Chapter 4

Results

This chapter reports the results of the three types of results of POE, which are sufficient to fulfill the first research objective. In organization, this chapter is separated in four main sections, which are the following:

- The first section is the presentation of the advantages and disadvantages of the A, B, and C building that are inferred from the mean of the users' satisfaction level on the aspects of building function. In addition, the noted comments of the user and building leader in the interview describe more the reason of advantages/disadvantages of the Dong Da complex. In summary, this section derived ten points of implication from the advantages and disadvantages of the Dong Da complex.

- The second section contains the results of the differences of mean level of users' satisfaction between groups of users in the Dong Da apartment complex. In particular, based on five criteria of user classification (type of building, gender, time of occupancy, floor height and the area standard of living per person), this section has five parts of comparing mean levels of user satisfaction between the groups of users. This section derived 6 points of implication from results discussion.

- In the third section, the Multiple Regression statistic finds the relationship between the overall satisfaction of users and aspects of building function in Dong Da complex. Then, this section shows predictive model of the overall satisfaction of the users and user satisfactions with aspects of building functions in Dong Da complex.

- Finally, the fourth section is a summary for the POE results and the limitation of the results.

4.1 The Disadvantages and Advantages of the Dong Da Complex

A basic form of POE is to assess the building's advantages and disadvantages from the viewpoint of the occupant(s). Then, in a short-term suggestion of the POE, the architects and project planner should develop the advantages and improve the disadvantages of the building (Brenda, 2006).

This section has two parts. The first part shows results of the advantages and disadvantages of each building (Building A, B and C) in the Dong Da complex. These results of advantages and disadvantages of the building are the high and low means of the users' satisfaction level. Then, the notes of users, which were collected during the interview, describe the results of the disadvantage and advantage aspects of the building. Finally, the second part is the summary of 9 results of the advantages and disadvantages of building function in the Dong Da apartment complex

4.1.1 The Advantages of Building A, B and C in Dong Da Complex

a. Advantages and Disadvantages of the A Building

As describing the results, below, table 4-1 shows the advantages and disadvantages of the building A that were found from the data analysis. The three advantages of the A building are aspects of Location, Pubic safety and Adequate equipment. However, the A building has three disadvantage aspects, which are Physical accessibility, Chemical safety, and the Parking (include Parking facilities, and Reachability). (Appendix 3)

Table 4-1: The Advantages and Disadvantages aspects of the A building

<table>
<tr><th></th><th>Mean Rank</th><th>Aspects of the Building Function</th><th>Mean</th><th>SD</th><th>The Description of Advantages and Disadvantage by Frequently Responses of Users</th></tr>
<tr><td rowspan="3">Advantages</td><td>1st</td><td>Location</td><td>5.85</td><td>0.83</td><td>Location of building is in the center of city</td></tr>
<tr><td>2nd</td><td>Public safety</td><td>5.02</td><td>1.12</td><td>The door of apartment has two layers, and the building is near police station</td></tr>
<tr><td>3rd</td><td>Adequate equipment and arrangement</td><td>4.69</td><td>1.18</td><td>Although almost of them were changed by the users; the equipment and their arrangement was no reason for complaint for users</td></tr>
<tr><td rowspan="4">Disadvantages</td><td>24rd</td><td>Physical accessibility</td><td>2.93</td><td>0.84</td><td>The entrance is narrow and. Some decoration details of the building are difficult to clean</td></tr>
<tr><td>25th</td><td>Chemical safety</td><td>2.66</td><td>0.88</td><td>The toilet system is decayed. The sound of running toilets gives an uncomfortable feeling
Musty wall are rather smelly</td></tr>
<tr><td>26th</td><td>Parking Facilities</td><td>1.98</td><td>1.01</td><td>No parking in the initial design of the building</td></tr>
<tr><td>27th</td><td>Reachability</td><td>1.93</td><td>1.17</td><td>No parking in the initial design of the building</td></tr>
</table>

b. Advantages and Disadvantages of the B Building

For describing the results, table 4-2 below shows the advantages and

disadvantages of the building B, which were found from the data analysis. The B

building has five advantage aspects of the building function, which are Location,

Public safety, User ergonomic safety, Light and Adequate access arrangements.

However, the disadvantages of the B building are aspects of Flexibility, Adaptability

and Parking. (Appendix 4)

Table 4-2: The Advantages and Disadvantages aspects of the B building

	Mean Rank	Aspects of The Building Function	Mean	SD	The Description of Advantages and Disadvantage by Frequently Responses of Users
Advantages	1st	Location	5.13	1.59	Location of building is in the center of city
	2nd	Public safety	4.65	1.28	The building is near a police station
	3rd	User ergonomics safety	4.61	1.31	This building only used for living
	4th	Light	4.61	0.88	Three sides of the building elevation have contact with natural light
	5th	Adequate access arrangements	4.58	1.42	Easy access to the building
Disadvantages	24th	Flexibility	2.97	1.02	Cannot change the function of space Floor area is to small
	25th	Adaptability	2.94	1.00	Cannot change the function of space, and floor area is small
	26th	Parking Facilities	2.43	1.20	No parking in initial design of the building
	27th	Reachability	2.39	1.05	No parking in initial design of the building

c. Advantages and Disadvantages of the C Building

For describing the results, table 4-3 shows the advantages and disadvantages

of the building C that were found from the data analysis. The C building has two

advantage aspects of building functions, which are the Location and Public safety.

However, the disadvantages of the C building are aspects of Chemical safety and the

Parking. (Appendix 5)

Table 4-3: The Advantages and Disadvantages aspects of the C building

	Mean Rank	Aspects of the Building Function	Mean	SD	The Description of Advantages and Disadvantage by Frequently Responses of Users
Advantage	1st	Location	5.70	1.02	Location of building in the center of city
	2nd	Public safety	4.61	1.12	the police station is very near
Disadvantages	25th	Chemical safety	2.74	1.05	The smell from the musty walls and high humidity
	26th	Parking Facilities	2.52	0.79	No parking was in initial design of the building
	27th	Reachability	2.22	1.13	No parking in initial design of the building

4.1.2 Disadvantages and advantages of Dong Da Apartments Complex

The advantages/disadvantages of the buildings A, B and C were shown in

above part, however, the evaluation on the Dong Da complex, which includes the

three buildings is the main objective of this research. Therefore, based on the previous

advantages/disadvantages, researcher summarizes the frequently mentioned

advantages and disadvantages of the three building of A, B and C which are in the

Dong Da complex. In particular, this part derived two advantage aspects and four

disadvantage aspects of building functions in the Dong Da complex. In addition, the

building leader, who is the manager of the Dong Da complex, also mentioned four

disadvantages of the Dong Da complex in building management.

a. Implication of Advantages of the Dong Da Complex

Effect of the neighboring environment: The frequent advantages of the Dong

Da apartment complex are the Location and Public safety. However, based on

common notes of the interview from user, researcher finds that the neighboring

environments, which are the location of city center city and the police station, effected

the satisfaction of users on aspects of location and public safety of the building.

A good designing for natural light: with the alternate arrangement of each

block apartment and space, the design of B building is good to get natural light. This

advantage of the design also made the building's access more clearly by the lighting.

b. Implication of Disadvantages of the Dong Da Complex

A disadvantage of *local Hue climate in design:* With the high humidity

climate of Hue (over 89%) and the flood season from July to November, the first floor

of the building was impacted with musty walls and humidity. This smell of must and

the high humidity also affected the low satisfaction of user on the chemical safety

aspect of the building.

The technology application in building equipment: the low technical standard

of the toilets, the sound of running wastewater and visibility of exposed equipment of

toilets made the low satisfaction of users on chemical safety aspect in the Dong Da

complex. Thus, the low technology of building equipment affected the low

satisfaction on safety aspects of the building.

The low flexibility of apartment's rectangle floor plan: The floor plan of the B

building is rectangle and its width is only 3.5m. Feeling inflexibility because of the

narrow width, the interviewed users claimed that when they want more functions in

the apartment, the corridor takes at least 0.9m; therefore, the users only have 2.4m for

a space or function. This is a small size for users to change the function of a space or

to re-arrange furniture. Thus, the 3.5 width of rectangle-plan apartment is the cause of the low flexibility and adaptable aspects in the B building.

Mistake of no parking design: The biggest disadvantage in the A, B, and C buildings is the Parking, which includes the Reachability and Parking facilities. This is a mistake of the applied design of the government that was only applied for developed socialist country, where public transportation is dominant. However, in the real situation of Dong Da, the demand of a motorbike parking is very high (over 83% of used vehicles are motorbikes). Therefore, not designing a parking is a serious mistake in the design.

c. The Disadvantages of the Dong Da Complex in Building Management

According to the notes and comments of the interview with the building leader, the researcher derived four more disadvantages in management of the Dong Da complex, which could not be found in the users comments

The lack of funeral space in building design: Beside the disadvantage of the buildings, the building leader mentioned that these building in the Dong Da Complex are lacking a funeral space because these building designs are copied from the "Soviet Union" that did not have this culture. This problem also affected the neighboring apartments.

The lack of a common space in buildings: The lack of a common room for people meeting affected the community relationships between users, therefore association of young people, retired officials, and holiday meetings are not possible.

Unnecessary decoration of building design: In A and C building, some detail decorations of the façade of the building are difficult to clean. Therefore, users did not care about maintenance; the used material and color of the buildings are in disorder.

The long corridor in household apartment: the long corridor of the B building had partitions made by the users because they claimed that long corridor affected their privacy and safety. Therefore, the building leader suggested that the architect should not design a long corridor for the household apartment. .

4.2 Differences of Satisfactions between User Groups in the Dong Da Complex

In a community, the consensus of users or residents is a very important factor for a stable community. The groups of users in the Dong Da apartment complex were seen as a community in the project of Dong Da. Therefore, understanding the differences between sub-groups of user is useful when the planner/policy maker wants to avoid conflicts of users' satisfaction on aspects of the building between the groups of user in the re-establish project meeting. Aim of this section is to find out the differences of user satisfaction on aspects of building function in the Dong Da complex.

Based on 5 criteria of the classification of groups of users (type of building, gender, time of occupancy, floor height and the standard living area) that were referred relevant research and project planner, this section is separated into five main parts. Following each part, first, to find the aspects of building function that had a different satisfaction between groups of users, a line chart provides a visual comparison between the means of satisfaction level. Then, a table of mean comparing

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and ranking of satisfaction level shows the mean satisfaction of which groups of users are higher or lower. To explain the differences of satisfaction between the groups of user, the researcher had to refer discussions of previous researchers and design theories. In addition, the ANOVA tests identifies the significance of difference of satisfactions on an aspect of building function between groups of users; however, the ANOVA only tests aspects of building, which were mentioned on previous research and theories design. Finally, the summary of this section derived six implication points of the results.

4.2.1 The Differences of Satisfactions between Groups of User in Building Types of A, B, and C

By mean comparing of users' satisfaction between groups of user of A, B and C building is to find which building is better or worse in which aspect of building function.

Figure 4-1: The chart of comparing means of user satisfaction between user groups of A, B and C building
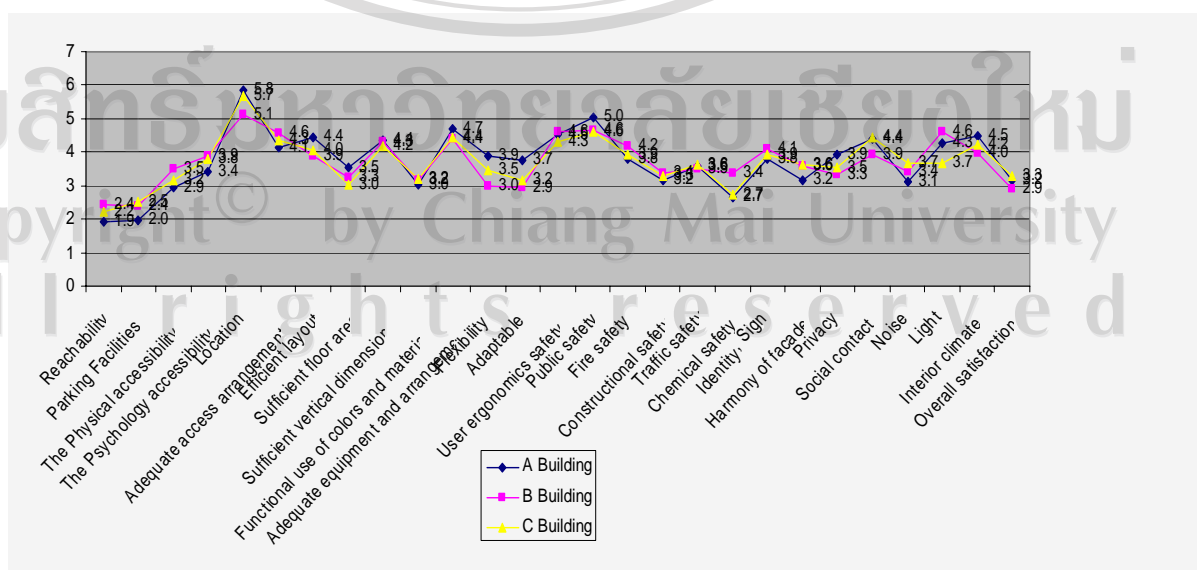
From the visual illustration of the line chart (figure 4-1), the means of users'

satisfaction on the aspects of building are similar and the overall satisfaction between

them are not different, (Appendix 6). However, in aspects of Flexibility and Light, the

three groups of users of A, B and C building have differences of satisfaction. In

particular, the groups of user of B building had lowest satisfaction on the aspects of

flexibility of their own building but they have more satisfaction on the aspects of the

light than the other groups, (Table 4-4)

Table 4-4: Comparing means of the user satisfaction between the user groups of A, B
and C building

	The aspect of building function	A building	B building	C building
Mean of user satisfaction (Mean Rank)	The light aspect	4.29 (2nd)	4.61 (1st)	3.65 (3rd)
	The flexible aspects	3.9 (1st)	2.97 (3rd)	3.48 (2nd)

Based on responses of users on the advantages/disadvantages of the Dong Da

complex and the survey situation, with the alternate arrangement of each block

apartment and space, the design of B building is good to get natural light, while the

design of A and C building limited the natural light because of its high density of

apartment layout. However, contrary to the advantage of the light, the floor plan of B

building has the lowest flexibility. The users commented that because the floor plan is

rectangle and floor is smaller than in the other buildings the users could not change

furniture and the function of space. As confirmation of the significance of the

different satisfactions between three groups of user by ANOVA test, the three groups

of users in A, B and C building had a different significance in the aspects of Light
(p=0.010903) (Appendix 7) and the Flexibility (p=0.000395) (Appendix 8) of the
building function.

   In short, as mentioned in the advantages/disadvantages of the building, the
user groups in three buildings of the Dong Da complex show not much difference of
satisfaction. However, the users' satisfaction of B building differs with the other
group on aspects of the Light and Flexibility.

4.2.2 The Differences between User Groups of 1st, 2nd, 3rd, 4th and 5th Floor

   In a visual illustration by a line chart (figure4-2), there are differences between
means of user's satisfaction between the groups of users of different floor height.
Specially, among five groups of users, the group of users of the first floor is
frequently highest or lowest satisfaction. This means that the group of users in the
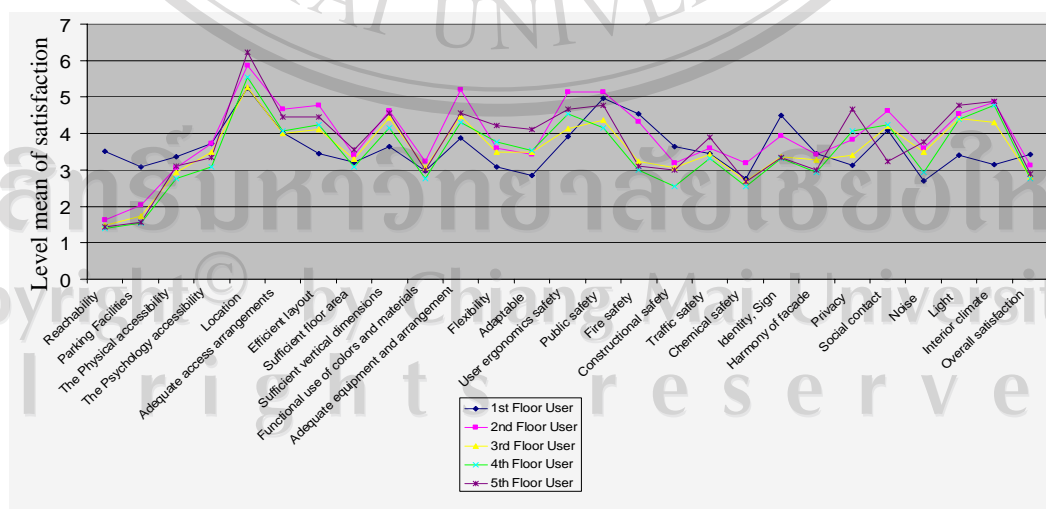first floor is different from the other groups of users.

Figure 4-2: The chart of comparing means of user satisfaction between user groups of

floor difference

By mean comparing and ranking of user's satisfaction (Table 4-5), the 1st floor group of user had opposites in their satisfaction on the aspects of building function. This group usually has the lowest or highest mean of satisfaction (1st or 5th). In particular, the user group of the first floor differ from the other groups on the four main aspects of Parking (includes Reachability, Parking facility), Interior climate, Fire safety and Privacy.

Table 4-5: Comparing means of the user satisfaction between the user groups of floor difference

	The aspect of building function	1st floor user group	2nd floor user group	3rd floor user group	4th floor user group	5th floor user group
Mean of user satisfaction (Mean Rank)	Reachability	3.52 (1st)	1.63 (2nd)	1.47 (3rd)	1.38 (5th)	1.44 (4th)
	Interior climate	3.15 (5th)	4.87 (2nd)	4.30 (4th)	4.77 (3rd)	4.89 (1st)
	Fire safety	4.55 (1st)	4.33 (2nd)	3.23 (3rd)	3.00 (5th)	3.11 (4th)
	Parking Facilities	3.09 (1st)	2.03 (2nd)	1.73 (3rd)	1.54 (5th)	1.56 (4th)
	Privacy	3.12 (5th)	3.83 (3rd)	3.40 (4th)	4.08 (2nd)	4.67 (1st)

Thus, Kaya (1997) and Sugur (1998) found that there are differences of satisfaction between user groups of different building floors. The case of the Dong Da POE also finds that there are differences between user groups of different floors. Based on the interview and situation surveying, below discussions attempt to find the reasons of the difference between the group of first floor users and the other groups.

The parking: The user group of the 1ˢᵗ floor is more satisfied than the other groups, who do not have their own parking. The distance from 2ⁿᵈ, 3ʳᵈ , 4ᵗʰ and 5ᵗʰ floor to the rented parking is farther than for the 1ˢᵗ floor inhabitants. This reason affected the differences between the group of first floor users and the other groups. Similarly, the group of first floor users used their living room as their parking at night. Therefore, they feel more convenience/satisfaction about the parking facility than the other user groups especially in the morning, when there are many people in the rented parking.

The Interior climate: As mentioned in the disadvantages of the building, the climate in Hue is hot and humid. Therefore, the users of higher floors, which are better ventilated, are more satisfied by the interior climate aspect. This is the reason why the users of the first floor had the lowest satisfaction.

The fire safety system: In fact, the Dong Da complex did not have a sufficient fire safety system. According to the distance of fire escape in the building, the user groups of the 1ˢᵗ and 2ⁿᵈ floor are more satisfied than the other groups. This reason explained why the users in the first floor are more satisfied than the other groups.

The Privacy of users: The group of 1ˢᵗ floor users has the lowest satisfaction of privacy. Thus, the 1ˢᵗ floor apartments were arranged around the stairs and the entrance, where there are a lot of passers-by. This affected the low user satisfaction of privacy aspects. Contrary to evaluation of the first floor group, the 4ᵗʰ and 5ᵗʰ floor users are more satisfied than the other groups about the privacy.

In short, the group of users of the first floor differs from the other groups on four main functional aspects of the building, which are: Parking (includes Reachability, Parking facility), Interior climate, Fire safety and Privacy.

4.2.3 The Differences between Groups of Male and Female

In a visual illustration by line chart (figure 4-3), the two groups of male and female have similar evaluation of satisfaction. However, the female group is more satisfied than male group on aspects of Health and Physical well-being, which includes aspects of Light and Interior climate.
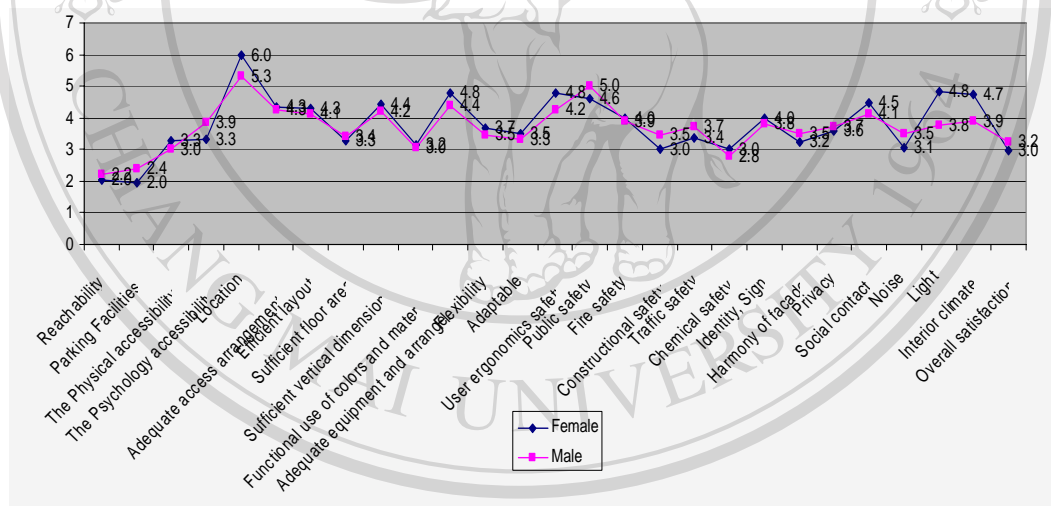

Figure 4-3: The chart of comparing means of user satisfaction between user group of male and female

Based on empirical research on impact of environment, it was anticipated that reactions exhibited by males might differ from those shown by females (Kaya, 1997; Rüstemli, 1992; Sears, Peplau, 1988). Thus, in case of Dong Da complex, Light and interior climate of environmental aspects of the building were evaluated differently by

male and female users. In particular, the male is more satisfied than female in aspect

of Health and Physical well-being, (Table 4-6). Thus, by the ANOVA test, there was

significance of different satisfaction between male and female group, Light aspects,

p= 3.38E-07, (Appendix 9) and Interior climate aspects p=0.001441, (Appendix 10).

Table 4-6: Comparing means of the user satisfaction between the user group of male
and user group of female

	The aspect of building function	User group of male	User group of female
Mean of user satisfaction (Rank)	Light	3.52 (2nd)	4.84 (1st)
	Interior climate	3.76 (2nd)	3.92 (1st)

In case of the Dong Da complex, the male group is less satisfied than the

females on the impact of environment. This is similar to research results of Stokols,

Rall, Pinner, and Schopler (1973)

**4.2.4 The Differences between Groups of above 9 Years Occupancy and Under 9
Years of Occupancy**

In a visual illustration by line chart (figure 4-4), the group of above 9 years

occupancy is frequently more satisfied than the group of less than 9 years of
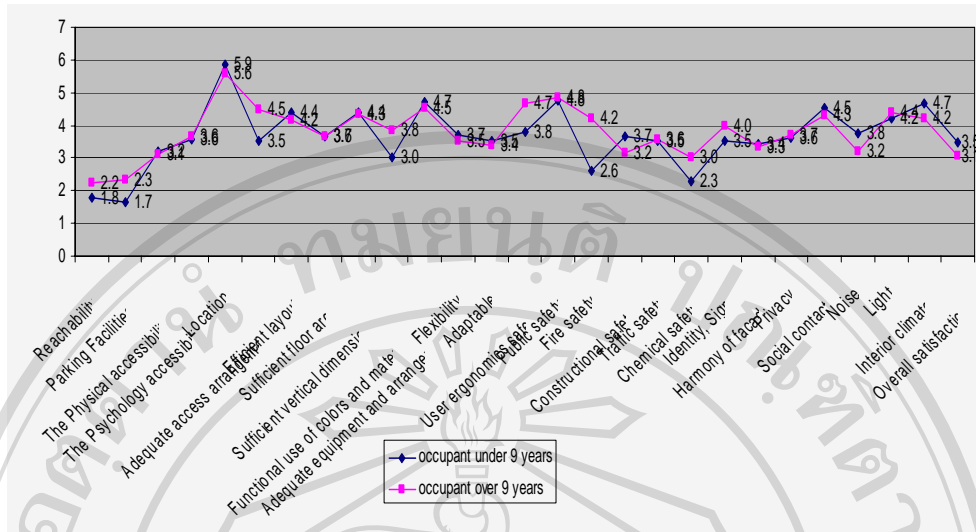
occupancy.

Figure 4-4: The chart of comparing means of user satisfaction between user group above 9 years of occupancy and under 9 years of occupancy

In comparing the means of user satisfaction between two user groups, we can see that the user group of above 9 years of occupancy is more satisfied than the user group of under 9 years of occupancy in four aspects of Fire safety, Adequate access Arrangements, Functional use of colors and materials.

Table 4-7: Comparing means of the user satisfaction between the user groups of above 9 years occupancy and under 9 years occupancy

	The aspect of the functional quality	user group under 9 year occupancy	user group over 9 year occupancy
Mean of user satisfaction (Rank)	Fire safety	2.62 (2nd)	4.23 (1st)
	Adequate access arrangements	3.52 (2nd)	4.48 (1st)
	Functional use of colors and materials	3.00 (2nd)	3.85 (1st)
	User ergonomics safety	3.81 (2nd)	4.65 (1st)

As based on the adaptability of people by the time, those who had stayed longer could balance their feeling better (adapted from "building image of environment" Lynch, 1975, and concept of "learning and memory" of Alan, 1997). Therefore, in the same environmental aspects, the user group of over 9years had more satisfaction than the other group. Beside, normally, the new occupants might be having a higher expectation in their building; therefore, they had a low satisfaction with the real situation of the old apartment (adapted from "expectation and satisfaction" of Scottish Consumer Council, 2002).

In short, the time of occupancy affects the user satisfaction on aspects of building function. In case of the Dong Da complex, the users, who occupied the building longer than 9 years, are more satisfied than the user group of less than 9 year of occupancy.

4.2.5 The Differences between Groups of Users of above Standard-Area and under the Standard-Living Area (12 sq.m / person)

In a visual illustration by line chart (figure 4-5), the group of users above standard-living area is more satisfied than group of user under the standard-living area. However, in the overall satisfaction aspect, there is no difference between the groups of user.
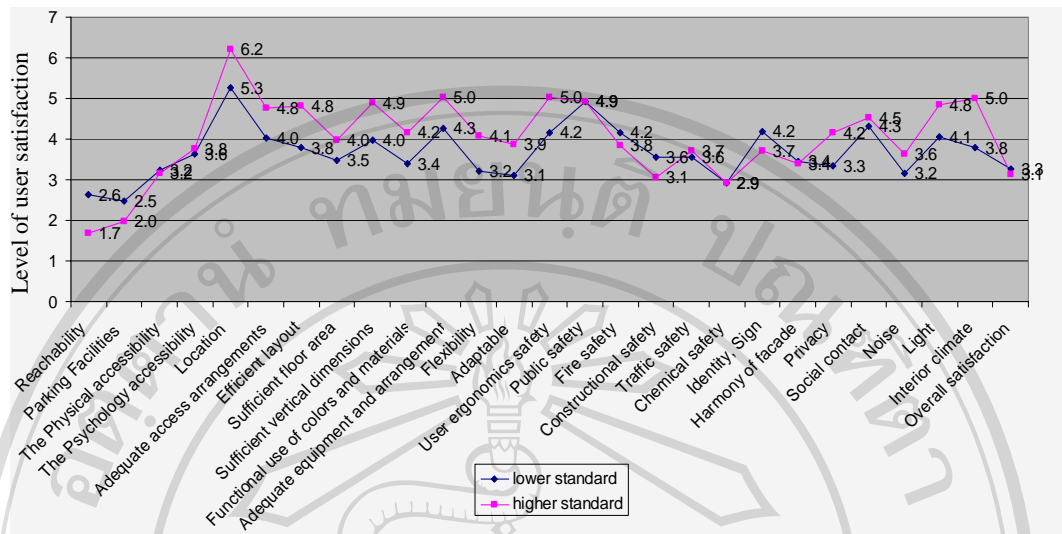
Figure 4-5: The chart of comparing means of user satisfaction between user group above standard and user group under standard (12 sq.m/ person)

By mean comparing of users' satisfaction between the two groups of user, we can see that the satisfaction of the group of above standard-living are is more satisfied than the group of less than 12sq.m per person in aspects of Efficient layout, Location, Sufficient vertical dimensions, User ergonomics safety, Flexibility, Privacy, Health and Physical well-being (includes Light and Interior climate).

Table 4-8: Mean Comparing of Users' Satisfaction between the Group above

standard-living Area and Group under Standard-living Area (12 sq.m / person)

	The aspect of the functional quality	user group of standard living area over $12m^2$/people	user group of standard living area under $12m^2$/people
Mean of user satisfaction (Rank)	Interior climate	5.00 (1st)	3.79 (2nd)
	Efficient layout	4.81 (1st)	3.79 (2nd)
	Reachability	3.00 (2nd)	3.85 (1st)
	Location	6.21 (1st)	5.28 (2nd)
	Sufficient vertical dimensions	4.89 (1st)	3.98 (2nd)
	User ergonomics safety	5.04 (1st)	4.16 (2nd)
	Flexibility	4.08 (1st)	3.21 (2nd)
	Privacy	4.17 (1st)	3.34 (2nd)
	Light	4.85 (1st)	4.05 (2nd)

With the advantage of the larger using area, the user group of above the

standard can easily arrange their layout and get better ventilation for the interior

climate. The light is better in the space of lower density of furniture as is the

ventilation. Therefore, the larger using area had more possibility of lower density of

furniture that lets light shine unobstructed.

The vertical dimension and area of an apartment has a relationship with visual

balance. In case of Dong Da Apartment, the relationship is positive because the user

group of the larger area is more satisfied than the other group. Beside, the larger area

gave more volume of working space for users. Therefore, the probability of

ergonomic accidents is lower. The larger area could help the user with more ability of

interior change. Personal spaces of users in a larger using area have less possibility of

interaction, then, the privacy of users in lager area is higher. (Adapted from Voordt, 2004)

In short, in case of Dong Da POE, the group of users over the standard of living area is more satisfied than the user group lower than the standard. Thus, crowding in the smaller area will decrease the satisfaction of users. Therefore, this could make the user group of a bigger living area, which is less crowded to be more satisfied, Erkip & Kayan, (2001).

4.2.6. The Summary of the Differences of User's Satisfaction between the User Groups

The conclusion part summarizes the differences of satisfactions between user groups. The below summary includes six implication points from the results, which should be presented to the projects planners, who want to know the different satisfaction of the users to avoid conflicts between users' evaluation:

- The user groups in three buildings of the Dong Da complex show not much difference in satisfaction

- The user group of the first floor is different from the other groups of different floors

- Males group is less satisfied than the females on the impact of environment, which are light and interior climate in Dong Da complex.

- User group of the building living there longer than 9 years is more satisfied than the user group under 9 year of occupancy

- The group of users over the standard of living area is more satisfied than the user group of lower than the standard

- Although, the different user groups had a different satisfaction on aspects of the building function, the overall satisfaction of the groups is not different

4.3 The Relationship between the Overall Satisfactions and the Other Satisfactions of User on Aspects of Building Function

The overall satisfaction is a very important evaluation, because it is as an evaluation of sustainable aspect of the building (Voordt, 2004) and shows a relation to the next decision of the user (Joseph, Robert & David, 2000). The objective of Liu (1999) consider residential satisfaction not as a measurement criterion of building quality but as a predictor of behavior, then it suggested that a wider systematic study of the important building aspects through Investigative and Diagnostic POE should be carried out in Hong Kong. Thus, the predictive model of what factor or aspects of the building function influence the overall satisfaction is significance information when the Dong Da project planner wants to have an effective scheme for a new building and link to the medium-term suggestion of next phase in the Dong Da project's implementation.

a. The Predictive Model of user's Overall Satisfaction on the Other Satisfactions of Users on Aspects of Building Function

Based on the analysis of the Multiple Regression with stepwise model (Table 17), the researcher got six factors or aspects that influenced the overall satisfaction of users in the Dong Da complex are Parking facilities, The Psychology accessibility,

Public safety, Flexibility and Identify-sign, and Adequate access arrangement,

(Appendix 11).

The intercept is b_0= -0.233. This is the average of overall satisfaction when all
of the independent variables are zero. However, zero is outside the range of the values
of the independent variables, therefore this is misleading when interpreting this value
(the input data of the building parameters are the integer from 1 to 7)

Regression statistics:

Observations	113.000
Sum of weights	113.000
DF	106.000
R^2	0.394
Adjusted R^2	0.360
MSE	0.402
RMSE	0.634

Analysis of variance:

Source	DF	Sum of squares	Mean squares	F	Pr > F
Model	6	27.683	4.614	11.485	< 0.0001
Error	106	42.583	0.402		
Corrected Total	112	70.265			

Computed against model Y=Mean(Y)

Figure 4-6: The summary output of the Multiple Regression Statistic of
step-wise model

The coefficient of determination is $R^2 = 0.394$ (figure 4-6), this means that
39,4% of the variation in the overall satisfaction aspect is explained by the six
independent variable, while 60,6% remains unexplained. The P_{value} of F test is less
than 0.0001; therefore, this predictive model is valid.

In particular, the overall satisfaction of users could be predicted by the below
regression equation:

$$Y_{(Overall\ Satisfaction)} = -0.233 - 0.144*X_{1(Adequate\ access\ arrangements)} + 0.292*X_{2(The\ Psychological\ accessibility)} + 0.267*X_{3(Flexibility)} + 0.214*X_{4(Parking\ Facilities)} + 0.207*X_{5(Identity\ \&\ Sign)} + 0.143*X_{6(Public\ safety)}$$

As inferred from that predictive equation, suppose that if each aspect of the independent variables is increased one unit (the user's satisfaction from very dissatisfied to very satisfied was divided in to 7 units), then the overall satisfaction will be increased 0.746 of a unit of the satisfaction by the user's evaluation. In particular:

- If the user's satisfaction on "the psychological accessibility" increases 1 unit then the overall satisfaction of user on the building could be increased 0.292 unit

- If the user's satisfaction on "the flexibility" increases 1 unit then the overall satisfaction of user on the building could be increased 0.267 unit

- If the user's satisfaction on "the parking facilities" increases 1 unit then the overall satisfaction of user on the building could be increased 0.214 unit

- If the user's satisfaction on "the identify-sign" increases 1 unit then the overall satisfaction of user on the building could be increased 0.207 unit

- If the user's satisfaction on "the public safety" increases 1 level unit the overall satisfaction of user on the building could be increased 0.143 unit

- If the user's satisfaction on "the adequate access arrangement" increases 1 unit then the overall satisfaction of user on the building could be decreased 0.144 unit

Among correlated aspects of building function, the aspect of psychological accessibility is the most related to the overall satisfaction of the user, while the aspect

of adequate access arrangement has a negative correlation with the overall satisfaction of the users.

Table 4-9: The model parameters of the predictive model of the overall satisfaction by Multiple Regression with step-wise model

Model parameters

Source	Value	Standard error	t	Pr > |t|	Lower bound (95%)	Upper bound (95%)
Intercept	-0.233	0.540	-0.431	0.667	-1.303	0.838
Reachability	0.000	0.000				
Parking Facilities	0.214	0.073	2.941	0.004	0.070	0.358
The Physical accessibility	0.000	0.000				
The Psychology accessibility	0.292	0.072	4.032	0.000	0.148	0.435
Location	0.000	0.000				
Adequate access arrangements	-0.144	0.049	-2.932	0.004	-0.242	-0.047
Efficient layout	0.000	0.000				
Sufficient floor area	0.000	0.000				
Sufficient vertical dimensions	0.000	0.000				
Functional use of colors and materials	0.000	0.000				
Adequate equipment and arrangement	0.000	0.000				
Flexibility	0.267	0.059	4.515	< 0.0001	0.150	0.385
Adaptable	0.000	0.000				
User ergonomics safety	0.000	0.000				
Public safety	0.143	0.053	2.686	0.008	0.037	0.249
Fire safety	0.000	0.000				
Constructional safety	0.000	0.000				
Traffic safety	0.000	0.000				
Chemical safety	0.000	0.000				
Identity & Sign	0.207	0.075	2.760	0.007	0.058	0.356
Harmony of façade	0.000	0.000				
Privacy	0.000	0.000				
Social Contact	0.000	0.000				
Noise	0.000	0.000				
Light	0.000	0.000				
Interior climate	0.000	0.000				

b. Discussion of the Factors of the Predictive Model

As mentioned in the advantages/disadvantages of the Dong Da complex, the lack of parking is the biggest problem of the Dong Da design. Therefore, it has

affected the users' satisfaction during the time of using and led to the low overall

satisfaction on the quality of their building in Dong Da apartment complex.

The public safety had positive correlation with the overall satisfaction of users.

Thus, according to Lynch (1975), if the security or safety of the environment is better

then one could establish a harmonious relationship between himself and outside

environment. Therefore, the safety had an influence on the user groups of the Dong

Da complex.

Altas & Ozsoy (1998) found that the aspect of flexibility was related to the

overall satisfaction of users with their living. Thus, the cycle adjustment of the

building is ten years when the household is changing the number of users, such as

getting married, a new child and space for adults. The occupancy time of households

in Dong Da apartment complex is longer than 25 year, therefore, they got experience

of the functional aspect of the flexibly of their apartment. Besides, the income of users

got higher in recent year that increased demands of furniture changes in apartment.

Therefore the apartment has to be more flexible for these changes. In short, the

flexibility of the building related to the overall satisfaction of the Dong Da users.

The identity- sign and the psychology accessibility of the building are two

aspects related to the processing of identity and meaning of building image of an

environment by human psychology (Lynch, 1975), while the environment of Dong Da

apartment complex has become an image of an environment in the users' memory.

Therefore, this could be the reason of the positive correlation between the aspects of

identity-sign and psychology accessibility with the overall satisfaction of users on the

building in Dong Da complex. Therefore, in the future, the clarification of identifying

signs and the "welcome of the accessibility" in the new building of the Dong Da project proposal could advantageously influence the overall satisfaction of the users.

In contrary, the aspects of adequate access arrangement had a negative correlation with the overall satisfaction of users in the Dong Da complex. The group of B building users has highest satisfaction (mean = 4.56) on aspect of access arrangements among the groups of user; however, the users separated the corridors that linked to the others access of their apartment. By users' argument from the interview, they claim that too much access of the building decreased the privacy and the security of the building, while Baum (1979), (Lynch, 1975) found that the privacy and security of building related the users' satisfaction on their living. Therefore, this could be the indirect reason why the aspects of access arrangement had negative correlation with the overall satisfaction of user on the building.

c. Conclusion Relationship between the Overall Satisfactions and the Other Satisfactions of User on Aspects of Building Function

In summary, the result showed that the aspects of Parking Facilities; The Psychology accessibility; Public safety and Identify-sign had a positive correlation with the overall satisfaction of users. Therefore, the planner should focus and invest on these aspects of the new buildings of the Dong Da complex; this is an effective planning to get the user's satisfaction for the Dong Da redevelopment project. In contrary, the aspects of adequate access arrangement had a negative correlation with the overall satisfaction of the users.

4.4 The Summary of Results

This section is the summary of research discussions, which were exposed in the three above sections of three results of POE. In particular, seventeen points of implication are found that includes 10 points from the disadvantages and advantages, 6 points from the different groups of user and 1 point from the predictive model of the overall satisfaction of user in the Dong Da complex. In addition, the second part of this section also mentions the limitations of the Dong Da POE results.

4.4.1 The Summary of Dong Da POE results

According to summaries from the three above sections of POE results, this POE research found seventeen implications that become suggestions in the next chapter 5. In briefly, below are the seventeen attention points:
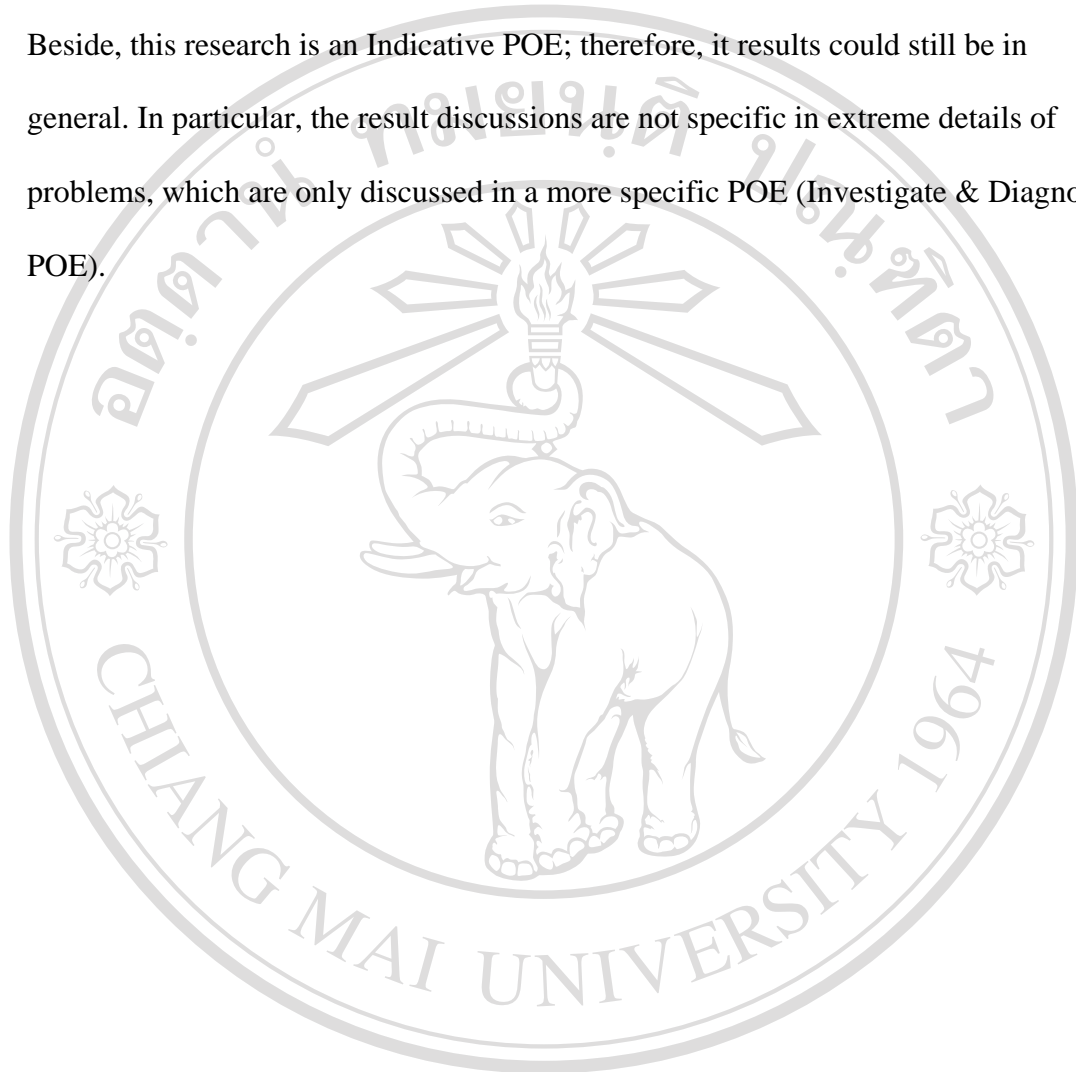
- The advantages of the Dong Da apartment complex:
    - Effect of the neighboring environment, the center location of city and the police station influenced the advantages of the Location and Public aspects of the Dong Da complex
    - A good design of building B that opened three elevations which have contact with natural light

- The disadvantages of the Dong Da apartment complex:
    - The first floor in apartments of Dong Da complex has low height and ventilation , therefore it was impacted by the high humidity and the flood season of Hue

- The low flexibility of apartment B because of the narrow width of the apartment

- The old technology application exposed the drain -water system that effected the chemical safety aspects of the building

- No parking design is a serious mistake in Dong Da complex, the aspect of Parking has the lowest satisfaction

• The disadvantages of the Dong Da complex in building management through the building leader:

  - The lack of funeral space made it difficult for the leader in environmental management of the building

  - The lack of a common space in buildings made it difficult for the leader in public-events organization

  - Unnecessary decoration of building design made it difficult for the leader in building maintenance

  - The long corridor in household apartment is not necessary for housing building because it leads to low privacy of users; the leader always listens to the complains and negative reactions of users

• The differences of user satisfaction between groups of user in Dong Da apartment complex:

  - The user group of B building is more satisfied than A and B building in aspects of Light but is less satisfied in aspects of Flexibility of the building

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- The user group of the first floor has different satisfaction than the other groups of different floors, such as lowest satisfaction on the aspects of privacy and interior climate but highest satisfaction on the aspects of parking and fire safety

- User group of the building living longer than 9 years is more satisfied than the user group under 9 year of occupancy on aspects of Fire safety, Adequate access arrangements, Functional use of colors and materials, User ergonomics safety

- Males are less satisfied than the females on the impact of environment, which are aspects of light and interior climate in Dong Da complex

- Although, the different user groups had a different satisfaction on aspects of the building function, the overall satisfaction of the groups is not different

• The relationship between the user satisfactions on aspects of building function and the overall satisfaction of the users on Dong Da apartment complex:

- The user satisfaction on the aspects of Parking Facilities; The Psychology accessibility; Public safety and Identify-sign are positive correlated with the overall satisfaction of user in Dong Da complex. Contrarily, the user satisfaction on the aspect of Adequate access arrangement is negative correlated with the overall satisfaction of the user

4.4.2. The Limitation of the Results

This POE results is the output of the statistics, therefore, the predictive model of the overall satisfaction is only applied for users in the Dong Da apartment complex. Beside, this research is an Indicative POE; therefore, it results could still be in general. In particular, the result discussions are not specific in extreme details of problems, which are only discussed in a more specific POE (Investigate & Diagnostic POE).