

## **RESULTS AND DISCUSSIONS**

The result and discussion were divided according to the collected data into two parts, as follows :

Part 1 : Data collection and analysis by way of survey was divided into two phases, ie.

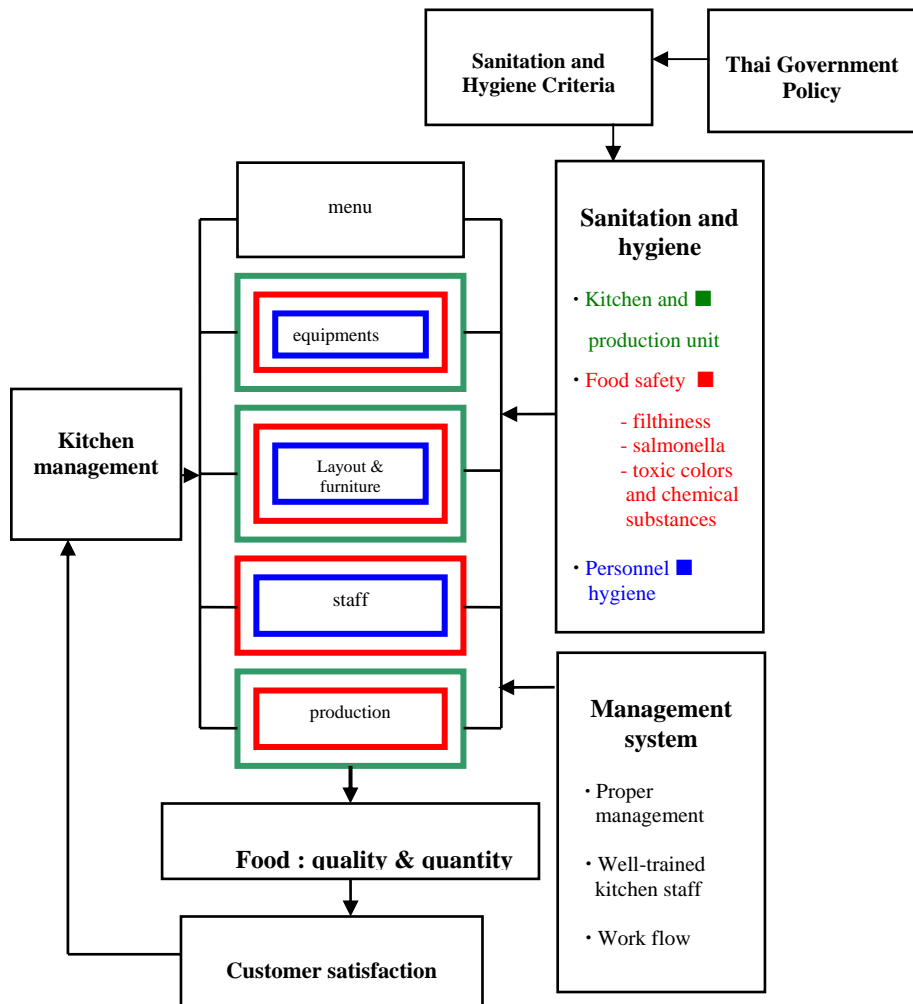
A. Documentary survey

B. Observation and interview by interview questionnaire and observation forms

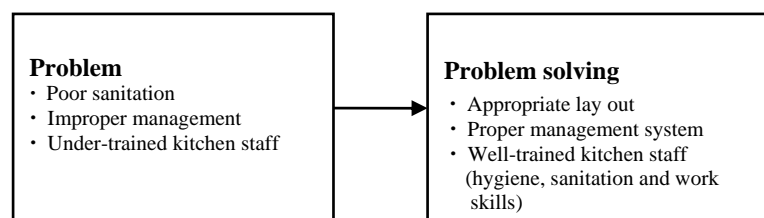
Part 2 : Synthesis of overall data to propose a model of Thai kitchen for large quantity foodservices.

**Part 1 : A. documentary survey, summary:**

1. Situation of Thai kitchen ;



2. Problems and problems solving of Thai kitchen



**Figure 1** Situation of Thai kitchen

**Source:** Adapted from Fuller *et al.* (1985); Ninemeire (1990); Fuller and Kirk (1991); Payne-Palacio (1994); Knight *et al.* (2000); The Government Public Relation Department (2004); (2005a); (2005b)

According to the popularity of Thai food derived from its taste which comprised of herbs, spices and other ingredients (The Government Public Relation Department, 2004). Thus, in 2003 Thai government has issued the policy on supporting “Thai Kitchen of the World” (Thaifarmzone, 2005). Moreover, since 2002 the project on “ Clean Food Good Taste ” was created and certificates were given to restaurants whose operation met the criteria of sanitation and hygienic quality. The criteria emphasized on sanitation and hygiene of kitchen and production unit, food safety and personnel. Thus, the said policy of the Government had influenced Thai food restaurant entrepreneurs to seriously considered the issue particularly in kitchen management. As for kitchen management, there were 5 factors which should be taken into account ie. menu, equipment, staff, layout and production.

First important factor was menu since the content of menu defined the operation and established the direction for management. It also determined the item purchased, their cost, the operation’s personnel (staff) and facility (equipment) requirements, and the type of service that will be offered (Knight *et al.*, 2000).

Equipment requirements depended on the menu. Therefore, one could eliminate the requirement for much equipment and also save on space by limiting the content of menu. Equipment had to arranged and used properly and should be integrated with other equipment so that the various subsystems of the production would work efficiently (Knight *et al.*, 2000).

Staff was another important factor, to achieve maximum productivity in the kitchen one should consider number, skills and experience of the staff (Fuller *et al.*, 1985).

Layout or kitchen plan also depended on the menu, which determined the allocation of the equipment and furniture, the quantity and the method of production (Fuller and Kirk, 1991).

The actual production was planned according to the menu which acted as a blueprint and raw materials, personnel and equipment would be provided accordingly (Ninemeire, 1990).

In order to maintained and up-grade the popularity, the above factors should be taken into consideration, all of which were controlled by management systems. The said systems comprised of proper management, well-trained kitchen staff and well work flow.

To summarized the whole picture, the successful operation under proper sanitation and hygiene, good kitchen management and proper management system would result in high quality (clean and acceptable) and right quantity (sufficient) of food to the customer satisfaction.

However, certain problems were found in Thai kitchen operation including poor sanitation, improper management and under-trained kitchen staff (The Government Public Relation Department, 2005a, 2005b). And the problems solving issues were suggested by Fuller *et al.* (1985); Payne-Palacio *et al.* (1994) that appropriate layout, proper management systems, and well-trained kitchen staff in terms of hygiene, sanitation and work skills.

B. Observation and interview by interview questionnaire and observation forms.

The findings from interview questionnaire showed that;

**Section 1** : General data on sample groups

**Table 1** Frequency distribution by types and levels of hotels understudy

levels	Type		Total (%)
	Chain hotels (%)	Single hotels (%)	
5-star	8 (44.5)	-	8 (100.0)
4-star	6 (33.3)	10 (84.6)	16 (100.0)
3-star	4 (22.2)	55 (15.4)	59 (100.0)
Total	18 (100.0)	65 (100.0)	83 (100.0)

**Table 2** Frequency distribution by levels and characteristics of chain hotel

Characteristics of chain hotels	Star levels			total (%)
	5 (%)	4 (%)	3 (%)	
Within the country	2 (16.7)	8 (66.6)	2 (16.7)	12 (100.0)
Inside and outside the country	6 (100.0)	-	-	6 (100.0)
Total	8 (44.4)	8 (44.4)	2 (11.2)	18 (100.0)

The sample group was comprised of 83 affiliated hotels under the Thai hotel association . The sample groups were divided into 2 types i.e. 1) 18 chained hotels and , 2) 65 single hotels, as shown in table 1. The majority of chain

hotels (66.6%) were located within Thailand as 4-star hotels, while 100% of 5-star hotels were located both inside and outside the country (table 2) .

**Table 3** Frequency distribution by types and levels of interviewed hotel from survey

levels	Type		Total (%)
	Chain hotels (%)	Single hotels (%)	
5-star	8 (100.0)	-	8 (100.0)
4-star	6 (85.7)	1 (14.3)	7 (100.0)
3-star	2 (40.0)	3 (60.0)	5 (100.0)
total	16 (80.0)	4 (20.0)	20 (100.0)

From table3, the result revealed that there were 20 hotels allowed the researcher for the interview. And majority of interviewed hotels were chained hotels (80%) and the rests were single hotels ( 20%)

**Table 4** The causes of sample groups which unable to render complete information

Causes	Number (%)
- The kitchen did not meet requirement as set by this research.	40 (63.5)
- The hotels had no policy to render the information.	18 (28.5)
- The hotels were under renovation and promotion process.	3 (8.0)
Total	63 (100.0)

Moreover, this research encountered with the limitations on certain data resulting in the inability of completion due to 3 basic problems namely 1) 63.5% of the kitchen did not meet requirement as set by this research, 2) 28.5 % of the total had no information on policy and, 3) 8.0 % were under renovation and promotion process as shown in table 4 .

Thus, totally research had sample group 20 hotels, 9 of which had separate Thai kitchen while the rest Thai kitchen operated with other types of kitchens. The finding also showed that the majority of 5-star chain hotel (83.3%) had set up Thai kitchen separately. But all 3–star hotel single hotels did not have separate Thai kitchen (see table 5).



## Section 2 : Personnel structure of production unit in Thai kitchen.

The literature findings revealed that Thai kitchen was arranged similar to the Western standard kitchen ie. the traditional staff brigade or the traditional kitchen brigade system. The staff were designated as i) chef de cuisine, the head chef or first chef. , ii) sous / second chef, the second-in- charge in the kitchen. , iii) chef de partie or the station chef, in charge of particular areas of production., iv) demi chef, a chef specializing in a particular type of cooking as part of the kitchen brigade., v) commis chef, a cook who had just completed an apprenticeship or had an equivalent qualification and, vi) kitchen helpers, the workers who assisted cooks by keeping the kitchens clean and by performing a variety of food preparation task. Meaning that in the past, kitchens in major establishments had very large number of staffs, called “brigades“, which in turns had chains of command. They were organized into areas of specialization within the kitchen and dining facilities (Kinton and Ceserani, 1984; Negi, 1999; Cracknel *et al.*, 2000; Magris and McCreery, 2001).

Foodservice business had later changed into hospitality industry system, due to changing in customers’ preference and competition, the establishment was influenced to change and rearrange in terms of preferred menu qualitatively and quantitatively. As a consequence, such change affected the number of chefs and assistants to be less because of higher wages, preparation of convenience food, improvement of storage facilities, and requirement of more efficient and relevant kitchen equipments (Magris and McCreery, 2001).

From the survey, Thai kitchen staff positions were similar to brigade system since most executive chefs who presently supervised of all kitchens in hotels in (single and chained hotels) in Thailand were foreigners. Moreover, the results also showed that the main duties of Thai kitchen staff were comparatively similar to western kitchen as shown in table 6 (Australia’s career Information Service, 2006; Job Guide 2006, 2006; Alberta Occupational Profiles, 2007).

**Table 6** Positions and functions in Thai kitchen

Positions	Functions (Duties and responsibilities)
Chef de cuisine ( The head chef )	The head chef was the person in charge of the administrative functions which were:- <ul style="list-style-type: none"> <li>- to organize the kitchen.</li> <li>- to supervise cooks and other kitchen staff.</li> <li>- to create menus and new recipes seasonally etc.</li> <li>- to acquire the food-stuffs and kitchen supplies based on specification and reasonable price according to quality standard and budget.</li> <li>- to advise on purchasing of equipment .</li> <li>- to recruit and supervise kitchen staffs.</li> <li>- to estimate labor and food cost and modify menus to meet the budget.</li> <li>- to check received orders for quantity and quality of product, in case of problem.</li> <li>- to control the quality of raw and cooked food products.</li> <li>- to ensure that sanitation standards were maintained properly.</li> <li>- to assist in staffs development and training.</li> <li>- to confer with other sections within the establishment.</li> <li>- to promote the establishment by way of practicing good public relations.</li> </ul>
Sous – chef (The second chef)	The second chef relieves the head chef in his absence. He was actually the chef’s right–hand man, whose main job was to run the kitchen smoothly according to the head chef’s wishes.

**Table 6** (continued)

Positions	Functions (Duties and responsibilities)
Chef de partie (Station chef)	<p>Each chef de partie was in-charge of a section in the kitchen, usually this was a job of the specialist. A chef de partie organized his own section as well as assigned specific work to his assistants.</p> <p>The station chefs were :</p> <ul style="list-style-type: none"> <li>-wok chef shared the job with demi-chef and helpers in managing and preparing fried, grilled and stir-fried foods .</li> <li>-curry chef managed, prepared and took care of Thai curries, soups (plain and hot) and side dishes .</li> <li>-salad chef managed and prepared Thai salads and sauces including vegetables and fruits as complementary and garnishing.</li> </ul>
Demi-chef	<p>Demi-chef assisted chef de partie as well as administered commis. The term demi-chef was sometimes used to denote the first commis of each station.</p>
Commis	<p>Commis assisted chef de partie, they were graded as first, second and third commis according to length of service and experience, with the first commis being the direct assistant to</p>

**Table 6** (continued)

Positions	Functions (Duties and responsibilities)
Commis	chef de partie and responsible for directing more work than other commis and so on.
Kitchen helpers	Kitchen helpers were those who kept the kitchen clean and tidy. Sweep and scrub floors, remove garbage, clean and store kitchen equipments and utensils were also parts of their duties. In some establishments kitchen helpers also removed and stored supplies in cupboards and refrigerators, assisted in basic food preparation as ordered by the superiors (e.g. washing, slicing and partially cooking of vegetables and meats in advance), assembled and measured ingredients, and helped line cooks in preparing certain food orders.

However, there was a difference between Thai and Western kitchens among chef de partie, demi chef and 1<sup>st</sup> commis ie. during rush hours or in absence of any of them, they could interchange or replaced or support each other. Since they all had certain level of ability prepared and cooked Thai food. In the contrary, chefs and cooks in Western kitchen could not substitute each other because they were specialized in specific food only.

### **Section 3** : General data of staff in Thai kitchen

The general data of 108 Thai kitchen staffs in 20 hotels were divided into sex, age, educational level, field and experience as the following : -

## Sex

**Table 7** Frequency distribution between sex and staff position

Position	Sex		Total (%)
	Male (%)	Female (%)	
Chef de cuisine / Sous chef	9 (45.5)	11 (55.0)	20 (100.0)
Chef de partie	2 (10.5)	17 (89.5)	19 (100.0)
Demi chef	2 (18.2)	9 (81.8)	11 (100.0)
Commis	13 (28.3)	33 (71.7)	46 (100.0)
Helper	5 (14.7)	7 (58.3)	12 (100.0)
Total	31 (28.7)	77 (71.3)	108 (100.0)

The majority of staff member in a Thai kitchen of different positions namely chef de cuisine/ sous chef, chef de partie, demi-chef, commis and kitchen helper were female i.e. 55.0%, 89.5%, 89.5%, 81.8%, 71.7%, and 58.3% respectively. And the staff ratio in Thai kitchen were female 71.3% : male 28.7% ( see table 7 ). While, on the other hand, the majority of Western kitchen staff were male ( Siriravetkun, 2001; Australia's Career Information Service, 2006). Which seemed appropriate since the kitchen was pretty hectic and hard which work as one needs to stand for long periods of time and some heavy lifting required e.g. moving cases of food items weighted up to 50 kgs. which is unable by female ( Australia's Career Information Service, 2006; Human Resource Department of University of Manitoba, 2007 ). In view of Thai kitchen, a majority of staff were female may be

due Thai culture that Thai ladies ability to serve delicious and presentable food was a must and pride among since the years of King Rama V (Two Hundred Years of Ratanakosin Cerebration Committee, 1982).

### Age

**Table 8** Frequency distribution between staff positions and age

Positions	Age (years)							Total (%)
	18-24(%)	25-30(%)	31-35(%)	36-40(%)	41-45(%)	46-50(%)	51-55(%)	
Chef de cuisine / Sous Chef	-	-	2 (10.0)	8 (4.0)	4 (20.0)	4 (20.0)	2 (10.0)	20 (100.0)
Chef de partie	1 (5.9)	4 (23.5)	1 (5.9)	5 (29.4)	2 (11.7)	4 (23.5)	-	17 (100.0)
Demi chef	-	6 (60.0)	1 (10.0)	3 (30.0)	-	-	-	10 (100.0)
Commis	9 (20.9)	28 (65.1)	2 (4.7)	3 (7.0)	-	1 (2.3)	-	43 (100.0)
Kitchen helpers	4 (33.3)	6 (50.0)	-	-	2 (16.7)	-	-	12 (100.0)
<b>Total</b>	14 (13.7)	44 (43.1)	6 (5.9)	19 (18.6)	8 (7.8)	9 (8.8)	2 (2.0)	102 (100.0)

The majority of chef de cuisine /sous chef and chef de partie were in 36-50 years of age i.e. total of 80% (40%+20%+20%) and 64.6% (29.4%+11.7%+23.5%) respectively. And 23.5% of the latter were among 25-30 years age group. While demi chef, commis and kitchen helpers were found to be much younger i.e. 60.0%, 86.0% and 83.3% respectively, of which were at the age group of under 30 years (see table 8 ).

According to Alberta Occupational Profiles (2007) which reported that kitchen in USA were 20 – 21 years (21%) and 35 -36 years (21%) who possessed good healthiness as well as stamina (Alberta Occupational profiles, 2007and Human

Resource Department of University of Manitoba, 2007). Thus, the age ranges of Thai kitchen staff seemed to agree with that of those in USA in terms of suitability for kitchen work.

### Educational level

**Table 9** Frequency distribution between staff positions and educational levels

Positions	Educational Levels						Total (%)
	<Primary School (%)	Primary School (%)	Junior high School (%)	high School (%)	Associate Degree (%)	Bachelor Degree (%)	
Chef de cuisine / Sous Chef	3 (15.0)	3 (15.0)	8 (40.0)	2 (10.0)	3 (15.0)	1 (5.0)	20 (100.0)
Chef de partie	2 (11.8)	3 (17.6)	3 (17.6)	3 (17.6)	4 (23.5)	2 (11.8)	17 (100.0)
Demi chef	-	-	3 (30.0)	-	4 (40.0)	3 (30.0)	10 (100.0)
Commis	-	-	13 (31.0)	7 (6.7)	12 (28.6)	10 (23.8)	42 (100.0)
Kitchen helpers	-	2 (20.0)	6 (60.0)	-	-	2 (20.0)	10 (100.0)
<b>Total</b>	5 (5.1)	8 (8.1)	33 (33.3)	12 (12.1)	23 (23.2)	18 (18.2)	99 (100.0)

Educational level of the majority of chef de cuisine/ sous chef, commis and kitchen helpers were at junior high (40.0%, 31.0% and 60.0% respectively). While chef de partie and demi chef had at least associate degrees (23.5% and 40% respectively) (see table 9).

Almost all chefs had certain technical qualification obtained through small extend of apprenticeship training or related post-secondary education, they might started as cooks or even lower skill kitchen positions such as kitchen helper (Alberta Occupational Profiles, 2007). U.S. Department of Labor (2006) also reported that many chefs were trained on the job, and acquired further work experience and training from chef mentors in the restaurants where they worked. Nevertheless,

although certification was not required to enter the work, but it could be a measure of accomplishment and could lead further advancement and higher-paying positions.

### Fields of study

**Table 10** Frequency distribution between staff positions and fields of study

Positions	Fields of study*		Total (%)
	Direct (%)	Indirect (%)	
Chef de cuisine / Sous chef	1 (20.0)	4 (80.0)	5 (100.0)
Chef de parti	4 (50.0)	4 (50.0)	8 (100.0)
Demi chef	5 (83.3)	1 (16.7)	6 (100.0)
Commis	18 (60.0)	12 (40.0)	30 (100.0)
Kitchen helpers	2 (100.0)	-	2 (100.0)
Total	30 (58.8)	21 (41.2)	51 (100.0)

\*fields of study; direct = the fields which were related to food / cooking

indirect = the fields which was not related to food

Table 10 showed that the majority of chef de partie, demi chef and commis had completed their study directly in food i.e. 83.3% and 60% respectively. While 20% of chef de cuisine / sous chef were qualified in food field. Nevertheless, two out of 10 kitchen helpers had completed their study in food, while the rest were at junior high school level and below. Only 20% of chef de cuisine/ sous chef had studied in food field. But there was no different in number of chef de partie between direct and indirect background in food. In general, those who had commercial food

preparation background would start at lower positions but it would take them a shorter length of time in ascending to a higher position. Moreover, their education may provided them a benefit when looking for jobs in better restaurants (U.S. Department of Labor, 2006).

### Experience

**Table 11** Frequency distribution between staff positions and experience

Positions	Experience (years)					Total (%)
	None (%)	2-3 (%)	4-5 (%)	6-7 (%)	8 up (%)	
Chef de cuisine / Sous Chef	-	-	-	-	20(100.0)	20 (100.0)
Chef de partie	-	-	-	14 (73.7)	5 (26.3)	19 (100.0)
Demi chef	-	-	9 (81.8)	2 (18.2)	-	11 (100.0)
Commis	-	30 (65.2)	16 (34.8)	-	-	46 (100.0)
Kitchen helpers	12 (100.0)	-	-	-	-	12 (100.0)
Total	12 (11.1)	30 (8.1)	25 (23.1)	16 (14.2)	25 (23.1)	108(100.0)

All chefs de cuisine / sous chefs understudy had at least 8 years of experience in food service. While 26.3% of chef de partie had spent at least 8 years and 73.7% had 6-7 years on the job. Only 18.2% of demi chef had 6-7 years and 81.8% had 4-5 years of experience. And 65.2% of commis were 2-3 years on the job. The figure on chef de cuisine / sous chef as shown in table 11 agreed with Negi (1999) who stated that proficiency as a chef came after 10 years and competence to undertake responsibilities with at least 15 to 18 years of experience to be an executive chef. In addition to technical training, chefs usually required 3 to 6 years of experience in commercial food preparation (Alberta Occupational Profiles, 2007).

As for kitchen helpers, the research showed that all of them (100%) had no experience in food preparation what so ever. Nevertheless, Alberta Occupational Profiles (2007) and U.S. Department of Labor (2006) stated that there was no experience requirements for kitchen helpers and food assemblers and most skills were learned on the job.

### Analysis of the relationship

**Table 12** The relationship between staff positions and general characteristics of Thai kitchen staff

Characteristics	n	$\lambda^2$	p
Sex	108	7.248	.123
Ages	102	67.972	.000
educational levels	99	33.489	.030
Fields of study	51	6.274	.180
experience	108	290.458	.000

The analysis of the relationship between the general characteristics of Thai kitchen staff and their positions showed that : 1) the positions were related to age, education, and experience, however, 2) the positions were not related to sex and fields of study, both at 0.5 statistical significant level. According to U.S. Department of labor (2006) the advancement opportunities for chefs, cooks and food preparation workers depended on their training, work experience, and ability to perform more responsible and sophisticated tasks. Furthermore, the advancement was

generally easier and faster for those who had a high school diploma and were willing to take further education (Australia's Career Information Service, 2006).

**Table 13** Skills characteristics of Thai kitchen staff at management and job levels

( n=20)

Levels	Skill characteristics	$\bar{X}$	SD
Management level	Must have practical ability in Thai food cooking in terms of good taste and hygienically standard	9.50	1.14
	Must have the ability in setting Thai menu correctly and suitably	9.50	1.14
	Must have the knowledge of Thai food ingredients	7.70	1.59
	Must have the correct technique in Thai cooking	7.65	1.56
	Must have the ability in developing the standard of food service	7.10	1.59
	Must have the ability in utilizing the kitchen equipments properly and safely	5.60	1.14
	Must have knowledge and skill in how to transfer heavy load	2.05	1.50
	Must have the ability in solving problems encountered under pressure	0.70	1.34
	Must have the ability to deliver the training	0.50	1.05
	Must have the ability in computer usage	0.45	1.09
Job level	Must have the knowledge of Thai food ingredients	9.30	1.12
	Must have practical ability in Thai food cooking in terms of good taste and hygienically standard	8.10	1.11
	Must have the correct technique in Thai cooking	7.65	1.34
	Must have the ability in utilizing the kitchen equipments properly and safely	7.20	1.79
	Must have the ability in developing the standard of food service	5.80	1.47
	Must have the ability in English language usage enough	5.55	2.18
	Must have knowledge and skill in how to transfer heavy load	5.10	1.77

$\bar{X}$  : 8.1-10.0 = most important , 6.1-8.0 = very important, 4.1-6.0 = important,

2.1-4.0 = less important and 0-2.0 = least important

Requirements of the kitchen staff in management level (chef de cuisine, sous chef and chef de partie) and job level (demi chef, commis and kitchen helper) in two different categories namely skills and personal characteristics were studied, as shown in table 13 and table 14.

In table 13, the findings showed that the essential skills of kitchen staff at management level were;

1) The most important skills i.e. they must have practical ability in Thai food cooking in terms of good taste and hygienically standard as well as the ability in setting Thai menu correctly and suitably ( $\bar{X} = 9.50$ ,  $SD = 1.14$ ).

2) The very important skills i.e. they should have the knowledge of Thai food ingredients ( $\bar{X} = 7.70$ ,  $SD = 1.59$ ), the correct technique in Thai cooking ( $\bar{X} = 7.65$ ,  $SD = 1.56$ ) and the ability in developing the standard of food service ( $\bar{X} = 7.10$ ,  $SD = 1.59$ ).

3) The important skill was the ability in utilizing the kitchen equipments properly and safely ( $\bar{X} = 5.60$ ,  $SD = 1.14$ ).

4) The less important skills i.e. they must have knowledge and skill in how to transfer heavy load ( $\bar{X} = 2.05$ ,  $SD = 1.50$ ), the ability in solving problems encountered under pressure ( $\bar{X} = 0.70$ ,  $SD = 1.34$ ), the ability the ability to deliver the training ( $\bar{X} = 0.50$ ,  $SD = 1.05$ ) and the ability in computer usage ( $\bar{X} = 0.45$ ,  $SD = 1.09$ ).

In addition, the findings showed that the essential skills of kitchen staff at job level were;

1) The most important skills i.e. they must have the knowledge of

Thai food ingredients ( $\bar{X} = 9.30$ ,  $SD = 1.12$ ) as well as must have practical ability in Thai food cooking in terms of good taste and hygienically standard ( $\bar{X} = 8.10$ ,  $SD = 1.11$ ).

2) The very important skills i.e. they must have the correct technique in Thai cooking ( $\bar{X} = 7.65$ ,  $SD = 1.34$ ) and the practical ability in Thai food cooking in terms of good taste and hygienically standard ( $\bar{X} = 7.20$ ,  $SD = 1.79$ ).

3) The important skills i.e. they must have the ability in developing the standard of food service ( $\bar{X} = 5.80$ ,  $SD = 1.47$ ), the ability in English language usage enough ( $\bar{X} = 5.55$ ,  $SD = 2.18$ ) and the knowledge and skill in how to transfer heavy load ( $\bar{X} = 5.10$ ,  $SD = 1.77$ ).

In summary, the results showed that the most important skills of Thai kitchen staff in management level must have practical ability in Thai food cooking in terms of good taste and hygienically standard as well as must have the ability in setting Thai food menu correctly and suitably. According to the results of “Desired characteristics of cooks in Bangkok hotels” by Siriravetkun (2001) showed that kitchen staff must have the knowledge how to cook food hygienically. Alberta Occupational Profiles (2007) which specified that chefs must plan menus and ensure food meets quality standard. Moreover, the results also showed that the very important skills of Thai kitchen staff at management level were the knowledge of Thai food ingredients as well as have the correct technique in Thai food cooking. According to Human Resources Department of University of Manitoba (2007) which specified that chefs needed to have the good knowledge of the principles of cooking, commercial quantity cooking and special functions.

As for the job level, the results showed that Thai kitchen staff must have the knowledge of ingredients about Thai food as well as must have practical ability in Thai food cooking in terms of good taste and hygienically standard. In fact, kitchen staff in job level were required to have little education or training since the

skills could be learned and put into practice on the job. Training generally started with basic sanitation and workplace safety and continued with instruction on food handling, preparation, and cooking procedures (U.S. Department of Labor, 2006).

In addition to the results above showed that English language and computer skills were less important in lower positions among those at both management and job levels.

However, few samples understudy had added certain skill characteristics that should also be considered in implementation of proposed model, such as the ability in solving problems encountered under pressure, the ability to deliver the training, and the ability in computer usage.

**Table 14** Personal characteristics of Thai kitchen staff at management and job levels  
( n = 20)

Levels	Personal characteristics	$\bar{X}$	SD
Management level	Must have good belief and pride in one's occupation	9.10	1.07
	Must have the ability to work with others as teamwork	8.70	0.98
	Must agree to accept advises and opinions from others	8.65	1.08
	Must be in good health	8.20	1.76
	Must be careful and interested in the job	8.05	1.46
	Must have a keen sense of taste and odor	8.00	1.02
	Must have good sense of cleanliness	7.80	1.39
	Must be alert and willing to work hard	7.50	1.43
	Must be honest and reliable	6.70	2.38
	Must be punctual	5.60	1.71
Job level	Must be in good health	8.85	1.75
	Must have good sense of cleanliness	8.75	0.91
	Must have the ability to work with others as teamwork	8.30	1.59
	Must have good belief and pride in one's occupation	7.85	1.66
	Must have a keen sense of taste and odor	7.80	1.70

**Table 14** ( continued )

Levels	Personal characteristics	(n=20)	
		$\bar{X}$	SD
Job level	Must be alert and willing to work hard	7.10	1.58
	Must agree to accept advises and opinions from others	6.55	1.84

$\bar{X}$  : 8.1-10.0 = most important, 6.1-8.0 = very important, 4.1-6.0 = important, 2.1-4.0 = less important and 0-2.0 = least important

In table 14, the findings showed that the essential personal characteristics of kitchen staff at management level were;

1) The most important personal characteristics i.e. they must have good belief and pride in one's occupation ( $\bar{X} = 9.10$ ,  $SD = 1.07$ ), the ability in working with others as teamwork ( $\bar{X} = 8.70$ ,  $SD = 0.98$ ), agree to accept advises and opinions from others ( $\bar{X} = 8.65$ ,  $SD = 1.08$ ), and be in good health ( $\bar{X} = 8.20$ ,  $SD = 1.76$ ) respectively.

2) The very important personal characteristics i.e. they must be careful and interested in the job ( $\bar{X} = 8.05$ ,  $SD = 1.46$ ), have a keen sense of taste and odor ( $\bar{X} = 8.00$ ,  $SD = 1.02$ ), have good sense of cleanliness ( $\bar{X} = 7.80$ ,  $SD = 1.39$ ), be alert and willing to work hard ( $\bar{X} = 7.50$ ,  $SD = 1.43$ ), and be honest and reliable ( $\bar{X} = 6.70$ ,  $SD = 2.38$ ) respectively.

3) The important personal characteristic i.e. must be punctual ( $\bar{X} = 5.60$ ,  $SD = 1.71$ ).

In addition, the findings showed that the personal characteristics of kitchen staff at job level were;

1) The most important personal characteristics i.e. they must be in good health ( $\bar{X} = 8.85$ ,  $SD = 1.75$ ), have good sense of cleanliness ( $\bar{X} = 8.75$ ,  $SD = 0.91$ ) and have the ability in working with others as teamwork ( $\bar{X} = 8.30$ ,  $SD = 1.59$ ).

2) The very important personal characteristics i.e. they must have a good belief and pride in one's occupation ( $\bar{X} = 7.85$ ,  $SD = 1.66$ ), have a keen sense of taste and odor ( $\bar{X} = 7.80$ ,  $SD = 1.70$ ), be alert and willing to work hard ( $\bar{X} = 7.10$ ,  $SD = 1.58$ ), and agree to accept advises and opinions from others ( $\bar{X} = 6.55$ ,  $SD = 1.84$ ) respectively.

3) The important personal characteristics i.e. they must be punctual ( $\bar{X} = 6.30$ ,  $SD = 2.25$ ), careful and interested in the job ( $\bar{X} = 5.95$ ,  $SD = 1.23$ ), and honest and reliable ( $\bar{X} = 5.90$ ,  $SD = 1.58$ ).

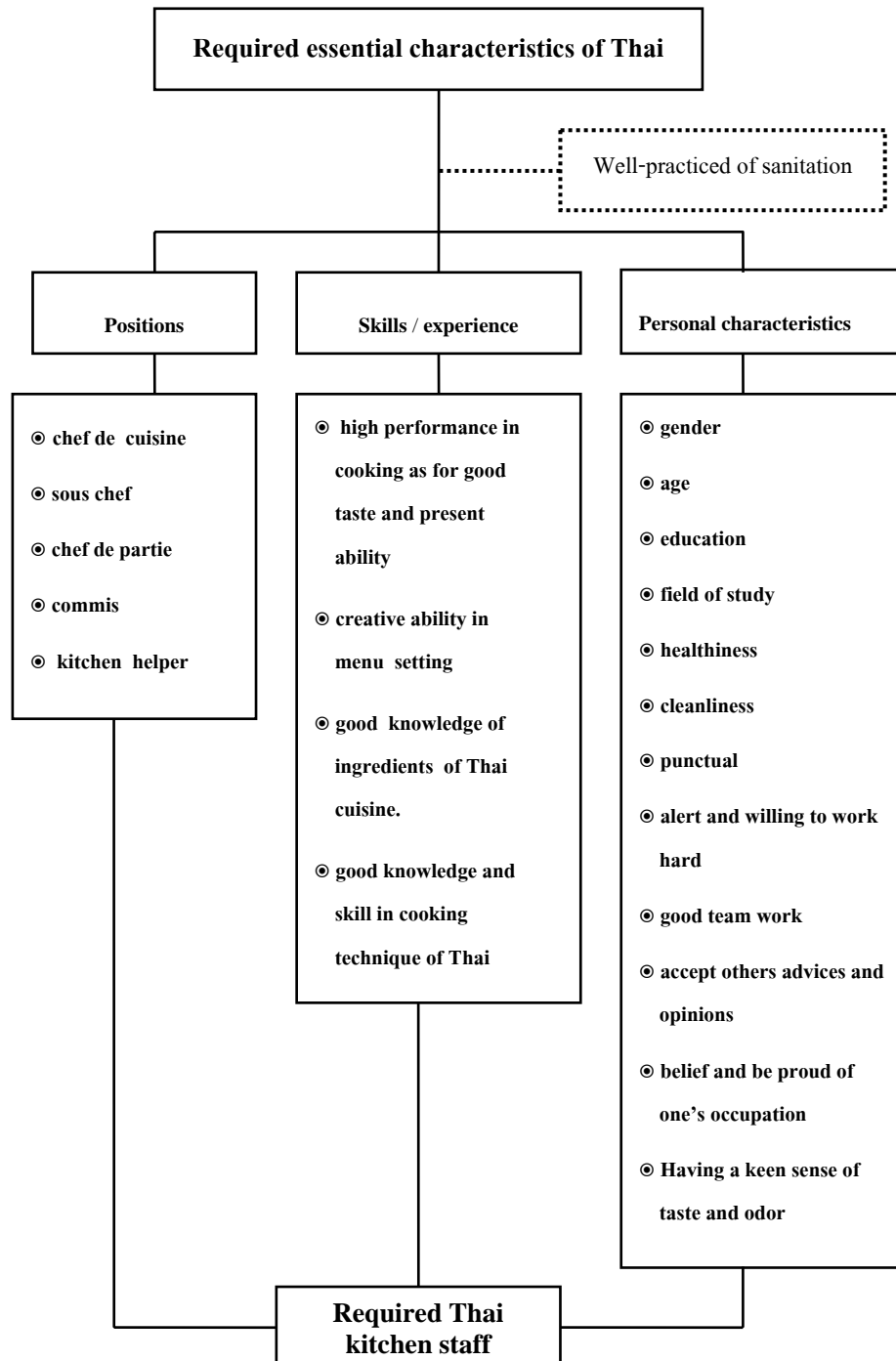
As for the most important personal characteristics, Thai kitchen staff at management level must have good belief and pride in their occupation, should have the ability in working with others as teamwork, accepted advises and opinions from others, and have a good health. Moreover, Haines (1974) and Dubrin (1992) stated that kitchen staff have related and cooperated not only with others in the kitchen but also in food service. According to Alberta Occupational Profiles (2007) specified personal characteristics needed among chefs were excellent communication skills, interpersonal skills and team-building skills, and, good health as well as stamina. In addition, the results of "Desired characteristics of cooks in Bangkok Hotels" by Siriravetkun (2001) showed that the most important of human relationship characteristics of kitchen staff in Bangkok hotels were that they must have faith and pride in their occupation as well as must be able to work well with others.

In aspect of job level, the results showed that the most important personal characteristics of Thai kitchen staff must have a very good health as well as good sense of cleanliness. Due to kitchen staff had to work while standing for long period of time, occasionally needed to lift heavy objects and sometimes in hot and

humid environments. Thus, the physical stamina and good health were required (U.S. department of Labor, 2006; Alberta Occupational Profiles, 2007). Which in turns also agreed with Alberta Occupational profiles (2007) that kitchen staff must have a high level of personal cleanliness. In foodservice industry, hygiene is extraordinary important because of poor sanitation is not only dangerous to customer but it is also bad for business. All foodservice workers must understand the importance of hygienic practices and the appalling dangers that attend their negligence. Poor food handling is often the cause of outbreaks of food poisoning (Fuller *et al.*, 1985).

Furthermore, the results also showed that kitchen staff at both management and job levels must have a keen sense of taste and odor. According to Alberta Occupational Profiles (2007) which specified that kitchen staff needed to have a keen sense of taste and odor plus excellent hand-eye co-ordination.

### Summation of essential characteristics of Thai kitchen staff



**Figure 5** Required essential characteristics of Thai kitchen staff

The required essential characteristics of Thai kitchen staff varied by position levels which were found to agree with the Western kitchen. In order to achieved the maximum production efficiency in the kitchen and good quality of food to satisfy the customers, the establishment should identify the types of personnel and skills as needed. As for required Thai kitchen staff, both skills/experience and personal characteristics should be viewed as crucial to successful staff development and the goal of the business. Morgan (1981) stated that as long as a foodservice establishment was operated sufficient number of staff and their skills were necessary to provide the offered service. In addition, Fuller *et al.*(1985) stated that the quality of the foodservice depended on the skills of the staff and the effort they put into the production. The skills were strictly required in Thai kitchen staff ie. high performance in cooking as for good taste and present ability, creative ability in menu setting, good knowledge of ingredients and skills in cooking technique of Thai cuisine. In aspect of personal characteristics, gender, age, education, field of study, healthiness, cleanliness, punctual, alert and willing to work hard, good team work, accept others advices and opinions and belief and proud of one's occupation were the criteria of the Thai kitchen staff, as shown in Figure 5.

In order to fulfill the customer satisfaction, all 3 essential characteristics : positions, skills and personal characteristics, of Thai kitchen staff should be altogether exercised under well-practiced of sanitation.

#### **Section 4** : Management and production systems of Thai kitchen

**Purchasing** : A committee of managing executives and executive chef decided on a purchasing method. Centralized purchasing system was very popular among chained hotels in Thailand. The requirements of each individual units including Thai kitchen were relayed to central office. The central office added up total requirements of all units and made purchase order. Moreover, fortnightly quotation method was used in selection of supplier. The main purpose of choosing that method was to obtain the best quality of merchandise, based on specifications

established for each hotel, at the lowest possible price or the best quality to fit the needs ( Negi,1999, 2002).

In selection of supplier for Thai kitchen, the results revealed that the various suppliers were asked to quote on particular quality, price, quantity, packaging and delivery charges, all were taken into consideration. All prices were noted on a master quotation sheet to be used in comparing on the other aspects, the lowest price quoted supplier got the orders. This purchasing method agreed with the competitive-bid method stated by Knight and Kotschevar (1989).

Normally, the hotels selected different merchandise from many suppliers, but Magris and McCreery (2001) stated that purchasing merchandise from more than two or more suppliers to get cheaper rates could be false economy because it could be increased the number of invoices to be handled and more financial tasks to be done. On the other hand Negi (2002) stated that it was preferable for reasons than price, to obtained quotations from two or more suppliers for each item, so that if occasion, one supplier could not deliver the requested merchandise there would be other one who could.

Purchasing was a function concerned with the search, selection, and purchasing of merchandise in accordance with the catering policy of the food and beverages establishment. The results showed that in large operation hotels, there was a full time purchasing agent / purchase manager / purchasing steward who was responsible for all purchased food and beverage and non – consumables. In small hotels, perishables (food items) such as meat, poultry, fish, fruits, vegetables etc. were purchased by the executive chef, while non-perishable items were purchased by assistant manager.

Purchasing of all kitchens in the hotels had set a standard purchase specification for proper and effective control in buying. It gave uniformity and consistency in purchasing and receiving. It also aid to maintain a desired food cost and create a standard product. Each specification had to determined by the purchase

officer, executive chef, food and beverage manager and food and beverage controller as per the catering policy, the menu requirements and its price range. In addition management established specifications based upon a thorough study of market, menu, portion sizes, selling price and yield test. The copies of specifications were distributed to purchasing agent, food and beverage manager, food and beverage controller, receiving clerk, chef, all senior catering staffs and were sent to all the approved suppliers.

In addition, the results revealed that sometimes the specification of some raw materials had to be changed as the change of the menu. According to Negi (1999), the specifications in each hotel had to re-evaluated by the management from time to time as new merchandise continually appeared on the market, new items in the menu were introduced, new styles of cutting meat were recommended and food packaging procedures were improved and revised.

From the survey, it has been found that some hotels had used both quotation method and the direct purchase method. In the direct purchase method, most buyers purchased from wholesale market. Direct purchase method guaranteed fresh goods at relatively low price, although it was time consuming and involved the additional cost of transportation.

Prior to sending the purchasing order to the central purchasing agent, each kitchen needed to a list of approved suppliers and market list to be approved by the kitchen chef after which it was sent to chef office. The market list was prepared manually or computerized. After the chef office had received the suppliers and market list, the executive chef would authorize and place the purchase order. Upon receiving the order, the purchase office contacted over telephone, fax, computer, with the approved suppliers.

The purchase order was the important document to be issued for all ordered items. Beside the items, it should include delivery time, terms of payments, the agreed price and other conditions/ institutions (Negi, 1999).

The purchase order was printed in six duplicate copies and each copy went to different destination as the following :-

- 1<sup>st</sup> copy ( white) to Supplier
- 2<sup>nd</sup> copy (Yellow) to Account department
- 3<sup>rd</sup> copy (pink) to Purchase agent/manager
- 4<sup>th</sup> copy (blue) to Chef office
- 5<sup>th</sup> copy (green) to Receiving department
- 6<sup>th</sup> copy (orange) to Food and beverage controller

The quantity of goods that were purchased daily were planned in advance according to estimated sales and the planned menu. The quantities of food needed for production was identified from the menu and standardized recipes. Moreover, the chef determined the necessity of purchasing perishable items after checking the quantity in stock, the order of food to prepare and the day's menu (Payne–Palacio *et al.*, 1994 ).

Nevertheless, the results showed that the cost of each food item that was purchased had to be analyzed. The cost analysis was done to ensure that goods purchase was satisfied with regards to the final quality and yield obtained. This was possible by calculating and analyzing cost of a portion based on storage loss, processing or preparation loss, cooking loss and serving loss (Negi, 1999 ).

As for the perishable goods purchasing in the hotels, the finding showed that daily purchasing was used. For example, orders for perishable goods of Thai kitchen were requested one day in advance and to be used day by day since the kitchen had limited space in addition to keeping up with the standard food quality. Negi (1999) stated that the higher the stock level could cause the danger of spoilage, stock loss, and complication in the stock-taking procedures.

Food purchasing for each kind of goods ( see also Figure 6)

- Meat, poultry, and their preserved products were purchased from producers that were certified or recommended on quality standard. There were two purchasing methods ie. buying directly from producers and quotation method from distributor or purveyor.

- Eggs were purchased by two methods ie. directly from good quality standard farms and through the distributors. Some hotels used duck eggs for Thai snack or dessert.

- Seafoods were purchased through distributor or purveyor from local market or wholesale market such as Mahachai market , Sapanpla market etc.

- Preserved foods : such as fermented Thai sausages, fish balls, meat balls etc. were purchased by quotation method from quality brands which were certified by Food and Drug Department, Ministry of Health.

- Vegetables and fruits were purchased directly from fresh markets and wholesale markets such as Klongtei market, Pakklong market , Simummeung market, and Thai market. Some hotels might use quotation method.

- Dry foods and seasonings were purchased by quotation method from importers or distributors.

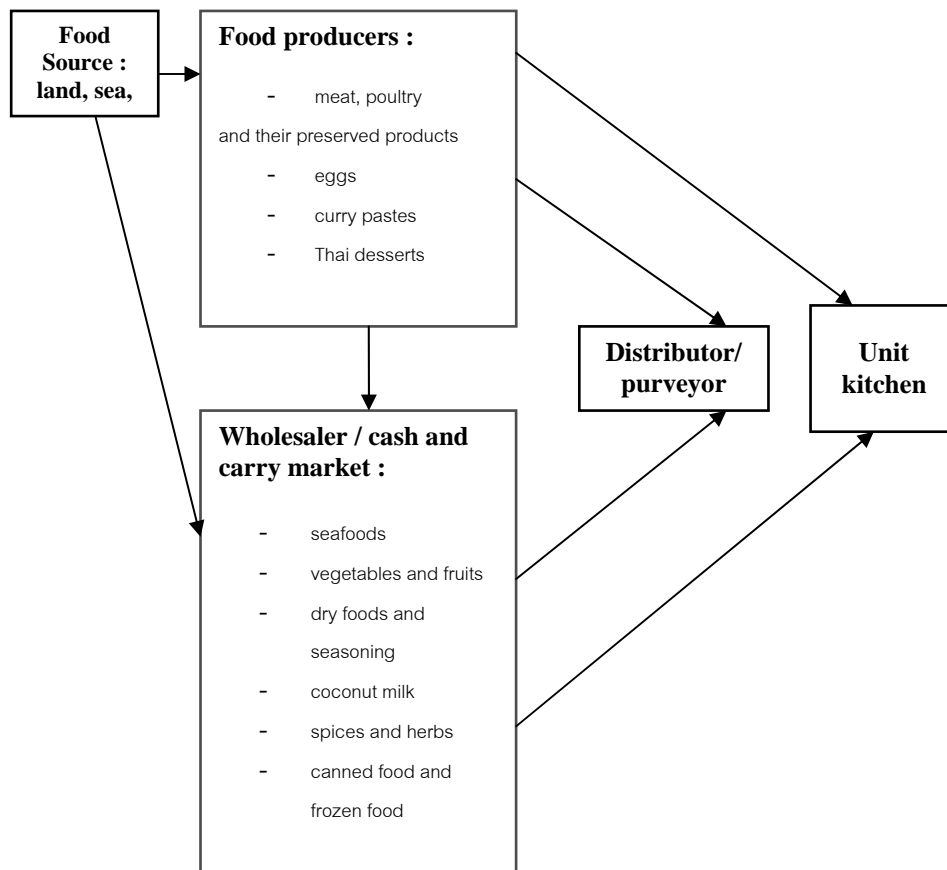
- Spices and herbs were purchased by either quotation method or directly from local markets.

- Curry pastes were normally purchased directly from producers who were listed as good and famous quality brand. Some hotels might purchase by quotation method.

- Coconut milk was purchased by bidding method from wholesale market or fresh market.

- Thai desserts were mostly purchased directly from certain producers.

- Canned foods and frozen foods were purchased by quotation method. But since cooking of Thai food prefers more fresh and raw goods and less of processed foods, and, also the availability of the fresh items in the market as well as cheaper price.



**Figure 6** Raw material supply channels

**Receiving** : The food commodities receiving procedure in Thai kitchen was done by centralized receiving department. Deliveries were accompanied by the covering invoice. Invoice, a document containing detailed information about the food deliveries, was presented to the receiving clerk in duplicate by the person

making the delivery (Negi, 1999). The receiving clerk would sign and return second copy in acknowledging to the purveyor that the hotel had received the commodities listed. The original invoice then en routed to the account department for paying the bills. However, Negi (2002) stated that no invoices or delivery slips were kept at the receiving department if the deliveries were incomplete. Afterwards when received then they had been completed the receiving clerk would attach the purchase order to the receiving sheet and forward all documents to the food and beverage controller. They were then kept in a pending file until the proper invoice was received.

The results showed that in some cases goods were rejected because they did not meet the set quality standard purchase specification and damaged due to packaging and transportation. According to Negi (2002), when accepting goods in packages or in containers the receiver had to checked for damage and all uncovered or open perishable food except fruits and vegetables had to be rejected.

In most hotels goods were received in the morning time. However, according to Negi (1999), the usual practice in many hotels was to take deliveries of perishable items early in the morning and groceries items in the afternoon for purpose of convenience and saving of time.

In order to check deliveries thoroughly and efficiently, certain supplies and equipments should be available at the receiving area namely,

- copies of all standard purchase specifications
- equipments such as platform scale, digital scale, and thermometer
- stationery items such as forms, tags and rubber stamps

For quantity inspection of food items in Thai kitchen, the receiving clerk would count and check the weight of received goods and tally according to the delivery notes and purchase order. According to Negi (1999), goods were checked with invoice and clearly examined as to price (quotations sheet), quality and quantity

or weight. For quality inspection of goods items, experienced receivers were required to inspect all types of food items. A copy of the purchase specification manual was normally at hand for this purpose. Some hotels, the receiving department displayed photographs for quick and easy reference for quality inspection purpose. In case of doubt on the quality of food, the executive chef must be consulted. Moreover, any discrepancy must be adjusted through issuance of credit note.

The receiving method for quality of raw materials for Thai kitchen :-

- Meat, poultry, seafood and their preserved products were checked on general appearance, smell and touch. Some hotels used thermometer to check the temperature at the center of the meat or container.

- Preserved foods: the general appearance was checked as well as smelling, touching, and, checking for the expired date.

- Vegetables were examined on the general appearance and freshness.

- Fruits were examined on the general appearance, freshness and firmness, and for some cases such as water melon it needed to check the inside.

- Eggs were checked on appearance and freshness.

- Coconut milk: pasteurized coconut milk was examined on container and expired date. For fresh coconut milk, the checking was on fresh smell, color and cleanliness.

- Dry foods and seasonings were checked on cleanliness, containers and expired date.

- Dry spices and herbs were checked the appearance, cleanliness,

odor and package.

- Canned foods were checked on the container and expired date.

- Desserts were checked on the typical appearance, smell, containers and the production date.

**Storage** : There are three types of storage areas i) the dry store room, ii) the freezer and iii) the refrigerator. Proper storage of food immediately after it has been received and checked is important factor in prevention and control of loss or waste.

In addition, all goods should be properly wrapped or packed in containers with lids prior to storage to prevent the moisture loss and to avoid the odor and microbes contamination among themselves (Magris and McCreery, 2001). The result showed that the process of storage in all hotels was similar. The storage space differed depending on the size of hotel. Normally, larger hotels would arranged separate room for different goods such as meat room, seafood room, vegetable and fruits room, prepared food room and finished food room. Smaller hotels on the other hand, had to used the same room to store all goods but would arrange them in different areas and kept at the same temperature regardless of different kinds of goods.

Walk-in refrigerators were used for general and long-term storage and reach-in units located near work station for storage of daily perishable foods for preparation and temporarily storage. In Thai kitchen normally, individual refrigerator units were grouped together for convenience in receiving, preparation and serving.

Goods were categorized as perishable items such as meat, fish, dairy product, fruits and vegetables and non-perishable items such as rice, flour, sugar, seasonings, etc. Upon receiving, all perishable items were usually transferred directly to the kitchens. The utilization of those items were under the direct supervision of the

executive chef. The non-perishable items were taken to storeroom. All containers were opened, each item was checked, and placed on racks or shelves.

Each kitchen in the hotel made par stock which was a number of units related to usage and time needed to get delivery (Negi, 1999). By this method, Thai kitchen would have reservation of goods for using within the kitchen and in appropriate quantity. The dry food storage in Thai kitchen such as spices, sugar, salt, seasonings, etc. were stored in plastic container with lids and well labeled. Rice was stored in large container with close-fitting lid. The dry storeroom should be fairly cool between 10°C and 20°C and well ventilated (Magris and McCreery, 2001).

For meats, poultry, and seafoods, after receiving process they were sent to butcher department to be stored in either freezer or chiller. The frozen meat were kept in deep freezer room at -18°C. While fresh meat was cleaned and trimmed by standard specification of each kitchen, then packed and sent to the chiller at 5°C. Seafoods were cleaned, trimmed and put in container with ice and stored in the chiller. Ice was the best preservative for keeping fresh fish, since it not only kept the cold temperature but also kept the surface of the fish moist. Finely crushed ice was preferable to large pieces as it did not bruise the fish (Negi, 1999).

For vegetables and fruits, after cleaning, peeling, trimming and packing, they were stored in vegetable and fruit room at 12°C.

The other foods such as eggs, coconut milk, curry paste, prepared foods, stocks and soups for curry, etc. were stored in the chiller at 5 °C.

**Issuing :** In taking the goods from storeroom, a requisition form had to be filled out and signed by a chef. Negi (2002) stated that no food or other supplies were removed from the storeroom without authorization. Usually form of a written requisition should be sent to chef office in order that the executive chef would consider on food cost control, the amount of goods to be issued, and the amount of par stock in each kitchen. If all were correct, then he countersigned the form. According

to Negi, (1999); Magris and McCreery (2001) supplies were an important factor in controlling costs and preventing loss from pilferage. And stock control was essential in all catering establishments because it ensured adequate stocks, prevented wastage (under regular checking) and enabled the chef to check profits.

When requisition had been approved by executive chef, the list of needed supplies were submitted to the store keeper who completed the requisition. The order was filled and delivered to the appropriate department or section.

In addition, a requisition for goods in the kitchen were issued one day in advance so that stocks could be checked and orders made for delivery on the day required. All requisitions were submitted to the storeroom in duplicate. The copy was sent to the food and beverage controller for comparison with the original which was received from the store room after it had been priced. The original was retained in the food and beverage controllers office for costing purpose.

And as for the rotation of stock, the system of “ first in first out” should be practiced so that existing or old stock was used first ( Negi,1999; Magris and McCreery, 2001).

Thai kitchen in hotels sometimes used internal transfers to borrow goods from other kitchens in case of running a little short of needed items , all immediate needs, and raw material which was not normally use in Thai kitchen. Internal issuing requisition was the same as other issuing method. According to Negi (2002 ), when food items were transferred from one kitchen to another, records had to be maintained as regards to items and amount that were transferred. In order to determined accurate food cost, it was necessary to maintain records of the food transferred.

At the end of the day all memos were sent to the controller office, where they were entered in the daily issue sheet to adjust the cost figures to achieve

greater accuracy. Then the controller office sent all memos to accounts office where entries were made in the financial records.

**Production** : the results showed that a production schedule was planned a week in advance by production unit, in order that the steps could be completed without affecting the quality of food and evenly distribution of workload.

Most kitchens used the standardized recipe as an important tool in control production. Therefore, the chef could predict quality, quantity and the portion cost of finished product, and it simplified purchasing (Payne–Palacio *et al.*, 1994). Use of standardized recipes was helpful when training new or substitute production employees and made management less dependent on the whims of changes in personnel (Knight and Kotschevar, 1989; Payne–Palacio *et al.*, 1994).

Thai kitchen also used standardized recipe to control the production, the portion to produce, the appearance of food and quantity to be served. And standardized portion was important not only in the control of costs, but also in creating and maintaining consumer satisfaction. No one likes to receive a smaller serving than other customers for the same price (Payne–Palacio *et al.*, 1994).

In production planning of Thai kitchen, Thai chef would consider the availability and skill of staffs which were the factors determining the variety and complexity of a menu and when it needed to change the food items on the menu.

The results revealed that hotels with separate Thai kitchen served Thai foods in its dining room only. And menu mainly offered as a la carte type which food items in a meal was consecutively served same as European menu ie. appetizer, soup, salad and main dish. Furthermore, the set menu type was also offered as an alternative according to the customer's need so called full course type and it was cheaper than a la carte. Such set menu normally offered two choices, for example, meat or seafoods, beef or pork.

The cycle menu was also used in Thai kitchen, each hotel set the length of cycle differently depending upon its management policy. It was found that most hotels changed menu in every 4 or 6 weeks, but some hotels extended up to 8 months. Many hotels set a strategy to achieve customer's satisfaction by offering special food items for each week in addition the menu, or occasionally offered certain promotions. And after the initial planning had been completed, the planner could review and revise the menus to meet changing needs such as holidays, vacations, changes in personnel or availability of a food items. Payne-Palacio *et al.* (1994) stated that cycle menus had several advantages. Repetition of the menu aided in standardizing preparation procedures and in efficient used of equipment, forecasting and purchasing were simplified, and, employee workloads could be balanced and fairly distributed.

Thai kitchen which was not separated for other kitchens but actually arranged into sections, normally produced foods for buffet and cocktail services. The production batch, the exact number of customers and the required time were informed in advance. So chef could make a production plan in terms of the amount of food and work schedule accordingly. In the contrary, for a la carte menu, chef would not know the number of customers. Thus, the hotel kitchen system had to set production forecast based on the past data, so that it would not cause overproduction or underproduction. In the case of overproduction, high cost and food leftover would be the consequence. On the other hand, underproduction affected on customers satisfaction and foodservice employees frustration if food shortage occurred too frequently and resulting in rushed, last-minute food preparation and delayed service. Payne-Palacio *et al.* (1994) stated that a good forecasting systems was based on sound historical data that reflected the pattern of actual menu item demand in foodservice operation.

The results showed that types and sizes of utensils and equipments for available separated Thai kitchen were almost similar to any domestic kitchen since each dish was prepared only by a portion for each order. On the other hand, sectioned Thai kitchen which produced foods for buffet and cocktail services, amount of food

items was prepared in large quantity. Therefore, the preparation and cooking needed large equipments with time and labor saving. Payne–Palacio *et al.*(1994) stated that number and capacity of equipment were based on the number served at the interval of greatest demand in relation to cooking time required for specific items. The equipments required for the preparation and serving of buffet to a lot of clients were quite different from the equipments for a la carte.

However, whether it was a la carte, set menu, buffet or cocktail, one had to prepared goods in advance, in order to enabled employee workloads to be spreaded evenly throughout the day and would not result in too much last–minute preparation. According to Magris and McCreery (2001), kitchens which were well organized began with the preparation of basic ingredients, and, all advanced preparation was done before cooking started and food was served.

Moreover, the steps and methods of raw materials preparation in the production unit of Thai kitchens in hotels were similar. As Payne–Palacio *et al.* (1994) stated that most menu items had to go through part or all of the following steps:- 1) storage, 2) thaw time, 3) assembly i.e. weighing or measuring, 4) pre–preparation i.e. vegetable cleaning, peeling, cutting, chopping, preparing pans, 5) preparation i.e. mixing, combining ingredients, 6) cooking i.e. boiling, stir–fried, steaming and boiling, 7) finishing i.e. packaging food for freezing, and 8) storage prior to serving i.e. heated, refrigerated, frozen.

Nevertheless, in the preparation of buffet food , the quantity of unfinished and finished food which had been prepared in advance were in large amount when compared to those of a la carte type which the amount of foods were prepared in smaller quantity in advance. Therefore, the buffet preparation in advance was more important, so the chef had to set the production planning including the needs of equipments and labor saving devices, appropriate storage containers, adequate storage and refrigeration. Furthermore, proper cooling, packaging and freezing were strictly important to the quality and safety of the finished products.

The results showed that the principles of Thai food preparation and cooking in large quantity were similar to small quantity except for certain procedures which the volume involved. In addition, mechanized equipment was essential for bulky processes and time saving procedures, especially in buffet operation.

For preparation of coconut milk curry, pasteurized form was used in most of Thai kitchens because of its keeping quality and convenience compared to fresh coconut milk. For non-coconut milk curry, chicken stock was normally used. For stir-fried food, vegetables and meats were prepared in advance, especially meats were marinated with salt and pepper. And for spicy salad, spicy salad dressing, meats and vegetables were also prepared in advance.

The following examples of pre-preparation of raw materials in Thai kitchen in hotels had been observed:

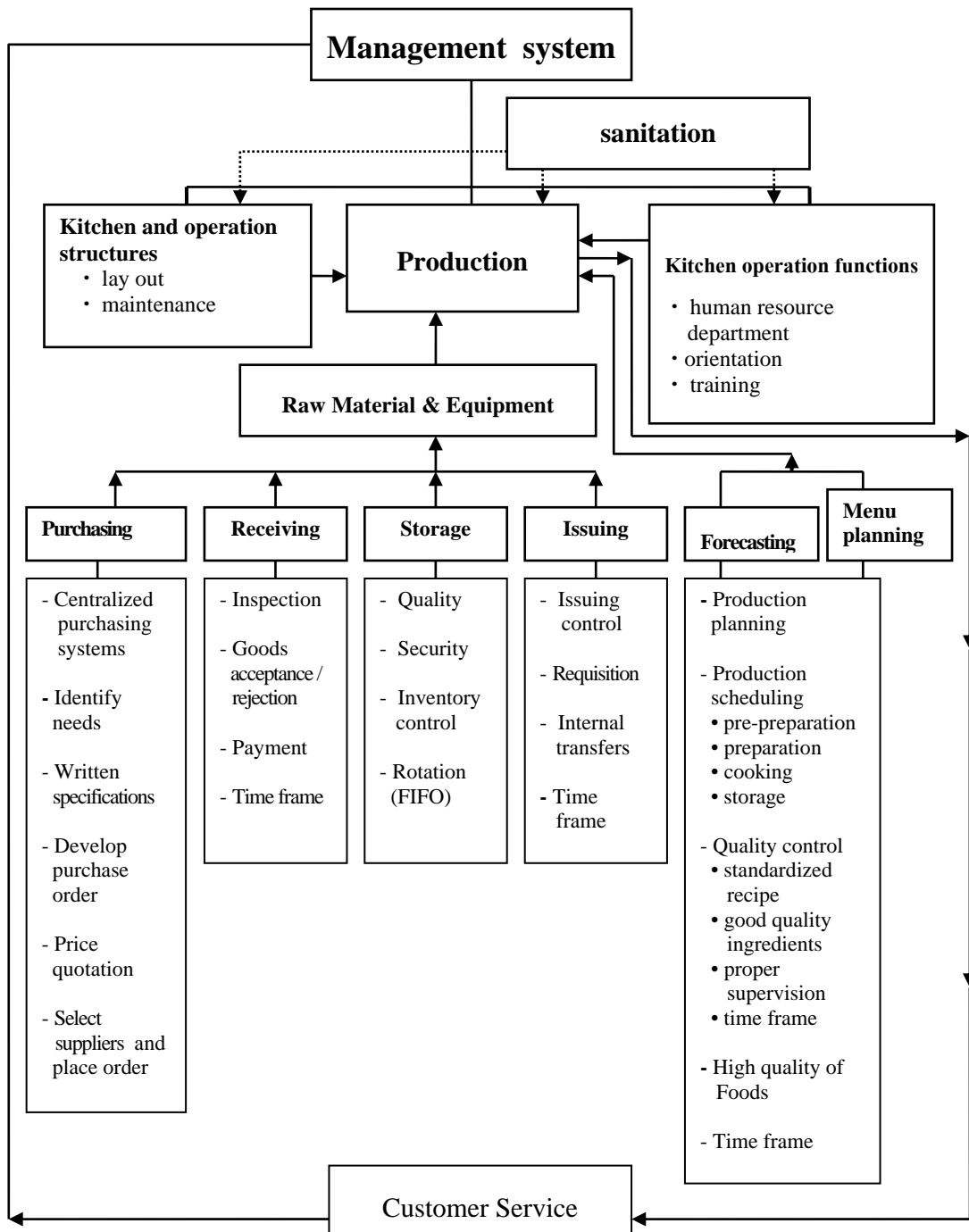
Stocks : Thai cooking used stock as the basis of flavor in many dishes such as vegetables soups and stir- fired dish. The main stocks often found in Thai kitchen were :-

- 1) Chicken stock which was made by slow boiling of whole chicken or bones with pepper and salt to a clear and light flavor stock.
- 2) Fish and seafood stock which was made by slow boiling of bones of fish or heads and shells of prawn with lemon grass and kaffir lime leaves to eliminate the fishy odor, for a shorter time than chicken stock. It was used in fish and seafood dishes such as spicy soup with prawn.

Garnish items : for preparation of carving vegetables for garnishing, most Thai kitchen in the hotels did not emphasize on finely carving procedure due to time consuming and food safety. For most dishes, lettuce, green onion, and fresh red chili were normally used. The popular vegetables that were used for carving were the hard texture varieties such as carrot, pumpkin and cucumber. The carving was done in

advance and the carved items were kept in a container with lid and stored in the chiller. They were supposed to be used as garnish within 1-2 days.

**Summation of Thai kitchen operation**



**Figure 7** Management and production of Thai kitchen

In view of Thai kitchen, management system consisted of kitchen and operation structures, production and kitchen operation functions. All of which involved sanitation in all aspects of operation (see also Figure 7).

As for kitchen and operation structures, there were two factors which should be considered ie. layout and maintenance.

Layout was the process of arrangement of the physical facilities, including equipments, such that operational efficiency was achieved. Kitchen design should also consider other essential factors namely, ease of maintenance, good sanitation, good working, safety, adequate type and amount of lighting and ambient control for productivity efficiency and noise reduction.

Kitchen maintenance was important factor affecting cost in long run. Fuller and Kirk (1991) stated that appliances and establishment not well-maintained became inefficient, increasing energy costs and decreasing employee productivity. In addition, cleaning which was mandated by health regulations, was a part of maintenance. Therefore, maintenance and cleaning were factors that establishment should considered prior to making a purchase decision on a new piece of equipment.

Preparing for production involved several processes ie. purchasing, receiving, storage and issuing. As for Thai kitchen in hotels, food and supplies were purchased under the centralized purchasing system. Payne-Palacio *et al.* (1994) stated that centralized purchasing system, was the system in which a purchasing department was responsible for obtaining needed supplies and equipments for all unit in the establishment, using certain purchasing method. The methods of purchasing that were selected depend on the policies and size of the establishment, the amount of money available, location of supplier and frequency of deliveries. A quotation method was normally used in Thai kitchen. In addition, the amount and quality of food required for foodservice within the limitations imposed by the budget, financial policies of the establishment and required knowledge of internal and external factors. Internal factors included customers, menu, recipes, labor availability, skills of staff,

equipments, storage facilities and quantity of food needed. While external factors included marketing system, food standards and quality, food available on the market and purchasing method. The purchasing procedures in Thai kitchen included several steps ie. identify needs, written specifications, develop purchase order, informal method, price quotation and select suppliers and place order.

Receiving was operated under the time frame ie. after, supplier delivered the ordered goods to the receiving area. Receiving personnel would inspect goods according to purchase order, purchase specification and delivery invoice to confirm that quantity and quality of goods had met the requirements of operation as ordered. In certain cases, goods were rejected because they were not ordered, not delivered on time, inadequate quality, incorrect quantity/ weight and incorrect price. After delivered goods had been checked and accepted, they were transferred to the proper storage and delivery invoice was sent to the accounting department. The accounting staff processed the necessary documents and pay the suppliers.

Storage concerned in particular the quality and security of food. After goods had been received and checked, they had to stored immediately in the proper storage. This practice should minimize quality deterioration and opportunity for theft. Inventory control was also an important procedure in storage process. Goods which were stored in orderly and systematic arrangement follow logical method of use, such as “FIRST IN FIRST OUT” (FIFO), as well as record on the inventory sheet (Chakkapak, 1996). In addition, accurate records were essential to inventory control and also provided a basis of purchasing and cost analysis (Payne-Palacio *et al.*, 1994).

Issuing was the controlling process of transferring foods from storage to place where they were processed (Kinght and Kotschevar, 2000). For proper issuing control, no food or other supplies should be issued from storeroom without proper requisition. In some cases, when Thai kitchen required the use of certain goods which were not purchased specifically for Thai kitchen or lack of urgent-needed items, the internal transfer system was used to issue such goods from

other kitchens. Using the transfer form which was similar in content to the requisition form.

Production process began with forecasting and menu planning. forecasting was the basis for determining quantities of menu items to be prepared and foods to be purchased or requisitioned from the storeroom. And it was also vital to financial management which in turn facilitated efficient scheduling of labor, use of equipment and space. In addition, accurate forecasting should minimize the chance of overproduction or underproduction, both of which had to be seriously considered because they could be costly. Leftover and low quality of food might occur in overproduction. On the other hand, underproduction might result in customer dissatisfaction, hence, substitution with expensive items should be offered to customer to compensate for shortage item (Payne-Palacio *et al.*, 1994).

Menu was the focal point from which many functions and activities in foodservice establishment began. It determined food to be purchased. And it was also the basis for production planning which in turn determined production scheduling and cost control.

In menu planning, many factors had to taken into account namely the nutritional requirement, food habits, goal of establishment, amount of money available, limitation on equipment, physical facilities, number and skills of staff and type of service( Payne-Palacio *et al.* 1994). And according to summary of documentary survey, the goal of foodservice operation was to served food that was high quality in aspects of cleanliness, acceptable and right quantity to customers. Therefore, menu planning was important process that had to do prior to production planning.

Production planning and scheduling steps required knowledge of food production steps in terms of pre-preparation, preparation, cooking, storage prior to serving and time required in production. Each recipe should be broken down into production steps to determine the steps that could be done in advance.

Use of standard recipe, good ingredients and proper supervision of food production were vital to quality control. Standardized recipe was a recipe which was set up formally by the establishment in terms of yield (portion), quality (taste) and production time for use in operation. In addition, standardized portion was also designated in order to not only for control of costs but also to create and maintain customer satisfaction (Payne-Palacio *et al.*, 1994).

Ultimately, all processes of food production must be completed within the time frame, so that high quality of foods were served to customer with maximum satisfaction.

Kitchen operation functions were responsible by human resource department. Staffing and managing human resource involved all the methods of matching tasks to be performed with staff available to do the work. However, the chef was the person who decided on manpower needs in terms of number and skill of staff at kitchen level (John *et al.*, 1990). In order to identify, simplify and reduce the unnecessary components, each task in the kitchen could be allocated among the kitchen staff as per their proficiency. There were two important processes that should be considered in kitchen operation function.

Orientation provided newly staff with a solid understanding of job to be done. If orientation clearly set out the requirements and responsibilities of the job, staff would recognize the expectation of establishment. In addition, good orientation should include a complete tour of the facility, introduction to all personnel with whom the new staff will be working with, and description of all establishment policies and procedures that were pertinent to the job.

Training was the most effective method of eliciting good performance on the job. Training should be thought of as an educational process whose specific goal was to teach job competent (Knight and Kotschevar, 1989). Moreover, advantages of a good training program included reduction in labor turnover, absenteeism, accidents, production costs, increase in the maintenance of

morale, job satisfaction and efficient production at high level (Payne-Palacio *et al.*, 1994).

In conclusion of the whole picture, the achievement of management system under well-planned kitchen and operation structure, well-organized production and well-performed kitchen operation functions would result in high quality and right quantity of food to the customer satisfaction. And all factors were compatibles operated with good sanitation under the time frame.

**Section 5** : The results on problems, limitations and solutions in management and production system of Thai kitchen.

**Table 15** Problems and solutions in management and production of Thai kitchen in context of hotel business.

Problems	Solutions
Raw material and Equipment;	
Purchasing :-	
1. Under specified quality and/or quantity of merchandises	1. Reviewing of supplier selection and competitive purchasing policy
2. Delayed delivery time	2. Determining and establishing supplier qualifications such as contract, responsibility and service
Receiving :-	
1. Improper quality and/or quantity merchandise	1. Selection of supplier
2. Mislabeled merchandise	2. Providing knowledge to receiving personnel
3. Inappropriate substitution	3. Providing proper receiving equipments for efficient quality check
4. Lack of receiving equipments	

**Table 15** (continued)

Problems	Solutions
<b>Storage :-</b>	
1. Limited and/or unsuitable arrangement of storage space	1. Rearrange the storage space for proper convenience and safety
2. Limited and incorrect preparation prior to storage	2. Training for kitchen staff on storage and issuing procedures
3. Limited and/or improper equipments	3. Regularly checking of storage equipments
<b>Production :-</b>	
1. Over load and complicated production schedules ( the numbers of orders in menu items in accordance with equipments and staff )	1. The chef should consider the restriction on capacity of equipments and staff prior to setting the menu items.
2. Lack of cooking equipments for better yield and time saving.	2. Well-planned work schedule should be done in advance.
3. Limited space and equipments for ready-to-cook ingredients and finished products	3. Providing sufficient and appropriate equipments
4. Inappropriate equipments for preparation and cooking	4. Providing proper equipments
5. Limited equipments for dish warming	5. Providing proper basic English in cooking for kitchen staff
6. Lack of ability to transfer heavy load among female staff	
7. Some Thai chefs could not establish the standard recipes in English	

**Table 15** (continued)

Problems	Solutions
Hygiene:-	
Poor sanitation* ( building, furniture and equipments )	- Providing basic and advance sanitation training for kitchen staff. - construct sanitation check-list and put into practice.
Training:-	
Insufficient training.	- Providing operation training for staff at least twice a year, particularly the problematic aspects.

\* from observation

Table 15 revealed the problems and limitations as stated by the hotel chefs, and the solutions as proposed by the researcher with regards to theoretical facts.

#### **Purchasing problems and solutions :**

1) The quality and/or quantity of goods did not meet specification such as low weight, damaged package, improper temperature, and wrong producer/ manufacturer.

2) The product was not received at the specified time and date.

If one or more of these problems occurred in production system over workload, fatigue and frustration among kitchen staff and improper food quality would be the consequence.

As for the solution to such problems, the selection of suppliers in terms of policy, responsibility and service was essential. Moreover, management personal (chef) and the purveyor had to worked closely together to establish a proper purchasing procedures.

### **Receiving problems and solutions :**

The results showed that the problems which occurred in receiving of Thai kitchen in the hotel were weight shortage, substandard quality, mislabeled merchandise, spoiled or damaged merchandise and inappropriate substitutions. The cause of this problems was that all or most merchandise would arrive at the same time. So the receiving staff were unable to cope with proper receiving procedures that they had to used random method which might result in certain mistakes. Solutions that might, to some extent, lessen such problems were providing in-service training to receiving personnel and proper receiving equipment. Payne–Palacio *et al.* (1994) stated that qualifications of the receiving personnel had to include knowledge of good quality standards and awareness of written specifications, the ability to evaluate product quality and recognize unacceptable product, and understanding of the proper documentation procedures.

### **Storage problems and solutions :**

From this study, the resulted showed that storage problems in most Thai kitchen in hotels were space limited, unsuitable arrangement and limited and/or improper equipment. To avoid overstocking, a low inventory helped in elimination of waste, setting mere space and better rotation of stock. Moreover, staff should be trained on storage procedures, and issuing process and keeping the storeroom clean without contamination.

### **Issuing problems and solutions :**

Issuing problems of Thai kitchen in hotels were lack of stock, or inadequate goods in the storeroom, delayed requisition of the needed issues, all of which affected the production schedule. These were specially occurred during long holidays when the suppliers were on recess. In such a case, the kitchen had to order goods in large amounts which in turn resulted in over inventory stock and risk of spoilage and stock loss (Payne–Palacio *et al.*, 1994).

### **Production problems and solutions :**

Several problems in production were:

- Some kitchens put too many food items in their menu while the provision of equipment were insufficient. Thus, chef had to be careful about overload and complicated production schedules since the use of same equipments for cooking of various items would take longer time. Moreover, the taste of food items might be irregular and affected customers satisfaction.

- Limited space and equipments for ready to cook ingredients and finished products was also the problem. Most Thai kitchen in the hotels that offered buffet service had problem in limited storage area and refrigeration. Separated Thai kitchens which offered a la carte menu also had the same problem in insufficient refrigerators to store ready-to-cook ingredients.

- There was limitation of equipment such as infrared lamps that were used for warming dish prior to serving.

- Some equipments were not appropriate for Thai food cooking such as grilled prawn had to be done on salamander or use of Western stove for stir-fried food.

- Most Thai kitchens were lacked of typical equipment for better yield and time saving, for example, spicy fish ball mixer.
- Most Thai kitchen staff in the hotels were female who were lack of ability to transfer heavy load, especially when the Thai kitchen catered a bulky buffet foods.
- Some of Thai chefs could not established the standard recipe in English.

The solutions to solve these problems in production were the chef needed to have the knowledge in aspects of the menu planning, production planning, and understanding well enough to determine the extent and complexity of the required food preparation to be served. Therefore, an appropriate work planned should be scheduled to ensure a continuous flow of goods according to the production system without any obstruction.

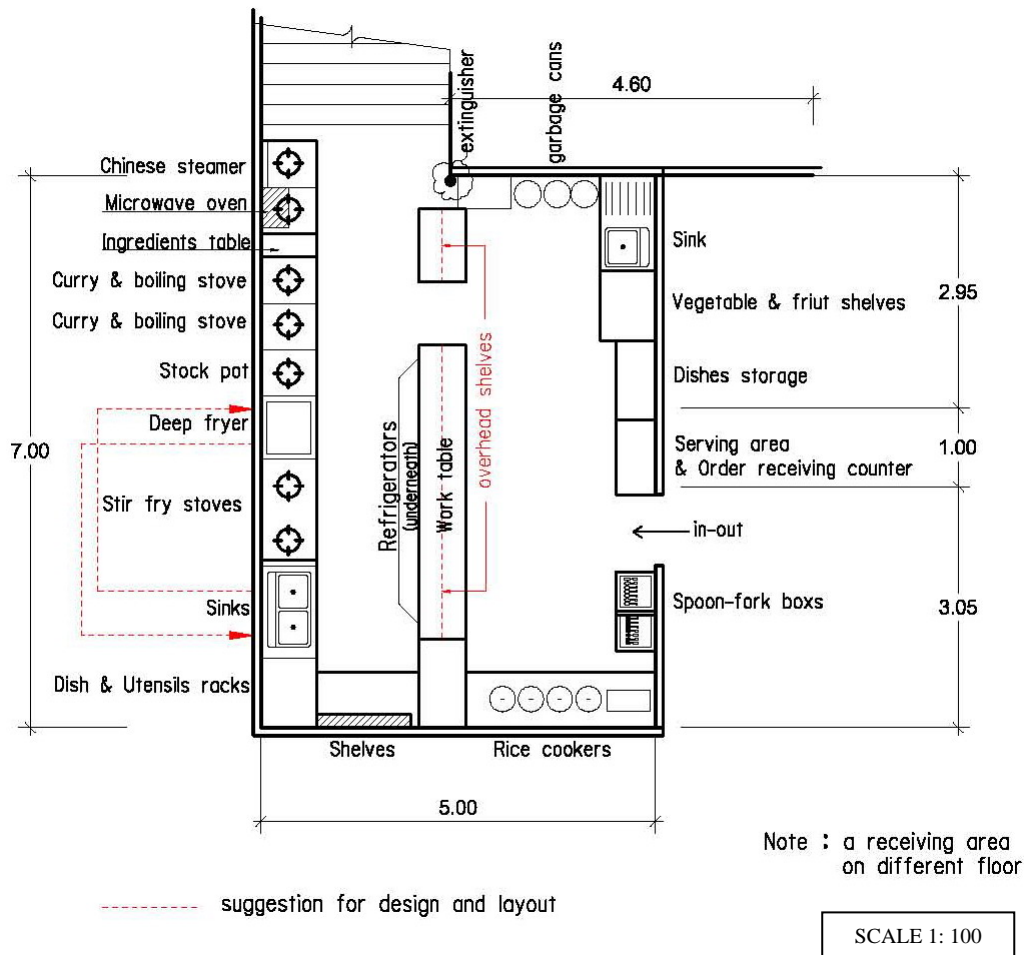
Furthermore, the chef had to considered the restrictions on number of equipment and staff and be familiar with the methods and steps of preparation along with equipment capacity and other utensils prior to setting menu items. Space in refrigerators and freezer also had to considered (Payne–Palacio *et al.*, 1994; Negi, 1999; Knight and Kotschevar, 2000).

### **Section 6 : Hotel kitchen design and layout**

Commonly, hotels in Thailand established two kitchens ie. international or Western kitchen and Thai kitchen in order to respond to the customer needs. However, in number of hotels, Thai kitchen was not included in original design. Instead, it was adapted from either Chinese or Indian kitchen when the popularity of the latter decreased while Thai foods achieved greater preference by the tourists due to promotion in tourism lately. Nevertheless, in general, an area was provided to set up a kitchen, then one would try to fit the equipments into the space

available instead of making the space of work to fit the specific needs of the operation, flow of work in particular, as suggested by Katsigris and Thomas (1999). It was also observed that, majority of Thai kitchens in hotels were comparatively similar designed in aspects of space allocation and functional areas according to the basic of Thai cooking pattern. Thai kitchen design varied according to size and shape of kitchen. And most kitchens was not so planned to serve when the number of customers increased abruptly due to insufficient and, to certain extent, inappropriate equipments. Since Thai food cooking produces lots of moist smoke and acrid smell, all of dry and moist heat cooking equipments in most hotels were located under ventilating hoods to remove heat and fumes. As Katsigris and Thomas (1999) stated that in most communities, as a law enforcement, all heat-and/or moisture-producing equipments must be located under ventilating hoods.

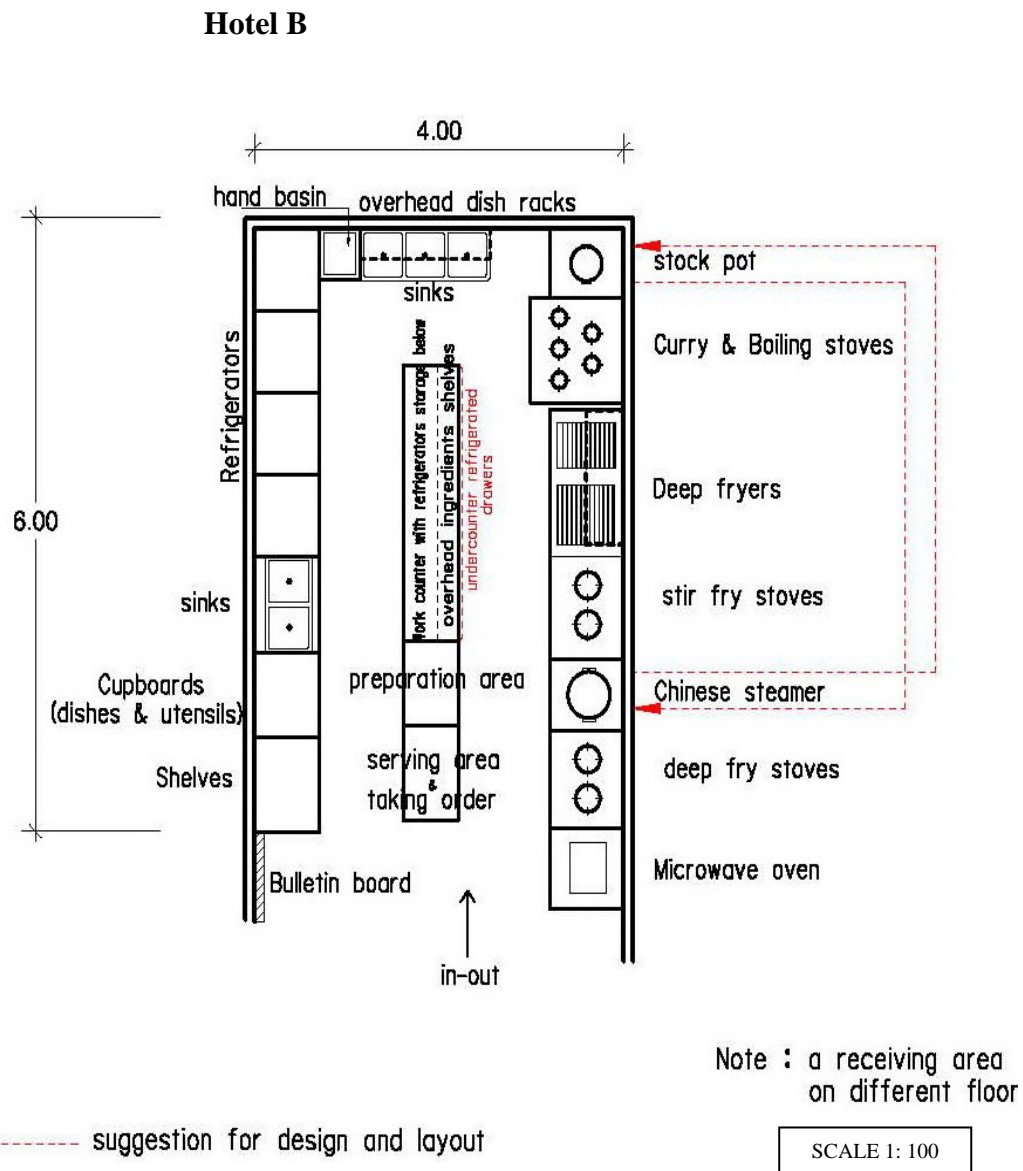
### Hotel A



**Figure 8** Kitchen layout of hotel A, 100 servings

The kitchen of Hotel A was designed as a combination shape. Work table was in the center so work could be done from both sides. However, there should be the walk through at both ends of work table for better traffic flow. There were numbers of refrigerated drawers below the work table to chill all of ready-to-cook-ingredients for every cooking station. This was a good design since refrigerators would not block the aisle so that work flow in the kitchen was not interfered (Baraban and Durocher, 2001). Cooking areas was appropriate for example, dry-heat cooking area (stir fry stoves and deep-fryers) were grouped together and likewise, moist-heat cooking areas were positioned together.

However, sinks were misplaced because they should be placed in between dry and moist cooking areas that staff could be easily accessed from both sides.



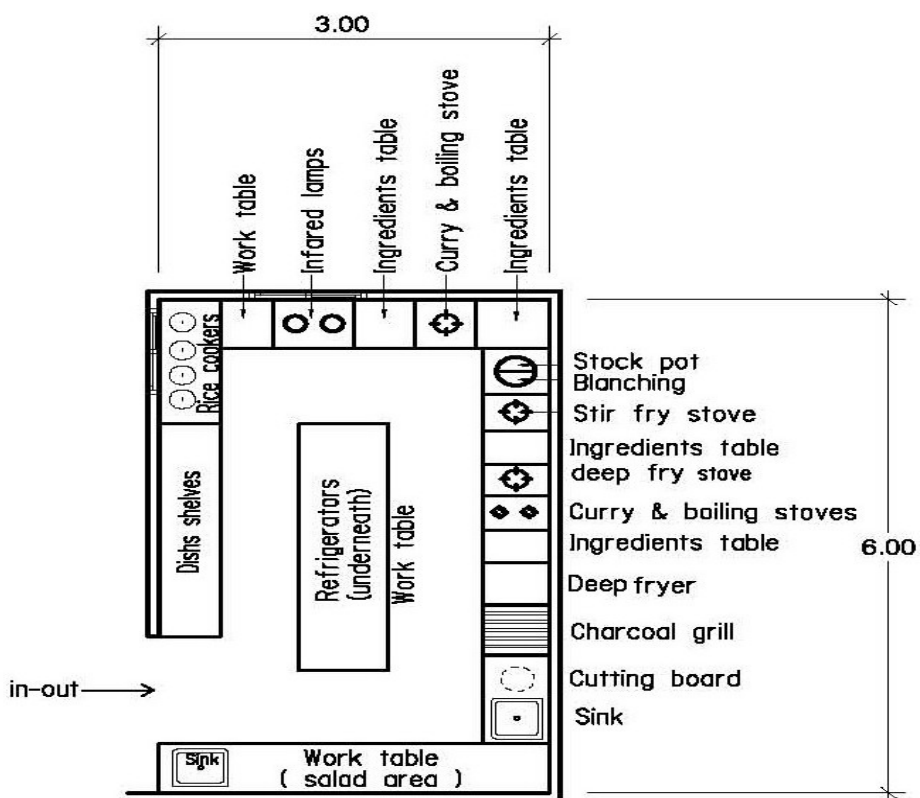
**Figure 9** Kitchen layout of hotel B, 60 servings

The kitchen of Hotel B was designed as an U-shape which was convenient as all working areas were within easy reach. Space allocation was also appropriate ie. refrigerators were grouped together and next to the sinks while the

cooking line was located on one side. Work table was positioned in the middle which was accessible from both sides.

However, reach-in refrigerators normally took up a lot of space so it was suggested that undercounter refrigerated drawers should be installed for more convenience, and time and space saving. Dry-heat and moist-heat cooking stations should be separately grouped. And certain cooking facilities should be adjacent to each other, for example stir fry stoves and stock pot.

### Hotel C

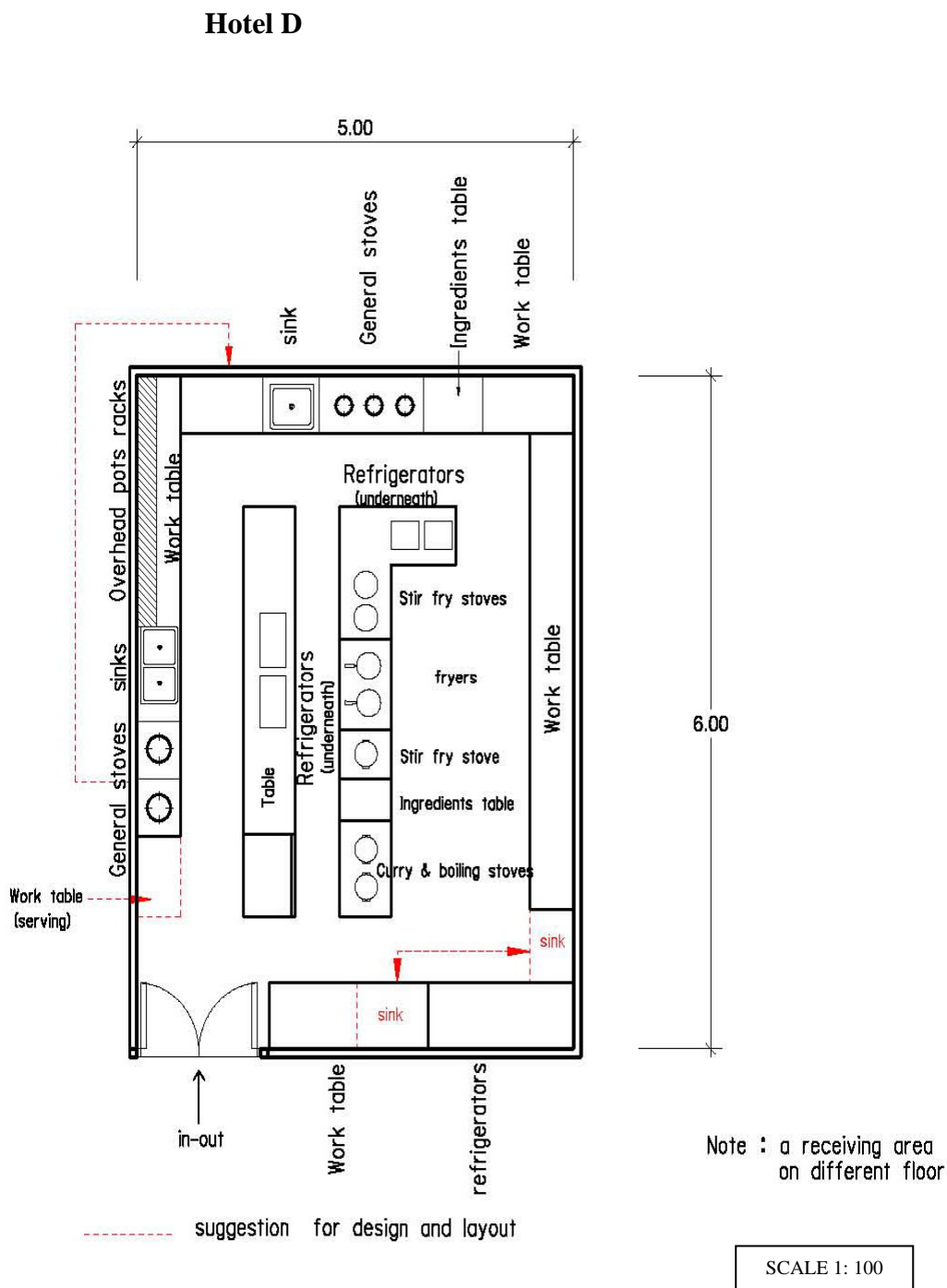


Note : a receiving area on different floor

SCALE 1: 100

**Figure10** Kitchen layout of hotel C, 80 servings

The kitchen of Hotel C was designed in a rectangular shape that accommodate most convenient flow. However, the length of a rectangular should not exceed twice its width for best efficient operation (Payne-Palacio *et al.*, 1994). Although it was such a small kitchen in terms of dimensions, the space allocation was so appropriate that it could meet the requirements of all of areas. There were refrigerated drawers below work table to store ready-to-cook-ingredients within arm reach. These refrigerators, though not sufficient in space, were very convenient, and time, labor and space saving. Moreover, ingredients table was installed close workstation so that staffs could cook comfortably and fast.



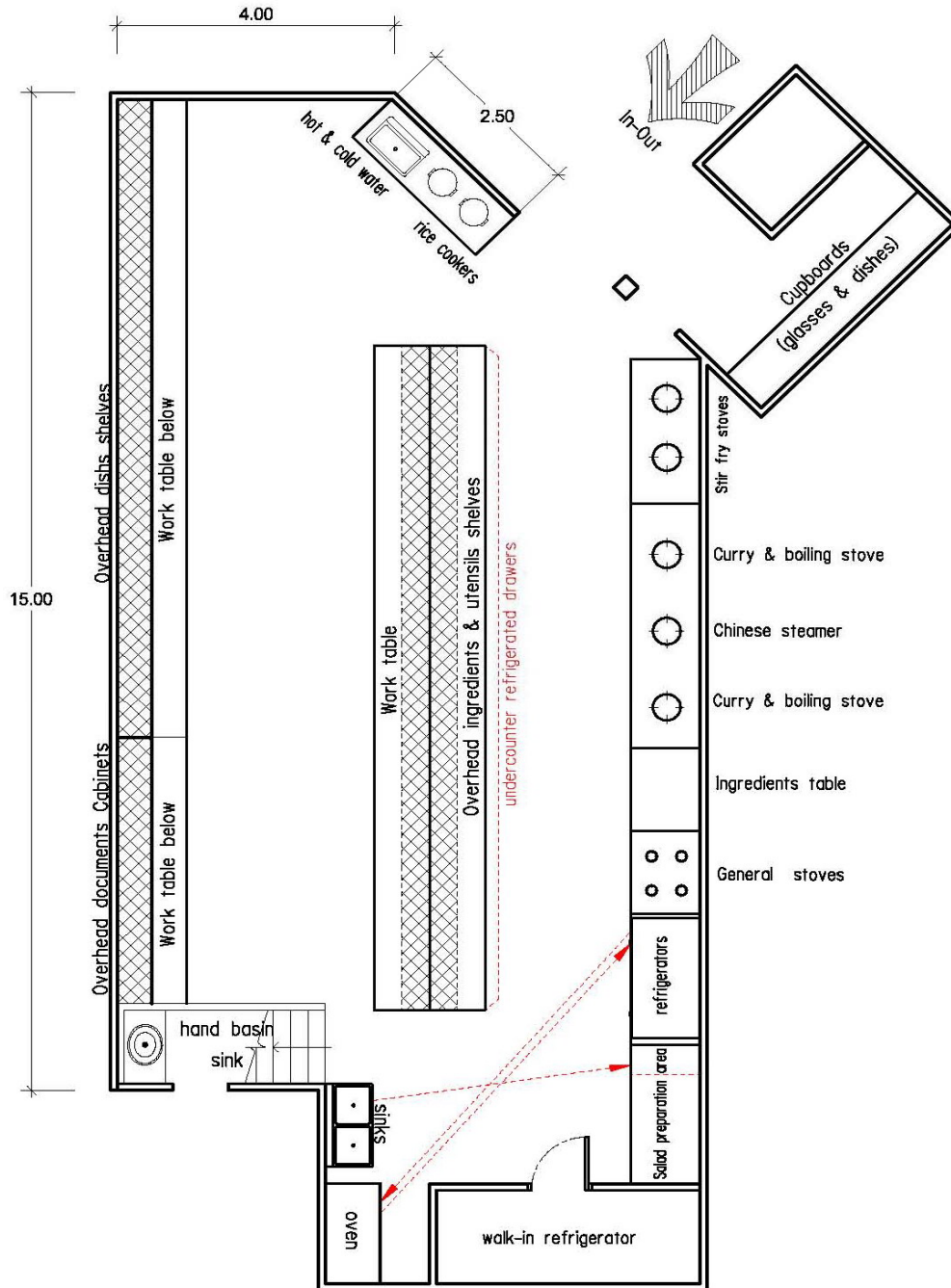
**Figure 11** Kitchen layout of hotel D, 70 servings

The layout of the kitchen in Hotel D was a combination of U-shape and islands of L and I shape resulted in a well flow traffic. Space allocation was so efficient and functional that staff could work from all sides. There were sufficient

refrigerators and worktables for workstations and preparation. But the sinks were not sufficient and far from refrigerators.

There should work table next to cooking stations and near to the door for holding cooked foods before serving. There should be overhead cupboards or shelves above work tables for storage of dry ingredients, small utensils and plates for serving. This design should eliminated the staff's need to turn around for plates (Baraban and Durocher, 2001)

**Hotel E**



----- suggestion for design and layout

Note : a receiving area on different floor

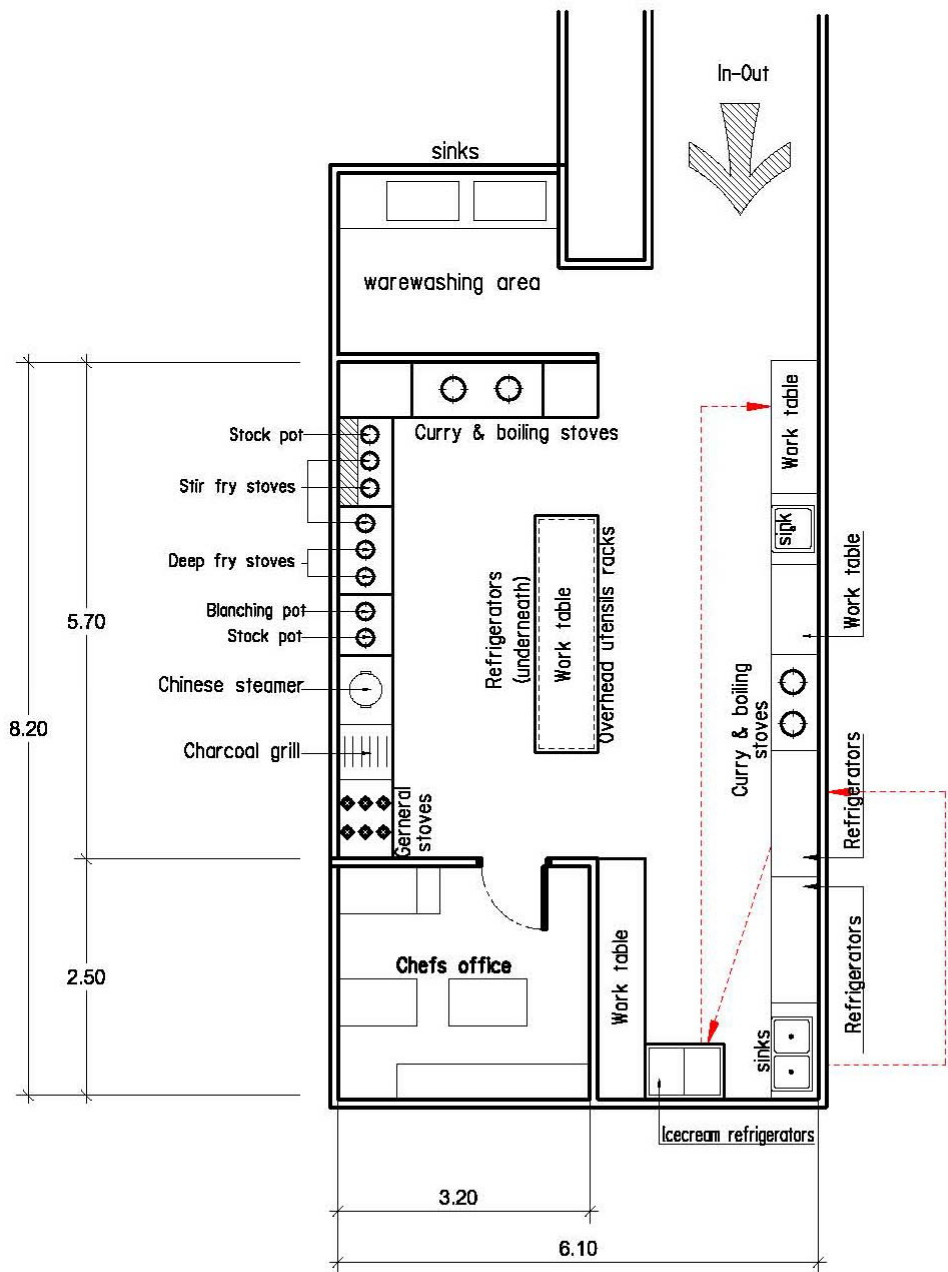
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**Figure 12** Kitchen layout of hotel E, 100 servings

The kitchen of Hotel E was a corridor shape where equipments were arranged along one side parallel to two long work tables, in the central and on the opposite side. There were sufficient space to do the food preparation freely, for example, hot cooking line and cold preparation line. There was a walk-in refrigerator which could stored both raw and cooked foods in large quantity.

Space allocation was inappropriate and improper, for example, reach-in refrigerators should not be installed next to the stoves because would make the operation of refrigerator more costly and reduced its lifetime ( Mississippi State University Extension Service, 2007). Sinks should be adjacent to salad area as well as work table because raw materials must be washed and drained here, prior to conveying to further preparation.

**Hotel F**



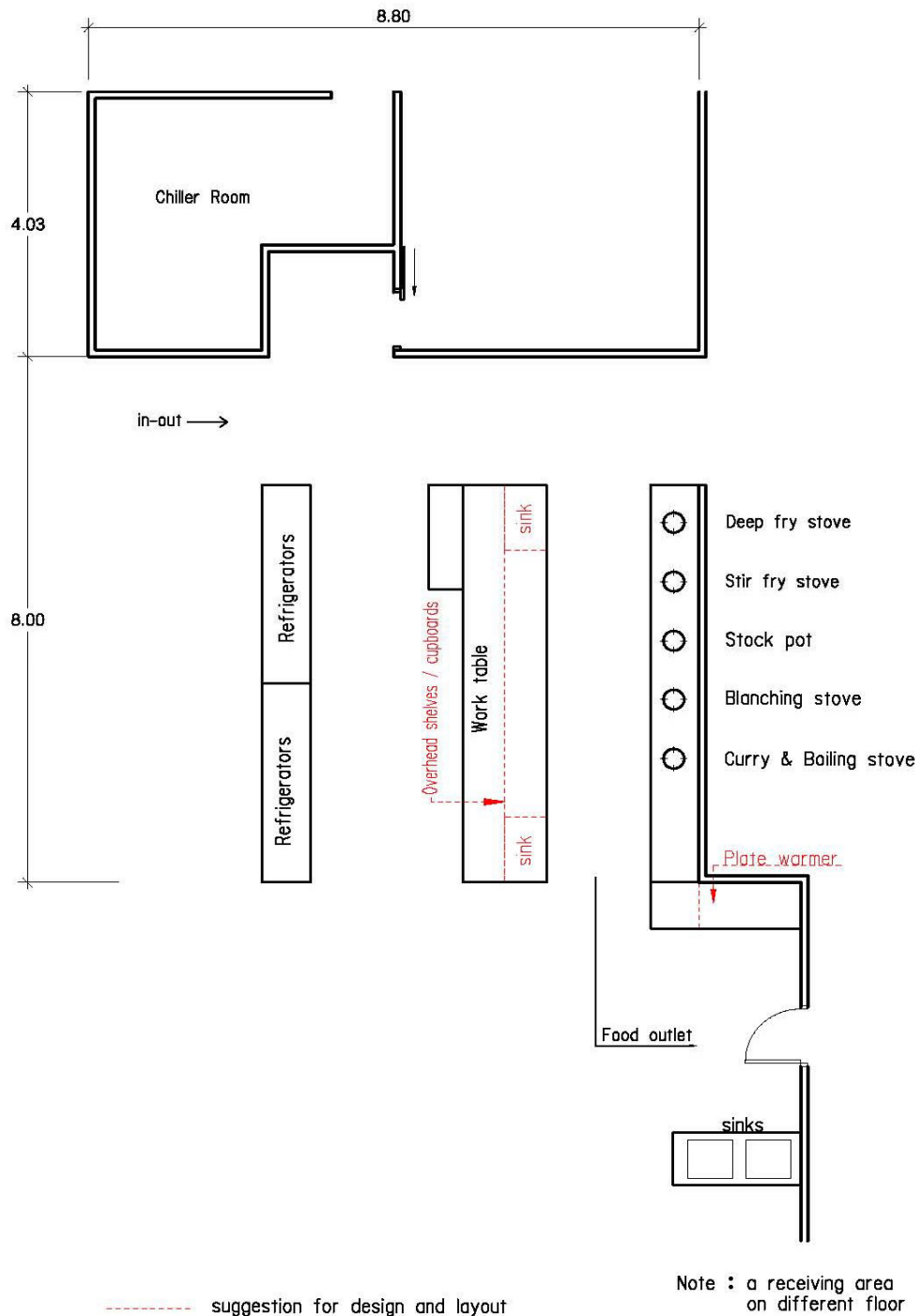
Note : a receiving area on different floor

SCALE 1: 100

**Figure 13** Kitchen layout of hotel F, 200 servings

The kitchen of Hotel F had a long and large a combination shape with a small office for chef at one corner where the chef could monitor kitchen activities as well as deal with paperwork, store records, product information, and consult reference books (Baraban and Durocher, 2001). Separate areas were provided for main activities ie. storage, cooking and warewashing with separate sinks and work tables though not appropriately allocated, for example, refrigerators were installed next to stoves, and ice cream refrigerator should be near food outlet etc. (Mississippi State University Extension Service, 2007). There was limited refrigerated storage space and work table for such a large kitchen which produced various pre-cooked and cooked food items.

**Hotel G**



**Figure 14** Kitchen layout of hotel G

The large kitchen of Hotel G was set in a corridor shape. Cooking lines and refrigerators were installed against opposite walls and work table was set as an island in the middle of the kitchen. Kitchen area was ample thus more cooking equipments could be added if necessary. However, there was a lot of wasted space in terms of functional and efficient design, while sinks were observed to be misplaced and too far from work table and cooking station.

### Hotel H

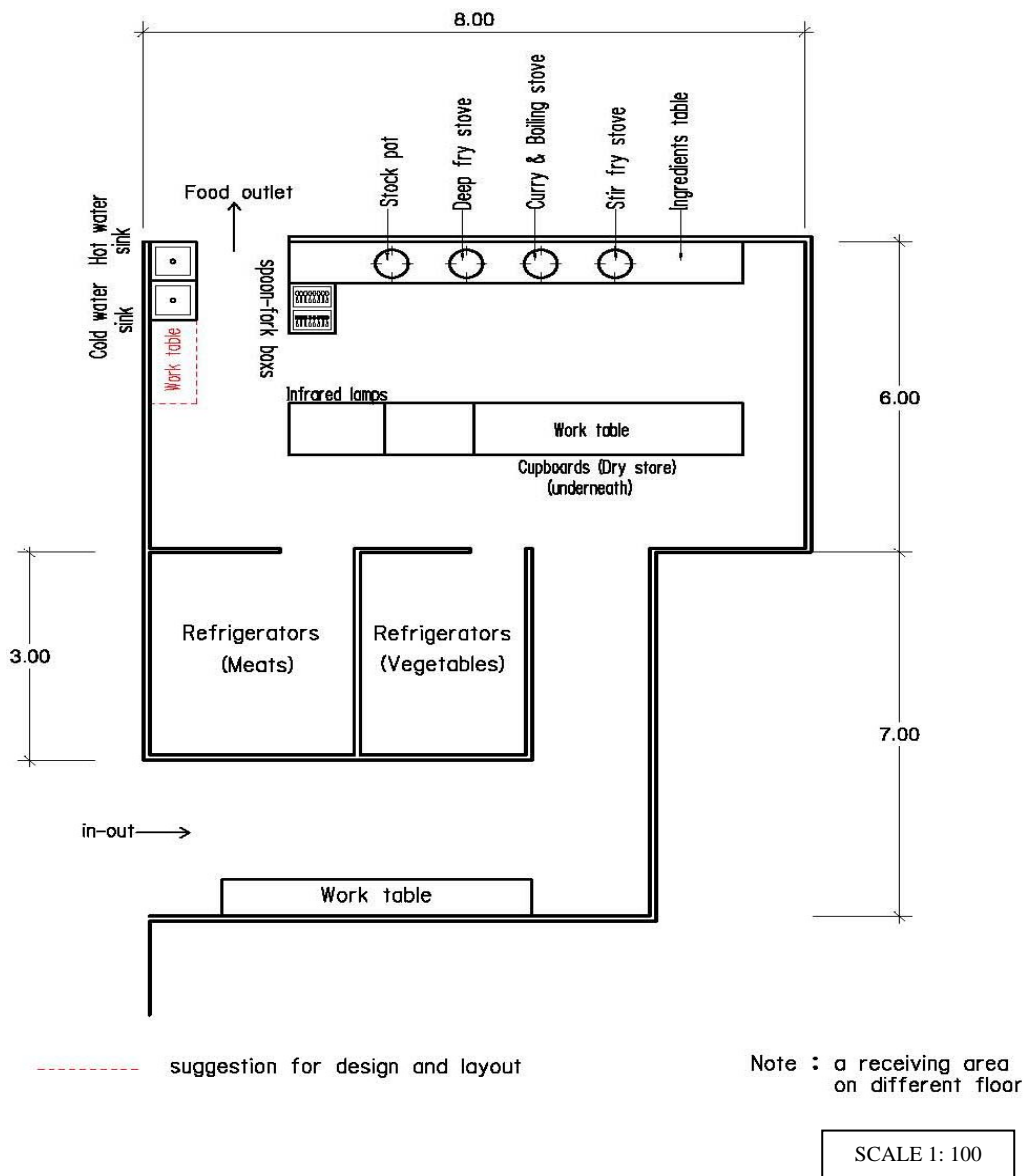
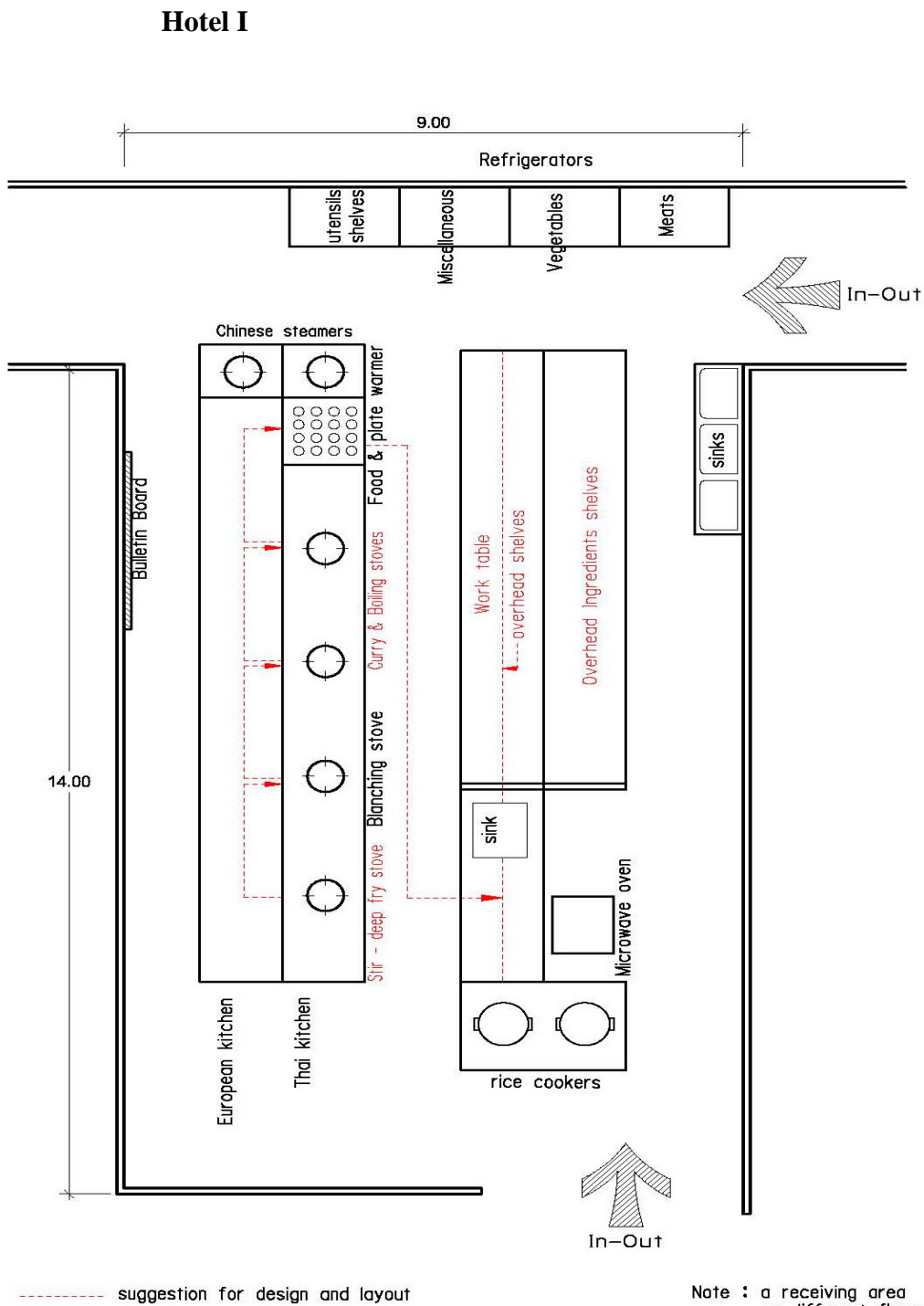


Figure 15 Kitchen layout of hotel H

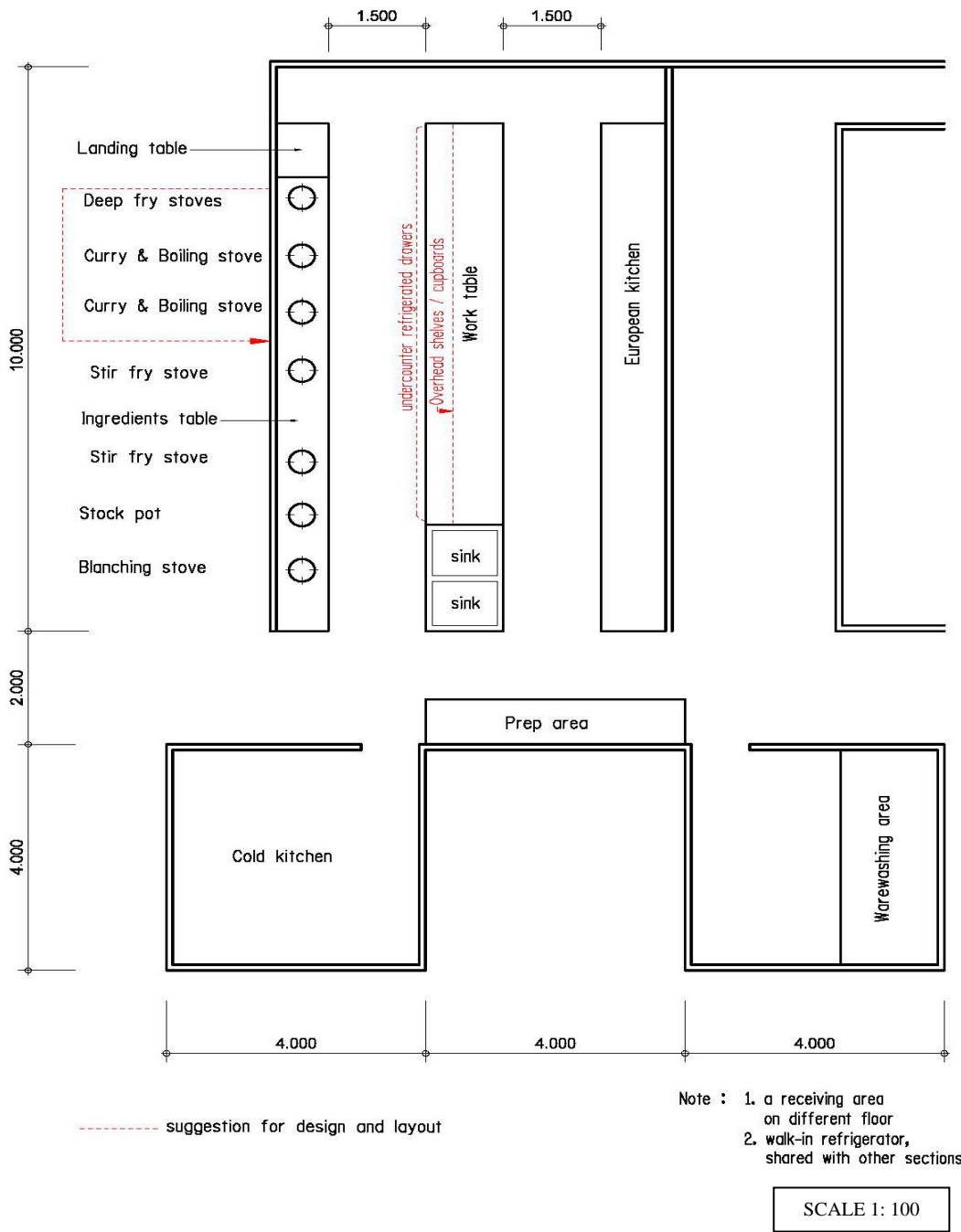
The kitchen of Hotel H was designed as a corridor shape with cooking line installed at one side parallel to work table. There were two walk-in refrigerators for separate storage of vegetables and meats in bulk capacity. However, the functional design and layout seemed inappropriate and insufficient for effective operation. For example, there should be work table attached to the sinks, ready-to-serve counter near serving outlet etc.



**Figure 16** Kitchen layout of hotel I

The large kitchen of Hotel I was set in a corridor shape . Thai kitchen cooking and serving facilities were separated from Western kitchen. A set of walk-in refrigerators were provided for various kinds of raw materials ie. meat, vegetables and miscellaneous. Plate warmer was misplaced, actually it should be installed adjacent to work table and close to the dining room for better convenience and well work flow.

### Hotel J



**Figure 17** Kitchen layout of Hotel J

A very large kitchen of Hotel J was set in a corridor shape and Thai kitchen was separated from Western kitchen on the opposite walls with work tables and sinks in between. Ample walk through space was so provided that traffic flow

was not interfered. Cooking line was arranged in one side along with work table. However, the stir fry stoves and deep-fryers should be grouped together. Besides, undercounter refrigerated drawers below work table should be provided so that all refrigerated and frozen foods would be easily accessed at arm reach of the cooks.

### Staffing

**Table 16** Management system: service capacity in the hotels

Hotel	Kitchen Area ,sqm.	No. of servings	No. of kitchen staff	Serving : kitchen staff
A	35	100	6	17:1
B	24	60♦	7	9:1
C	18♦	80	9	9:1
D	30	70	5♦	14:1
E	60★	100	10	10:1
F	50	200★	15★	13:1

$$\bar{X} = 36 \quad 100 \quad 9$$

★ = Maximum scores

♦ = Minimum scores

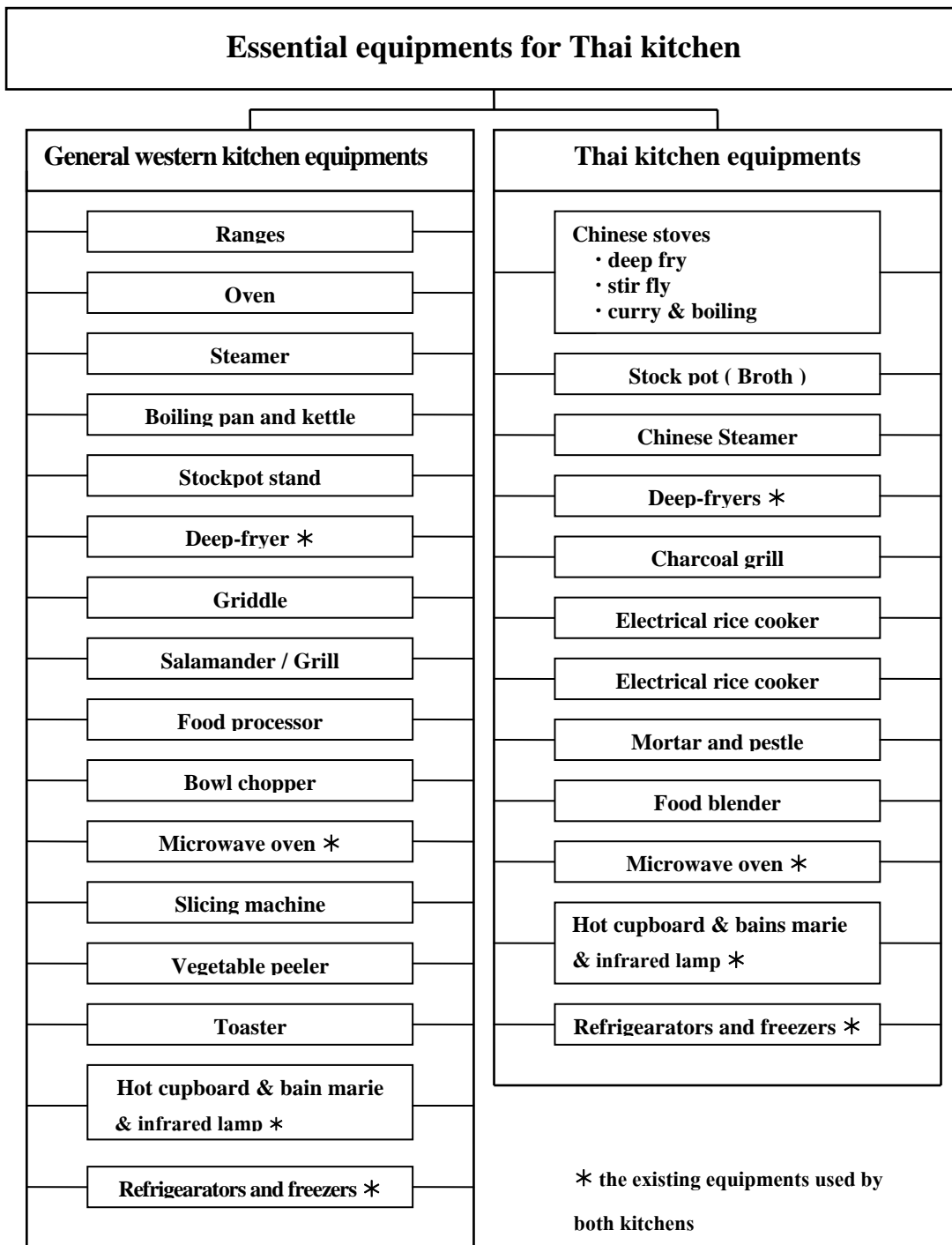
From the observation, the results showed the service capacity of different hotels as compared to that suggested by Fuller *et al.* (1985) that the average area required for Thai kitchen was less than Western kitchen ie 36 sq.m. per 100 seating capacity, while Western kitchen required 46.45 sq.m. per 100 seating capacity. The maximum area required and seating capacity of Thai kitchen were 60 sq.m. per 200 seats, whilst Western kitchen required 116.12 sq.m. at the same seating capacity. And the minimum of area required per seating capacity of Thai kitchen were 18 sq.m.

per 60 seats, while Western kitchen required area at least 27.87 sq.m. per 50 seating capacity.

As for the staff, the maximum number Thai kitchen staff was 15, who worked in kitchen that served for 200 seating capacity. Thus, the serving to kitchen staff ratio was 13 : 1. In some organizations, the minimum number Thai kitchen staff was 5 who served for 70 seating capacity. And the serving to kitchen staff ratio was almost the same ie. 14:1. However, the observation also revealed that the highest ratio of the number of serving to kitchen staff were 17 : 1. Therefore, the important factor governing the ratio was the potential of kitchen staff in terms of skills/experience and personal characteristics in order to successfully perform the kitchen work and fulfill the customers' satisfaction.

### **Available of equipment**

The result of the observation showed that there were similarity of equipment in Thai kitchen and international (Western) kitchen, except for some specific equipment in Thai kitchen such as rice cooker, mortar and pestle as shown in figure 18. However, certain equipments were irrelevantly used, for example : the Western range were used for stir-frying and a salamander was used for grilling.



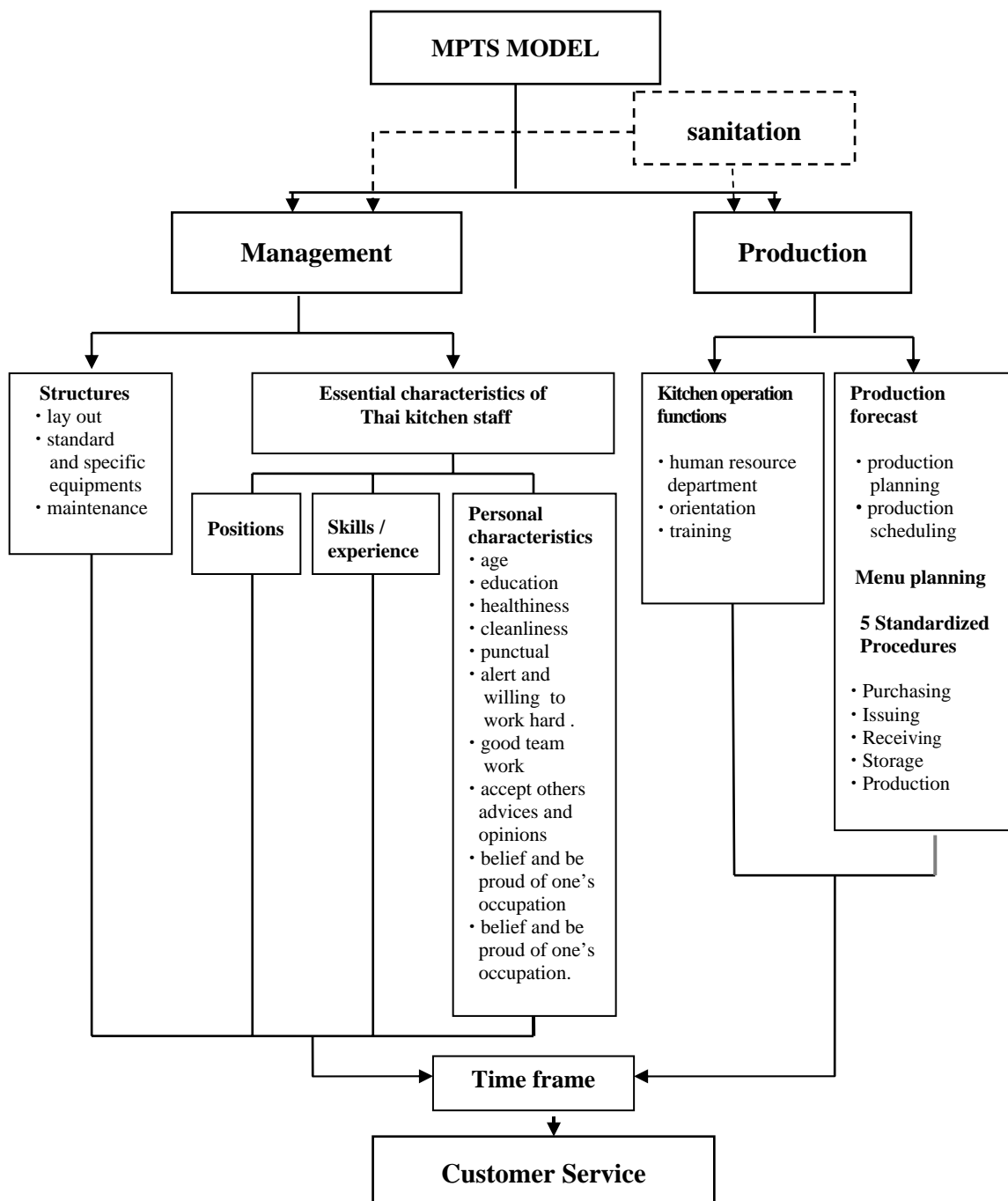
**Figure 18** Essential equipment for Thai kitchen

**Table 17** Structure systems : available of equipment

Equipments	No. of equipments					
	Hotel A	Hotel B	Hotel C	Hotel D	Hotel E	Hotel F
Stove						
- deep fry	2	2	2	2	1	2
- stir fry	2	2	2	2	2	4
- curry & boiling	2	5	6	2	2	7
Stock pot	1	1	1	1	1	3
Deep fryer	1	1	-	1	1	-
Grill	1	1	1	1	1	1
Steamer	-	1	1	-	-	1
Oven	-	-	-	-	1	-
Microwave	1	1	1	1	1	2
Electrical rice cooker	4	2	4	2	4	6
Refrigerators	100 cubic feet	150 cubic feet	108 cubic feet	275 cubic feet	616cubic feet	362 cubic feet

Table 17 revealed no significant different in number of equipments among hotels understudy. However, it was observed that the allocation of certain equipments and furniture made the different in terms of work flow, time consuming and performance (see also kitchen design and layout).

**Part 2** : Synthesis of the research output to propose a model of Thai kitchen for large quantity foodservices.



**Figure 19** Thai Kitchen Model for Foodservice Business

There were two important components of Thai kitchen model for foodservice business ie. management and production. Management consisted of structures and essential characteristic of Thai kitchen staff. And production consisted of kitchen operation functions.

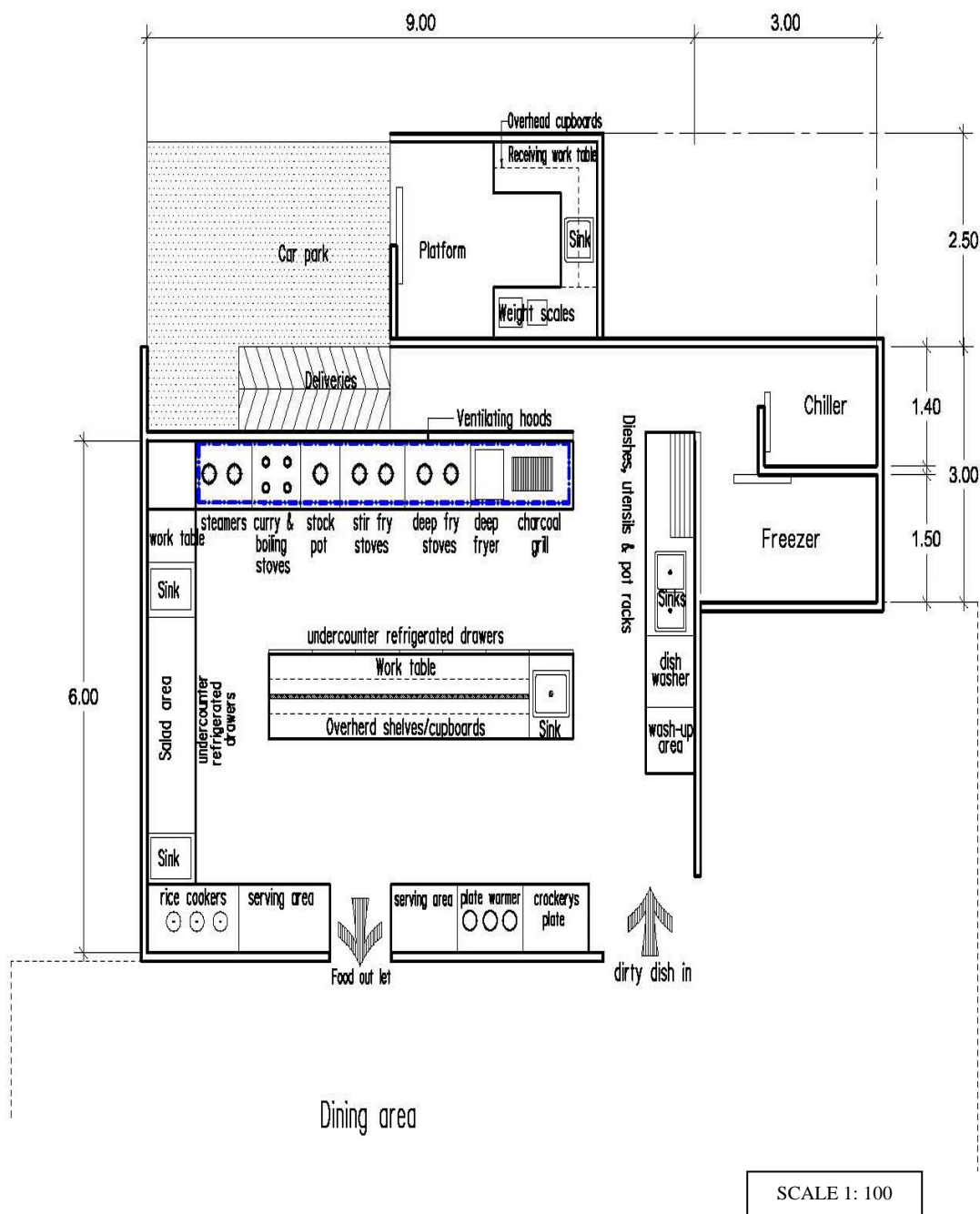
Management comprised of various components :

Kitchen structures composed of practicable layout, good maintenance and proper standard and specific equipments.

Layout of Thai kitchen consisted of six main workstations ie. curry-boiling, stir-fry, deep-fry, steamer, charcoal-grill and cold salad. The practicable layout of Thai kitchen should comprised of appropriate functional space according to menu, well work flow, proper and efficient equipments, ease to maintenance, good sanitation, safety, well ventilation and proper lighting and ambient as shown in Figure 20.

As for equipment, specific Thai kitchen were available in Thai kitchen (see Figure18). Thai kitchen needed several equipments namely Chinese stoves, Chinese steamers, stock pot, deep fryer, charcoal grill, electric rice cooker, a set of mortar, food blender, microwave oven, hot cupboards/bains marie/ infrared lamps and refrigerators( as shown in Figure18). In addition, factors to be considered in selection of equipment for kitchen ie. budget, floor plan/space and allocation, needs, design, size or capacity, materials, construction, cost of care and upkeep and reliability and reputation (Chakkapak, 1996).

Maintenance costs were comparative to food costs and would be added up to production cost. So it should be seriously considered in order to reduce problem that might occurred from inefficient equipment which in turn affected the productivity and increased the cost in the long run. Therefore, maintaining mechanical equipments required an efficient system of regular checking. This should included frequent checks by chef and kitchen assistants so that problem could be spotted early and repair promptly (Fuller *et al.*, 1985).



**Figure 20** Proposed layout of Thai kitchen

In aspects of essential characteristic of Thai kitchen staff, this should be considered in terms of skills/experience and personal characteristics which varied by the position levels. These factors were crucial to achieve in this business.

Since the results showed that position structure of Thai kitchen were similar to that of Western kitchen (see figure 5) and the results of analysis of the relationship showed that the positions were positively related to experience (skills). Thus, skill was vital factor that should be considered in order to achieved the goal of the business. The essential skills required of Thai kitchen staff were high performance in cooking as for good taste and present ability, creative ability in menu setting, good knowledge of ingredients of Thai cuisine and skill in cooking technique of Thai cuisine ( see Figure 5).

However, the results of analysis of the relationship, showed two factors which did not concern essential personal characteristics namely gender and filed of study.

As for gender, only one female staff came up with a problem as lack of ability to transfer heavy load. On the other hand, the male counterpart were able to cook as good as female or even better.

In aspect of filed of study, any one could learned on the job and also it was a Thai custom that cooking was the hand-me-down process ie. one already had a knowledge on Thai cooking to some extend.

Therefore, the required essential personal characteristic of Thai kitchen staff were: age, education, healthiness, cleanliness, punctual, alert and willing to work hard, good team work, accept others advices and opinions, and belief and be proud of one's occupation (see Figure 5).

Production involved kitchen operation functions, production forecast, menu planning and 5 standardized procedures.

Kitchen operation\_functions in terms of orientation and training of all staff at all levels, both aspects were performed by human resource department.

Moreover, the achievement of the system should be operated in compatible with the orientation and training program that provided by human resource department under the time frame. Orientation should be provided to employees with proper understanding of the job to be done and training should be provided to the employees to achieve effective task. Besides, establishment must provide the personal hygiene and basic sanitation training to kitchen staff. In addition, this system should implement the sanitation check list to monitor and prevent the outbreaks of food poisoning and control the quality standard of the system

Production planning and scheduling were the basic components of the production forecast, which in turn was a prediction of the number of customers to be served in a meal or a day and an assignment of the number who would chose each menu item (Payne-Palacio *et al.*, 1994). In forecasting, sales history records should be used to estimate production needs for the upcoming week. In addition, number of meals to be served daily, the number of portions of some or all menu items served, the weather, and special events or activities should also be taken into consideration.

Production planning should be scheduled for food preparation. Careful planning ensured the efficient use of employee, time allocation, equipment, and minimum of production problems (Payne-Palacio *et al.*, 1994).

Menu planning had an affect on staffing, selection of equipment, layout, kitchen activities, work schedules and so on. Work should flow smoothly, guest should be served effectively and profits should be greater if the menu had been properly planned (Ninemeier, 1990). Thus in order to achieve such goals, factors should be taken into account in menu planning were customer profile, cost and price policy, supplies: availability and season, processed food, capacity of staff, equipment, business balance and gastronomic balance ( Fuller *et al.*, 1985).

In actual production of Thai kitchen the 5 standardized procedures should be established into the management system, namely purchasing, issuing, receiving, storage and production.

Purchasing should be standardized to ensure that the raw material was acquired in needed quantities and qualities at favorable prices at appropriate time. Receiving should be standardized in order to ensure that all goods received, conform as to quantity, quality and quoted price to those ordered. Storage was standardized to guard against spoilage and theft. Issuing should be standardized to ensure the raw materials were used in the order they were received in order to prevent spoilage and theft. Production procedure should be standardized to satisfy customers on a given items which were produced by standard method as well as the specific ingredients to acquire same quality in every serving.

Consequently, the MPTS Model for Thai kitchen foodservice business was set up in pursuing the goals of clean food.