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Variables that influence stakeholder satisfaction with the creation of corporate images of Thailand's National Housing Authority

Siwatt Pongpiachan [a,b]

[a]Center for Research & Development of Disaster Prevention & Management, School of Social and Environmental Development, National Institute of Development Administration (NIDA), Bangkok, Thailand; [b]SKLLQG, Institute of Earth Environment, Chinese Academy of Sciences, Xi'an, China

ABSTRACT

The project output will assist with the strategic planning and determination of communication tactics, coupled with public relations, to establish a good corporate image under fluctuating global circumstances. Questionnaires and non-experimental, in-depth interviews were used for both quantitative and qualitative research, respectively. The main objective of this study is to explore stakeholder attitudes and satisfaction with the creation of corporate images by Thailand's National Housing Authority (NHA). The investigation of NHA stakeholders' attitudes and comments toward the building of this government entity's corporate image strategy led to sustainable developments within the NHA by determining concepts and research methods, crafting a research plan, and identifying the characteristics of the target group. This study includes other sections related to measuring the attitude index, data collection and analysis, comparisons and interpretations of the target group and stakeholder perspectives. The target population is comprised of: Residents in 68 communities under the governance of NHA and Thai citizens, executive directors of the Ministry of Social Development and Human Security (MSDHS), board committee, executive directors, and general staff, companies, the private sector, entrepreneurs, and building contractors, public relations staff. Overall, 30 categories of stakeholders were interviewed. Secondary information, such as project documents, was collected and utilized for action planning, which reflects stakeholder opinions towards the NHA. The survey sample size of stakeholders was limited to 400 people from 12 districts, comprising 31,844 households under the 68 NHA projects in Bangkok.

KEYWORDS

National Housing Authority (NHA) of Thailand; corporate social responsibility (CSR); analysis of variance (ANOVA); Pearson analysis (PA); hierarchical cluster analysis (HCA); multiple linear regression analysis (MLRA); principal component analysis (PCA)

Introduction

According to the website of Thailand's National Housing Authority (NHA), the NHA:

> is a state enterprise attached to the Ministry of Social Development and Human Security (MSDHS). It was established on February 12, 1973, in compliance with…National Executive Decree No. 316. It currently operates under the NHA Act (B.E. 2537), with the objectives to provide housing for low and middle income earners, to provide financial assistance to those

CONTACT Siwatt Pongpiachan pongpiajun@gmail.com Center for Research & Development of Disaster Prevention & Management, School of Social and Environmental Development, National Institute of Development Administration (NIDA), 118 Moo 3, Sereethai Road, Klong-Chan, Bangkapi, Bangkok 10240, Thailand

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> who need to have their own housing, to deal with the business of building construction and land acquisition, and to upgrade, demolish or relocate slums in order to assist people in achieving better living, social and economic conditions. (NHA)

The NHA's main vision is to be a high-performing organization focused on the residential development of communities and cities for social security, with six main goals:

(i) Build homes for low-to-moderate income people to improve their quality of life.
(ii) Develop cities with a favourable environment.
(iii) Generate product innovation, services, and a positive company image.
(iv) Foster strong, self-reliant communities.
(v) Manage properties to create added value and utilise their most efficient benefits.
(vi) Develop personnel and organisations to help them achieve sustainability in accordance with the NHA's strategic plan of 2014–2016.

Fluctuations in the global economy (e.g. wages and rent), social paradigm shifts, amenities, city competitiveness, and the dramatic growth of property businesses will inevitably affect the quality of life of stakeholders and residents (Deller, Tsai, Marcouiller, & English, 2001; Kilbourne, McDonagh, & Prothero, 1997; Ridgway & Zipple, 1990; Roback, 1982; Rusk, 1993). As a result, building a strong corporate image and enhancing communication skills are essential to securing stakeholders' trust (Hansen, Dunford, Boss, Boss, & Angermeier, 2011; Lin & Lu, 2010; Pruzan, 2001), as well as that of the residential communities surrounding NHA premises. This will guarantee that all NHA projects are above the established standard and ensure that residential communities trust the organization. To be recognized at both the national and international levels, it is important for the NHA to gain all stakeholders' trust by conducting activities that satisfy all parties' needs, covering entire areas via the most effective communication channels.

Therefore, to achieve sustainable business, a survey that measures all stakeholders' satisfaction and attitudes regarding the creation of NHA's corporate image is crucial (D'amato, Henderson, & Florence, 2009; Ganescu, 2012; Kolk & Van Tulder, 2010). Furthermore, this will boost community public participation with an emphasis on economic, social, and environmental dimensions, which will subsequently lead to nationwide acceptance. The output of this project will be exposed to the public eye, thus helping to build a database that the NHA can utilize for sustainable development, and report on activity outcomes at the global level. Overall, the key aims of this project are:

(i) To investigate, collect, and analyse data on the attitudes of stakeholders and general citizens towards the products and activities launched by the NHA. This will lead to the development of a positive corporate image.
(ii) To examine the most realistic practices for developing activities and corporate management in accordance with global fluctuations
(iii) To study and develop communication channels associated with NHA stakeholders to build a strong corporate image in the most effective and creative manner

Research methodology

Sample size criteria

There are several strategies for determining sample size:

(i) *Applying the sample size of a similar study*. This approach may run the risk of duplicating errors that were unintentionally conducted in determining the sample size for another investigation.
(ii) *Using a census for comparatively small populations*. This method uses the entire population as the sample, which is not suitable for a comparatively large sample size.
(iii) *Employing published tables*. This technique adopts published tables, which give the sample size for a provided set of criteria. However, the limitations and constraints of this application are (3i) the sample sizes only represent the number of *obtained* responses, not the number of planned questionnaires, and (3ii) the sample sizes in the table are generally based on the assumption of normal distribution.
(iv) *Selecting formulas to calculate a sample size* (Cochran, 1963; Singh & Masuku, 2012a; Sudman, 1976). This approach involves applying equations provided by previous studies (Cochran, 1963; Yamane, 1967). Major benefits include the freedom to select different combinations of levels of precision, confidence, and variability. By applying the formula proposed by Yamane (1967) (Equation 1), the minimum number of households to sample was 400 (n = 93,327; e = 0.05).

$$n = \frac{N}{(1 + Ne^2)} \tag{1}$$

where n, N, and e represent the minimum number of households to sample, the population of households registered with NHA's Bangkok office, and acceptable inaccuracy rate, respectively. It is crucial to underline that the Yamane formula can only be employed for a finite population with a simple random sampling technique (particularly for social surveys) instead of being correlational or for experimental research.

Sampling area

(i) Households (n = 400)
In this study, a simple random sampling (SRS) method was carefully chosen to acquire thorough and complete information from the sample group by interviewing the head of the household or a designated person. The geographical cluster sampling areas consisted of Central Bangkok (Din Daeng District), Southern Bangkok (Klongtoey, Bangna, and Pathumwan districts), Northern Bangkok (Lak Si, Bang Khen, and Saimai districts), Eastern Bangkok (Klongsamwa, Minburi, Latkrabang, and Saphansoong districts), and Southern Krungthonburi (Bangkhuntien District) (see Figure 1).
(ii) In-depth Interviews (n = 30)
A purposive sampling method was carefully selected for the in-depth interviews with community leaders (who can publicly express the community's general concerns), government officials (such as high-ranking government officers in MSDHS), and opinions from the private sector (such as construction companies).

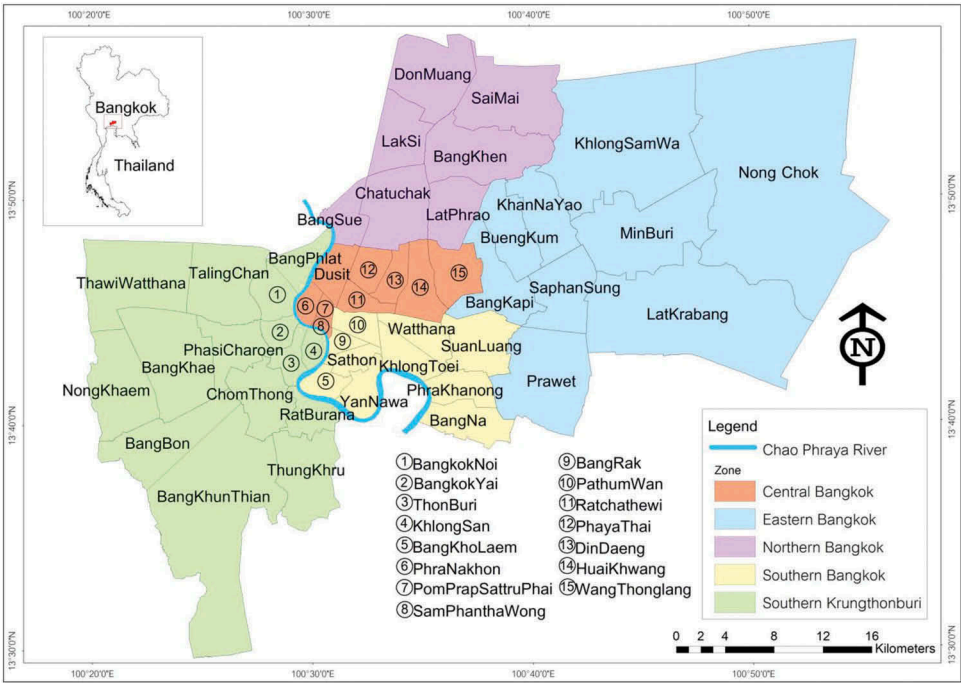


Figure 1. Map of sociological survey areas in Bangkok.

Sampling devices

When conducting in-depth interviews, sampling devices are actual people (e.g. government officials and community leaders). For quantitative research, questionnaires are used among households and local establishments. In this study, the questionnaire was designed to have both close- and open-ended questions; it consisted of three parts:

Part 1: General information such as the participant's gender, religion, education, occupation, marital status, place of origin, and history of resident relocation.

Part 2: Information regarding economic and social status, such as sources of income or the number of household members.

Part 3: Opinions in NHA communities about the satisfaction level of interviewees and/or questionnaire respondents related to the following themes: NHA's reputation, leadership, efforts to promote technological development, overall credibility and image, the quality of services and management systems, executive visions, personality and knowledge of staff members, morality, ethics, the administrative performance of NHA executive members, the suitability of property prices, and the quality of infrastructure (including security systems and luxurious club houses, fitness centers and swimming pools).

All satisfactory levels can be categorized as follows:

- *Extremely satisfied* (6 points)
- *Very satisfied* (5 points)
- *Okay* (4 points)

- *Neither satisfied nor dissatisfied* (3 points)
- *Dissatisfied* (2 points)
- *Extremely dissatisfied* (1 point)

In addition, the scores of answers can be classified as follows:
High (80–100%) *Medium* (70–79%) *Low* (0–69%)

Statistical analysis

This study applied a method called descriptive statistics, which explains the fundamental characteristics of the data (e.g. the arithmetic mean, standard deviation, minimum, and maximum). General information (such as gender, age, education, and income; i.e. independent parameters) and 39 questionnaire items (i.e. dependent parameters) were statistically analyzed. This occurred using *t*-tests, analysis of variance (ANOVA), simple linear regression analysis (SLRA), Pearson analysis (PA), multiple linear regression analysis (MLRA), hierarchical cluster analysis (HCA), and principal component analysis (PCA), with assistance from SPSS (Statistical Package for the Social Sciences), Version 13. The probability distribution function (PDF), a statistical concept that describes the relative probability of this random variable taking on a given value, was applied to stakeholders of all ages (n = 400). The probability for the random variable to fall within a particular region is given by the Gaussian distribution, which can be described as follows:

$$y = \frac{1}{\sigma\sqrt{2\pi}} \exp\left(\frac{1(x-\mu)^2}{2\sigma^2}\right) \tag{2}$$

where y, σ, σ^2, μ, and x represent the PDF, standard deviation, variance, average, and age of each stakeholder, respectively.

Results & Discussion

Research outcomes: Qualitative opinions

In this study, the qualitative survey was based on the level of satisfaction with the NHA of 30 people who work at MSDHS including general staff, executive directors, entrepreneurs, and mass media personnel. Generally, NHA executive directors understand the limitations of this organization, which declare that the NHA, as a state-run company, is not allowed to compete with the private sector based on the Constitution of the Kingdom of Thailand. Interestingly, entrepreneurs and mass media personnel who used to collaborate with the NHA have highlighted their concerns on performance management, while citizens have a negative impression of the NHA due to both television and radio broadcasts of several NHA projects with poor reputations. Overall, the satisfaction level toward the NHA in different dimensions can be described as follows:

(i) Satisfaction with information acknowledgment has not changed since 2008.
(ii) Satisfaction with projects/facilities and management performance is ranked at a moderate level.

The majority of executive directors are concerned about the NHA's corporate image due to complaints about NHA projects, a lack of appropriate facilities, and quality of life. Most executive directors agree that the NHA should have more communication channels. Interestingly, most NHA general committees have not shown any concern for the corporate management system since the government operates considerably well. Like the executive directors, a majority of NHA general committees believe that the NHA should have more communication channels. General committees think that the NHA cannot be compared to any private property enterprises in Thailand; thus, it would be better to compare the NHA to its counterparts in other countries (e.g. the NHA in the Philippines). In this study, a comparison was conducted of brand images between the NHA and car companies. This can be ascribed to the fact that the NHA's image can be unconsciously rated based on car type (e.g. a luxurious sedan, an expensive sports car, an economy sedan, and a pickup truck) (Filippou et al., 2003). A previous study found that the distribution of brand names associated with luxurious sedans included Mercedes, BMW, Audi, Renault, and Ford (Filippou et al., 2003). Since most stakeholders liken the NHA to Japanese carmakers (such as Toyota), it seems reasonable to conclude that the general perception of the NHA is that it is a government agency responsible for public housing, with comparatively low property prices and an acceptable level of quality. Toyota has been one of the most popular car brands in the world for a long time, with reliability and safety as its most common characteristics. These findings reflect the fact that the NHA is considered a family-oriented, state-run enterprise that provides comparatively affordable and economical properties.

T-test on gender differences in relation to the level of satisfaction

As clearly displayed in Figure 2, some distinguishing features of PDF can be chiefly discerned from the initial image. First, a bell-shaped curve was detected in Figure 2. It is also interesting to note that the PDF's computed values are relatively more concentrated in the middle than in the tails. As a result, it appears reasonable to attribute this fact to the fairly uniform spatial distribution of the population's ages. Second, Figure 2 is a symmetric distribution (i.e. neither a positively nor negatively skewed distribution) due to its comparatively short right and left tails, underlining that the majority of the questionnaire respondents are 43–46 years old. Since one of the main hypotheses of employing inferential statistics to assess any significant differences is that each of the two populations being compared should follow a normal distribution, it seems rational to apply *t*-tests to evaluate discrepancies between levels of satisfaction based on gender. Table 1 displays abbreviations of the 39 questions associated with the NHA's image and activities; a *t*-test was applied to examine gender differences in relation to the average satisfaction level of the above-mentioned questions, as illustrated in Table 2a–2c. It is worth mentioning that gender differences were only observed in questions associated with Rep (i.e. the NHA's reputation), Dlp (i.e. the NHA's technological development for building residential properties), Stf (i.e. the overall quality of NHA staff members), Pri (i.e. the overall prices of NHA properties), geographic information system or GIS (i.e. customer services for using GIS), Rel (i.e. customer relations as conducted by NHA staff members), Ver (i.e. polite verbal communication skills of NHA staff members), and Str (i.e. the overall beauty of NHA architectural structures) (see Table 1).

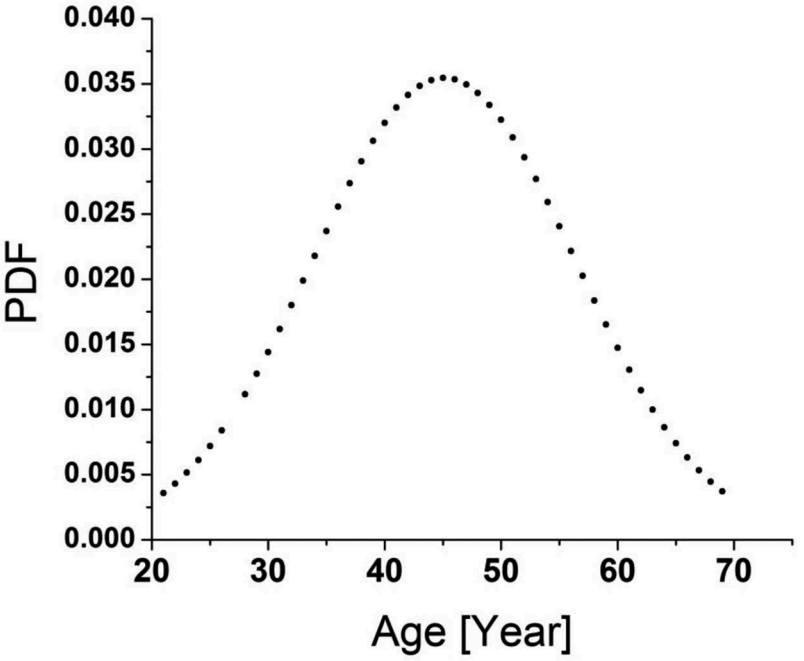


Figure 2. Probability distribution function of questionnaire respondent's age.

Previous studies have investigated gender differences in terms of verbal irony use (Colston & Lee, 2004), investment strategies (Graham et al., 2002), and residential environment (Stafford, Cummins, Macintyre, Ellaway, & Marmot, 2005). Earlier investigations highlighting gender differences in investment strategies which have emphasized to two crucial aspects: female purchasers seem both to be more risk averse and to have comparatively less confidence in their expenditure determinations than male purchasers in equivalent circumstances (Graham et al., 2002). When it comes to polite verbal communication skill, more caution is necessary as a previous study indicated that male respondents showed a greater likelihood of employing verbal irony relative to female respondents (Colston & Lee, 2004). As a consequence, there is a great risk of miscomprehension in the case of using verbal irony against female respondents and thus resulting in significant differences of satisfactory levels associated with Rel and Ver between two genders. It is also crucial to underline that some gender differences related with satisfactions of the overall beauty of architectural structure and technological development for building residential properties were observed in this study. These findings suggest that gender differences exist among male and female respondents in term of satisfactions with residential environment. Statistically significant interactions between gender and residential environment were also detected in a previous study conducted by using self-rated health technique coupled with multilevel regression models (Stafford et al., 2005).

Overall, these facts are in good agreement with the current study, indicating that prominent gender differences were observed in satisfaction levels associated with reputation, quality of services, verbal communication skills, the overall prices of NHA properties, customer relationships, and overall architectural beauty. For instance, female survey respondents appear

Table 1. List of content acronyms and abbreviations used in this study.

Abbreviation	Descriptions
Age	Actual age of interviewees and/or questionnaire respondents.
Gen	Gender of interviewees and/or questionnaire respondents.
Edu	Education level of interviewees and/or questionnaire respondents.
Mem	Actual family member of interviewees and/or questionnaire respondents.
Rep	Satisfactory level of interviewees and/or questionnaire respondents toward the reputation of NHA.
Lds	Satisfactory level of interviewees and/or questionnaire respondents toward the leadership of NHA as the outstanding organization for encouraging sustainable development for residential property management.
Dlp	Satisfactory level of interviewees and/or questionnaire respondents toward the continuous technological development of NHA for building residential properties.
Crd	Satisfactory level of interviewees and/or questionnaire respondents toward the credibility of NHA.
Acp	Satisfactory level of interviewees and/or questionnaire respondents toward the quality of services provided by NHA staffs.
Mng	Satisfactory level of interviewees and/or questionnaire respondents toward the managing system of NHA.
Vis	Satisfactory level of interviewees and/or questionnaire respondents toward the executive vision of NHA.
Psn	Satisfactory level of interviewees and/or questionnaire respondents toward the personality of NHA staffs.
Knw	Satisfactory level of interviewees and/or questionnaire respondents toward the knowledge of staffs associated with NHA projects.
Mor	Satisfactory level of interviewees and/or questionnaire respondents toward the morality and ethics of NHA executive members.
Ser	Satisfactory level of interviewees and/or questionnaire respondents toward the quality of service provided by NHA staffs.
Stb	Satisfactory level of interviewees and/or questionnaire respondents toward the suitability of NHA property prices based on the conditions of each project.
Con	Satisfactory level of interviewees and/or questionnaire respondents toward the hire purchase conditions of NHA properties.
CP	Satisfactory level of interviewees and/or questionnaire respondents toward the comparatively cheap price of properties in comparison with other housing companies.
CR	Satisfactory level of interviewees and/or questionnaire respondents toward the comparatively rental rates of properties in comparison with other housing companies.
Adm	Satisfactory level of interviewees and/or questionnaire respondents toward the administrative performances of NHA executive members.
Stf	Satisfactory level of interviewees and/or questionnaire respondents toward the overall quality of NHA staffs.
Img	Satisfactory level of interviewees and/or questionnaire respondents toward the overall image of NHA.
Pri	Satisfactory level of interviewees and/or questionnaire respondents toward the overall prices of NHA properites.
Car	Satisfactory level of interviewees and/or questionnaire respondents toward the environmental care activities supported by NHA.
Inv	Satisfactory level of interviewees and/or questionnaire respondents toward the image of creating innovation associated with residential development.
GIS	Satisfactory level of interviewees and/or questionnaire respondents toward the customer services for using GIS.
Rel	Satisfactory level of interviewees and/or questionnaire respondents toward the customer relation as conducted by NHA staffs.
GG	Satisfactory level of interviewees and/or questionnaire respondents toward the good governance of NHA.
Dre	Satisfactory level of interviewees and/or questionnaire respondents toward the job-appropriate clothing for NHA staffs.
Ver	Satisfactory level of interviewees and/or questionnaire respondents toward the polite verbal communication skill of NHA staffs.
HR	Satisfactory level of interviewees and/or questionnaire respondents toward the human relation of NHA staffs.
Fac	Satisfactory level of interviewees and/or questionnaire respondents toward the quality of facilitation services conducted by NHA staffs.
Act	Satisfactory level of interviewees and/or questionnaire respondents toward the overall activeness of NHA staffs.
Ans	Satisfactory level of interviewees and/or questionnaire respondents toward the overall quality of NHA staffs in responding customers'questions.
Loc	Satisfactory level of interviewees and/or questionnaire respondents toward the locations of NHA properties.
CA	Satisfactory level of interviewees and/or questionnaire respondents toward the common area of NHA properties.

(*Continued*)

Table 1. (Continued).

Abbreviation	Descriptions
US	Satisfactory level of interviewees and/or questionnaire respondents toward the utility space of NHA properties.
Mat	Satisfactory level of interviewees and/or questionnaire respondents toward the overall quality of materials used in NHA properties.
Str	Satisfactory level of interviewees and/or questionnaire respondents toward the overall beauty of NHA architectural structures.
Par	Satisfactory level of interviewees and/or questionnaire respondents toward the car park area of NHA properties.
Lux	Satisfactory level of interviewees and/or questionnaire respondents toward the overall luxurious of club house, fitness, and swimming pool inside NHA communities.
RW	Satisfactory level of interviewees and/or questionnaire respondents toward the road width of NHA communities.
Sec	Satisfactory level of interviewees and/or questionnaire respondents toward the security system of NHA communities.

satisfied with the NHA's general reputation and customer service for using GIS. Male survey respondents showed significantly higher satisfaction levels associated with technological development, the overall quality of staff members (particularly verbal communication skills), property prices, architectural structures, and customer relationships.

ANOVA: Education differences in relation to satisfaction level

The current study classifies the questionnaire respondents into seven groups based on their level of education:

(i) Elementary school (Grades 1–6)
(ii) Junior high school (Grades 7–9)
(iii) Senior high school (Grades 10–12)
(iv) Vocational certificate
(v) Vocational diploma
(vi) Bachelor's degree
(vii) Postgraduate degree

Among the 39 questions related to the NHA's images and activities, 20 questions reveal significant differences ($n = 400$, $p < 0.1$) in satisfaction level based on the ANOVA results, as displayed in Table 3a–3c. Significantly, respondents with an elementary education showed the highest satisfaction level associated with reputation, the knowledge of staff members, the suitability of property prices, hire purchase conditions, good governance, and car park areas. Further attempts to analyze some significant differences on satisfactory levels between seven educational groups were conducted by using the Post Hoc tests. Among numerous posteriori tests of assessing "familywise error" (e.g. Bonferroni Procedure, Tukey's Test, Duncan's Multiple Comparison Test, Holm-Bonferroni Procedure, Newman-Keuls, Rodger's Method, etc.), Fisher's Least Significant Difference (LSD) is widely used as a statistical tool for comparing the average of one group with the average of another after completing ANOVA. In order to verify the existence of a statistically significant difference between the average values, Fisher's LSD was computed and displayed in Figure 3d, Table 4. No significant differences in Fisher's LSD were detected on satisfactory levels associated with Crd, Mor, Ser, CP, Ver, Fac, Act, and

Table 2. Effects of gender differences on satisfactory level of NHA stakeholders as assessed by T-Test and F-Test.

2A

		Satisfactory Level toward Operational Performance													
		Age	Edu	Mem	Rep	Lds	Dlp	Crd	Acp	Mng	Vis	Psn	Knw	Mor	Ser
Male	*n*	121	121	121	121	121	121	121	121	121	121	121	121	121	121
	Aver	44.22	4.05	4.78	3.07	2.83	2.88	3.03	2.74	2.77	2.90	2.95	2.81	2.98	3.07
	Stdev	12.55	2.28	1.39	0.37	0.40	0.38	0.28	0.46	0.43	0.50	0.50	0.53	0.49	0.29
Female	*n*	279	279	279	279	279	278	279	279	279	279	279	278	278	278
	Aver	45.37	3.48	4.88	3.14	2.86	2.82	3.05	2.77	2.82	2.96	2.99	2.87	2.97	3.08
	Stdev	10.77	1.93	1.16	0.45	0.47	0.39	0.28	0.50	0.42	0.50	0.47	0.52	0.42	0.34
	T-Test	0.880	2.365	0.679	1.564	0.602	1.512	0.632	0.686	1.113	1.093	0.740	0.978	0.141	0.104
	One-Tail 0.10	NS	S	NS	S	NS	S	NS	NS	NS	NS	NS	NS	NS	NS
	F-Test	1.165	1.178	1.201	1.194	1.178	1.050	1.003	1.093	1.006	1.014	1.063	1.027	1.157	1.151
	$p < 0.001$	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

2B

		Satisfactory Level toward Property Price				Satisfactory Level toward Organizational Image								
		Stb	Con	CP	CR	Adm	Stf	Img	Pri	Car	Inv	GIS	Rel	GG
Male	*n*	121	121	121	121	121	121	121	121	121	121	121	121	121
	Aver	2.79	2.89	3.59	3.42	2.63	2.97	3.19	3.41	3.06	2.65	1.35	3.23	2.69
	Stdev	0.45	0.43	0.56	0.67	0.52	0.41	0.50	0.49	0.51	0.71	0.72	0.54	0.52
Female	*n*	279	279	279	279	279	279	279	279	279	279	279	279	279
	Aver	2.85	2.93	3.57	3.38	2.66	2.91	3.19	3.27	3.06	2.68	1.49	3.07	2.72
	Stdev	0.47	0.49	0.58	0.70	0.50	0.41	0.50	0.45	0.55	0.76	0.79	0.53	0.47
	T-Test	1.216	0.816	0.254	0.541	0.452	1.315	0.081	2.549	0.026	0.410	1.682	2.783	0.552
	One-Tail 0.10	NS	NS	NS	NS	NS	S	NS	S	NS	NS	S	S	NS
	F-Test	1.042	1.121	1.023	1.047	1.046	1.020	1.009	1.106	1.084	1.072	1.095	1.013	1.100
	$p < 0.001$	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

2C

		Satisfactory Level toward Qualities of Staffs						Satisfactory Level toward Expectations on NHA Properties								
		Dre	Ver	HR	Fac	Act	Ans	Loc	CA	US	Mat	Str	Par	Lux	RW	Sec
		121	121	121	121	121	121	121	121	121	121	121	121	121	121	121
Male	*n*	3.38	3.24	3.19	3.23	3.11	3.23	3.00	2.77	2.48	2.45	2.56	2.05	1.18	2.49	2.53
	Aver	0.66	0.47	0.42	0.52	0.39	0.56	0.40	0.47	0.66	0.57	0.55	0.76	0.39	0.62	0.62
	Stdev	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279
Female	*n*	3.35	3.11	3.16	3.20	3.11	3.26	3.02	2.73	2.55	2.47	2.39	1.96	1.15	2.51	2.47
	Aver	0.61	0.33	0.40	0.50	0.37	0.53	0.30	0.47	0.54	0.62	0.63	0.73	0.42	0.55	0.63
	Stdev															
	T-Test	0.437	2.872	0.625	0.504	0.158	0.400	0.438	0.611	1.095	0.300	2.678	1.080	0.605	0.401	0.918
	One-Tail 0.10	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	S	NS	NS	NS	NS
	F-Test	1.085	1.416	1.048	1.029	1.049	1.052	1.351	1.000	1.220	1.095	1.144	1.030	1.080	1.122	1.029
	$p < 0.001$	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Note that
n: number, Aver: average, Stdev: standard deviation, S: Significance, NS: Non-Significance

Table 3. Effects of education level differences on satisfactory levels toward NHA management system as assessed by ANOVA.

3A

				Satisfactory Level toward NHA Management System										
		Age	Mem	Rep	Lds	Dlp	Crd	Acp	Mng	Vis	Psn	Knw	Mor	Ser
	Aver	55.5	5.2	3.3	2.8	2.6	3.1	2.8	2.8	2.9	3.1	3.1	2.9	3.2
1	Stdev	7.3	1.3	0.5	0.5	0.5	0.3	0.6	0.5	0.6	0.5	0.5	0.6	0.5
	n	52	52	52	52	52	52	52	52	52	52	52	52	52
	Aver	45.6	5.1	3.2	2.8	2.7	3.0	2.7	2.7	2.8	2.9	2.9	3.0	3.1
2	Stdev	11.0	1.1	0.5	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.5	0.5	0.4
	n	103	103	103	103	102	103	103	103	103	103	103	103	103
	Aver	44.3	4.8	3.1	2.9	2.9	3.0	2.6	2.8	3.0	3.0	2.7	3.0	3.1
3	Stdev	10.5	1.1	0.4	0.5	0.3	0.2	0.5	0.4	0.5	0.4	0.5	0.4	0.3
	n	59	59	59	59	59	59	59	59	59	59	58	58	58
	Aver	41.4	4.8	3.1	2.8	2.9	3.1	2.8	2.8	3.0	3.0	2.8	3.0	3.1
4	Stdev	8.4	1.1	0.4	0.5	0.3	0.3	0.5	0.4	0.5	0.5	0.5	0.5	0.3
	n	89	89	89	89	89	89	89	89	89	89	89	89	89
	Aver	40.6	4.0	3.0	3.0	3.2	3.0	3.0	3.0	3.4	3.4	2.6	3.2	3.0
5	Stdev	9.6	0.7	0.0	0.0	0.4	0.0	0.0	0.0	0.5	0.5	0.5	0.4	0.0
	n	5	5	5	5	5	5	5	5	5	5	5	5	5
	Aver	39.6	4.3	3.1	2.8	3.0	2.9	2.8	3.0	3.1	3.0	2.9	3.0	3.1
6	Stdev	13.7	1.2	0.3	0.5	0.0	0.3	0.4	0.0	0.3	0.0	0.5	0.0	0.3
	n	12	12	12	12	12	12	12	12	12	12	12	12	12
	Aver	43.5	4.56	3.01	2.95	2.96	3.01	2.78	2.83	2.96	2.94	2.83	2.99	3.08
7	Stdev	12.8	1.4	0.3	0.4	0.3	0.2	0.4	0.4	0.6	0.5	0.5	0.3	0.3
	n	80	80	80	80	80	80	80	80	80	80	80	80	80
	GV	126.91	1.49	0.19	0.22	0.16	0.08	0.25	0.18	0.25	0.23	0.27	0.20	0.11
	GM	45.10	4.85	3.13	2.85	2.83	3.04	2.75	2.81	2.95	2.97	2.84	2.98	3.08
	SST	50638	596	74	86	63	33	98	71	99	93	109	78	44
	SSM	7555	26	4	2	7	0	2	1	3	2	5	1	0
	SSR	43083	570	71	85	56	33	97	70	96	91	104	77	43
	dfr	393	393	393	393	392	393	393	393	393	393	392	392	392
	SSM+ SSR	50638	596	74	86	62	33	98	71	99	93	108	78	43
	MS_M	1259.18	4.39	0.65	0.28	1.15	0.07	0.33	0.20	0.52	0.33	0.79	0.12	0.06
	MS_R	109.63	1.45	0.18	0.22	0.14	0.08	0.25	0.18	0.24	0.23	0.26	0.20	0.11
	F	**11.49**	**3.02**	**3.61**	**1.31**	**8.08**	**0.80**	**1.35**	**1.15**	**2.13**	**1.45**	**2.99**	**0.60**	**0.57**
	$p < 0.1$	**S**	**S**	**S**	**NS**	**S**	**NS**	**NS**	**NS**	**S**	**NS**	**S**	**NS**	**NS**

3B

		Satisfactory Level toward Property Price				Satisfactory Level toward Organizational Image								
		Stb	Con	CP	CR	Adm	Stf	Img	Pri	Car	Inv	GIS	Rel	GG
1	Aver	3.0	3.2	3.6	3.5	2.6	3.0	3.3	3.2	3.1	2.8	1.7	3.2	3.0
	Stdev	0.5	0.5	0.6	0.9	0.6	0.4	0.5	0.4	0.4	0.6	1.0	0.5	0.3
	n	52	52	52	52	52	52	52	52	52	52	52	52	52
2	Aver	2.9	2.9	3.6	3.4	2.6	2.9	3.2	3.2	3.1	2.7	1.3	3.1	2.8
	Stdev	0.4	0.5	0.6	0.7	0.5	0.5	0.5	0.4	0.5	0.8	0.7	0.5	0.4

(*Continued*)

Table 3. (Continued).

3B

		Satisfactory Level toward Property Price				Satisfactory Level toward Organizational Image								
		Stb	Con	CP	CR	Adm	Stf	Img	Pri	Car	Inv	GIS	Rel	GG
	n	103	103	103	103	103	103	103	103	103	103	103	103	103
3	Aver	2.7	2.8	3.6	3.4	2.7	2.9	3.1	3.4	3.1	2.4	1.4	2.9	2.6
	Stdev	0.5	0.5	0.6	0.7	0.5	0.4	0.5	0.5	0.7	0.9	0.7	0.6	0.5
	n	59	59	59	59	59	59	59	59	59	59	59	59	59
4	Aver	2.8	3.0	3.6	3.4	2.6	3.0	3.2	3.3	3.0	2.6	1.5	3.2	2.7
	Stdev	0.4	0.4	0.6	0.7	0.5	0.4	0.5	0.5	0.5	0.7	0.8	0.6	0.5
	n	89	89	89	89	89	89	89	89	89	89	89	89	89
5	Aver	3.0	2.4	3.6	3.4	3.0	2.6	3.0	3.4	3.0	2.4	1.4	3.0	2.8
	Stdev	0.0	0.5	0.5	0.5	0.0	0.5	0.0	0.5	0.0	0.9	0.5	0.7	0.4
	n	5	5	5	5	5	5	5	5	5	5	5	5	5
6	Aver	2.8	2.3	3.6	3.7	3.0	3.3	3.3	3.3	2.1	3.0	1.3	3.1	2.8
	Stdev	0.5	0.5	0.5	0.5	0.0	0.5	0.5	0.5	0.3	0.0	0.8	0.8	0.4
	n	12	12	12	12	12	12	12	12	12	12	12	12	12
7	Aver	2.78	2.95	3.54	3.20	2.66	2.95	3.08	3.43	3.14	2.71	1.38	3.13	2.50
	Stdev	0.5	0.4	0.5	0.6	0.5	0.3	0.5	0.5	0.5	0.8	0.6	0.5	0.5
	n	80	80	80	80	80	80	80	80	80	80	80	80	80
	GV	0.21	0.22	0.33	0.47	0.25	0.17	0.25	0.21	0.29	0.57	0.59	0.29	0.23
	GM	2.84	2.92	3.57	3.39	2.66	2.93	3.19	3.31	3.07	2.65	1.44	3.11	2.72
	SST	84	89	130	189	100	67	100	85	115	229	234	115	92
	SSM	3	9	0	4	3	3	3	3	13	6	5	2	9
	SSR	82	80	130	184	98	64	98	82	102	223	229	113	83
	dfr	393	393	393	393	393	393	393	393	393	393	393	393	393
	SSM+ SSR	84	89	130	189	100	67	100	85	115	229	234	115	92
	MSM	0.46	1.56	0.06	0.72	0.47	0.44	0.42	0.51	2.14	1.00	0.82	0.36	1.46
	MSR	0.21	0.20	0.33	0.47	0.25	0.16	0.25	0.21	0.26	0.57	0.58	0.29	0.21
	F	**2.23**	**7.68**	**0.17**	**1.54**	**1.91**	**2.67**	**1.69**	**2.45**	**8.22**	**1.77**	**1.41**	**1.25**	**6.87**
	p < 0.1	**S**	**S**	**NS**	**NS**	**S**	**S**	**NS**	**S**	**S**	**S**	**NS**	**NS**	**S**

3C

			Satisfactory Level toward Qualities of Staffs						Satisfactory Level toward Expectations on NHA Properties								
		Edu	Dre	Ver	HR	Fac	Act	Ans	Loc	CA	US	Mat	Str	Par	Lux	RW	Sec
1	Aver	5.2	3.1	3.1	3.1	3.3	3.1	3.2	3.0	2.8	2.6	2.5	2.3	2.4	1.2	2.7	2.5
	Stdev	1.3	0.4	0.4	0.4	0.6	0.4	0.5	0.3	0.4	0.5	0.6	0.8	0.7	0.4	0.5	0.6
	n	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
2	Aver	5.1	3.3	3.2	3.1	3.2	3.1	3.2	3.0	2.7	2.5	2.4	2.5	2.0	1.1	2.6	2.4
	Stdev	1.1	0.6	0.4	0.3	0.5	0.4	0.5	0.3	0.5	0.6	0.7	0.6	0.8	0.3	0.6	0.7
	n	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103
3	Aver	4.8	3.6	3.1	3.2	3.1	3.1	3.2	3.1	2.8	2.5	2.4	2.4	1.9	1.2	2.4	2.7
	Stdev	1.1	0.6	0.3	0.4	0.4	0.4	0.4	0.3	0.4	0.5	0.6	0.6	0.7	0.4	0.5	0.5
	n	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59
4	Aver	4.8	3.3	3.1	3.1	3.2	3.1	3.3	3.1	2.7	2.6	2.5	2.4	1.9	1.2	2.5	2.4

(*Continued*)

Table 3. (Continued).

3C

			Satisfactory Level toward Qualities of Staffs						Satisfactory Level toward Expectations on NHA Properties								
		Edu	Dre	Ver	HR	Fac	Act	Ans	Loc	CA	US	Mat	Str	Par	Lux	RW	Sec
	Stdev	1.1	0.6	0.4	0.4	0.5	0.4	0.6	0.3	0.5	0.6	0.6	0.6	0.7	0.5	0.6	0.7
	n	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
5	Aver	4.0	3.2	3.2	3.2	3.0	3.0	3.2	2.6	2.6	2.8	2.6	2.4	2.2	1.0	2.8	2.4
	Stdev	0.7	0.4	0.4	0.4	0.0	0.0	0.4	0.9	0.5	0.4	0.5	0.5	0.8	0.0	0.4	0.5
	n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	Aver	4.3	4.3	3.1	3.3	3.3	3.0	3.3	3.1	2.9	2.2	1.9	2.6	1.8	1.2	2.1	2.8
	Stdev	1.2	0.8	0.3	0.5	0.8	0.0	0.6	0.3	0.3	0.4	0.8	0.8	0.6	0.4	0.3	0.5
	n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
7	Aver	4.56	3.31	3.18	3.25	3.19	3.14	3.31	2.96	2.70	2.63	2.61	2.55	1.91	1.18	2.49	2.53
	Stdev	1.4	0.6	0.4	0.5	0.5	0.4	0.6	0.3	0.5	0.6	0.5	0.5	0.8	0.4	0.6	0.6
	n	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
	GV	1.49	0.38	0.15	0.16	0.26	0.15	0.29	0.11	0.22	0.33	0.37	0.37	0.55	0.16	0.33	0.39
	GM	4.85	3.36	3.15	3.17	3.21	3.12	3.26	3.02	2.73	2.54	2.46	2.44	1.99	1.16	2.51	2.49
	SST	596	154	60	64	102	58	116	45	89	133	149	148	220	65	130	156
	SSM	26	16	0	1	1	0	1	2	2	4	7	3	10	1	7	5
	SSR	570	138	59	64	101	58	116	43	88	129	142	146	210	64	123	151
	dfr	393	393	393	393	393	393	393	393	393	393	393	393	393	393	393	393
	SSM+ SSR	596	154	60	64	102	58	116	45	89	133	149	148	220	65	130	156
	MSM	4.39	2.61	0.04	0.15	0.16	0.06	0.11	0.38	0.28	0.75	1.15	0.45	1.69	0.17	1.10	0.80
	MSR	1.45	0.35	0.15	0.16	0.26	0.15	0.29	0.11	0.22	0.33	0.36	0.37	0.53	0.16	0.31	0.38
	F	3.02	7.43	0.28	0.95	0.63	0.39	0.38	3.48	1.25	2.28	3.19	1.22	3.16	1.02	3.52	2.08
	$p < 0.1$	S	S	NS	NS	NS	NS	NS	S	NS	S	S	NS	S	NS	S	S

Note that

Aver: Average, Stdev: Standard Deviation, *n*: Number, GV: Grand Variance, GM: Grand Mean, SST: Total Sum of Squares, SSM: Model Sum of Squares, SSR: Residual Sum of Squares, dfr: Degree of Freedom, MS_M: Model Mean Squares, MS_R: Residual Mean Squares

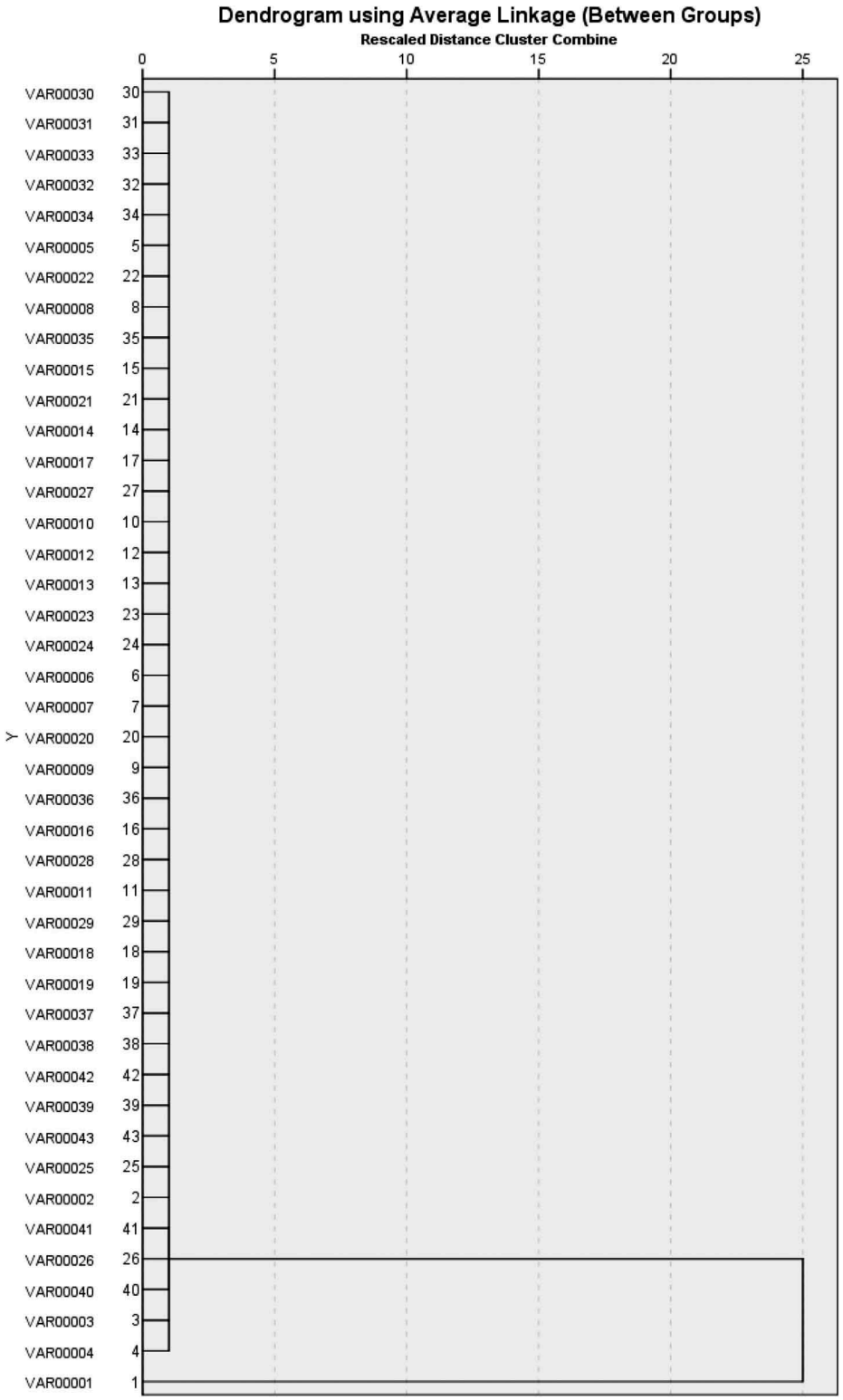


Figure 3. Dendrogram of hierarchical cluster analysis by using 43 variables obtained from this social survey.

Variable	Description
VAR00001	Actual age of interviewees and/or questionnaire respondents.
VAR00002	Gender of interviewees and/or questionnaire respondents.
VAR00003	Education level of interviewees and/or questionnaire respondents.
VAR00004	Actual family member of interviewees and/or questionnaire respondents.
VAR00005	Satisfactory level of interviewees and/or questionnaire respondents toward the reputation of NHA.
VAR00006	Satisfactory level of interviewees and/or questionnaire respondents toward the leadership of NHA as the outstanding organization for encouraging sustainable development for residential property management.
VAR00007	Satisfactory level of interviewees and/or questionnaire respondents toward the continuous technological development of NHA for building residential properties.
VAR00008	Satisfactory level of interviewees and/or questionnaire respondents toward the credibility of NHA.
VAR00009	Satisfactory level of interviewees and/or questionnaire respondents toward the quality of services provided by NHA staffs.
VAR00010	Satisfactory level of interviewees and/or questionnaire respondents toward the managing system of NHA.
VAR00011	Satisfactory level of interviewees and/or questionnaire respondents toward the executive vision of NHA.
VAR00012	Satisfactory level of interviewees and/or questionnaire respondents toward the personality of NHA staffs.
VAR00013	Satisfactory level of interviewees and/or questionnaire respondents toward the knowledge of staffs associated with NHA projects.
VAR00014	Satisfactory level of interviewees and/or questionnaire respondents toward the morality and ethics of NHA executive members.
VAR00015	Satisfactory level of interviewees and/or questionnaire respondents toward the quality of service provided by NHA staffs.
VAR00016	Satisfactory level of interviewees and/or questionnaire respondents toward the suitability of prices of NHA properties based on the conditions of each project.
VAR00017	Satisfactory level of interviewees and/or questionnaire respondents toward the hire purchase of NHA properties.
VAR00018	Satisfactory level of interviewees and/or questionnaire respondents toward the comparatively cheap price of properties in comparison with other housing companies.
VAR00019	Satisfactory level of interviewees and/or questionnaire respondents toward the comparatively rental rates of properties in comparison with other housing companies.
VAR00020	Satisfactory level of interviewees and/or questionnaire respondents toward the administrative performances of NHA executive members.
VAR00021	Satisfactory level of interviewees and/or questionnaire respondents toward the overall quality of NHA staffs.
VAR00022	Satisfactory level of interviewees and/or questionnaire respondents toward the overall image of NHA.
VAR00023	Satisfactory level of interviewees and/or questionnaire respondents toward the overall prices of NHA properties.
VAR00024	Satisfactory level of interviewees and/or questionnaire respondents toward the environmental care activities supported by NHA.
VAR00025	Satisfactory level of interviewees and/or questionnaire respondents toward the image of creating innovation associated with residential development.
VAR00026	Satisfactory level of interviewees and/or questionnaire respondents toward the customer services for using GIS.
VAR00027	Satisfactory level of interviewees and/or questionnaire respondents toward the customer relation as conducted by NHA staffs.
VAR00028	Satisfactory level of interviewees and/or questionnaire respondents toward the good governance of NHA.
VAR00029	Satisfactory level of interviewees and/or questionnaire respondents toward the job-appropriate clothing for NHA staffs.
VAR00030	Satisfactory level of interviewees and/or questionnaire respondents toward the polite verbal communication skill of NHA staffs.
VAR00031	Satisfactory level of interviewees and/or questionnaire respondents toward the human relation of NHA staffs.
VAR00032	Satisfactory level of interviewees and/or questionnaire respondents toward the quality of facilitation services conducted by NHA staffs.
VAR00033	Satisfactory level of interviewees and/or questionnaire respondents toward the overall activeness of NHA staffs.
VAR00034	Satisfactory level of interviewees and/or questionnaire respondents toward the overall quality of NHA staffs in responding customers' questions.
VAR00035	Satisfactory level of interviewees and/or questionnaire respondents toward the locations of NHA properties.
VAR00036	Satisfactory level of interviewees and/or questionnaire respondents toward the common area of NHA properties.
VAR00037	Satisfactory level of interviewees and/or questionnaire respondents toward the utility space of NHA properties.
VAR00038	Satisfactory level of interviewees and/or questionnaire respondents toward the overall quality of materials used in NHA properties.
VAR00039	Satisfactory level of interviewees and/or questionnaire respondents toward the overall beauty of NHA architectural structures.
VAR00040	Satisfactory level of interviewees and/or questionnaire respondents toward the car park of NHA properties.
VAR00041	Satisfactory level of interviewees and/or questionnaire respondents toward the overall luxurious of club house, fitness, and swimming pool inside NHA communities.
VAR00042	Satisfactory level of interviewees and/or questionnaire respondents toward the road width of NHA communities.
VAR00043	Satisfactory level of interviewees and/or questionnaire respondents toward the security system of NHA communities.

Figure 3. Continued.

Ans. In other words, respondents' educational levels did not play any significant roles on satisfactory levels related with credibility, morality, service quality, property price, verbal communication skill, facilitation services, activeness, clear responding, and reflecting skills of NHA staffs. These findings implicate the quality of staff as a distinctive core competency of NHA.

On the contrary, some significant differences were detected in satisfactory levels connected with Rep, Dlp, Knw, Stb, Con, Dre, Loc, US, Mat, Par, and RW. These results indicate that educational level can significantly influence on satisfactions related with

Table 4. Effects of education level differences on satisfactory levels toward NHA management system as assessed by the protected Fisher's Least Significant Difference (LSD) test (α = 0.05).

Between Group	Age	Mem	Rep	Lds	Dlp	Crd	Acp	Mng	Vis	Psn	Knw	Mor	Ser	Stb
GROUP1-2	S	NS	S	NS	NS	NS	NS	NS	NS	S	S	NS	NS	S
GROUP1-3	S	NS	S	NS	S	NS	NS	NS	NS	NS	S	NS	NS	S
GROUP1-4	S	S	S	NS	S	NS	NS	NS	NS	NS	S	NS	NS	S
GROUP1-5	S	S	NS	NS	S	NS	NS	NS	S	NS	NS	NS	NS	NS
GROUP1-6	S	S	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
GROUP1-7	S	S	S	S	S	NS	NS	NS	NS	NS	S	NS	NS	S
GROUP2-3	NS	NS	NS	NS	S	NS	NS	NS	S	NS	S	NS	NS	NS
GROUP2-4	S	NS	NS	NS	S	NS	NS	NS	S	NS	NS	NS	NS	NS
GROUP2-5	NS	NS	NS	NS	S	NS	NS	NS	S	S	NS	NS	NS	NS
GROUP2-6	NS	S	NS	NS	S	NS	NS	S	NS	NS	NS	NS	NS	NS
GROUP2-7	NS	S	S	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
GROUP3-4	NS	NS	NS	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS
GROUP3-5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GROUP3-6	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GROUP3-7	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GROUP4-5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GROUP4-6	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GROUP4-7	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GROUP5-6	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GROUP5-7	NS	NS	NS	NS	NS	NS	NS	NS	NS	S	NS	NS	NS	NS
GROUP6-7	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Between Group	Con	CP	CR	Adm	Stf	Img	Pri	Car	Inv	GIS	Rel	GG	Dre	Ver
GROUP1-2	S	NS	NS	NS	NS	NS	NS	NS	NS	S	NS	NS	NS	NS
GROUP1-3	S	NS	NS	NS	NS	NS	NS	NS	S	S	S	S	S	NS
GROUP1-4	S	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	S	NS	NS
GROUP1-5	S	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GROUP1-6	S	NS	NS	S	S	NS	NS	S	NS	NS	NS	NS	S	NS
GROUP1-7	S	NS	S	NS	NS	S	S	NS	NS	S	NS	S	NS	NS
GROUP2-3	NS	NS	NS	NS	NS	NS	S	NS	NS	NS	NS	S	S	NS
GROUP2-4	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GROUP2-5	S	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GROUP2-6	S	NS	NS	S	S	NS	NS	S	NS	NS	NS	NS	S	NS
GROUP2-7	NS	NS	NS	NS	NS	NS	S	NS	NS	NS	NS	S	NS	NS
GROUP3-4	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	S	NS	S	NS
GROUP3-5	S	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GROUP3-6	S	NS	NS	NS	NS	NS	NS	NS	S	NS	NS	NS	NS	NS
GROUP3-7	NS	NS	S	NS	NS	NS	NS	NS	S	NS	NS	NS	S	NS
GROUP4-5	S	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
GROUP4-6	S	NS	NS	S	S	NS	NS	S	NS	NS	NS	NS	S	NS
GROUP4-7	NS	NS	S	NS	NS	S	NS	NS	NS	NS	NS	S	NS	NS
GROUP5-6	NS	NS	NS	NS	S	NS	NS	S	NS	NS	NS	NS	S	NS
GROUP5-7	S	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GROUP6-7	S	NS	S	S	S	NS	NS	S	NS	NS	NS	S	S	NS

Between Group	HR	Fac	Act	Ans	Loc	CA	US	Mat	Str	Par	Lux	RW	Sec
GROUP1-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	S	NS	NS	NS
GROUP1-3	NS	NS	NS	NS	NS	NS	NS	NS	NS	S	NS	S	S
GROUP1-4	NS	NS	NS	NS	S	NS	NS	NS	NS	S	NS	S	NS
GROUP1-5	NS	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS
GROUP1-6	NS	NS	NS	NS	NS	NS	S	S	NS	S	NS	S	NS
GROUP1-7	NS	NS	NS	NS	NS	NS	NS	NS	S	S	NS	S	NS
GROUP2-3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	S	S
GROUP2-4	NS	NS	NS	NS	S	NS	S	NS	NS	NS	S	NS	NS
GROUP2-5	NS	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS
GROUP2-6	NS	NS	NS	NS	NS	NS	NS	S	NS	NS	NS	S	NS
GROUP2-7	S	NS	NS	NS	NS	NS	S	S	NS	NS	NS	NS	NS
GROUP3-4	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	S
GROUP3-5	NS	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS
GROUP3-6	NS	NS	NS	NS	NS	NS	NS	S	NS	NS	NS	NS	NS
GROUP3-7	NS	NS	NS	NS	S	NS	NS	S	NS	NS	NS	NS	NS
GROUP4-5	NS	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS
GROUP4-6	NS	NS	NS	NS	NS	NS	S	S	NS	NS	NS	S	NS
GROUP4-7	NS	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS
GROUP5-6	NS	NS	NS	NS	S	NS	S	S	NS	NS	NS	S	NS
GROUP5-7	NS	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS
GROUP6-7	NS	NS	NS	NS	NS	NS	S	S	NS	NS	NS	S	NS

reputation, technological development, staff's knowledge, suitability of property prices, property conditions, job-appropriate dressing, property locations, utility spaces, building materials, car park area, and road width of NHA communities. It is obvious that well-educated respondents generally dissatisfied with the overall facility conditions coupled with the staff knowledge, indicating that NHA should seriously consider about organizing training workshops and seminars for sales staff in order to improve both their architectural insights and presentation skills.

As previously mentioned in Section 3.1, the NHA can be compared to Japanese carmakers. This suggests that the majority of stakeholders with an elementary education recognize the NHA as a family-oriented state enterprise, providing relatively low property prices at a decent standard. More importantly, questionnaire respondents with a degree greater than or equal to a vocational diploma demonstrated the highest satisfaction levels related to technological development, executive goals, administrative performance, overall staff quality, property prices, environmental care activities, innovation in connection with residential development, formal staff uniforms, utility space, property materials, road width, and security systems. There are many reasons for these findings.

First, highly educated respondents tend to understand and appreciate the core values of several corporate social responsibility (CSR) activities in comparison to those with a low education level. These results are consistent with an earlier investigation underlining that customers' satisfaction and loyalty are greatly affected by their education level (Suh, Greene, Israilov, & Rho, 2015). A previous study also highlights that customer purchase intentions are positively correlated with their awareness of CSR activities (Lee & Shin, 2010). Another investigation associated with Chinese consumers' awareness of CSR activities indicates that economic responsibilities are the most crucial aspect, while philanthropic responsibilities are of least importance (Ramasamy & Yeung, 2009). Chinese consumers' comparatively high priority of economic aspects are in good agreement with the fact that the questionnaire respondents significantly displayed the highest satisfaction levels associated with NHA property prices. Second, an earlier study reported that efforts to increase customers' service knowledge and equip them with the skills to apply critical information can assist companies in differentiating their service offerings, and provide a strong foundation on which to build a trusting relationship (Eisingerich & Bell, 2008). Findings indicate that services in the private sector should become more transparent with clients, and avoid the tendency to conceal 'black box' procedures and protocols. To enhance customer loyalty and trust, the NHA should theoretically make more effort to disseminate knowledge associated with technological development, environmental care activities, innovation related to residential development, property materials, and security systems. This will lead to a sustainable relationship between the NHA and its customers.

Multiple linear regression analysis: Parameters that influence satisfaction level

MLRA is an advanced statistical method of linear regression analysis. MLRA was conducted to explain the relationship between one continuous dependent variable (i.e. satisfaction score) and two independent variables (i.e. age, education) as a predictive analysis. Independent parameters can be continuous or categorical. Furthermore, three main assumptions are essential before applying MLRA. First, the regression residuals have to be theoretically normally distributed. Second, a linear relationship between the

independent and dependent parameters should exist. Third, multicollinearity (i.e. a phenomenon in which one predictor variable in a multiple regression model can be linearly predicted from the others with a substantial degree of accuracy) should not exist. By employing the satisfaction scores from the questionnaire respondents, coupled with independent parameters such as actual age (AGE) and seven scales of education level (EDU), as previously classified in Section 4.3, MLRA was successfully calculated, as shown in Equations (3)–(7). Noticeably, SL1, SL2, SL3, SL4, and SL5 are the average satisfaction scores of the following NHA activities:

- SL1: Lds, Mng (i.e. average satisfaction level of stakeholders towards the NHA's management system)
- SL2: Stb, Con, CP, CR, Pri (i.e. average satisfaction level of stakeholders towards the prices of NHA properties)
- SL3: Rep, Img, Inv (i.e. average satisfaction level of stakeholders towards the NHA's public image)
- SL4: Acp, Psn, Knw, Ser, Stf, Rel, Dre, Ver, HR, Fac, Act, Ans (i.e. average satisfaction level of stakeholders towards the service quality of NHA staff members)
- SL5: Dlp, Crd, Vis, Mor, Adm, Car, GIS, GG, Loc, CA, US, Mat, Str, Par, Lux, RW, Sec (i.e. average satisfaction level of stakeholders towards overall expectations of the NHA)

In this study, SPSS (Version 13.0) was used to perform MLRA by inputting the dependent (i.e. SL1–SL5) and independent variables (i.e. AGE, EDU). The MLRA equations can be described as follows:

$$SL1 = 2.89 + 0.000530 \times AGE + 0.00598 \times EDU \tag{3}$$

$$SL2 = 3.09 + 0.00343 \times AGE - 0.0177 \times EDU \tag{4}$$

$$SL3 = 2.72 + 0.00177 \times AGE - 0.00372 \times EDU \tag{5}$$

$$SL4 = 3.17 - 0.00000988 \times AGE + 0.0104 \times EDU \tag{6}$$

$$SL5 = 2.396 - 0.000570 \times AGE - 0.000390 \times EDU \tag{7}$$

There are numerous components related to the MLRA results (see Table 5). First, both the ages and education levels of the questionnaire respondents are positively correlated with an average value of stakeholder satisfaction towards the NHA's management system (i.e. SL1). Second, the ages of the questionnaire respondents are positively correlated with the average satisfaction level toward NHA property prices (i.e. SL2) and images (i.e. SL3), while education level is negatively correlated with SL2 and SL3. Third, the ages of stakeholders are negatively correlated with the average satisfaction level towards the service quality of NHA staff members (i.e. SL4), while education level is positively correlated with SL4. Finally, both the ages and education levels of the questionnaire respondents are negatively correlated with the average satisfaction level of stakeholders towards overall expectations of the NHA (i.e. SL5).

Although older and highly educated stakeholders were considerably satisfied with the NHA's management system (i.e. Equation 3), overall satisfaction levels with property (e.g. property materials, car parks, locations, common areas, security systems, luxurious

Table 5. Relationships between independent variables (e.g. age, education) and different types of dependent variables as assessed by MLRA.

	Coefficient	Standard Error	LCL	UCL	*t*-Stat	*p*-level	H_0 (5%)
Dependent variable: Average of satisfactory level of stakeholders toward the management system of NHA							
Intercept	2.88478	0.03925	2.80760	2.96195	73.48856	0	rejected
46	**0.00053**	0.00072	−0.00088	0.00194	0.73928	0.46017	**accepted**
7	**0.00598**	0.00398	−0.00185	0.01381	1.50072	0.13422	**accepted**
Dependent variable: Average of satisfactory level of stakeholders toward the price of NHA properties							
Intercept	3.08593	0.09143	2.90618	3.26567	33.75239	0	rejected
46	**0.00343**	0.00167	0.00014	0.00671	2.05129	0.04090	**rejected**
7	**−0.01766**	0.00928	−0.03590	0.00058	−1.90387	0.05765	**accepted**
Dependent variable: Average of satisfactory level of stakeholders toward the image of NHA							
Intercept	2.72091	0.05554	2.61171	2.83010	48.98773	0	rejected
46	**0.00177**	0.00101	−0.00022	0.00377	1.74629	0.08154	**accepted**
7	**−0.00372**	0.00564	−0.01480	0.00736	−0.66037	0.50940	**accepted**
Dependent variable: Average of satisfactory level of stakeholders toward the service quality of NHA staffs							
Intercept	3.17389	0.08383	3.00909	3.33869	37.86249	0	rejected
46	**−9.87853E-6**	0.00153	−0.00302	0.00300	−0.00645	0.99486	**accepted**
7	**0.01044**	0.00850	−0.00629	0.02716	1.22698	0.22056	**accepted**
Dependent variable: Average of satisfactory level of stakeholders toward the overall expectation of NHA							
Intercept	2.39563	0.05525	2.28701	2.50425	43.36135	0	rejected
46	**−0.00057**	0.00101	−0.00256	0.00141	−0.56845	0.57005	**accepted**
7	**−0.00039**	0.00561	−0.01141	0.01063	−0.06941	0.94470	**accepted**

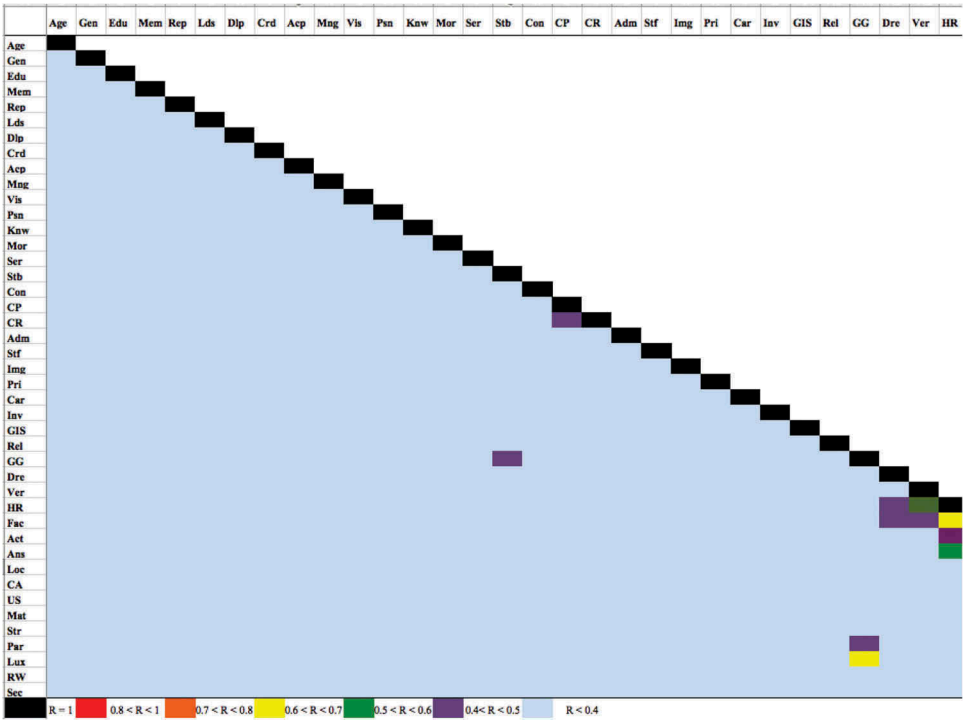
Note. Bolded text are acronyms and abbreviations used in this study listed in Table 1.

facilities), good organizational governance, morality, ethics, and visions of the NHA's multiple executive committees fell significantly below their expectations. Elderly stakeholders tend to be content with NHA property prices (i.e. SL2) and images (i.e. SL3), while the highly educated population requires further improvements of these two aspects. Moreover, elderly stakeholders seem disappointed with the quality of NHA staff members (i.e. SL4), while highly educated respondents are satisfied with their standard of service.

Pearson correlation analysis of NHA stakeholder satisfaction levels

An investigation of the Pearson correlation analysis indicated that the following activities had positive correlations such as Lux *vs.* GG, Fac *vs.* HR (i.e. $0.7 > R > 0.6$; highlighted in yellow); Ans *vs.* HR, Ver *vs.* HR (i.e. $0.6 > R > 0.5$; highlighted in green); and GG *vs.* Stb, CR *vs.* CP, Par *vs.* GG, Fac *vs.* Dre, HR *vs.* Dre, Fac *vs.* Ver, Act *vs.* HR, Ans *vs.* Fac, Ans *vs.* Act (i.e. $0.5 > R > 0.4$; highlighted in purple) (see Table 6). These results reveal that the satisfaction level associated with good governance is positively correlated with other features such as the overall luxury of clubhouses, fitness facilities, and swimming pools inside NHA communities; the suitability of property prices; and car park areas. These considerably positive relationships highlight that the process of decision-making inside the NHA is highly associated with efficient and effective administration in a given framework of facilities. Furthermore, the quality of facilitation services conducted by NHA staff members is positively correlated with their human relationships, politeness, and appropriate clothing. These findings emphasize staff quality as one of the NHA's core competencies, which other state enterprises do not easily replicate. In addition, all satisfaction levels connected with human relations (HR) show some positive correlations with the overall activeness, appropriate clothing, and polite verbal communication skills of NHA staff members. These findings again signal the importance of a human resources office as the capability and/or advantage that distinguishes an enterprise from its competitors.

Table 6. Pearson correlation coefficients between dependent and independent variables.



Hierarchical cluster analysis (HCA) of NHA stakeholder satisfaction levels

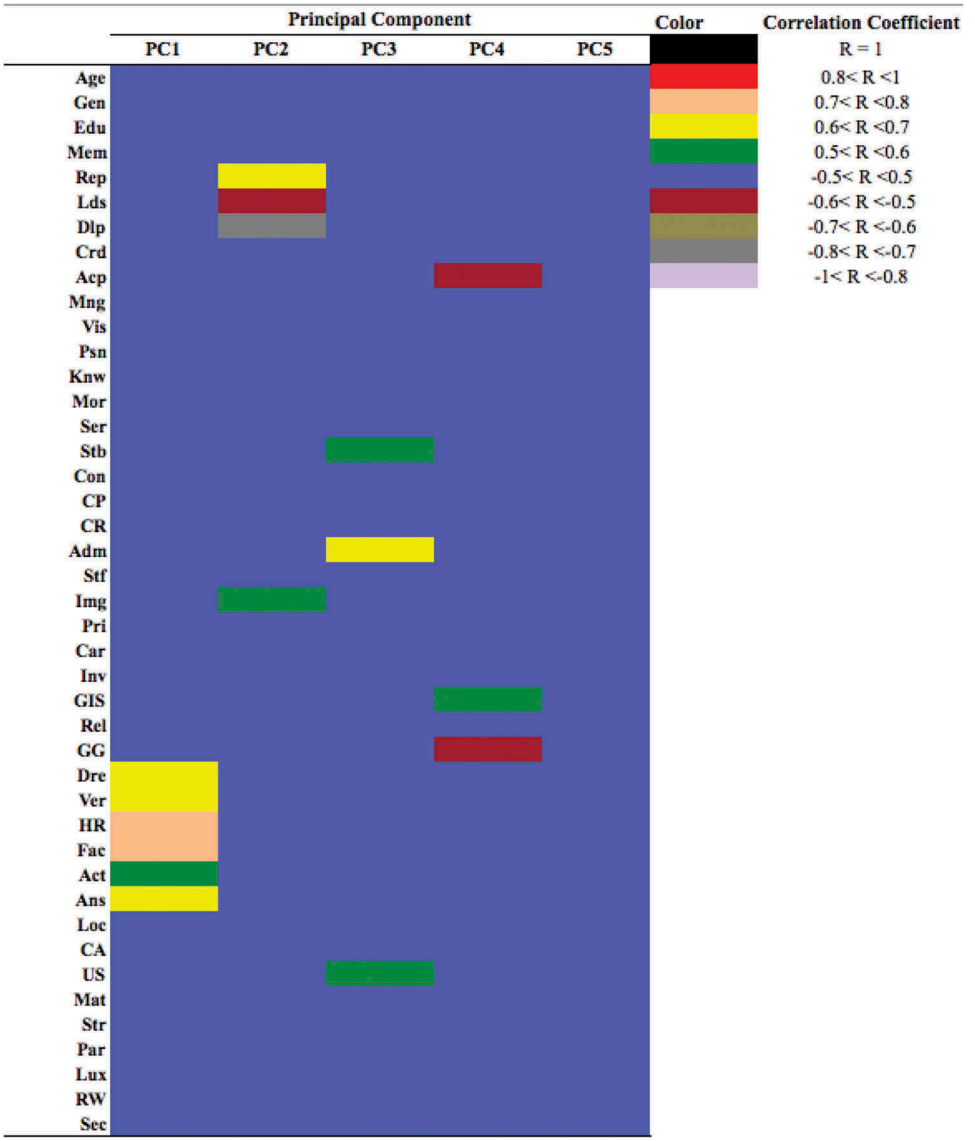
HCA is widely employed in data mining and advanced statistics, which can be categorized into two types, namely, agglomerative and divisive. While an agglomerative is a "bottom up" strategy by merging several pairs of clusters as one moves up the hierarchy, a divisive concept is a "top down" approach starts from one cluster splits down repetitively as one moves down the hierarchy. Over the past few decades, HCA has been consistently applied in environmental sciences (Pongpiachan, 2015; Pongpiachan & Iijima, 2016), social sciences (Pongpiachan, 2018), psychology (Henry, Tolan, & Gorman-Smith, 2005), and marketing research (Punj & Stewart, 1983). As displayed in Figure 3, the independent variables are surprisingly close to each other along with some dependent variables (i.e. VAR25, VAR26, VAR40, and VAR41). This indicates that actual age, education level, gender, and actual family member of questionnaire respondents have some appreciable influences on satisfactory levels toward the image of creating innovation associated with residential development (i.e. VAR25), the customer services for using GIS (i.e. VAR26), the car park of NHA properties (i.e. VAR40), and the overall luxurious of club house, fitness, and swimming pool inside NHA communities (i.e. VAR41). As previously mentioned in Section 3.2, some gender differences were only detected in satisfactory level related with reputation, technological development, property price, staff quality, the overall beauty of NHA architectural structures and customer services for using GIS.

These *t*-Test results are to some extent in good agreement with HCA dendrogram underlining the remarkable affinity between VAR25 (i.e. the image of creating innovation associated with residential development) and VAR41 (i.e. the overall luxurious of club house, fitness, and swimming pool inside NHA communities) (see Figure 3). Numerous statistical results associated with the strong affinity between variables can be distilled from a HCA dendrogram. Firstly, the close proximity of VAR30, VAR31, VAR33, VAR32, and VAR34 indicates that the satisfactory levels toward qualities of NHA staffs (e.g. polite verbal communication skill, human relation, facilitation service, and activeness) move in the same direction. It is also crucial to underline that these variables are irrelevant to age, gender, educational level, and family member of questionnaire respondents. Secondly, variables associated with satisfactions toward the managing system (i.e. VAR10), the personality (i.e. VAR12), the project knowledge (i.e. VAR13) and the morality and ethics of NHA executive members (i.e. VAR14) are located adjacent to the satisfactory levels of hire-purchase of NHA properties (i.e. VAR17) and customer relations as conducted by NHA staffs (i.e. VAR27). These findings suggest that stakeholders generally connect the quality of NHA executive members with property prices and customer relations. Thirdly, similar patterns were also observed for VAR6, VAR7, VAR20, VAR9 indicating that satisfactions of interviewees toward the leadership of NHA as the outstanding organization for encouraging sustainable development for residential property management, the continuous technological development for building residential properties, and the quality of staff services are extremely close to the administrative performances of executive members.

Principal component analysis (PCA) of NHA stakeholder satisfaction levels

PCA is a multivariate technique widely applied in the field of environmental science (Pongpiachan, 2015; Pongpiachan et al., 2017a, 2018; Pongpiachan & Iijima, 2016; Pongpiachan et al., 2015, 2017b), business (Ho & Wu, 2009; Olawale & Garwe, 2010), finance (Cha & Chan, 2000; Jalil, Feridun, & Ma, 2010), and psychology (Hotelling, 1993; Raskin & Terry, 1988). The major difference between PCA and other statistical models (e.g. SLRA, HCA, MLRA) is that PCA does not require dependent or independent parameters. Since PCA is designed for identifying the relationship between parameters, all parameters are displayed in standardized form with an average of 0 and a standard deviation of 1. PCA is an advanced statistical model that evaluates a data table in which detections are explained by numerous, inter-correlated, quantitative dependent parameters. PCA's main aim is to extract the crucial knowledge from the table, exhibit it as a set of new orthogonal parameters called principal components (PCs), and to show the arrangement of conformity of the detections. PCA is extensively used to break down the information in numerous observed parameters into a smaller set of components, and seeks a linear relationship of parameters such that the maximum variance is drawn out from the parameters. Consequently, PCA reduces this variance and finds a second linear relationship that explains the maximum proportion of the remaining variance, which is named as the principal axis method and results in orthogonal (uncorrelated) factors. As a result, the largest consolidation, offering a description for the greater part of the variances, becomes principal component 1 (PC1); the second greatest proportion explains the next largest amount of variances and becomes principal component 2 (PC2) and so on. By employing this analogy, the complication of a matrix can be simplified in the form of principal components.

Table 7. Principal component analysis of dependent and independent variables.



In the present social investigation, there are 43 parameters. PCA decreases the matrix to five major PCs (see Table 7). After carefully investigating PC1, parameters HR and Fac have positive correlation values greater than 0.7 but less than 0.8. Interestingly, the positive correlation coefficients of Dre, Ver, Act, and Ans were larger than 0.5 but lower than 0.7. These findings indicate that the satisfaction levels associated with HR and the quality of facilitation services are deeply connected to the stakeholder delight score, which is related to job-appropriate clothing, polite verbal communication skills, overall staff activeness, and the level of customer service in answering questions. Since the relatively

high correlation coefficients of these six variables (i.e. HR, Fac, Dre, Ver, Act, and Ans) were observed in PC1, it is reasonable to assume that human resources is the most valuable resource and the NHA's core competency.

In the second principal component (i.e. PC2), some negative correlation coefficients ranging from −0.7 to −0.5 were detected in Lds and Dlp, while considerably strong positive correlation values were observed in Rep (i.e. $0.6 < R < 0.7$) and Img (i.e. $0.5 < R < 0.6$). These outcomes underline that the NHA's overall image and reputation are negatively correlated with the satisfaction level associated with NHA leadership. The NHA is recognized as an outstanding, state-run organization that encourages sustainable development for residential property management and continuous technological development for building residential properties. This discrepancy is most likely caused by a lack of improvement, particularly in terms of technological development coupled with leadership. In the third principal component (i.e. PC3), variables Stb and Adm have positive correlation values within the ranges of $0.5 < R < 0.6$ and $0.6 < R < 0.7$, respectively. This finding suggests that stakeholders generally believe that NHA executive members can successfully manage property prices based on the conditions of each project.

Research limitations/implications & originality/value

Much of the previous studies fail to provide appropriately grounded theoretical evidences for the detected empirical finding on satisfactory levels associated with corporate images. This study is the first to utilize some advanced statistical tools for developing the "effects made by age, gender, and educational level" approach as previously mentioned in section 3.2–3.7. A unique theoretical examination is provided of the relationship between dependent parameters (i.e. 39 satisfactory levels) and independent variables (i.e. age, gender, educational level). Conceptual refinement in the age, gender, and educational level could be further expanded by employing the theoretical platform developed here to empirical analyses and, to investigate its relevance to understanding how stakeholders appreciate property products, evaluate the quality of staffs and value about corporate image issues.

Conclusions

Although qualitative results have highlighted some concerns about the performance management of NHA executive members, the overall satisfaction score is categorized at a moderate level. Noticeable gender differences were detected at satisfactory levels connected with reputation, the quality of services, verbal communication skills, property prices, customer relations, and overall architectural beauty. Female stakeholders seem satisfied with the NHA's general reputation and customer service when using GIS, while male survey respondents displayed significantly higher satisfaction levels related to technological developments, verbal communication skills, property prices, architectural structures, and customer relations. The ANOVA results indicate that age and education level significantly affect satisfaction levels in terms of each NHA activity. The MLRA results also underline that elderly stakeholders tend to be satisfied with NHA property prices and images, while highly educated respondents think that further revisions need to be made to these two features. It is also crucial to note that elderly stakeholders appear dissatisfied with the quality of NHA staff members, while highly educated people are satisfied with

their standard of service. Overall, both PA and PCA highlight human resources as the most valuable resource, suggesting that the quality of staff is the NHA's core competency.

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