Thai Engineers' Readiness to Cope with the Free Flow of Skilled Labor in the ASEAN Economic Community

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Abstract. *The objectives of this study were: (1) to study the readiness of Thai engineers to cope with the free flow of skilled labor (FFSL) in the ASEAN Economic Community (AEC) in the areas of knowledge of the AEC, working skills and foreign languages; (2) to compare their readiness according to their demographic backgrounds: gender, age, education, position level and the size of the company; and (3) to study their methods of preparation for readiness to cope with the FFSL in the AEC. The sample size was 420 engineers, derived using the multi-stage random sampling technique. The instrument used in this study was a questionnaire developed by the researcher. Its validity and reliability were calculated according to IOC, ITC and Cronbach's Alpha coefficient methods. It was found that: the engineers' readiness in the areas of knowledge, working skills and foreign languages was at a moderate level and; the comparison of readiness in the area of knowledge revealed that only the factors of position level and size of the company made a significance difference in their readiness in this area. The comparison of readiness in the area of working skills revealed that only the factors of education and position levels had a significant difference in the readiness in this area. Engineers with Master's degrees had a higher level of readiness than those with bachelor's degrees, and those who occupied management positions had higher readiness than those who occupied operational positions. The comparison of readiness in the area of foreign languages revealed that only the factor of size of the company made a significant difference in readiness in this area, with engineers who were employed in large companies having higher readiness than those who were employed in small and medium sized companies. The methods mostly used in the preparation for readiness were monitoring and studying information and participating in training programs provided by the company.*

Keywords : Thai engineers, electronics and computer companies, readiness, preparation for readiness, free flow of skilled labour, AEC.

Introduction

The official establishment of the ASEAN Economic Community (AEC) will come into force in 2015. The AEC is part of the ASEAN Community (AC) which is comprised of three principal pillars: the ASEAN Security Community (ASC), the ASEAN Economic Community (AEC) and the ASEAN Socio-Cultural Community (ASCC). The ASEAN Charter is a legally binding mechanism used as a framework for establishing rules and regulations for member countries' compliance (DOITN, 2009). The AEC is a major pillar force to drive economic cooperation in the AC which will lead to a single market and a joint base for production. There will be a free movement of products, services, investment, finance and skilled labor. Consumers will be able to choose among the variety of products and services and people can travel more conveniently and freely in the AC (DOITN, 2009). The establishment of the AEC is based on international trade theories. According to Daniels, Radebaugh, and Sullivan (2011), these theories can be classified into five groups: (1) interventionist theories; (2) free trade theories; (3) trade pattern theories (4) the statics and dynamics of trade; and (5) factor-mobility theory. The integration of cross-national cooperation and agreements can be classified into three major levels: (1) bilateral; (2) regional; and (3) global integrations. The AEC is an integration at a regional level, where nations situated in the same geographical region establish an agreement for cooperation similar to the establishment of the Europen Union (EU) (Daniels et al., 2011). The free

flow of skilled labor (FFSL) is normally an important part of the agreement of integration. Factor-mobility theory of international trade has a strong influence on the concept of FFSL, as it expresses the view that production factors movement occurs at the international level, including the labor factor. In recent years, approximately three percent of the world's population or approximately 200 million people have migrated from one country to work in another country (Daniels et al., 2011).

Along with the official establishment of the AEC, the FFSL will commence at the same time. The FFSL refers to the actions taken by the AEC to allow the free movement of skilled labor, including engineers in the AEC member countries, without any legal limitations, according to the mutual recognition agreements (MRA). The movement of labor has, in fact, been occurring for centuries. The major causes of the movement include economic and political factors (Daniels et al., 2011), such as when a country is faced with an economic crisis or war. During recent times, the movement for economic reasons has been increasing, especially the movement under the free flow of labor in various economic communities applying the concept of geocentricism in human resource management. This concept does not take into account the nationality of the applicants, but seeks for the best qualified applicants to fill any vacant positions. This concept promotes the implementation of the free flow of labor (Daniels et al., 2011). The most explicit example is the free flow of labour in the European Union (EU) (Mattoo & Carzaniga, 2003). The free flow of labor is an important action to achieve the goals of the AEC. A person who has a certificate of skills recognition by an AEC member country can seek employment and be employed in any AEC member country similar to the practice in the EU member countries (Parnglilars, 2012). The free flow of labor is classified as Mode 4 under the free trade in services within the ASEAN agreement framework which extends the scope of cooperation beyond the regular agreement to promote the real operation of the free trade in services. The major activities are to reduce or revoke any limitation or condition that prevents the ability to access to a market under the principles of National Treatment (NT). The position of "Engineer" is one of the professions that are essential to the economic and social development of a country, both in the short and long term, to be opened up for FFSL in the AEC (Parnglilars, 2012). This means that engineers from one AEC member country can seek employment and be employed in other member countries without having to have a visa and a work permit. Therefore, Thai engineers must have readiness to cope with the actions taken by the AEC to allow the free movement of skilled labor, including engineers in the AEC member countries, without any legal limitations, according to the MRA.

Statement of the Problem

The implementation of the FFSL in the AEC constitutes a major change in the employment system and practice in AEC member countries. It creates both opportunities and threats to Thai engineers. Opportunities include the chances for relocation to work in other AEC member countries in higher positions, for higher pay and to gain more experience for future career advancement. Threats include higher competition in employment and career advancement opportunities, as employers have more choices for selection, employment and promotion. In order to be competitive in employment and able to take advantage of this change, Thai engineers must be able to cope with the FFSL. The major readiness areas essential to Thai engineers includes knowledge of the AEC, working skills, and foreign languages. Despite the time schedule for the implementation of FFSL in the AEC being a few years ahead, it is surprising that so little empirical research has actually been conducted in this area. Research related to FFSL in the AEC is especially scarce in the area of readiness of employees in the first seven professions to be opened for FFSL. Very few studies have focused on the readiness of Thai engineers to cope with FFSL in the AEC (Pisarnvanich & Nukprach, 2012; Wongboonsin, Srisaengnarm, & Sermcheep, 2012).

Significance of the Study

The classification of 'Engineer' is one of the first seven professions to be opened for free flow initially in the AEC. An "Engineer" is considered to be one of the important professions in the economic and social development of the country, especially in electronics and computer companies employing high technology. The electronics and computer industry is one of the most important export sectors in the

Thai economy. The value of exports in 2011 and 2010 were US$30,959.51 million and US$33,046.20 million respectively (IOEE, 2012). It ranked second highest in the AEC in 2003. In addition, this industry is considered to be one of the largest employment sources in Thailand where engineers are employed. The implementation of the free flow of engineers in the AEC could have a considerable impact on the engineers in this industry. From a literature review, it was found that very few studies have been conducted in this area and this fact made the researcher interested in conducting this study, which intends to make further contributions to the literature in this area and to provide some guidelines for Thai engineers and other stakeholder groups to prepare for readiness to cope with FFSL in the AEC.

Objectives

The objectives of this study were: (1) to study the readiness of Thai engineers in order to cope with the FFSL in the AEC in the areas of knowledge of the AEC, working skills and foreign languages; (2) to compare their readiness according to their demographic backgrounds: gender, age, education, position and the size of the company; and (3) to study their methods of preparation for the readiness to cope with the FFSL in the AEC.

Literature Review

Corresponding to the topic, problem, significance and the objectives of this study the researcher conducted a review of related literature as follows: (1) Knowledge of the AEC; (2) Working skills; (3) Foreign languages; (4) Readiness preparation methods; and (5) Demographic backgrounds and readiness to cope with FFSL.

Knowledge of the AEC: Knowledge is defined as "what people understand about things, concepts, ideas, theories, procedures, practices and the way we do things around here" (Armstrong, 2010, p. 86). Nonaka and Takeuchi (1995) argue that knowledge can be explicit or tacit. Explicit knowledge is recorded and available in general and can be codified. Tacit knowledge exists in people's minds, is difficult to articulate in writing and is acquired through personal experience. It includes "scientific or technological expertise, operational know-how and insights about an industry, and business judgement" (Hansen et al., 1999, cited in Armstrong, 2010, p. 86). One of the key components to make change successful is knowledge about the change of employees and people concerned.

The implementation of FFSL in the AEC will create changes in the employment system and practices in AEC member countries. The Thai workforce including engineers must prepare themselves and be ready for FFSL. According to the National Economic and Social Development Plan (NESDP) No. 11, B.E. 2555-2559 (2012-2016), one of the risk areas of Thai labor, which includes engineers, that requires urgent development is the knowledge and skills including the knowledge of diversified cultures (NESDB, 2011). Parnglilars (2012) stated that it would provide more opportunities for Thai engineers to have more employment opportunities in the AEC if adjustment and readiness methods and development in knowledge of FFSL in the AEC are provided to them and also for Thai educational institutes. The results of a study by the University of Thai Chamber of Commerce (UTCC), Center for International Trade Studies (CITS) (UTCC, 2012) and Pisarnvanich and Nukprach (2012) indicated that only 30 percent of Thai engineers have knowledge and understanding of the AEC.

Working Skills: Skills can be defined as "the structural elements that demand or constrain discretion, the responsibilities conferred or withheld, the variety of tasks undertaken, the power to determine when tasks have been satisfactorily completed and the 'porosity' that allows the job holder to prioritize" (Vallas, 1990, pp. 379–98). They can be divided into three types: technical, interpersonal or human and conceptual skills and can be referred to as managerial skills (Boone & Kurtz, 2010). Technical skills "involve having specialized knowledge about procedures, processes, equipment and include the related abilities of knowing how and when to use that knowledge" (Hitt, Black, & Porter, 2009, p. 20). Human skill is "the ability to work with, understand, and motivate other people, both individually and in groups", while conceptual skill is "the mental ability to analyze and diagnose

complex situations" (Robbins & Judge, 2011, p. 43). By its nature, engineering work requires all three types of skills, especially human and conceptual skills, which are essential parts of managerial skills.

The implementation of FFSL in the AEC expands opportunities for Thai engineers to apply their managerial skills, as they may have to work with others, not only in Thailand, but also in the other AEC member countries. Working skills required for FFSL for engineers include skills in working with foreigners, supervision skills and managerial skills. Specifically, they may have to supervise or be under the supervision of foreign engineers, both in Thailand and in the other AEC member countries. Parnglilars (2012) argued that Thai engineers do not like change and do not want to work in other countries. In addition, Thai engineers do not have readiness in skills in business and management. Wongboonsin et al., (2012) found that most Thai engineers do not want to have things changed and go to work in other countries, causing weakness for them in terms of accumulating knowledge and experience. In addition, they need to develop themselves to gain more skills in business and management and they are not provided with enough development activities in this area.

Foreign Languages: Language is "a unified system of symbols that permits the sharing of meaning" (Gamble & Gamble, 2008, pp. 105-6). It is "a vehicle of symbolic value, including for the transfer of ideology" (Tannenbaum & Abugov, 2010, p. 74). Language is a major means for communication. Communication is "the transfer and understanding of meaning" (Robbins & Judge, 2011, p. 377). As individuals spend "nearly 70 percent of their waking hours communicating… good communication skills are critical to career success" (Robbins & Judge, 2011, p. 376) for any profession including engineers. In the present globalized working environment, language has become a major component of competency requirements for employment in various positions, including engineers.

The implementation of FFSL in the AEC creates an environment that requires more use of language in daily work life. As English has been adopted as the official language of the AEC, Thai engineers must have ability to use English in their work. In addition, the language of the AEC member countries where they will be relocating is also essential. Tuekla (2011) argued that the FFSL in the AEC creates a new need in certain skills, including language skills, and the most important language is English followed by the languages of other AEC member countries. The NESDP No. 11 also stated that Thai labor has limitations in foreign languages (NESDB, 2011). A study by the Working Committee for Labour and Social Welfare of the third National Economic and Social Development Advisory Council (NESAC, 2011) found that Thai labor lacked readiness in foreign languages, including English and the other languages of the AEC member countries. Parnglilars (2012) argued that Thai engineers do not have readiness in foreign languages and communication skills. Studies by Pisarnvanich and Nukprach (2012), UTCC (2012), and Wongboonsin et al. (2012) supported this view.

Readiness Preparation Methods: The preparation for change is the process of anticipating what actions are required in order to cope with such change, according to change theories (Cummings & Worley, 2009). The readiness to change reflects the beliefs, attitudes, intention and scope of purposes and these are important factors to the success of change (Armenakis, Harris, & Mossholder, 1993). Hammer (2001) provided a three-step process for creating readiness to change comprising: creating an early warning system; responding to change effectively; and creating supporting infrastructure. Cummings and Worley (2009) proposed a method for creating readiness for change by: being sensitive to the pressure for change; revealing the real present situations and the desirable change; and providing positive information about the expected results from the change. This is to create awareness of the benefits resulting from such change through communication, information sharing, education, training and development. In addition, Kreitner (1998) provided strategies to overcome resistance to change and to create readiness for change, which includes providing education, training and communication.

The implementation of FFSL in the AEC creates challenges for Thai engineers, especially in the opportunity of employment and career advancement. Those who are ready will be able to take advantage in the opportunity, while those who are less ready are likely to find it is a threat to them. Various methods are available for use in preparing for readiness for change. However, previous

studies indicated that training is the method mostly used for preparation for readiness for various groups (e.g., Mingsiririat, 2007; Prayoonpanich, 2012; TDRI, 2010; Truong & Swierczek, 2009; Vas & Coeurderoy, 2006; and Vichinrojran, 2005). A study by Pisarnvanich and Nukprach (2012) indicated that Thai engineers are using training and self-development as a method to prepare themselves for entering FFSL.

From the literature review, it is evident that the studies related to engineers were conducted with Thai engineers in general. The studies did not directly examine the readiness of Thai engineers in the electronics and computer companies, as intended in this study.

Demographic Background: Demography is "the study of the size, territorial distribution, and composition of population, changes therein, and the components of such changes" (Hauser & Duncan, 1959, p. 2). In terms of research, it is the characteristics of the population or sampling group to be used in a study, usually as an independent variable or variables of such a study.

This study selected four demographic factors as independent variables: gender, age education and position, as well as the organizational variable of size of company where the sample groups of this study were employed. Gender, age and size of company factors were selected based on a study by Vichinrojran (2005), who found that the business operator in the cosmetics industry applying for GPM standard with different gender, age and size of company had different levels of readiness for certification. The education factor was based on a study by Khamchana (2005), who found that personnel with different educational levels had different levels of readiness for decentralizing the education management authority to local administration. The position level factor was based on a study by Koyfong (2008), who found that personnel with different position levels had different levels of readiness for transferring of education institutes from the Ministry of Education to be under the supervision of provincial administration and a study by Kavaliauskaite (2010), who found that the position or status factor had the highest influence over the readiness for contracting out in municipalities in Lithuania.

Research Framework

Based on the above literature review, this study developed the following research framework, as shown in Figure 1.

Figure 1: Research Framework

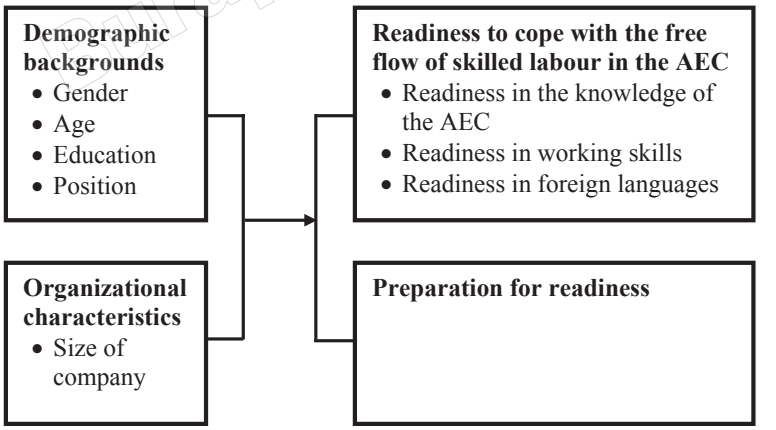

Figure 1 shows the relationships between the independent variables of this study (gender, age, education level, position level and size of company) and dependent variables (readiness in the knowledge of AEC, working skills and foreign languages, including the methods of preparation for readiness of engineers). It will be used as a basis for hypothesis development and testing in this study.

Hypotheses

Parallel to the objectives of this study and research framework, and consistent with the relevant literature, this study tested the following hypotheses:

H1. Thai engineers with different demographic backgrounds have different levels of readiness in the area of knowledge about the AEC.

H2. Thai engineers with different demographic backgrounds have different levels of readiness in the area of working skills.

H3. Thai engineers with different demographic backgrounds have different levels of readiness in the area of foreign languages.

An hypothesis related to preparation for readiness was not proposed, as the objective of this study was to learn how Thai engineers are to prepare themselves to cope with the FFSL in the AEC only.

Methodology

Population and Samples: This study used a quantitative survey research method. The population of this study was Thai engineers in electronics and computer companies who were members of the Electronics and Computer Employers' Association. There were 28 companies employing 7,000 engineers who volunteered to participate in this study. The sample size was 420 engineers derived from the multi-stage random sampling technique.

Instrument: The instrument used in this study was a questionnaire developed by the researcher. It is divided into six parts: (1) questions related to demographic backgrounds of respondents including gender, age, education level, position level, and size of the company which is on a checklist; (2) questions related to readiness in knowledge of the AEC which is on a checklist; (3) questions related to readiness in working skills which is on a 5-level rating scale; (4) questions related to readiness in foreign languages which is also on a 5-level rating scale; (5) questions related to the preparation for readiness in the three areas of knowledge, skills, and foreign languages which is a choice and ranking types questions; and (6) comments and suggestions which are open-end questions.

The questionnaires have been tested through the processes of validity and reliability. A validity check was performed by five experts and a calculation was made using Index of Item Objective Congruence (IOC) method. The minimum acceptable of IOC value is > .50 (Tarikanan, 2012). Only those items with the IOC of > .50 were selected. The pilot test of the questionnaires was then conducted with 30 Thai engineers in electronics and computers companies who were not the sample group of this study. The calculation of discrimination power of each selected item for questions of knowledge about AEC, working skills and foreign languages was made using the Item Total Correlation (ITC) method. The minimum acceptable level of discrimination power is .20 (Suriyawong et al., 2009). Only those items with discrimination power of .20 and above were selected. The discrimination power of the items selected ranges from .26-.83. The reliability was calculated according to Cronbach's Alpha coefficient method for questions related to readiness in working skills (8 items) and questions related to readiness in foreign languages (6 items) which are on a 5-level rating scale. The minimum acceptable level of the Cronbach's Alpha coefficient is .70 (Santos, 1999). The Cronbach's Alpha coefficient of the two scales was above .70. It was .87 for questions related to readiness in working skills and .89 for questions related to readiness in foreign languages.

Data Collection and Analysis: Questionnaires with a cover letter requesting cooperation were sent to Human Resource Managers (HRM) for distribution to the sampled engineers in each company. The HRMs then collected the completed questionnaires and returned them to the researcher by post, using the preaddressed envelope to the researcher by the date specified in the letter. Close coordination and follow-up, including telephone calls and personal visits, were made with all HRM's to ensure that questionnaires were completed and returned on time. The researcher received 134 questionnaires back from 10 companies by post. She picked up 171 questionnaires herself from 10 companies and sent a messenger to pick up 115 questionnaires from the other eight companies. All 420 questionnaires were received which a 100 percent return rate. All questionnaires were complete and useable for data analysis. Statistics used included: frequency, percentage, mean, standard deviation, t test, one-way analysis of variance, and a test using Scheffe's method.

Results

The results of the study are presented to test the objectives and hypotheses of the study. They are presented in the form of a table, followed by interpretations and explanations. Descriptive explanations are made where tables are not provided.

Table 1: Respondents' profiles

Contents	Frequency	Percent
Gender		
Male	285	67.9
Female	135	32.1
Total	**420**	**100.0**
Age		
Below 30 years	191	45.5
30-40 years	176	41.9
41-50 and above	53	12.6
Total	**420**	**100.0**
Education Level		
Bachelor's Degree	367	87.4
Master Degree's and above	53	12.6
Total	**420**	**100.0**
Position Level		
Operational	299	71.2
Management	121	28.8
Total	**420**	**100.0**
Size of Company		
Small size companies employing 100 engineers and below	140	33.3
Medium size companies employing 101-300 engineers	140	33.3
Large size companies employing 301 engineers and above	140	33.3
Total	**420**	**100.0**

An analysis of respondents' demographic backgrounds, presented in Table 1, reveals that the majority of the Thai engineers (67.9 percent) are male, 45.5 percent are aged under 30, 87.4 percent graduated with a bachelor's degree, 71.2 percent are at the operational level and approximately 33.3 percent each are in small, medium and large size companies.

Table 2: Frequency and percentage of readiness in the area of knowledge of the AEC

Knowledge of the AEC	Frequency	Percent
1. High (9-13 Marks)	174	41.4
2. Moderate (5-8 Marks)	246	58.6
3. Low (0-4 Marks)	0	0.0
Total	**420**	**100.0**

Table 2 shows that the majority of Thai engineers (58.6 percent) have readiness in the area of knowledge of the AEC at a moderate level (5-8 marks), while 41.4 percent have readiness at a high level (9-13 marks).

Table 3: Means, standard deviations and readiness levels in the area of working skills and foreign languages

	$\bar{x}$	SD	Readiness Level
Working Skills			
1. Skills in working with foreigners in Thailand	3.39	0.82	Moderate
2. Skills in working with foreigners in the AEC member countries	3.35	0.80	Moderate
3. Skills in supervising foreign employees in Thailand	3.20	0.77	Moderate
4. Skills in supervising foreign employees in the AEC member countries	3.18	0.81	Moderate
5. Skills for being under supervision of foreign engineers in Thailand	3.42	0.77	Moderate
6. Skills for being under supervision of foreign engineers in the AEC member countries	3.33	0.77	Moderate
7. Skills in managing organization having foreign engineers under supervision in Thailand	3.40	0.75	Moderate
8. Skills in managing organization having foreign engineers under supervision in the AEC member countries	3.34	0.76	Moderate
Total	**3.33**	**0.61**	**Moderate**
Foreign Languages			
English Language			
Speaking	2.94	.87	Moderate
Reading	3.27	.86	Moderate
Writing	3.08	.87	Moderate
Communication	2.96	.91	Moderate
Total	**3.06**	**.80**	**Moderate**
Language of the AEC member countries			
Speaking	2.70	1.32	Moderate
Reading	2.60	1.32	Moderate
Total	**2.68**	**1.29**	**Moderate**

Table 3 indicates that Thai engineers have readiness at a moderate level in both the areas of working skills and foreign languages.

Table 4: Comparison of readiness in the area of knowledge of the AEC by demographic factors of Thai engineers

Gender	$\bar{x}$	**SD**	**t**	**sig**
Male	8.21	1.65	1.756	.080
Female	7.90	1.67		
Age	$\bar{x}$	**SD**	**F**	**sig**
Below 30 years	8.06	1.63	.384	.682
30-40 years	8.11	1.67		

41-50 and above	8.28	1.73		
Total	8.11	1.66		
Education Level	$\bar{x}$	**SD**	**t**	**sig**
Bachelor's Degree	8.08	1.63	-.993	.321
Master Degree's and above	8.32	1.86		
Position Level	$\bar{x}$	**SD**	**t**	**sig**
Operational	7.99	1.61	-2.336*	.020
Management	8.41	1.73		
Size of Company	$\bar{x}$	**SD**	**F**	**sig**
Small	7.94	1.70	3.605*	.028
Medium	7.97	1.45		
Large	8.41	1.78		
Total	8.11	1.66		

*p < 0.05

As shown in Table 4, Thai engineers with different genders, ages and education levels have no significant differences in their level of readiness in the area of knowledge of the AEC. However, it was found that Thai engineers with different position levels have different levels of readiness in the area of knowledge of the AEC (p<.05). Those who occupied management positions had higher readiness than those who occupied operational positions. At the same time, Thai engineers in different sized companies had different levels of readiness in the area of knowledge of the AEC (p<.05). Those engineers who were employed in large companies had higher readiness than those who were employed in small and medium sized companies. However, when a comparison by pairs was made it was found that there was no difference in their readiness level and this finding may have been caused by the limitation of the sensitivity of Scheffe method applied in this study, although it is well recognized as one of the most reliable methods.

Table 5: Comparison of readiness in the area of working skills by demographic factors of Thai engineers

Gender	$\bar{x}$	**SD**	**t**	**sig**
Male	3.35	.61	1.051	.294
Female	3.28	.60		
Age	$\bar{x}$	**SD**	**F**	**sig**
Below 30 years	3.32	.61	.004	.996
30-40 years	3.33	.59		
41-50 and above	3.33	.67		
Total	**3.33**	**.61**		
Education Level	$\bar{x}$	**SD**	**t**	**sig**
Bachelor's Degree	3.30	.61	-1.994*	.047
Master Degree's and above	3.48	.61		

Position Level	$\bar{x}$	SD	t	sig
Operational	3.29	.58	-2.168*	.031
Management	3.43	.66		
Size of Company	$\bar{x}$	**SD**	**F**	**sig**
Small	3.27	.61	.946	.389
Medium	3.33	.60		
Large	3.37	.61		
Total	**3.33**	**.61**		

*p < 0.05

Table 5 indicates that Thai engineers with different gender, age and size of company had no significantly different levels of readiness in the area of working skills. Thai engineers with different education levels had different levels of readiness in the area of working skills (p<.05). Thai engineers with Master's degrees or higher had higher readiness than those with bachelor's degrees. Thai engineers with different position levels had different levels of readiness in the area of working skills (p<.05). Those who occupied management positions had higher readiness than those who occupied operational positions.

Table 6: Comparison of readiness in the area of foreign languages by demographic factors of Thai engineers

Gender	$\bar{x}$	SD	t	sig
Male	2.99	.95	-.918	.359
Female	3.06	.69		
Age	$\bar{x}$	**SD**	**F**	**sig**
Below 30 years	3.0562	.75669	.450	.638
30-40 years	2.9696	.82725		
41-50 and above	2.9994	1.34776		
Total	**3.0127**	**.87896**		
Education Level	$\bar{x}$	**SD**	**t**	**sig**
Bachelor's Degree	2.98	.78	-1.163	.250
Master Degree's and above	3.21	1.40		
Position Level	$\bar{x}$	**SD**	**t**	**sig**
Operational	2.98	.76	-1.021	.309
Management	3.09	1.11		
Size of Company	$\bar{x}$	**SD**	**F**	**sig**
Small	2.90	.85	5.492*	.004
Medium	2.93	1.01		
Large	3.21	.73		
Total	**3.01**	**.88**		

*p < 0.05

Table 6 indicates that Thai engineers with different gender, age, education and position levels

had no significantly different levels of readiness in the area of foreign languages. Thai engineers in different size of companies had significantly different levels of readiness in the area of foreign languages ($p<.05$). Those engineers who were employed in large companies had higher readiness than those who were employed in small and medium sized companies. A comparison by pairs applying the Scheff¢e method confirmed that those engineers who were employed in large companies had higher readiness than those who were employed in small and medium sized companies.

The results of a comparative study and testing of hypotheses are summarized in Table 7.

Table 7: A comparative study and testing of hypotheses

Hypotheses	Gender	Age	Education	Position	Company Size	Remarks
H1	No difference -Reject	No difference -Reject	No difference -Reject	Different -Accept	Different -Accept	Management had higher readiness Large size had higher readiness but when compared by pairs there is no difference
H2	No difference -Reject	No difference -Reject	Different -Accept	Different -Accept	No difference -Reject	Master's Degree had higher readiness Management had higher readiness
H3	No difference -Reject	No difference -Reject	No difference -Reject	No difference -Reject	Different -Accept	Large size had higher readiness and when compared by pairs of large size had higher readiness than medium and small sizes

Table 7 indicates the results of the testing of Hypothesis 1, that only the factors of position level and size of company were accepted, while, in Hypothesis 2, only the factors of education and position levels were accepted. For Hypothesis 3 only the factor of size of company was accepted.

The study of the preparation for readiness of Thai engineers in the area of knowledge of the AEC found that the method mostly used in the preparation for readiness in this area was monitoring and studying information. The method used least was continuing on to higher education sponsored by outside organizations or institutions. The study of the preparation for readiness of Thai engineers in the area of working skills found that the method mostly used in the preparation for readiness in this area was participating in training programs provided by the company. The method used the least was continuing in higher education sponsored by outside organizations or institutions and continuing on to higher education by self-sponsorship. The study of the preparation for readiness of Thai engineers in the area of foreign language found that the method mostly used in this area was participating in training programs provided by the company. The method used the least was training of foreign languages in the AEC member countries by company employee exchange programs.

Discussion

The study of readiness in the area of knowledge of the AEC revealed that a majority of Thai engineers had readiness at a moderate level. This finding indicated that they are required to seek more knowledge in order to increase their readiness in this area. This finding is consistent with the concept

presented in the NESDP No. 11, B.E. 2555-2559 (2012-2016) (NESDB, 2011); and Parnglilars (2012). However, this finding is inconsistent from the results of studies by UTCC (2012) and Pisarnvanich and Nukprach (2012). The reasons for this difference could be that those engineers in electronics and computer companies are dealing with high technology that changes rapidly and causes them to be alert and seek new knowledge to update themselves all the time in order to cope with these changes, so that they have more knowledge and understanding of the AEC than other groups of engineers.

The study of readiness in the area of working skills revealed that in the total picture Thai engineers have readiness at a moderate level. A review of the answers item-by-item found that the readiness was at the moderate level for all items. The item with the highest mean was the readiness to be under the supervision of a foreign engineer who is working in Thailand, while the lowest mean item was the supervision of foreign engineers working in the AEC member countries. The findings corresponded with the concept presented by Parnglilars (2012). This indicates that Thai engineers are not ready to supervise foreign engineers, but are ready to work under the supervision of foreign engineers. Thai engineers occupying management positions are ready to manage an organization employing foreign engineers in Thailand only. The reason for this may be that they do not have sufficient foreign language skills to cause them to lose their confidence in their communication which is one of the most important factors in supervision and management. It also indicates that they are not ready to work in other AEC member countries. These findings are consistent with the results of studies by Wongboonsin et al. (2012) and Pisarnvanich and Nukprach (2012).

The study of readiness in the area of foreign languages reveals that for using the English language Thai engineers have readiness at a moderate level. A review of the answer item by item found that their readiness was at the moderate level in all items. The item with the highest mean was the reading of English and the lowest mean item was the speaking of English. For other languages, it was found that in the total picture Thai engineers have readiness at a moderate level. These findings are consistent with the concept presented by Parnglilars (2012), Tuekla (2011) and the NESDP No. 11 (NESDB, 2011). They also confirm the findings of Pisarnvanich and Nukprach (2012), UTCC (2012), Wongboonsin et al. (2012), and the Working Committee for Labour and Social Welfare of the Third National Economic and Social Development Advisory Council (NESAC, 2011).

The comparison of readiness based on the demographic backgrounds of Thai engineers in the area of knowledge of the AEC, according to Hypothesis 1, revealed that only the factors of position level and size of the company made a significant difference in the readiness in this area and so the hypothesis was accepted. In the case of position level, it was found that those who occupied management positions have higher readiness than those who occupied operational positions. The reasons for this could be that those engineers with different duties and responsibilities find it necessary to apply knowledge in their work differently. Those who occupy operational positions may have limited and narrower duties and responsibilities which are restricted to inside the company only, while those who occupy management positions have to perform management functions and coordinate with various people both inside and outside the company, including people in other countries. These findings support the results of studies by Koyfong (2008) and Kavaliauskaite (2010). For the size of company, it was found that those engineers who were employed in large companies had higher readiness than those who were employed in small and medium sized companies, which supports the finding by Vichinrojran (2005). It may be that those large companies are normally either international or multinational or global companies applying the concepts of international human resource management, as described by Noe, Hollenbeck, Gerhart, and Wright (2011), and Armstrong (2010). These companies have subsidiaries and networks in various countries including the AEC member countries. Engineers in these companies are required to contact and coordinate their work with foreigners, so that they have opportunities to learn from them in their work and it also motivates them to learn more by themselves, so that they can keep pace with their peers in other countries.

Hypothesis 1 was rejected when a comparison was made in the areas of readiness based on demographic backgrounds by gender, age and education level of Thai engineers. These factors did not make a significant difference in the readiness in this area. In the case of gender, it could be interpreted that, at present, the values of equal rights and opportunity are promoted and well accepted in society,

so that males and females have equal opportunity, especially in education. At present, there is a considerable number of females studying and working in the various engineering fields. Therefore, gender should not be an obstacle to learning and seeking for knowledge. In the case of age, it could be interpreted that, at present, there are a variety of methods and media for learning, especially the internet, so that people of all ages have channels to gain more knowledge easily and equally. In addition, engineers must have at least a bachelor's degree and have a basic aptitude in technology, so that they are able to seek more knowledge themselves. Hence, the age factor should not be the cause for the differences in readiness. These findings correspond with the concept of equal employment opportunity (EEO) as stated by Armstrong (2010), Daniels et al. (2011) and Noe et al. (2011). In the case of the education level, it is inconsistent with the findings of Khamchana (2005). This could be interpreted, as stated above, that engineers must have at least a bachelor's degree and they have a basic aptitude in technology, so that they are able to access more knowledge themselves easily and at all times.

The comparison of readiness based on demographic backgrounds of Thai engineers in the area of working skills, testing Hypothesis 2, revealed that only the factors of education and position levels have a significant difference in the readiness in this area, so that this hypothesis was accepted. In the case of education level, it was found that those engineers with Master's degrees had higher readiness than those with bachelor's degrees, which corresponds with the findings of Khamchana (2005). This result could be interpreted by arguing that those engineers with Master's degrees or higher are educated more comprehensively in research that enables them to be better in analyzing, synthesizing and understanding of more complicated problems. This could be a cause for engineers with different education levels to have readiness in this area at different levels. In the case of position level, it was found that those engineers who occupied management positions had higher readiness than those who occupied operational positions. This result supports the findings of Koyfong (2008) and Kavaliauskaite (2010). At the same time, those who occupy management positions have to perform management functions, both in terms of people and work. They are required to coordinate with various people both inside and outside the company, including people in other countries. Therefore, it could be a cause for engineers who occupy different position levels to have a different readiness level and that those who occupy management positions to have higher readiness than those who occupy the operational positions.

Hypothesis 2 was rejected when a comparison was made in the areas of readiness based on demographic backgrounds of Thai engineers in working skills by gender, age and size of the company. These factors did not make a significant difference in the readiness in this area. In the case of gender and age, they could be discussed and explained in the similar way as stated in the readiness in the area of knowledge of the AEC. In addition, it could be interpreted that there is not much difference in the basic structure and nature of engineering work, although normally those who are older would have more experience, but, due to the present variety of learning technology, methods, learning channels and their basic aptitude in technology, these factors make them to be able to access more knowledge easily and rapidly themselves and apply this in their work. In the case of size of the company, the present result supports the findings by Vichinrojran (2005), that people in different sized organizations have different levels of readiness. This could be interpreted by arguing that the basic structure of engineering work in various companies is composed of similar components, no matter if it is a small, medium or large company and causes engineers who are employed in different sized companies to have no difference in readiness in this area.

The comparison of readiness based on demographic backgrounds of Thai engineers in the area of foreign languages, according to Hypothesis 3, revealed that only the factor of size of the company made a significant difference in readiness in this area and so this hypothesis was confirmed. It was found that those engineers who were employed in large companies had a higher level of readiness than those who were employed in small and medium sized companies. The findings could be argued, discussed and explained in a similar way as stated above for readiness in the area of knowledge of the AEC.

Hypothesis 3 was rejected when a comparison was made in the areas of readiness based on demographic backgrounds of Thai engineers in the area of working skills by gender, age, education, and position levels. These factors did not make a significant difference in the readiness in this area. In the cases of gender and age it could be argued that most engineers studied in Thai programs using Thai language as the major teaching and learning media. Although some English language courses were taught, they concentrated on technical terms. This could be a major cause for Thai engineers to have reduced English proficiency both in terms of gender and age. In addition, the Thai education system is open to both males and females to study in the same classes and programs. When they have graduated and entered their employment they may not continue to study English, but choose to concentrate on their job performance instead. Thus, their English proficiency may not increase according to their length of service. In the cases of education and position levels, the findings of this study are inconsistent with the findings of Khamchana (2005), Koyfong (2008) and Kavaliauskaite (2010). It could be argued that this is due to the fact that most engineers studied in Thai programs no matter at what level. Though there are some international programs, the numbers of graduates in these programs are minimal and, although there are some graduates from abroad, the number of them is also minimal.

The study of the preparation for readiness of Thai engineers in the area of knowledge of the AEC found that the method mostly used in the preparation for readiness in this area was monitoring and studying information. The preparation methods used correspond to the concepts of Kreitner (1998) and Cummings and Worley (2009) in the area of communication. However, it indicates that Thai engineers in electronics and computer companies do not make an extra effort to prepare for readiness, as it can be seen that they are relying mostly on training programs provided by the company. The findings of this study support the findings of Wongboonsin et al. (2012) and are inconsistent with the findings of Pisarnvanich and Nukprach (2012), that Thai engineers are continuously developing at a satisfactory level.

The study of the preparation for readiness of Thai engineers in the area of working skills found that the method mostly used in the preparation for readiness in this area was participating in training programs provided by the company. The findings of this study indicated that Thai engineers recognize the importance of training in preparing themselves for their readiness to enter the FFSL in the AEC. However, their training concentrates on training conducted in Thailand and has not been extended to include the training in other AEC member countries.

The study of the preparation for readiness of Thai engineers in the area of foreign languages found that the method mostly used in this area is participating in training programs provided by the company. The findings of this study correspond to the concept of the need for preparation for readiness in foreign language, as asserted by Parnglilars (2012), Tuekla (2011), the NESDP No. 11 (NESDB, 2011) and Kreitner (1998). However, this finding indicates that the major methods used by Thai engineers in electronics and computer companies are participating in training programs provided by the company and training programs organized by outside organizations sponsored by the company, and by paying fees at their own expense. It does not include training in the AEC member countries by the company employee exchange program, which is in the form of on-the-job training which would provide more opportunities for Thai engineers to access the real situations and working conditions and which would help enhance the effectiveness and efficiency of learning and meeting the real needs of all concerned.

Recommendations

Practical Implications: (1) Thai engineers should prepare themselves for the readiness to cope with the FFSL in the AEC in all three areas by using various methods simultaneously. The preparation methods include: monitoring and studying related information, training, further education at higher levels, and study tours in AEC member countries. (2) Companies should also establish a system to provide up-to-date information about the FFSL in the AEC to employees. Training programs in the areas of skills and English language should be provided to employees. Motivational programs should be established

to promote and encourage employees to engage in self-development programs in order to be able to advance in their careers. Programs for upgrading the competency of engineers to meet with the ASEAN engineering professional standards should be established. (3) Government agencies involved should provide information and knowledge about laws, ways of life, language and culture of various AEC member countries to all concerned. It should also provide guidelines for upgrading competency for engineers and other professionals who want to work in AEC member countries. (4) Educational institutes should adjust their curricula and provide teaching and learning methods to be in line with the ASEAN engineering professional standards. English and the languages of selected AEC member countries should be emphasized in the curricula.

Future Research Agenda: A similarly designed study for engineers in other industries and a study of other professions should be conducted. A study of the impact of the FFSL the AEC upon Thai engineers and the methods of coping with those impacts should be conducted.

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