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Applying the A-Kano Model to Assess the Impact of Common Area Elements on Customers' Perceptions of Subdivision Housing Projects in Metropolitan Bangkok

Kongkoon Tochaiwat[1,2], Damrongsak Rinchumphu[3,*], Jatuphon Wangsong[1], Patcharida Seniwong[1]

[1] Faculty of Architecture and Planning, Thammasat University, Thailand.
[2] Thammasat University Research Unit of Project Development and Innovation in Real Estate Business, Thailand
[3] Faculty of Engineering, Chiang Mai University, Chiang Mai, Thailand
*Corresponding e-mail: damrongsak.r@cmu.ac.th

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ABSTRACT

In the field of residential real estate development, understanding customer perception contributes to project success. This quantitative research studied customer perception towards common area elements in housing projects by applying the Analytical Kano (A-Kano) Model. Information was collected from a questionnaire survey of 150 buyers of detached and semi-detached houses in housing projects situated in metropolitan Bangkok who purchased their properties within five years. The quota sampling method was used, and the data were analyzed by descriptive statistics and the A-Kano Model. The research results identify important characteristics of three groups of residential development common area elements: (1) must-have elements, (2) one-dimensional elements, and (3) attractive elements. Buyers agree that most public utility elements are essential (a "must-have"), while landscape features are one-dimensional or related to satisfaction. The research results can offer guidelines to help developers determine and choose the right elements to include in common areas to stimulate buying decision by customers.

Keywords: common areas, subdivision housing project, a-kano model, buying decision, customer perception

INTRODUCTION

Thais believe that a residence is one of life's four requisites, i.e., clothing, food, shelter, and medicine. Society, of course, is continually developing to meet the needs of the rising population, resulting in economic growth and improved quality of life. As a result, the real estate business is highly competitive. When these constantly developing expectations are coupled with the lifestyle changes that resulted from the COVID-19 pandemic, it is clear that project developers must adjust to key changes, and apply various strategies to develop projects that respond to such demands. It is also clear that each project's development model differs from those of its competitors (Arumwirot, 2015).

The housing business continues to grow (Real Estate Information Center, 2021). For a developer to succeed in this growing market, common areas are very important because they respond to the needs and support the residents' quality of living. Tochaiwat (2020) surveyed the buyers of various types of residences and found that common areas have a high level of influence on buying decisions. Successful developers, then, aim to design and build common areas that meet statutory requirements but which also cater to the needs of residents (Riratanaphong et al., 2016). A housing project has various common area elements, including public utilities and public facilities such as common areas and recreational areas (Threekunprapa, 2014). Therefore, project developers need to study their potential customers' requirements before designing these common areas in order to understand and determine the arrangement of common areas that best respond to the resident's needs and requirements. This process will lead to increased project sales and lead to sustainable success in the long term (Tochaiwat, 2020; Yildirim, 2020).

However, it has been found that the generally used approach for studying customers' requirements using a Likert Scale and Descriptive Statistics has some drawbacks, as discussed by Li (2013); Hodge and Gillespie (2003). One important weakness of the approach is that it forces respondents to choose from the given options, which may not reflect their exact requirements. This issue causes information distortion and could result in the loss of important information.

The Kano Model, developed by Dr. Noriaki Kano in 1984, is a theory used to study the needs or satisfaction of buyers of a product or service. The theory helps prioritize the importance of systematically developing a product or service, and improving its characteristics in order to offer buyers the most satisfactory answer to their needs (Sauerwein et al., 1996). Moreover, the model can also be used to categorize the needs and preferences of different buyer groups, resulting in better plans and strategy adjustments that respond to their needs in order to precisely satisfy each customer group (Chapavang & Kaemkate, 2014).

Understanding the background and importance of the common area elements in housing projects, the researchers were interested in studying and analyzing the different perspectives towards residents' concerns about the elements of common areas, and set out to identify and analyze the differences between those acquired by the Likert Scale approach and those identified by using the Kano model. The researchers also aimed to classify these elements according to the Kano model using the Analytical Kano (A-Kano) Method (Xu et al., 2009) to classify the different types of characteristics to better reflect the customers' perspectives of the common areas of a housing project, and reveal effective strategies for integrating them into the project design and development phrases. This new understanding will be constructive for entrepreneurs, designers, and buyers of housing projects.

LITERATURE REVIEW

Selection concepts that affect the level of housing prices

Housing projects comprise different types of houses, such as detached or semi-detached houses or townhomes; the proper housing selection is that which meets the needs of the residents and offers benefits in terms of efficiency and cost-effectiveness (Real Estate Information Center, 2011). The literature review suggested that residents are inclined to choose a house based on both external and internal factors. The internal factors consist of personal

requirements that may differ for each individual. The main internal factor is the price (which is related to the person's occupation and income), the use of common areas within the project, and proximity to the workplace (Hellberg et al., 2021; Maoludyo & Aprianingsih, 2015). External factors are the physical characteristics of the housing, such as the environment, accessibility to housing, utilities, and the social conditions surrounding the properties (Zeng, 2013).

Since price, because it relates directly to affordability or the buyer's ability to pay the mortgage, is one of the key factors affecting decisions to choose a residence, the acquired data of this research were collected, grouped, and analyzed according to price ranges of the studied houses. One prior study, a survey by the Agency for Real Estate Affairs (2021), revealed that detached and semi-detached houses can be divided into five groups, according to price range, namely (1) lower than $91,970, (2) $91,971–$153,280, (3) $153,281– $306,560, (4) $306,561–$613,120 and (5) higher than $613,121. At the time of the study, the exchange rate was 32.62 baht per US dollar (Bank of Thailand, 2021). This paper converts all prices into US dollars for categorization purposes.

Importance of the design principle of the housing projects' common areas

From the literature review, it was found that the design of the housing projects' common areas is related to the purchasing needs of residents. Two essential issues are involved: the importance of designing the common areas of the housing projects, and the principles of designing common areas of the housing projects, which will be briefly elaborated.

Importance of the common areas

Common areas are essential to a housing project's residents since they directly affect users' physical and mental behaviors. Supportive and compatible design of such areas to suit the usage is necessary. Studying the usage behavior will lead to the design of the most suitable models and elements of each housing project's common areas (Brankov, 2019), which will vary according to the principle of designs, sizes, and numbers of activities. Of central importance are the public benefits for the residents that promote a better quality of living (Threekunprapa, 2014).

The researchers also found that creating designs reflect the homebuyers' interests is important. Several design factors should be considered, such as parks, security systems, common area management systems, clubhouses, swimming pools, roads, playgrounds, and other aesthetic factors. These traits determine the importance of meeting the buyers' interests, which helps promote better sales (Tochaiwat et al., 2018).

Elements of housing projects' common areas

The common areas for detached and semi-detached housing projects include such things as public utilities, facilities, decorations, and landscaping (Limpanich, 2014). The researcher scrutinized books, academic journals, and online information from entrepreneurs, and summarized the elements of common areas discussed in prior literature as shown in Table 1.

Table 1 displays the elements of common areas the researcher studied from 12 sources: four books, five theses, one journal article, and online consultation with the design staff of two entrepreneurs : (Anonymous01 (personal communication, January 3, 2018, Anonymous02 (personal communication, January 10, 2018). The researchers categorized these elements into three groups: (1) elements of the project's public utilities (Group A), (2) elements of facilities (Group B), and (3) elements of the project's landscaping (Group C). The details of each group are shown in Table 1.

A number of design principles should be taken into account in the development of a housing project. They consist of: (1) principles of designing project master plans following the location and landscape, (2) a traffic system that responds to convenience and accessibility of various areas, (3) energy-saving design, (4) a quality public utility system, (5) public facilities that support various forms of relaxation, and (6) elements of rest areas and parks. These principles are applied differently for each project, based on collection of data about the residents' behaviors that affect the common area designs in various models (Kaewprom et al., 2020; Suttiwongpan et al., 2019).

Table 1

Summary of Common Area Elements from the Literature

Elements/Source	Boonkham (2009)	Maleeloy (2014)	Threekunprapa (2014)	Tochaiwat et al. (2018)	Riratanaphong (2016)	Pongputthaporn (2006)	Charoennoom (2009)	Sawyer (2005)	Hultsman (1998)	DAMDI (2009)	Amonymus01 (2018)	Amonymus02 (2018)	Count
Public Utility Elements													
Bicycle Lane	✓	✓							✓	✓			**4**
Security Guardhouse		✓		✓	✓			✓			✓	✓	**6**
CCTV System		✓			✓						✓	✓	**4**
Communal Parking	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	**10**
Facility Elements													
Clubhouse		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	**10**
Lobby			✓					✓			✓	✓	**4**
Fitness		✓	✓	✓	✓	✓		✓			✓	✓	**8**
Working Space											✓	✓	**2**
Library		✓										✓	**2**
Sauna								✓			✓		**2**
Theatre				✓								✓	**2**
Meeting Room / Banquet Hall		✓	✓			✓		✓			✓	✓	**6**
Swimming Pool		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	**10**
Jacuzzi											✓	✓	**2**
Poolside Sunbeds											✓	✓	**2**
Convenient Store		✓		✓		✓	✓						**4**
Playground	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	**11**
Children's Play Equipment	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	**11**
Recreational Sports Ground	✓	✓	✓	✓			✓	✓	✓	✓		✓	**9**
Outdoor Exercise Equipment		✓	✓	✓							✓	✓	**5**
Landscape Elements													
Park	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**12**
Project Signages		✓			✓			✓	✓	✓	✓	✓	**7**
Project Gateway		✓		✓	✓						✓	✓	**5**
Tree Rows along the Roads	✓	✓			✓						✓	✓	**5**
Statues		✓							✓	✓	✓	✓	**5**
Park Benches		✓	✓					✓	✓	✓	✓	✓	**7**

Table 1 (Continued)

Elements/Source	Boonkham (2009)	Maleeloy (2014)	Threekunprapa (2014)	Tochaiwat et al. (2018)	Riratanaphong (2016)	Pongputthaporn (2006)	Charoennoom (2009)	Sawyer (2005)	Hultsman (1998)	DAMDI (2009)	Amonymus01 (2018)	Amonymus02 (2018)	Count
Pavilions		✓							✓	✓	✓	✓	**5**
Swings		✓						✓	✓			✓	**4**
Woody Plants	✓	✓			✓						✓	✓	**5**
Bushes and Flowery Plants		✓			✓						✓	✓	**4**
Waterfall / Waterfall Wall		✓								✓	✓	✓	**4**
Fountain		✓								✓	✓	✓	**4**
Lake	✓	✓		✓	✓				✓	✓		✓	**7**
Bridge		✓										✓	**2**

Note. Anonymous01 (personal communication, February 3, 2018)
Anonymous02 (personal communication, February 10, 2018)

Analytic Kano (A-Kano) Model concept

The Kano model (Kano et al., 1984) is a widely accepted quality perception measurement method in total quality management (Ek & Çikiş, 2015). However, there are certain limitations to the original Kano model (Wu et al., 2020; Xu et al., 2009). Xu et al. (2009) explained that such limitation is due to the lack of a quantitative assessment. For this reason, the Analytical Kano (A-Kano) Model was described and presented. A-Kano divides product and service quality into four categories:

1) Must-have quality is often not demanded by customers since they usually expect it to be provided. The lack of such a provision would cause great dissatisfaction. However, its presence would not lead to extra satisfaction.

2) One-dimensional quality adds to the products or services to promote greater customer satisfaction, but does not exceed the customer's original expectation of those products or services.

3) Attractive quality is the quality that exceeds the customers' expectations, offering a whole new experience for them.

4) Indifferent quality is that towards which customers are neutral; they do not identify the difference between the presence or absence of such quality in the products or services.

The literature review also showed that the Kano and A-Kano Models have been applied to real estate projects in various research areas. For example, Llinares and Pages (2011) studied the application of the Kano Model in the Kansei Engineering process to identify users' perceptions and find quantitative relationships between their subjective responses and design elements of different housing models. The research found that the Kano Model can be used to identify non-linear characteristics. Ullah et al. (2021) studied the real estate online platform (REOP) users' perceptions using the Kano Model and the SISQual Approach. Määttänen et al. (2014) conducted their study on office building tenants' perceptions towards green service attributes, while Chiang and Perng (2018) studied the perceptions of property management customers by using a combination of

SERVQUAL, the Kano Model, and a Refined Kano Model. Wu et al. (2020) employed Importance-Performance Analysis (IPA) with the Kano Model to avoid the limitation of neglecting attribute performance and importance, which was done in the process of studying luxury apartment services.

With respect to application of the Kano Model and A-Kano Model in real estate project design, Ek and Çikiş (2015) and Veshasitt (2018) used the Kano Model to study buyers' opinions on housing styles in housing projects. Gupta and Malhotra (2016) studied the opinions of homebuyers, and found that demographic factors significantly affected the decision to buy a residence. Puanghiran (2019) using the A-Kano Model for a study on customers' opinions about homes designed and constructed by home builders, while Tochaiwat et al. (2020) used the A-Kano Model to study opinions on elements of interior house landscape. However, neither the Kano Model or A-Kano Model has been employed in a study of customers' perceptions of the elements of common areas in housing projects.

RESEARCH METHODOLOGY

This research applied quantitative methodology in analyzing the relationships between the common area elements of detached and semi-detached houses in housing projects and price level factors affecting buyer interest in metropolitan Bangkok. Thirty-four common area elements were included in the study. The researchers gathered these elements from literature review, and the A-Kano Model concept was applied to develop a questionnaire. Then, the five sample groups of housing project home buyers in metropolitan Bangkok were determined by Quota Sampling, based on the prices of detached and semi-detached houses, which were (1) lower than $91,970, (2) $91,971–$153,280, (3) $153,281–$306,560, (4) $306,561–$613,120, and (5) higher than $613,121. Each price level comprised 30 samples, the smallest sample size allowable for the parametric test (Student, 1908; Vanichbuncha, 2017), for a total of 150 samples in the study.

The questionnaire consisted of four parts:

(1) the demographic characteristics of the respondents;

(2) opinions about purchase interest with and without certain aspects of common areas. Respondents were able to choose from five levels of answers, offered in descending order;

(3) detailed characteristics of common area elements, formatted as multiple-choice questions that use the percentage analysis method; and

(4) an open-ended question asking for additional suggestions about styles or other requirements for the project's common areas.

In the study, the researchers tested the research tools used in the research by subjecting the questionnaire to content validity and reliability tests.

(1) The content validity was tested to verify that the questionnaires were consistent with the study objectives by using the Index of Item-Objective Congruence (IOC). This involved showing the questionnaire and interview form to three individuals with expertise in designing common areas of housing projects who also had good understanding of the research process. The forms were assessed with three possible answers, namely, precise (+1), not sure (0), and not precise (-1). After review and scoring, the results were evaluated. For a question to be used, it needed to have an IOC value of 0.5 (50 percent) or greater.

(2) reliability was assessed testing the created questionnaire with 30 samples to find the Cronbach's Alpha Coefficient. It was 0.723, which is higher than the minimal acceptable value of 0.7 or 70 percent.

Therefore, the questionnaire was determined to be sufficiently precise to be used for data collection from the sample groups (Polit & Hungler, 1999; Streiner & Norman, 1995). Then, the questionnaires were provided to the home buyers of the villages with the determined price ranges. The respondents completed the questionnaires and returned them to the researchers by mail.

Once the respondents' completed opinion questionnaires were received by the researchers, the categories of common areas in the housing projects were grouped according to the A-Kano

Model according to the following steps (Xu et al., 2009).

1) The opinions on the common area elements of the housing projects of each respondent were classified into Attractive (A), One-dimensional (O), Must-have (M), Questionable (Q), Reverse (R), or Indifferent (I), considering the respondents' responses when the elements specified in the rows are present and those indicated in the columns are absent, as summarized in Table 2.

2) A frequency table was created for each common area element showing the number of responses classified as Attractive (A), One-dimensional (O), Must-have (M), Questionable (Q), Reverse (R), or Indifferent (I), respectively.

3) The buyer satisfaction coefficient (CS+) and buyer dissatisfaction coefficient (CS-) of each relevant element was analyzed using equations (1) and (2).

$$Customer\ Satisfaction\ (CS+) = \frac{(A+O)}{(A+O+M+I)} \quad (1)$$

$$Customer\ Dissatisfaction\ (CS-) = \frac{(O+M)}{(-1)(A+O+M+I)} \quad (2)$$

Where:

A, O, M, and I are the frequencies of respondents classified as Attractive (A), One-dimensional (O), Must-have (M), or Indifferent (I), respectively.

4) The CS+ and CS- values of each common area element was plotted into a graph according to the A-Kano Method to classify each element into different categories, which are Attractive (A), One-dimensional (O), Must-have (M) and Indifferent (I).

Where:

A (Attractive) is a quality that attracts and impresses customers.

O (One-dimensional) is a quality that customers desire.

M (Must-have) is a quality customers expect the project to have.

Q (Questionable) is a quality that needs to be questioned.

R (Reverse) is a quality that customers do not desire.

I (Indifferent) is a quality towards which customers feel neutral.

RESULTS AND DISCUSSION

Personal data of the respondents

The personal data from the questionnaire survey, i.e., demographic data and living behavior data, of 150 respondents are shown in Table 3. Most of the respondents were female, private company officers or business owners, aged 30–50 years, with a bachelor's degree education, household income between $1,840 to $6,131, and were living in a household with 2–4 family members.

Customer perception towards common area elements

With respect to the data analysis of the buyers' interest in common area elements in detached and semi-detached houses in housing projects, the researcher classified these elements into four groups. *Attractive elements* appeal to customers; *one-dimensional elements* are related to the customers' needs; *fundamental* are essential or intrinsic to the products, and *indifferent* elements do not impact the customers' feelings. Figure 2 provides the detail, and a summary of the elements in the different groups is shown in Table 4. It should be noted that some cells in Table 4 have been adjusted to ensure the continuity in the results of closely aligned price levels. For examples, the categories of park and project gateway of the upper-class projects were changed from "One-dimensional (O)" and "Indifferent (I)", respectively, to "Must-have (M)" in order to align with the results from both main-class projects and high-class projects, both of which are deemed to be "Must-have".

Table 2

Classification of Opinions Towards the Common Area Elements from Each Respondent

Customer Requirement		**Dysfunctional**				
		Like	**Expect**	**Neutral**	**Live with**	**Dislike**
Functional	Like	Q	A	A	A	O
	Expect	R	I	I	I	M
	Neutral	R	I	I	I	M
	Live with	R	I	I	I	M
	Dislike	R	R	R	R	Q

Note. From "An analytical Kano model for customer need analysis" by Q. Xu, R.J. Jiao, X. Yang, M. Helander, H.M. Khalid & A. Opperud, 2009, *Design Studies, 30*(1), 87–110. (https://doi.org/10.1016/j.destud.2008.07.001) Copyright 2009 by Elsevier.

Table 3

Demographic Data of the Respondents

Data	**Number**	**Percentage**
1. Sex	150	100.00
1.1 Female	81	54.00
1.2 Male	69	46.00
2. Age	150	100.00
2.1 Less than 30 years	25	16.67
2.2 30–39 years	72	48.00
2.3 40–49 years	35	23.33
2.4 50–60 years	15	10.00
2.5 More than 60 years	3	2.00
3. Education	150	100.00
3.1 Lower than bachelor's degree	8	5.33
3.2 Bachelor's degree	84	56.00
3.3 Master's degree	51	34.00
3.4 Higher than master's degree	7	4.67
4. Career	150	100.00
4.1 Private company officer	74	49.34
4.2 Business owner	35	23.33

Table 3 (Continued)

Data	Number	Percentage
4.3 Government / state enterprise officer	27	18.00
4.4 Freelance	9	6.00
4.5 Unemployed / retired	5	3.33
5. Monthly Household Income	150	100.00
5.1 Less than $1,839	25	16.67
5.2 $1,840–$3,065	44	29.34
5.3 $3,066–$6,131	38	25.33
5.4 $6,132–$12,262	23	15.33
5.5 More than $12,262	20	13.33
6. Number of family members	150	100.00
6.1 1 person	3	2.00
6.2 2–4 persons	106	70.67
6.3 5–7 persons	35	23.33
6.4 More than 8 persons	6	4.00

Table 4

Summary of the Common Area Elements in Housing Projects

Common area elements in housing projects	**Economy class (Lower than $91,970)**	**Main class ($91,971–$153,280)**	**Upper class ($153,281–$306,560)**	**High class ($306,561–$613,120)**	**Luxury and super luxury class (Higher than $613,121)**
A. Public utility elements					
(A1) Bicycle lane	I	I	I	I	I
(A2) Security guardhouse	M	M	M	M	M
(A3) CCTV system	M	M	M	M	M
(A4) Communal parking	O	I	I	A	O
B. Facility elements					
(B1) Clubhouse	I	I	O	O	O
(B2) Lobby	M	I	I	M	O
(B3) Fitness center	O	O	O	O	O
(B4) Working space	A	I	I	I	A
(B5) Library	A	I	I	I	I

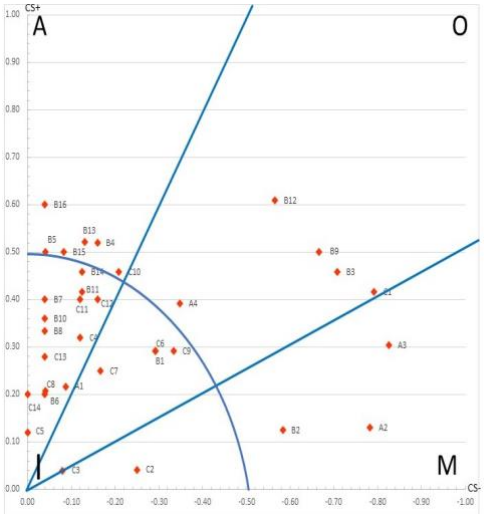
Table 4 (Continued)

Common area elements in housing projects	Economy class (Lower than $91,970)	Main class ($91,971–$153,280)	Upper class ($153,281–$306,560)	High class ($306,561–$613,120)	Luxury and super luxury class (Higher than $613,121)
(B6) Sauna	I	I	I	I	A
(B7) Theatre	I	I	I	I	I
(B8) Meeting room / Banquet hall	I	I	I	I	A
(B9) Swimming pool	O	O	O	O	O
(B10) Jacuzzi	I	I	I	I	A
(B11) Poolside sunbed	I	I	I	I	I
(B12) Convenience store	O	A	I	I	A
(B13) Playground	A	O	I	I	A
(B14) Children's play equipment	I	I	I	I	A
(B15) Recreational sports ground	A	I	I	I	O
(B16) Outdoor exercise equipment	A	I	I	I	I
C. Landscape elements					
(C1) Park	O	M	M	M	M
(C2) Project signages	I	M	M	M	M
(C3) Project gateway	I	M	M	M	M
(C4) Tree rows along road	I	M	O	O	O
(C5) Statue	I	I	I	I	A
(C6) Park bench	I	M	O	O	O
(C7) Pavilion	I	I	I	I	A
(C8) Swing	I	I	I	I	I
(C9) Woody plant	I	O	O	O	O
(C10) Bushes and flowery plant	A	O	O	O	O
(C11) Waterfall / Waterfall wall	I	I	I	I	I
(C12) Fountain	I	I	I	I	I
(C13) Lake	I	I	I	I	I
(C14) Bridge	I	I	I	I	I

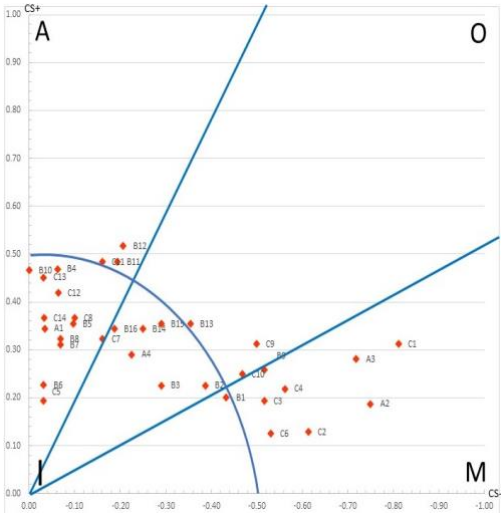
Note. A = Attractive, O = One-dimensional, M = Must-have, I = Indifferent

Figure 2

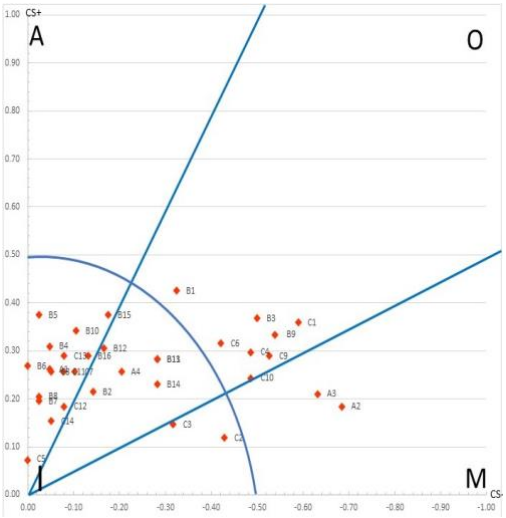
Common Area Elements in Housing Projects Classified by A-Kano Model



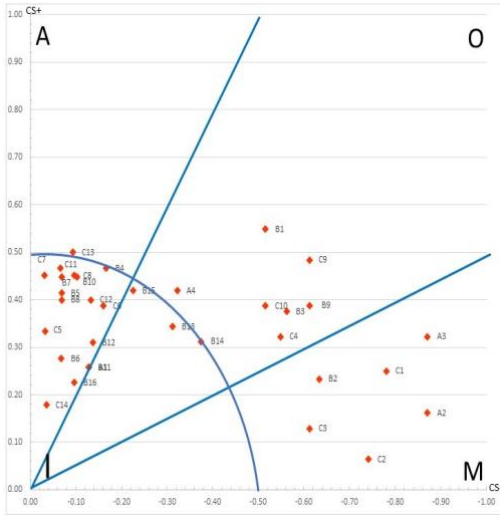
(1) Priced lower than $91,970



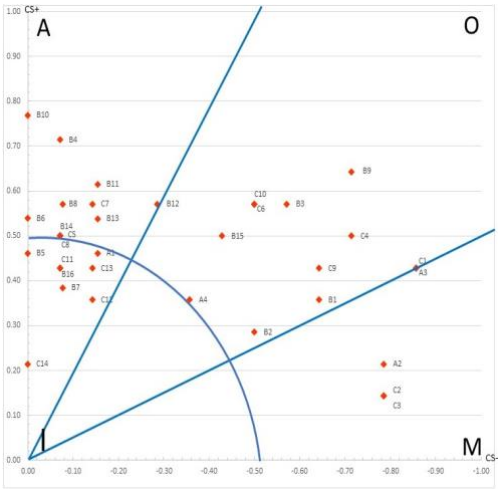
(2) Priced at $91,971 – $153,280



(3) Priced at $153,281 – $306,560



(4) Priced at $306,561 - $613,120



(5) Priced higher than $613,121

Note:

A = Attractive

O = One-dimensional

M = Must-have

I = Indifferent

Knowing the categories of the common area elements classified by the A-Kano Model can suggest to real estate developers, as well as their project designers, how to handle each element efficiently. The analysis indicates that buyers at all price levels are concerned with the must-have elements that respond to their needs for security and safety in life and property. As can be seen from the elements in the project public utility group (Group A), most are necessary to buyers, namely the security guardhouse (A2) and CCTV system (A3). Apart from that, homebuyers in the price ranges higher than $91,969 are concerned about the projects' landscape elements, such as having a park (C1), project signages (C2), and project gateway (C3), which are landscape elements of the project that create positive images of the project along the street frontage. This represents the need for quality and aesthetics in the lives of homeowners and residents.

As for the facility elements, homebuyers in the price ranges under $613,120 were more inclined to desire a common area that can be used for welcoming guests (B2), reflecting the desire for privacy among the buyers.

For the elements relating to customers' needs or one-dimensional elements, the research results reveal that communal parking areas (A4), a fitness area (B3), and swimming pool (B9) are the elements that buyers at all price levels tend to desire.

Regarding landscape architectural elements, buyers tend to have higher demands at higher project price levels. For projects priced lower than $91,970, buyers would only require parks (C1) (according to Thai law, housing projects must allocate at least five percent of saleable areas for recreational parks within each project). At the same time, woody plants (C9) and flowery plants (C10) are more likely to be desired by buyers above the $91,970 price range. Meanwhile, buyers in price levels higher than $153,281 usually prefer projects offering tree rows along the roads (C4) and park benches (C6).

Moreover, for the attractive elements, it was found that nearly all elements in this category are facility elements (Group B) or landscape elements (Group C). The only public utility element (Group A) found to be an attractive element was communal parking for projects at the $306,561-$613,120 price range. No security element is an attractive element because buyers simply expect security to be designed into housing projects. Certain elements likely to be in demand among buyers at all price levels are working space (B4) and playground areas (B13). Noticeably, buyers at the $613,121 price level and higher usually have ten required elements, e.g., library (B6), conference room or banquet hall (B8), Jacuzzi (B10), statues (C5), and pavilions (C7), that are different from the needs of buyers from other price ranges. This reflects the idea that buyers' at this price level expect the developer to provide a common area that is more fulfilling than those of lower prices, in line with the higher prices and common fees.

RESULTS AND RECOMMENDATIONS

This research shows that the results of the A-Kano model analysis provide more profound and more insightful perspectives into the needs of homebuyers of housing projects than what is revealed by Likert scale analysis. This is due to the lack of open-ended questions. A Likert Scale can only show the degree to which the buyers are satisfied (Very highly satisfied, Highly Satisfied, Satisfied, Somewhat dissatisfied, or Dissatisfied) based on whether a common area element is available or unavailable. Knowing such information, project developers or designers still need to be made aware of how to design the project (Hodge & Gillespie, 2003; Li, 2013). On the other hand, the A-Kano model categorizes the element across different groups, pointing to different suitable design and pricing strategies. The study shows that buyers' perspectives vary according to the price levels of the subject properties. This finding supports the relationships between the demographic factors and the common area requirements, which is consistent with the studies of Gupta and Malhotra (2016); Maoludyo and Aprianingsih (2015) which also indicated that price levels are related to the income level or the ability of homebuyers to pay the mortgage (Tochaiwat, 2020). This result was obtained from the quantitative analysis process (Xu et al., 2009), making it more reliable. The

research results suggest that the most common area public utility elements in housing projects are *must-have* elements, and most landscape elements (Group C) are *one-dimensional*.

Based on the results of the study, there are several recommendations offered by the researcher, as follows:

1) Operators or housing developers of low-rise housing projects are able to identify the buyers' interest in common area elements at different price levels. This enables them to decide which elements are necessary, related to the buyers' needs, and which ones will impress buyers, which allows the project developers to appropriately determine the appropriate design and layout of a project's common areas. Such decisions should align with the purchase needs, and efficiently and economically lead to development of the project's selling points without unnecessarily wasting any effort or expense on elements that buyers do not value. For example, developers may avoid over-budgeting on the one-dimensional or attractive elements while forgetting to provide enough must-have ones.

(a) Customers expect to be provided with the must-have elements; therefore, these elements must be provided in projects. For example, safety is one of the basic needs of house residents, buyers at all price ranges expect security guardhouses and CCTV systems (Mulroy & Ewalt, 1996; Tochaiwat, 2020; Wei et al., 2015) .

(b) As to one-dimensional elements, they are added to a project to promote greater customer satisfaction, with consideration given to the available budget. Customer satisfaction depends on the inclusion of these elements. Examples are parking (number of parking lots), fitness facilities (amount of equipment), swimming pool (size of the pool), parks (area of the parks), and convenience stores (size of the stores). According to Kotler and Keller (2016), these elements can be viewed as the expected product, that is, the attributes the customers expect when they purchase the product. It is the way in which each brand responds to this expectation that differentiates it from others (Rinchumphu et al., 2013).

(c) Attractive elements are those that exceed the customers' expectations, and some of them should be added to projects in order to offer a uniquely attractive experience for customers. These elements correspond with Kotler and Keller's (2016) augmented product, which exceeds the customer's expectations. Examples of these elements include having a meeting room or banquet hall, sauna, jacuzzi, children's playground equipment, pavilion, or a statue in the projects with a price range above $613,121.

(d) Finally, indifferent elements such as bicycle lanes, theatres, swings, fountains, lakes, and bridges do not clearly affect customers' perceptions, so developers or designers should carefully consider whether they add value to projects. Construction of these elements leads to higher costs and prices, yet may not add to the perceived value of the project in the eyes of potential home buyers at all price ranges (Tochaiwat, 2020).

To apply the analytical results, project developers should first consider the must-have elements essential to the projects. Without them, buyers will not be satisfied. Next, some elements that attract buyers (attractive elements) at the relevant price range should be chosen to raise the perceived value of the project.

Furthermore, since one-dimensional elements increase the buyers' satisfaction, the project developers should determine the composition of the common areas in light of the buyers' preferences with respect to these elements and the remaining budget. If there are ample one-dimensional elements, the buyers' satisfaction will be enhanced. By the same token, the fewer of these elements that are provided, the less the buyers are satisfied.

These concepts can also be looked at from the standpoint of price range:

i. The *must-have* common area elements for **economy class projects** (prices lower than $91,970) are a security guardhouse, CCTV system, and lobby.

The *attractive* elements are a working space, library, playground, recreational sports ground, outdoor exercise equipment, bushes and flowery plants. In addition, communal parking, fitness areas, a swimming pool, convenience store, and park are the *one-dimensional* elements.

ii. The *must-have* elements for **main class projects** ($91,971 – $153,280) are a security guardhouse, CCTV system, parks, project signages, project gateway, tree rows along the road, and park benches. The *attractive* elements is a convenience store. In addition, the fitness facilities, swimming pool, playground, woody plants, and bushes and flowery plants are also *one-dimensional* elements.

iii. The *must-have* elements for upper-class projects ($153,281 – $306,560) are a security guardhouse, a CCTV system, parks, project signages and a project gateway. One-dimensional elements are a clubhouse, fitness facilities, swimming pool, tree rows along the road, park benches, woody plants, and bushes and flowery plants.

iv. For high-class projects ($306,561-$613,120), the *must-have* elements are a security guardhouse, CCTV system, lobby, parks, project signages, and project gateway. The *attractive* elements are communal parking. In addition, a clubhouse, fitness facilities, a swimming pool, tree rows along the road, park benches, woody plants, and bushes, and flowery plants comprise the *one-dimensional* elements.

v. For luxury and super luxury class projects (prices higher than $613,121), the *must-have* elements are a security guardhouse, CCTV system, parks, project signages, and project gateway. The *attractive* elements are a working space, sauna, meeting room or banquet hall, jacuzzi, playground, convenience store, children's play equipment, statue, and pavilion. In addition, communal parking, a clubhouse, lobby, fitness facilities, swimming pool, recreational sports ground, tree rows along the road, park benches, woody plants, and bushes and flowery plants are *one-dimensional* elements.

vi. It should be noted that for projects offering residences from more than one price-range, the developers should select the common area elements that can satisfy the greatest number of customers. All *must-have* elements for each price range of the residences in the projects must be provided along with some *attractive* elements that can satisfy customers all relevant price ranges. The remaining budget should be spent on the *one-dimensional* elements that can satisfy all, or almost all, of the potential customers at relevant price ranges.

2) From the research perspective, applying the Kano Model and A-Kano Model in a study of the common area elements in detached and semi-detached housing projects in different price ranges revealed customers' interest in the presence or absence of different elements. The major and important elements can be classified and distinguished, leading to better outcomes with respect to the decision to buy a house in the project. The results offer a more profound and insightful perspective on buyers' needs than does the Likert scale. Applying such a methodology to other areas of the real estate industry is also recommended.

3) As to the research limitations, this article aimed to find the categories of each common area element in projects across five price ranges because of the various demographic factors at play in each project. Therefore, the relationships between the demographic factors of an individual and the category of each common area element provide areas for future study.

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