrate hard skills with soft skills. Thus, from the reasons mentioned above, and with the current needs for the profession, there has been a call for the workforce to have knowledge, skills, areas of expertise, communication skills, and management and administration expertise. The development of the cooperation of the countries in the Asian region has increased the competition among skilled workers. All of these have brought the researchers interest in a study on the factors in the recruitment and the qualifications of the engineering profession to meet the needs of different organizations.

Objective of the research

1. To study the industrial factory's characteristics that affected the tendency towards demand of industrial employment in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone.
2. To study ideally qualified factor of engineering profession that affects a tendency towards demand of industrial employment in Amatacity Industrial Estate, Chonburi, after the Asean Free Trade Zone.

Hypotheses

1. The industrial factory with different characteris-

tics had differences in the tendency of employment of the automotive industry in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Area.

2. Ideally qualified factor of engineering profession that affects a tendency towards demand of industrial employment of the automotive industry in Amatacity Industrial Estate, Chonburi, after the Asean Free Trade Zone.

The scope of the research

1. The study focused on the recruitment factors concerning ideally qualified factor of engineering profession which affected the tendency of employment of the automotive industry in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Area.

2. The scope of population and sample group

2.1 Population consisted of the people involving in personnel recruitment such as human resources managers or human resources personnel of 148 industrial factories manufacturing automobiles which accounted for 32.64 % of all 454 factories in Amatacity Industrial Estate (Amatacity Industrial Estate, Chonburi, 2013)

2.2 The sample group consisted of 130 people involving in personnel recruitment such as human resources managers or human resources personnel of industrial factories in Amatacity Industrial Estate. Yamane Formula was employed for sampling at the confidence level of 95 %

3. The scope of the area: The study focused on Amatacity Industrial Estate in Chonburi.

4. The scope of time: It took 4 months from February to May, 2013.

Variables

Variables were as follows:

Independent Variables

1. The characteristics of organization consisted of type of business, size of workforce, length of organization, nationalities of the organization and its industrial group.
2. Factors ideally qualified factor of engineering profession consisted of business expertise, communication and interpersonal skill, capability to analyze and

solve problems, teaching and coaching skills, capability to manage changes in business world, and financial management capability.

Dependent Variables were the aspects of tendency of employment of the automotive industry in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone. For example, nationality was one of the aspects of the tendency towards demand of industrial employment.

The Expected Benefits

1. To understand the tendency towards employment demand of the automotive industry in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Area.
2. To understand the ideally qualified factor of engineering profession that affects a tendency towards demand of industrial employment in Amatacity Industrial Estate, Chonburi, after the Asean Free Trade Zone.

Methodology

The study was a survey research and questionnaires were used for data collection. The researcher had determined the research methodology by determining population, sample group, data collection, data analysis, and statistics used for the study.

The statistics used for the study

Statistics used for analyzing basic information and the correlations between independent and dependent variables consisted of frequency, percentage, mean, and standard deviation, One-way Analysis of Variance, and Multiple Regression Analysis.

The Results of the Research

The study was a survey research and purposive sampling was used for recruiting specific group of automotive industrial factories employing engineers in Amatacity Industrial Estate in Chonburi. After that, convenience sampling was used. From the data analysis, the findings were as follows:

Part 1 the results of demographic analysis

From data analysis, it was found that the total of the sample consisted of 110 respondents. Most of

the organizations belonged to company limited type (60.91%). Most of the factories had more than 1,000 employees (70 %). Most of the factories belonged to big industry type whose capital was a hundred million or over (65.45 %). Most organizations had been in business for over 10 years (50.0 %). Most organizations' nationality was Asian such as Japanese,

Korean, and Taiwanese (43.64 %).

Part 2 the results of ideal qualifications of engineering profession

From data analysis, it was found that the majority of the samples had overall opinion on the ideally qualified factor of engineering profession at the high level. This was shown in table 1.

Table 1 Mean and standard deviation of the level of opinion on the ideal qualifications of engineering profession as a whole or in each aspect

ideally qualified factor of engineering profession	Level of opinion			Rank
	\bar{X}	SD	interpretation	
1. Business expertise	3.99	0.59	high	2
2. Communication skill and interpersonal skill	3.32	0.59	moderate	6
3. Capability to analyze and solve problems	3.55	0.76	high	5
4. Teaching and coaching skills	3.56	0.86	high	4
5. Capability to manage changes in business world	3.57	0.68	high	3
6. Capability of financial management	4.00	0.52	high	1
Overall opinion	4.00	0.39	high	

From Table 1 it was found that the sample group had overall opinion on ideally qualified factor of engineering profession at the high level and its mean equaled 4.00. When each aspect was considered, it was found that the sample group had high opinion on ideally qualified factor concerning

financial management capability at the highest level, and its mean was 4.00 (high level). Communication and interpersonal skill was the last aspect, and its mean was 3.32 (moderate level). In addition, the qualifications could be classified into aspects. The factor which was the top was shown below.

Table 2 Mean and standard deviation of the level of opinion concerning each aspect of ideally qualified factor of engineering profession

ideal qualifications of engineering profession	Level of opinion		
	\bar{X}	SD	interpretation
Business expertise			
To what extent does your organization focus on candidate's knowledge concerning automotive production system?	4.42	0.75	highest
Communication skill and interpersonal skill			
To what extent does your organization focus on whether candidate can work in team and cooperate with their colleagues?	3.60	0.68	high
Capability to analyze and solve problems			
To what extent does your organization focus on the candidate's work experiences which match the position for which he applies?	4.36	0.57	highest

ideal qualifications of engineering profession	Level of opinion		
	\bar{X}	SD	interpretation
Teaching and coaching skills			
To what extent does your organization focus on professional engineers who have an open mind and share knowledge to their colleagues?	3.69	0.70	high
Capability to manage changes in business world			
To what extent does your organization focus on whether the professional engineer follows the news and events of the engineering profession?	3.87	0.92	high
Financial management capability			
To what extent does your organization focus on the candidate's financial knowledge, such as reducing production costs and cost analysis?	4.44	0.60	highest

From Table 2 it was found that the respondents agreed that professional engineers should have qualification concerning the business expertise. The organization of the sample primarily focused on knowledge concerning automotive production system, and its mean was 4.42 (the highest level). The respondents also agreed that professional engineers should have qualification concerning communication skill and interpersonal skill. The organization of the sample group primarily focused on whether the engineers could work in team and could be cooperative in their work. Its mean was 3.60 (high level). Next, the respondents agreed that professional engineers should have qualification concerning capability to analyze and solve problems. The organization of the sample group primarily focused on whether the engineer's experiences suited the position they applied or not, and its mean was 4.36 (the highest level). The respondents agreed that professional engineers should have qualification concerning teaching and coaching skills. The organization of the sample group primarily focused on professional engineers who had an open mind and share knowledge to

their colleagues. Its mean was 3.69 (high level). In addition, the respondents agreed that professional engineers should have qualification concerning capability to manage changes in business world. The organization of the sample group primarily focused on the candidate who followed the news and events of the engineering profession. Its mean was 3.87 (high level). Finally, the respondents agreed that professional engineers should have qualification concerning financial management capability. The organization of the sample group primarily focused on the candidate who knew how to reduce production costs and do cost analysis. Its mean was 4.44 (the highest level).

Part 4: The tendency towards employment of the automotive industry in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone

From the analysis, it was found that the overall perception on the tendency towards demand of employment of the automotive industry in Amatacity Industrial Estate, Chonburi was at the high level. This has shown in table3.

Table 3 Means and standard deviations of the overall and each aspect of the tendency towards demand of employment of the automotive industry in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone.

The tendency towards demand of employment of the automotive industry after the Asean Free Trade Zone	Level of opinion			Rank
	\bar{X}	SD	interpretation	
Nationality of engineers	3.05	0.64	moderate	2
The field of engineering demanded by automotive factories	4.00	0.68	high	1
Overall	3.62	0.50	high	

When each aspect of the tendency towards demand of automotive industry employment was considered, it was found that Thai nationality was the highest aspect of the tendency towards demand of automotive industry employment, and its mean was 3.90 which

was at the high level. Mechanical Engineering was the field of engineering demanded by the factories and its mean was 4.32 (the highest level). This was shown in Table 6.

Table 4 Means and standard deviations of the opinion level of each aspect of the tendency towards demand of automotive industry employment in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone

The tendency towards demand of automotive industry employment after the Asean Free Trade Zone	Level of opinion		
	\bar{X}	SD	interpretation
An engineer's nationality			
To what extent do you have the tendency to employ a Thai engineer?	3.90	0.98	high
The field of study which interests the employer			
To what extent do you have the tendency to employ an engineer with Mechanical Engineering Degree?	4.32	0.91	highest

The Results from Hypotheses Testing

Hypothesis 1: The Industry with the different types of business entities had difference in the tendency towards demand of automotive industrial employment in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone.

H_0 : The Industry with the different types of business entities had no difference in tendency towards

demand of automotive industry employment in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone.

H_1 : The Industry with the different types of business entities had difference in the tendency towards demand of automotive industry employment in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone.

Table 5 The Analysis of the comparison of the different types of business entities affecting the tendency towards demand of automotive industry employment in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone.

The tendency towards employment after the Asean Free Trade Zone.	type of business entity	n	\bar{X}	SD	F	P-value
Engineer's nationality	Sole Proprietorship	3	3.00	.87	.901	.443
	Partnerships	11	2.82	.64		
	Private Limited Companies	67	3.13	.62		
	Public Limited Companies	29	2.98	.67		
The demanded field of engineering	Sole Proprietorship	3	3.67	.29	2.854	.041*
	Partnerships	11	3.86	.84		
	Private Limited Companies	67	4.15	.60		
	Private Limited Companies	29	3.76	.74		

From table 7 this is the Analysis of the comparison of the different types of business entities which affect the ideally qualified factor of engineering profession which affected the tendency towards the automotive industry employment in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone. One-way ANOVA was the statistics used for the study and the 95% confidence level was determined. The results from the hypotheses testing showed that the P-value of the engineers' nationality equaled 0.443 which was higher than 0.05. This could not reject H_0 . This meant that automotive factories with different types of business entities in Amatacity Industrial Estate, Chonburi after

the Asean Free Trade Zone had no differences in the tendency towards the demand of employment of engineering profession.

P-value of the interesting field of engineering equaled 0.041. It was less than 0.05 which rejected H_0 . Therefore, different types of business entities had a different effect on the tendency towards the demand of employment of professional engineers with different field of engineering.

As a result, Least Significant Difference (LSD) was used for Multiple comparison to find out which pair of means was different at the significance level of 0.05. This is shown in Table 8.

Table 6 The comparison of the pair of means of the tendency towards the demand of employment of professional engineers with demanded field of engineering which was categorized by types of business entities in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone

Business type	\bar{X}	Sole Proprietorship	Partnerships	Private Limited Companies	Public Limited Companies
Sole Proprietorship	3.67		-0.20	-0.48	-0.09
P-value			.65	.22	.82
Partnerships	3.86			-0.29	0.11
P-value				.19	.65
Private Limited Companies	4.15				0.39*
P-value					.01
Public Limited Companies	3.76				
P-value					

* P-value < 0.05

From Table 4-18 and from the comparison of the pair of means between private limited company and public limited company which affected the tendency of employment, it was found that P-value equaled 0.01. This meant that the private limited company type of industrial factories had more tendencies to employ professional engineers with demanded field of engineering than public limited company type industrial factories. The difference of the means equaled 0.39.

Hypothesis 2: The ideal qualifications had an effect on the tendency towards the demand of employment of the automotive industry in Amatacity Industrial

Estate, Chonburi after the Asean Free Trade Zone. The hypotheses were determined as follows:

H_0 : The ideally qualified factor concerning engineer's nationality had no effect on the tendency towards the demand of employment of the automotive industry in term of nationality in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone.

H_1 : The ideally qualified factor concerning engineer's nationality had an effect on the tendency towards the demand of employment of the automotive industry in term of nationality in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone.

Table 7 The correlations between ideally qualified factor and the tendency towards the demand of employment of professional engineers in term of nationality in the automotive industry

ideally qualified factor of engineering profession	the tendency towards the demand employment of the automotive industry in term of nationality after the Asean Free Trade Zone		
	Pearson Correlation	Sig.	n
Business expertise	.038	.348	110
Communication skill and interpersonal skill	.111	.124	110
Capability to analyze and solve problems	.129	.089	110
Teaching and coaching skills	.448	.000*	110
Capability to manage changes in business world	.301	.001*	110
Capability of financial management	.267	.002*	110

* significance level of 0.05

Form table 4-35 The results; analyzed with Pearson Correlation at the significance level of 0.05 to find out the correlations between ideally qualified factor of engineering profession and the tendency towards the demand of automotive industry employment in term of nationality in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone; showed

that every variable had value that agreed with the condition of Multicollinearity. Every variable was not greatly correlated, so this could be used for predicting variable based on the analysis of correlation or the influence and it was consistent with the use of Linear Regression Analysis.

Table 8 The analysis of ideally qualified factor of engineering profession which affected the tendency towards of the demand of employment professional engineers in term of nationality

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.709	2	5.355	16.624	.000*
	Residual	34.464	107	.322		
	Total	45.173	109			

* significance level of 0.05

From Table 4-33, the analysis showed that at least one of the independent variables might be used to create regression equation, and this could be checked by the F-test table. The F value equaled 146.624 and P-value equaled 0.000*. This meant that it accepted H_1 , so the ideally qualified factor of engineering profession had an effect on the tendency towards the

demand of employment of the automotive industry in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone. At least one aspect from factor 1-6 could explain the tendency of employment of the automotive industry in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone at the significance level of 0.05.

Table 9 The results of the analysis to find out whether the ideally qualified factor of engineering profession was correlated with the automotive industry's tendency towards the demand of employment of the automotive industry engineers with certain capabilities in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone.

Ideally qualified factor of engineering profession	Coefficient value				Collinearity Statistic		
	b_0	Standard Error	β_0	t	Sig.	Tolerance	VIF
Constant value	0.992	.450		2.203	.030*		
Teaching and coaching skills (X_1)	0.309	.064	.414	4.818	.000*	.968	1.033
Capability of financial management (X_2)	0.240	.107	.193	2.254	.026*	.968	1.033
R	R^2	Adjusted R^2	SE(est.)	F	Sig.	Durbin-watson	
0.487	0.237	0.223	0.56753	16.624	.000*	1.869	

* The result rejected statistical hypotheses at the significance level of 0.05.

From the test, it was found that engineering profession's ideally qualified factor concerning teaching and coaching skills and capability of financial management had an effect on the tendency towards the demand of automotive industry employment in term of nationality in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone when each aspect was considered.

Discussion

From the analysis of hypotheses testing, the discussion based on the references and relevant researches could be explained as follows:

Objective 1: To study which industrial factory's characteristics affected the tendency towards the demand of employment of the automotive industry in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Area

The findings revealed that industrial factories with different characteristics had difference in the tendency

to employ engineers with demanded engineering field in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Zone. In fact, the type of business entities was the factor that could identify the condition of doing business legally.

To get listed for company establishment, the company could be considered medium-sized or large-sized businesses. Public limited companies were rather large. The business model would affect management system within each type of organization. The personnel management particularly affected the employment of the organization. This was consistent with the concept of Santiwong (2006). In a large organization like a public limited company, managing human resources in the organization was important and there was a clear division of duties while mid-sized enterprises would be structured in a more complex level. In the automotive industry in Amatacity Industrial Estate, Chonburi, it was found that most of the organizations were private

companies limited or public companies limited. Consequently, it was suggested that personnel management, especially employment be more systematic. Moreover, the production system needed engineers to control every step of the production process. The companies needed engineers who had the qualifications that suited the characteristics of the business. For example, they needed engineers with industrial engineering degree, mechanical engineering or electrical engineering degree. In the employment after the Asean Free Trade Zone, it was possible that although there were professional engineers from other countries in Asia in Thailand, the entrepreneurs of automotive industrial factories would consider the field of engineering in which they were interested better than engineers' nationalities. Moreover, the complex production system in each factory had a different effect on the tendency to employ engineers with different field of engineering. This was consistent with Koowattanachai (2008) who concluded that in Thai economic situation, engineers with different fields of studies were demanded to meet the need of development. For example, they were engineers with production skills (industrial factories), engineers with management skill combined with technical and sales skills, engineers with theoretical or academic skill who could design the strategic plan, do the analysis and research, and engineers with high performance. The companies needed the engineers from group 1 to group 4 to do the research and develop technology. In addition, the engineers should be able to work with foreign companies. This was consistent with Teerachai Imajaroensak's study entitled "The Recruitment of Personnel Managers in Automotive Industrial Factories in Amatacity Industrial Estate, Chonburi which revealed that the organizations with different sizes and types of business had difference in the significance level of personnel recruitment. From objective 3, the study was done to study ideally qualified factor which influenced the tendency towards the automotive industry employment of engineering profession in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Area. The findings revealed that the ideally qualified

factor of engineering profession regarding capability of financial management and teaching and coaching skills generally had an effect on the tendency towards the automotive industry employment of engineering profession in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Area. This was because in industrial management, every factory's need was the profit. Executives and staff should be aware of the importance of the management to earn profit. It was also found that automotive industry in Amatacity Industrial Estate in Chonburi primarily put an emphasis on the ability of financial management such as reducing production costs, analyzing cost and being able to solve the production problem effectively. This was because production process was the key to the organization and it also affected other parts of the whole operation. After the Asean free trade zone, the competitiveness of businesses would be more serious. The qualifications of staff with expertise in financial management that could bring the profitability and survival for an organization were an extremely important part in the recruitment and employment. Thus, the qualifications of staff with expertise in financial management must have an effect on the tendency towards automotive industry employment of the in Amatacity Industrial Estate, Chonburi after the Asean Free Trade Area. This agreed with Zinn and Haddad (2007, pp. 35-39) who said that engineers should create a balance between their technical expertise and business expertise in order to be successful in the workplace, and one important skill that should be improved was the capability of financial management. Considering ideally qualified factor of the engineering profession that affects the employment tendency of the automotive industry in Amata Nakorn Industrial Estate, Chonburi after the ASEAN free trade zone, the researcher found that other great qualifications of the engineering profession were the ability to teach and coach and the ability to manage financially. These two qualifications had an effect on the tendency towards employment concerning the nationality of engineers in the automotive industry in Amatacity Industrial Estate, Chonburi after Asean Free trade Zone. This was because although the automotive industrial group whose nationalities were Asian

such as Japanese, Korean, they were likely to hire Thai engineers for general process operation because there was large workforce and their salary was lower than that of engineers from other countries in Asia. For other foreign engineers, they were of administrative level and were transferred from the mother company. Consequently, the problem that most factories' faced was that Thai engineers had a high opinion of themselves; however, they lacked administrative skills especially financial skill.

Due to the fact that engineers belonged to professional specialty, most of engineers' work was often associated with the machinery and procession. Silaon (1999 cited in Kwangderndong, 2009, p. 30) stated that the work of engineers was often associated with machinery and procession; therefore, they lacked the knowledge of intellectual minds and human relations which were key features for good administration. In their study and their work, engineers were often familiar with only the correct answer, so they developed narrow concepts. This weakness existed obviously among Thai engineers. Therefore, when there was Asean Free trade, and Thai engineers didn't adjust themselves right now, the factories could solve this problem by hiring engineers from other countries. The two properties above were considered a major part of the operation and Thai engineers should develop and improve themselves to have these properties. This was consistent with the study of Bradford (1984 quoted in Vinai Viriyavidhayavongs and Satib Jiamsuchon, 2001, p. 3) found that successful leaders were not only capable of attracting people, but they could also control or coordinate with subordinates. This meant that they could make subordinates involved in making decisions. Ideally qualified factors of engineers should include professional knowledge, management skills, interpersonal and communication skills. The problems in the work were not caused by the lack of professional knowledge, but they were caused by the lack of interpersonal and communication skills.

The suggestions for further studies

1. There should be the study of the problems and drawbacks of the education concerning engineering

profession and then they can find the solutions.

2. There should be the study of the current problems of Thai engineers and the approach to develop knowledge and skills of engineers in both private and public sectors to have qualities that are comparable with those of other countries.

3. There should be the study to find out how laborers' problems would affect engineering profession when there will be the opening of Asean Free Trade in 2015. There should also be the preparation for serious competition.

References

- Suntiwong, T. (1996). *Strategic Management*. Bangkok: Thaiwattanapanic Punblisng Company.
- Koowattanachai, N. (2008). Demand and Labor Shortages in Engineering Industrial Estate Authority of Thailand. *Journal of University of the Thai Chamber of Commerce*, 29(3), 67-83.
- Amatacity Industrial Estate in Chonburi. (2013). *The Industrial Factories in Amatacity Industrial Estate*. Chonburi: Amatacity Industrial Estate in Chonburi.
- Kwangderndong, P. (2005). *The Relationship among Leadership, Optimism and the Success of the Work of Industrial Engineers*. Master's thesis, Science Industrial and Organizational Psychology, Graduate School, Chiang Mai University.
- Asawadilokrit, M. (2005). *The Attitude of Engineers towards the Free Trade of Engineering Service in Thailand, the Branch of Engineering and Construction Management*, Bangkok: The Faculty of Engineering, King Monkut University of Technology Thonburi.
- Office of the Education Council. (2006). *The Report on the Study of the Demand on workforce of Industrial Group*. Bangkok: Ministry of Education
- Asks PE Readers Their views on: Engineers as managers. (2006). *Professional Engineering*, 19(10), 16.
- Marino, G. N. (2009). Certified to lead. *Mechanical Engineering*, 131(8), 32-33.
- Zinn, J., & Haddad, R. (2007). The new essential skills. *Industrial Engineer*, 39(5), 35-39.