Influence of Master Plan Designs on Housing Project Purchase Decisions in Bangkok Metropolitan Areas

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Abstract

This is a quantitative study on master plan designs for housing estates, residences, and recreational facilities that influence the purchasing decision of customers. The study was divided into three main aspects: (1) master planning, (2) sceneries or side views, and (3) internal systems of housing projects. The researchers gathered data from 411 buyers of residences by quota sampling technique and analyzed the data, using descriptive statistics. Master planning influenced the purchasing decision in four aspects: (1) plot size, (2) plot location, (3) plot planning, and (4) plot density. As to the aspect of scenery and side view, the factors that influence the purchase decision the most are (1) electric pole type, (2) lake, (3) high-voltage poles, and (4) type of water tank whereas in the aspect of internal systems of the housing project the two factors that influence the purchase decisions the most are: (1) security system type and (2) double-security system. Furthermore, the researchers also found that types and pricing levels have relationships with the master plan design influencing the customers' decisions. Real estate developers and architects can use the findings in this research to develop the housing project master plans that stimulate the customers' buying decisions.

Keywords: Design, Master plan, Housing estate, Detached house, Townhouse, Price level

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1. Introduction

A place of residence is one of the most crucial choices in the survival of human beings. While the growing population is fueling the increasing demand for residences, the real estate business grows constantly. There is always competition when creating new business tactics. Thus, current projects are based on proper master plan design, appropriate facilities, and public utility development; e.g., type of architecture, landscape architecture, system design, and materials used in the construction, which promote a balanced environment and are attractive to customers, which in turn become the selling points. The master plan design and landscape architecture in the recreational area have part in improving the quality of life for the residents. However, the master plan for both residential areas and recreational areas should be designed based on customers' needs (Boonyanant, 2011). The project should be well-designed in all aspects. For example, the master planning should include plot location, circulation, housing location and crossroads, connection between residential areas and parks, composition, and proper house-facing direction. The sceneries and side views should include the types of trees, park design, front yard, central park, and materials used in the projects. The internal systems of the housing project should include security system and entrance-exit gate. If all of the designs are well-executed, the project will produce a satisfactory result and be of great value. A well-designed project can extend the value of the project and create a pleasant community. Moreover, an understandingly planned master plan design can also improve the quality of life and support the residents' spirits (Boonkham, 2009). As a lot of new residences are launched into market each year, an understanding about the factors leading to the customers' decisions to buy is extremely important to the real estate entrepreneurs. For these reasons, the researchers are interested in analyzing the master plan designs that significantly influence the customers' decisions to buy and the forms which meet the customers' needs in all housing types and price levels.

For the scope of this study, the researchers have chosen to study existing housing real estate development projects in the Bangkok Metropolitan Areas. The projects studied medium-sized housing projects with 100 - 499 housing plots for sale or 19 - 100 Rai in terms of project size (Office of the Council of State, 2007). The housing type can be either detached houses or townhouses (or row houses) with residents who have stayed in the project for less than three years.

2. Related Literature

According to Kotler's Customer Black Box Model, master plan is one of stimulus, which is processed in the mind (black box) and constitutes the decision-making process of the customers (Khan, 2006). In order to determine the factors influencing the purchase decision for housing projects, thirteen pieces of literature, related to a broad perspective of housing project master plan designs, such as living quality, laws and regulations, design efficiency, property management, sustainability, selling and marketing, feng-shui, and utilization efficiency, were reviewed. Most of them were applicable to the Bangkok Metropolitan area. After the analysis, 16 factors shown in Table 1 were identified as follows: (1) drainage system, (2) safety and lighting, (3) maintenance and common fund, (4) central park,(5) alternative energy system, (6) public area configuration, (7) plant materials, (8) distance to central area, (9) surface materials, (10) footpath and running track, (11) club/swimming pool, (12) playground, (13) road type, (14) sport field and recreational area, (15) sign and entrance arch, and (16) garbage disposal area. These factors are the components of a master plan as mentioned in the literature that determine the ability to stimulate the customer's purchase decisions, according to the Customer Black Box Model.

The researchers developed a questionnaire using these 16 factors and those the researchers analyzed from experience, as shown in Tables 2 - 5. The questions were divided into three groups: master planning, sceneries and side views, and internal systems of the housing estate project, which are detailed later in this article.

Table 1. Related Literature and Components of Master Plan.

Related Literature	Drainage System	Safety / Lighting	Maintenance and Common Fund	Public Park	Alternative Energy System	Area Configuration	Plant Materials	Distance to Central area	Surface Materials	Footpath and Race Track	Club and Swimming pool	Playground	Road Type	Sign and Entrance Arch	Garbage Container Area	Sport Field and Recreational Area
Arumwirot (2013)		/	/	/		/		/	/	/	/	/	/			
Boonkham (2009)	/			/		/	/			/			/			
Boonyanant (2011)		/		/	/		/			/		/	/			
Chaisri (2014)		/	/	/							/		/			
Chuwijit (2012)		/	/	/		/					/			/	/	
Department of Local Administration (2002)		/														
Hudakorn (2011)				/		/										
Maleeloy (2014)	/	/	/	/	/	/	/	/	/	/	/	/	/	/		/
Pongputthaporn (2006)		/	/	/			/				/	/	/		/	/
Rojanasamit (2000)		/	/	/			/	/		/	/	/				/
Sakoolsorn (2011)		/	/	/							/	/	/			
Thipayasothorn (2008)		/	/	/			/					/	/	/		/
Yingvilasprasert (2012)		/		/		/							/			

Table 2. Most influential factors to purchase decision.

Factor	Detached Houses				Townhouses				
	2.01-3.00 MB	3.01-5.00 MB	5.01-10.00 MB	>10.00 MB	<2.00 MB	2.01-3.00 MB	3.01-5.00 MB	5.01-10.00 MB	>10.00 MB
Master Plan Design									
Plot size	⦿		⦿						
Housing plot location		⦿							⦿
Group or linear model				⦿			⦿	⦿	⦿
Plot density in the project					⦿	⦿			
Project Landscape									
Type of electric line (underground and overhead)	⦿								
Lake in the project		⦿	⦿					⦿	⦿
High voltage pole				⦿		⦿	⦿	⦿	
Type of water tank					⦿				
Systems in the Project									
Security system	⦿		⦿		⦿	⦿		⦿	⦿
Double gate security system		⦿		⦿			⦿		

Note: The sign ⦿ means the factor has influential impact on respondents' purchase decision, as shown by its score being higher than 4.20 out of 5.00 Likert Scale.

Table 3. Percentages of selected forms of master planning factors.

Master Planning Perspective	Detached Houses				Townhouses				
	2.01-3.00 MB (N = 55)	3.01-5.00 MB (N = 60)	5.01-10.00 MB (N = 51)	>10.00 MB (N = 40)	<2.00 MB (N = 42)	2.01-3.00 MB (N = 42)	3.01-5.00 MB (N = 41)	5.01-10.00 MB (N = 40)	>10.00 MB (N = 40)
1. Housing Plot Location									
In front of the project site	36.21%	46.88%*	50.91%**	54.76%**	32.50%	38.46%*	55.88%**	52.50%**	31.25%
In the middle of the project site	53.45%**	43.75%*	45.45%	35.71%	50.00%**	41.54%*	35.29%	42.50%	68.75%**
At the back of the project side	6.90%	9.37%	3.64%	9.53%	17.50%	20.00%	8.83%	5.00%	0.00%
Others	3.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2. Plan Design and Context									
Group model	58.62%**	73.44%**	63.64%**	73.81%**	50.00%**	43.08%	35.29%	27.50%	37.50%
Linear model	36.21%	26.56%	32.73%	26.19%	47.50%	56.92%**	61.76%**	67.50%**	62.50%**
Others	5.17%	0.00%	3.63%	0.00%	2.50%	0.00%	2.95%	5.00%	0.00%
3. Club Location									
In front of the project site	43.10%*	31.25%	50.91%**	42.86%*	40.00%*	40.00%*	44.11%*	77.50%**	68.75%**
In the middle of the project site	46.55%*	62.50%**	45.45%	42.96%*	45.00%*	44.62%*	41.18%*	17.50%	18.75%
At the back of the project side	8.62%	6.25%	3.64%	14.28%	12.50%	15.38%	14.71%	5.00%	12.50%
Others	1.73%	0.00%	0.00%	0.00%	2.50%	0.00%	0.00%	0.00%	0.00%
4. Juristic Person Office Location									
In front of the project site	50.00%**	42.19%*	58.18%**	26.19%	45.00%*	50.77%**	23.53%	62.50%**	25.00%
In the middle of the project site	37.93%	45.31%*	40.00%	57.14%**	37.50%*	33.85%	61.76%**	37.50%	75.00%**
At the back of the project side	8.62%	12.50%	1.82%	16.67%	15.00%	15.38%	14.71%	5.00%	12.50%
Others	3.45%	0.00%	0.00%	0.00%	2.50%	0.00%	0.00%	0.00%	0.00%
5. Street Width in the Project									
As prescribed by the law	79.31%**	76.56%**	76.36%**	73.81%**	77.50%**	73.85%**	70.59%**	92.50%**	56.25%**
Wider than prescribed by the law	20.69%	23.44%	23.64%	26.19%	22.50%	26.15%	29.41%	7.50%	43.75%
6. House-Facing Direction									
North	46.55%*	37.50%*	49.09%*	35.71%*	57.50%**	53.85%**	38.24%*	42.50%*	50.00%**
South	15.52%	18.75%	23.64%*	35.71%*	7.50%	12.31%	35.29%*	37.50%*	31.25%
East	31.03%*	31.25%*	21.82%	23.82%	22.50%	18.46%	5.88%	15.00%	12.50%
West	6.90%	12.50%	5.45%	4.76%	12.50%	15.38%	20.59%	5.00%	6.25%
7. Drain Cover Location									
On the road surface	32.76%	42.19%	56.36%**	33.33%	47.50%	50.77%**	23.53%	60.00%**	18.75%
On the footpath	62.07%**	56.25%**	43.64%	66.67%**	50.00%**	46.15%	76.47%**	40.00%	81.25%**
Others	5.17%	1.56%	0.00%	0.00%	2.50%	3.08%	0.00%	0.00%	0.00%
8. Central Park Location									
In front of the project site	29.31%	25.00%	40.00%*	16.67%	12.50%	23.08%	44.12%*	47.50%	12.50%
In the middle of the project site	53.45%**	59.38%**	47.27%*	73.81%**	57.50%**	55.38%**	47.06%*	50.00%**	81.25%**
At the back of the project side	15.52%	15.62%	12.73%	9.52%	27.50%	21.54%	8.82%	2.50%	6.25%
Others	1.72%	0.00%	0.00%	0.00%	2.50%	0.00%	0.00%	0.00%	0.00%
9. Decorative Shape Design									
Freeform	37.93%*	50.00%**	56.36%**	38.10%*	35.00%*	43.08%*	44.12%*	55.00%**	31.25%*
Square	29.31%*	21.88%	20.00%	26.19%	32.50%*	27.68%*	26.47%*	35.00%	37.50%*
Round	22.41%	23.44%	16.36%	30.95%*	17.50%	23.08%	23.53%	7.50%	12.50%
Trapezoid	8.62%	3.13%	5.45%	4.76%	7.50%	3.08%	0.00%	2.50%	0.00%
Triangle	0.00%	1.55%	1.83%	0.00%	5.00%	3.08%	5.88%	0.00%	18.75%
Others	1.73%	0.00%	0.00%	0.00%	2.50%	0.00%	0.00%	0.00%	0.00%
10. Central Park Area Size									
Large size	12.07%	26.56%	18.18%	30.95%	17.50%	10.77%	17.65%	15.00%	37.50%
Medium size	72.41%**	50.00%**	65.45%**	64.29%**	72.50%**	81.54%**	67.65%**	67.50%**	56.25%**
Small size	13.79%	20.31%	10.91%	4.76%	10.00%	7.69%	14.70%	7.50%	6.25%
Central park is not needed	1.73%	3.13%	5.46%	0.00%	0.00%	0.00%	0.00%	10.00%	0.00%

Table 3. Percentages of selected forms of master planning factors. (continued)

Master Planning Perspective	Detached Houses				Townhouses				
	2.01-3.00 MB (N = 55)	3.01-5.00 MB (N = 60)	5.01-10.00 MB (N = 51)	>10.00 MB (N = 40)	<2.00 MB (N = 42)	2.01-3.00 MB (N = 42)	3.01-5.00 MB (N = 41)	5.01-10.00 MB (N = 40)	>10.00 MB (N = 40)
11. Road Pattern									
Straight road	12.07%	6.25%	7.28%	0.00%	22.50%*	20.00%*	8.83%	15.00%	12.50%
Main road with collector roads	29.31%*	10.94%	18.18%	11.90%	32.50%*	38.46%*	11.76%	25.00%*	25.00%*
Tabular road	20.69%*	20.31%	16.36%	7.15%	17.50%	18.46%	20.59%*	22.50%	12.50%
Circular road	20.69%*	29.69%*	36.36%*	28.57%	22.50%*	15.38%	47.06%*	30.00%*	37.50%*
Other non-specific form	17.24%	32.81%*	21.82%*	52.38%**	5.00%	7.70%	11.76%	7.50%	12.50%
12. Footpath Type									
Bushes next to the road before footpath	41.38%	43.75%*	38.18%*	64.29%**	50.00%**	47.69%*	41.18%*	52.50%**	31.20%*
Footpath next to the road before bushes	51.72%**	40.63%*	45.45%*	23.81%	40.00%	36.92%*	32.35%*	35.00%	43.75%*
Footpath and bushes next to the road alternatively	6.90%	14.06%	16.37%	7.14%	7.50%	13.85%	26.47%	12.50%	25.05%
Others	0.00%	1.56%	0.00%	4.76%	2.50%	1.54%	0.00%	0.00%	0.00%
13. Size of Pocket Park in front of the Project									
Big size	12.07%	21.88%	21.82%	38.10%	10.00%	7.69%	41.18%*	17.50%	25.00%
Middle size	68.97%**	57.81%**	65.45%**	57.14%**	75.00%**	83.08%**	32.35%	65.00%**	62.50%**
Small size	12.07%	15.63%	3.64%	2.38%	15.00%	6.15%	26.47%*	10.00%	0.00%
Pocket park is not needed	6.89%	4.68%	9.09%	2.38%	0.00%	3.08%	0.00%	7.50%	12.50%
14. Central Park Design									
Single big park	48.28%	57.81%**	49.09%	69.05%**	60.00%**	60.00%**	32.35%	52.50%**	62.50%**
Pocket parks in different areas	51.72%**	42.19%	50.91%**	30.95%	40.00%	40.00%	67.65%**	47.50%	37.50%
15. Traffic, Road and Footpath Design									
Various passage with good connection	22.70%*	21.66%*	12.14%	25.25%*	22.37%*	20.23%*	16.47%*	21.70%	17.02%
Continuity	7.09%	12.10%	11.43%	4.04%	14.47%	9.83%	4.71%	13.21%	8.51%
Appropriate for all sex, age and the disable	30.50%*	26.11%*	32.86%*	23.23%	27.63%*	24.28%*	5.29%	30.19%*	34.04%*
Well-arranged	13.48%	8.92%	10.00%	11.11%	13.16%	16.18%	11.76%*	6.60%	8.51%
Good materials	18.44%	20.38%*	21.43%*	29.29%*	15.79%	18.50%*	23.53%*	22.64%*	23.41%*
Beauty and luxury	6.38%	10.93%	12.14%	7.08%	5.26%	10.98%	7.06%	5.66%	8.51%
Others	1.41%	0.00%	0.00%	0.00%	1.32%	0.00%	1.18%	0.00%	0.00%
16. Facilities									
Swimming pool	25.65%*	23.21%*	25.60%*	24.09%*	27.87%*	26.05%*	29.25%*	25.98%*	22.95%*
Fitness club	24.08%*	23.63%*	29.17%*	24.00%*	25.41%*	23.53%*	31.13%*	26.77%*	19.67%*
Movie room	3.66%	2.52%	2.37%	4.38%	3.28%	0.84%	0.00%	2.37%	0.00%
Library	5.24%	7.59%	4.76%	4.38%	5.74%	4.62%	1.89%	5.51%	8.20%
Meeting room	7.33%	8.02%	5.95%	9.49%	2.46%	5.88%	3.77%	7.09%	8.20%
Parking lots	14.14%	14.35%	14.29%	18.98%*	15.57%	16.39%	16.04%	7.87%	19.67%*
Convenience store	19.90%*	20.68%*	17.86%	14.68%	19.67%	22.69%*	17.92%	24.41%*	21.31%*

Note: ** Form that has effect on purchase decision of not less than 50% of respondents.
* Forms that each has effect on purchase decision less than 50% but contributing to not less than 50% of respondents.

Table 4. Percentages of selected forms of sceneries and side view factors.

Sceneries and Side Views Perspective	Detached Houses				Townhouses				
	2.01-3.00 MB (N = 55)	3.01-5.00 MB (N = 60)	5.01-10.00 MB (N = 51)	>10.00 MB (N = 40)	<2.00 MB (N = 42)	2.01-3.00 MB (N = 42)	3.01-5.00 MB (N = 41)	5.01-10.00 MB (N = 40)	>10.00 MB (N = 40)
1. Park Design									
Tropical style	12.07%	23.44%*	30.91%*	11.90%*	30.00%*	20.00%*	11.76%	22.50%	0.00%
Flower park	25.86%*	18.75%*	14.55%	21.43%*	5.00%	18.46%	23.53%*	35.00%*	12.50%
Artificial park	20.69%	18.75%*	10.91%	2.57%	10.00%	21.54%*	14.71%	5.00%	0.00%
Modern park	31.03%*	21.88%*	20.00%*	21.43%*	27.50%*	21.54%*	35.29%*	25.00%*	50.00%**
Japanese park	6.90%	6.25%	7.27%	9.52%	10.00%	7.69%	3.88%	2.50%	12.50%
Chinese park	0.00%	4.68%	5.45%	4.76%	7.50%	3.08%	2.95%	2.50%	25.00%
Park with water area	3.45%	6.25%	10.91%	2.39%	10.00%	7.69%	5.88%	7.50%	0.00%
2. Entrance Gate in front of the Project									
Without overhead structure	41.38%	42.19%	43.64%	80.95%**	55.00%**	43.08%	23.53%	35.00%	50.00
With overhead structure	55.17%**	53.13%**	56.36%**	19.05%	40.00%	56.92%**	76.47%**	65.00%**	50.00%**
Others	3.45%	4.68%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3. Tree Type									
Flowering plants	25.87%	46.88%*	38.18%*	52.38%**	40.00%*	52.31%**	17.65%	55.00%**	68.75%**
Foliage plants	65.79%**	37.50%*	41.82%*	40.48%	47.50%*	41.54%	58.82%**	30.00%	12.50%
Fragrant plants	5.17%	7.81%	16.36%	4.76%	12.50%	4.62%	20.59%	15.00%	18.75%
Fruit plants	5.17%	7.81%	3.64%	2.38%	0.00%	1.53%	2.94%	0.00%	0.00%
4. Electricity and Telephone Wiring Installation									
Overhead	24.14%	23.44%	18.18%	16.67%	32.50%	13.85%	8.82%	10.00%	6.25%
Underground	75.86%**	76.56%**	81.82%**	83.33%**	67.50%**	86.15%**	91.18%**	90.00%**	93.75%**
5. Plants Used on the Traffic Islands									
Bush	46.55%*	59.38%**	38.18%*	50.00%**	55.00%**	63.08%**	32.35%*	32.50%*	43.75%*
Flowering plants	39.66%*	28.13%	32.72%*	19.05%	22.50%	13.85%	20.59%	27.50%*	31.25%*
Perennial plants	12.07%	10.94%	14.55%	2.38%	17.50%	10.77%	29.41%*	15.00%	6.25%
Not necessary	0.00%	1.55%	14.55%	28.57%	2.50%	12.30%	17.65%	25.00%	18.75%
Others	1.72%	0.00%	0.00%	0.00%	2.50%	0.00%	0.00%	0.00%	0.00%
6. Type of Water Tank									
On the ground	27.59%	17.19%	25.45%*	0.00%	20.00%	21.34%	8.82%	27.50%*	18.75%
Underground	60.34%**	64.06%**	45.45%*	92.86%**	57.50%**	52.31%**	47.06%*	47.50%*	62.50%**
Tower	10.34%	18.75%	16.36%	4.76%	15.00%	26.15%	38.24%*	20.00%	18.75%
Not necessary	1.73%	0.00%	12.74%	2.38%	0.00%	0.00%	5.88%	5.00%	0.00%
Others	0.00%	0.00%	0.00%	0.00%	7.50%	0.00%	0.00%	0.00%	0.00%
7. Main Entrance Road Type									
With traffic island	44.83%	39.06%	30.91%	21.43%	65.00%**	35.38%	52.94%**	60.00%**	43.75%
Without traffic island	55.17%**	60.94%**	69.09%**	78.57%**	35.00%	64.62%**	47.06%	40.00%	56.25%**
8. House Border									
Partitioned, solid fence (Taller than eye level)	32.76%*	28.13%*	21.82%	14.29%	47.50%*	27.69%*	17.65%	35.00%*	12.50%
No fence	41.57%*	43.73%*	36.36%*	57.14%**	27.50%*	32.31%*	50.00%**	40.00%*	50.00%**
Border with solid fence (not too tall)	18.97%	12.49%	23.64%*	16.67%	12.50%	24.62%	8.82%	17.50%	25.00%
Border with transparent fence	6.90%	15.65%	18.18%	11.90%	12.50%	15.38%	23.53%	7.50%	12.50%
9. Materials Used in Central Area									
Steel	13.79%*	1.53%	0.00%	2.38%	2.50%	3.08%	8.83%	0.00%	0.00%
Plastic	5.18%	12.50%	10.91%	4.77%	2.50%	3.08%	5.88%	10.00%	0.00%
Wood or composite wood	12.07%*	18.73%*	14.55%	28.57%*	15.00%	13.85%	20.59%*	12.50%	6.25%
Recycled materials	12.07%*	12.50%	9.09%	9.52%	2.50%	9.23%	17.65%	2.50%	12.50%
Cement, concrete and tiles	12.07%*	15.65%*	20.00%*	7.14%	40.00%*	21.54%*	11.76%	20.00%	31.25%*
Special water-permeable materials	10.34%	10.94%	7.27%	2.38%	7.50%	7.68%	5.88%	5.00%	12.50%
Mixed	34.48%*	28.15%*	38.18%*	45.24%*	30.00%*	41.54%*	29.41%*	50.00%**	37.50%*

Note: ** Form that has effect on purchase decision of not less than 50% of respondents.
* Forms that each has effect on purchase decision less than 50% but contributing to not less than 50% of respondents.

Table 5. Percentages of selected forms of internal systems of housing project factors.

Internal Systems of the Housing Project Perspective	Detached Houses				Townhouses				
	2.01-3.00 MB (N = 55)	3.01-5.00 MB (N = 60)	5.01-10.00 MB (N = 51)	>10.00 MB (N = 40)	<2.00 MB (N = 42)	2.01-3.00 MB (N = 42)	3.01-5.00 MB (N = 41)	5.01-10.00 MB (N = 40)	>10.00 MB (N = 40)
1. Security System Type									
Guardhouse	20.09%*	16.55%*	23.39%*	16.95%*	20.75%*	17.39%*	17.65%	21.43%	18.18%*
Surveillance camera	24.30%*	20.07%*	23.39%*	20.90%*	20.75%*	20.40%*	27.73%*	26.43%*	22.73%*
Alarm system	11.68%	14.08%	12.84%	12.43%	13.84%	16.05%	11.76%	13.57%	15.15%
Keycard system	23.36%*	17.96%*	22.02%*	20.34%*	20.13%*	19.06%*	25.21%*	25.00%*	19.70%*
Metal steel fence	2.34%	4.93%	2.75%	6.78%	5.66%	4.01%	1.69%	0.71%	1.51%
Location where all the security guards record the time	13.55%	12.68%	9.17%	15.25%	10.69%	13.38%	10.92%	6.43%	12.12%
Intruder detection system with beam detector at the back fence of the project	4.68%	13.73%	6.44%	7.35%	8.18%	9.71%	5.04%	6.43%	10.61%
2. Entrance and Exit Gate									
Folding gate	32.76%	29.69%	36.36%*	45.24%*	27.50%	26.15%	32.94%*	45.00%*	12.50%
Barrier gate	58.62%**	37.50%*	25.46%	16.66%	50.00%**	58.46%**	17.65%	32.50%*	43.75%*
Sliding gate	8.62%	32.81%*	38.18%*	38.10%*	20.00%	15.39%	29.41%*	22.50%	43.75%*
Others	0.00%	0.00%	0.00%	0.00%	2.50%	0.00%	0.00%	0.00%	0.00%

Note: ** Form that has effect on purchase decision of not less than 50% of respondents.
* Forms that each has effect on purchase decision less than 50% but contributing to not less than 50% of respondents.

3. Data and Methodology

This research is a descriptive study using quantitative methodology. The research population is the 2,753,972 people who bought properties in Bangkok (BMA Data Center, 2016). The first stage of the quantitative data collection and analysis was determining the demographic characteristics and samples; e.g., customers who bought properties in housing estates, including (1) detached houses and (2) townhouses at five different price levels: (1) less than 2.00 million baht (townhouse only), (2) 2.01 - 3.00 million baht, (3) 3.01 - 5.00 million baht, (4) 5.01 - 10.00 million baht, and (5) more than 10.00 million baht (Government Housing Bank, 2015). Each housing segment (type and price range) contained at least 40 samples, which is higher than the number (30 samples) suggested by Ngam-Yan (2011) for Parametric Statistics, with a total of 411 samples selected by the Quota Sampling Technique.

Demographic data and project details that affected the purchasing decision were studied by collecting demographic factors, type of house (detached house and townhouse), and price range, and the data collection tool was a questionnaire using a Likert Scale and multiple choice questions. The Likert Scale questions were used to determine how the factors collected from the literature impact on the respondents' decisions to buy residences, multiple choice questions were used to obtain further details of some factors and to clarify the designers' questions.

The analysis was conducted using a Best (1981) translation of the average scores, which categorized the factors with 1.00 - 5.00 average score range into five groups (lowest influential, low influential, medium influential, high influential, and highest influential), and a 4.21 - 5.00 score shows the highest influential factors in purchase decision from the five Likert Scale categories. The answers to the multiple choice questions were analyzed, taking into

account the percentage of the respondents who selected each choice, representing each form of a specific master plan design factor; then, the choice(s) that contributed no less than 50% of all respondents for each factor were highlighted. Finally, the highest influential factors in purchase decision and form(s) of the factors contributing to the majority of the respondents were discussed and used to develop some suggestions for the stakeholders of housing projects.

4. Results

The results of the study are divided into three parts: master planning, sceneries or side views, and internal systems of the housing project, while the highest influential factors to the purchase decision are considered. Table 2 shows the factors with very high influences on the purchase decision of the customers of each type (detached house and townhouse) and selling price range (four price ranges for detached house and five price ranges for townhouse) of residences, while the proportions of the answerers about their preferable forms for such factors are described in Tables 3 - 5, respectively.

After the data collected were analyzed, as shown in Tables 2 - 5, for both detached houses and townhouses, the conclusions are as follows:

4.1 Master Planning

From Table 2, there are four factors in the master plan design that most influence the purchase decision: (1) plot size, residents from the following house type and price levels gave priority to this factor, detached houses at price level of 2.01 - 3.00 million baht and detached houses at price level of 5.01 - 10.00 million baht; (2) plot location, residents from the following house types and price levels gave priority to this factor, detached houses at price level of 3.01 - 5.00 million baht and townhouses at price level of more than 10.00 million baht; (3) plot planning, both group and linear models, residents from the following house types and price levels gave priority to this factor, detached houses at price level of more than 10.00 million baht and townhouses at price level of more than 3.01 million baht; and (4) plot density, residents from the following house type and price levels gave priority to this factor, townhouses at price level of less than 2.00 million baht and townhouses at price level of 2.01 - 3.00 million baht.

As to the forms of the design factors affecting to the buyers' decisions in housing projects, the research results show the following:

(1) Regarding plot location and size compared to the single housing group, the higher the price level, the higher the percentage of respondents who preferred the houses in the front of the project site. This leads to the conclusion that residents from the lower price level housing are more interested in central areas than those from higher price level housing. For townhouse group, the residents from the price level of less than 2.00 and more than 10 million baht preferred the plot in the center of the project. In the detached house group, residents from the price level of more than 10 million baht preferred the plot in front of the project site, the same as the townhouse group with the price level between 3.01 - 10.00 million baht.

(2) Plan design and context of the project: the group model is preferred in all price levels of detached houses, whereas the linear model tends to be preferred in all price levels of townhouses.

(3) Club location: Residents from both detached houses and townhouses at different price levels preferred the club to be located in front of or in the middle of the project, not the back of the project. Residents from the detached house group at the price level of 3.01 - 5.00 million baht desired the club to be located in the middle of the project while the price level of 5.01 - 10.00 million baht desired it in the front of the project. The residents from the townhouse group with the price level above 5.01 million baht preferred the club to be located in front of the project.

(4) Juristic person office location: Residents from both house types with different price levels preferred the juristic office location to be in front of or in the middle of the project, but not in the back of the project. The residents from houses and townhouses with prices of 2.01 - 3.00 and 5.01 - 10.00 million baht preferred the location in front of the project while the houses and townhouses with prices more than10 million baht preferred the location in the middle of the project. In addition, the residents from the 3.01 - 5.00 million baht townhouses preferred the juristic person to be located in the middle of the project site.

(5) Width of the roads: Residents from both house types at different price levels preferred the width of the roads to be as prescribed by the law and had no interest in wider roads.

(6) House-facing direction: Residents from both house types and from all price levels preferred the house facing north. The south seems to be preferred by the residents of more than 5.01 million baht houses and 3.01 - 10.00 million baht townhouses, while the east is preferred by the residents of 2.01 - 5.00 million baht houses.

(7) Drain cover location: Residents from almost all price levels of houses preferred the drain cover on the footpath than on the road, except those of the 5.01 - 10.00 million baht ones. As to townhouses, this issue seemed to be linked to the price level.

(8) Central park location: Residents from both house types and from all price levels preferred the park location to be in the middle of the project. This implies that the residents want to have easy access to the central park.

(9) Decorative shape design in central area: Residents from both house types and from all price levels preferred a freeform and square shape. Residents do not desire the trapezoid or triangular shapes as they will create a narrow angle and less space.

(10) Central area size: Residents from both house types and from all price levels preferred an appropriately sized central area, not too big or too small. If the central area is too big, maintenance will be more expensive. If the central area is too small, it will not be efficiently used.

(11) Road pattern: There was no clearly preferred pattern. The residents from detached houses preferred a circular road or a freeform road, while the residents from townhouses preferred a straight road, a main road with collector, and a circular road.

(12) Footpath design: Residents from almost all price levels and from all house types desired the footpath design to have greenery bushes next to the road before the footpath, except those with the 2.01 - 3.00 million baht houses who preferred the footpath next to the road before bushes. Moreover, the footpath next to the road before bush design was also preferable in houses of less than 10.00 million baht and townhouses of 2.01 - 5.00 and more than 10.00 million baht.

(13) Pocket park in front of project: Residents from both house types and from all price levels tended to prefer a middle-sized park. If the park is too big, it requires higher expense for maintenance. If the park is too small, it will not be attractive.

(14) Central park: Residents from both house types and from all price levels tended to prefer a single big central park. However, small parks in different areas can be an alternative.

(15) Traffic, road, and footpath design: Residents from both house types and from all price levels tended to be concerned about the design for all genders, ages, and the disabled, with various passages designed at the same site, and also with a good connection or good materials used.

(16) Facilities: Swimming pool and fitness area were the main facilities required by the residents from both house types and from all price levels, while the alternative choice was a convenience store.

The customers' needs from both housing types can be concluded as follows: a good master plan design will help create efficient public area usage and easy access to the area. Residents from detached houses focus more on the easy access and transportation convenience while residents from the townhouse group focused more on staying near the facility in the project. The central park plan should be made into a single big park for efficient use, ease of maintenance, and management. The central park and pocket park size in the project should be of an appropriate size, neither too large nor too small, for all housing types and level prices. If the central park is too large, there will be more expense on maintenance and management.

4.2 Sceneries and Side Views

From Table 2, the four highest influencing factors in landscape design from each price level of both detached houses and townhouses are as follows: (1) electric line type; e.g.,overhead or underground, residents detached houses at price level of 2.01 - 3.00 million baht gave priority to this factor; (2) lake in the project, residents from the following house types and price levels gave priority to this factor: detached houses at 3.01 - 10.00 million baht and townhouses at price level of above 10.00 million baht; (3) no high voltage electric pole in the project, residents from the following house types and price levels gave priority to this factor: detached houses at price level of above 10.00 million baht and townhouses at price level of 2.01 - 10.00 million baht; and (4) water tank type, residents from townhouse at price level of below 2.00 million baht gave priority to this factor.

From Table 3, all influencing factors in both detached houses and townhouses can be concluded as follows:

(1) Garden style: Residents from detached houses and from all price levels preferred three styles of park, namely tropical style, flower gardens, and modern parks. Residents from townhouses at all price levels preferred

the modern parks while tropical parks and flower gardens can be the alternatives.

(2) Entrance gate: Residents from detached houses at low to medium price levels preferred the entrance with an overhead structure rather than without an overhead structure, which was preferable in high price houses and low price townhouses.

(3) Tree type: Residents from both house types and from all price levels preferred flowering plants or foliage plants. However, the high price level residents tended to prefer flowering plants while the low price level residents tended to prefer foliage plants. The maintenance expense seemed to be the main reason for this finding.

(4) Electric and telephone wiring installation: Residents from both house types and from all price levels preferred underground installation for the good scenery of the project.

(5) Plants used on traffic islands: Residents from both groups and from all price levels preferred bushes. Flowering plants were an alternative.

(6) Water tank type: Residents from both groups and from all price levels preferred an underground location to maintain a clear view of the scenery in the project.

(7) Main entrance road type: Residents from both house types and all price levels preferred roads without traffic islands because it is more convenient to cross the road. However, roads with traffic islands can be an alternative in townhouse projects.

(8) House border: Residents from both house types and from all price levels preferred the house border with no fence. This will make the area look spacious. However, the survey found that house border with high opaque fence (taller than eye level) was also preferable in some segments, especially those with low price level.

(9) Materials used in central area: Residents from both house types and from all price levels preferred the use of mixed materials. Wood or composite wood and concrete, cement, and tile are the main materials to be used.Recycled material is not yet a concern of the respondents.

The needs of customers from both housing types can be concluded as follows: residents gave priority to the aesthetics and beauty of the project perspectives both within and outside the project site. They preferred a good combination of living and nature, and shady trees which would create a good atmosphere within the project. In some projects, park design is a great concern. The park and trees should have the same style. Architecture and landscape architecture should be well designed. The transportation infrastructure in both detached houses and townhouses should not be complicated or inconvenient to use. Moreover, the roads should not be too straight to prevent fast driving. A circular road or zigzag road at intervals can be used to slow down the driving speed. The footpath nearby the road should look lively and decorated with bushes to create more green space. The design should be made for all ages and genders including having ramps for wheel chairs. A swimming pool and the surrounding area design could be a selling point of the project by including some features, such as some shades and areas facing west for sunbathing. A swimming pool can also be a good view from the fitness room. For the electrical wiring issue, if underground wiring is not possible, a high voltage transformer and wiring should be placed in a safe place; this should be far from the housing plots. However, the budgets for the project development should be taken into account.

4.3 Internal Systems of Housing Project

From Table 5, the top two influential factors of the purchase decision in the internal systems of the housing project perspective are (1) security system, for example, guardhouses, surveillance cameras, keycards for project entrances and exits, for residents from the following house types and price levels gave priority to this factor: detached houses at price levels of 2.01 - 3.00 million baht and 5.01 - 10.00 million baht and townhouse type at price levels of below 2.00 million baht, 2.01 - 3.00 million baht, and above 5.01 million baht and (2) double gate security, for residents from the following house types and price levels gave priority to this factor: detached houses at price level 3.01 - 5.00 million baht and above 10.00 million baht and townhouses at price level of 3.01 - 5.00 million baht.

From Table 3, all influencing factors in both detached houses and townhouses can be concluded as follows:

(1) Security systems: Residents from both house types and from all price levels were highly concerned about security. Guardhouses, surveillance cameras, and keycard system are needed.

(2) Entrance and exit gateway: Residents from both house types preferred entrance and exit barrier gates. Residents from moderate to high price level housing preferred a folding gate or sliding gate. These gates, unlike barrier gates, can be decorated and made luxury, which the residents from high price level housing prefer.

In summary, residents are concerned with safety and security. The design should make the residents feel safe within the project. A double gate security system that ensures the safety of life and assets within the project site is preferable. Guardhouses, surveillance cameras, alarm system, keycard system, and fences are only parts of the security system. Any of these designs should match the area and context within and outside the project. The most dangerous looking place should be made safer or the safest. For example, designing the road to be on the outer margin of the project site will place the housing plot in the inner area, further from the fence connecting to other people's areas. This will make residents feel safer.

5. Conclusion

This research studied the master plan designs for housing estates, residences, and recreational facilities that influence the purchasing decision of customers. The highest influential factors to the purchase decision and the favorite styles of master plan design factors are different among residential types and price levels. However, it should be noted that the highest influential factors to the purchase decision found seem to be the factors the authors added from their experience in master plan design rather than those from the literature review. This shows the special requirements of the customers when all the basic factors mentioned in the literature were satisfied. The master plan design does not include only specific components or plans inside the project site, but also the context and characteristics of the project site. Afterwards, all the data gathered from the survey were used to create a master plan for the housing estate. The results of this research have several benefits for developers and designers. The results can be used as guidelines for developing housing projects when designing the project master plan, allocating appropriate budgets to the project components, and promoting the project selling rate. However, there are some research limitations to be stated. Firstly, in order to simplify the research, only house types and prices were used in classifying the residences into segments. The influence of project design on purchase decision seems to be varied and difficult to identify by only housing prices and types. Secondly, in the questionnaire survey, the data were obtained mainly via letters, from which the respondents may not be able to visualize the real design. Thirdly, the data gathered from the people who live in the actual housing estate can be biased since they may answer the questions using their housing estate site as a standard. Fourthly, as this research focused on presenting the highest influential factors on the purchase decision and their favorite forms, only descriptive statistics were used in the data analysis. Finally, the results of this study can be used to help in developing the housing estates for both detached houses and townhouses at all price levels.

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