

BESSH-16**DECISION MAKING PROCESSING AND INDIVIDUAL DIFFERENCE BY
MOTIVATION IN SITUATING POTENTIALLY HAZARDOUS FACILITIES**YENMING J. CHEN¹ & KUANG-CHUNG HUO^{2*}^{1,2}National Kaohsiung University of Sci&Tech, No.1, University Rd., Yanchao Dist., Kaohsiung City 824, Taiwan**Keywords:**

Not In My Backyard (NIMBY)
Goal Framing Effect
Environmental Impact
Cluster Analysis
Neighborliness
Compensation
Trust
Perceived Risk

Abstract. Purpose-In this study, we extend the discussion on accepting not-in-my-backyard (NIMBY) facilities and reveal the genuine need for a versatile composition of residents in the vicinity. And to convince the message will be the message of influence and there are differences in behavioral outcomes or goal statement. Only with fair segmentation of various types of residents can public policy balance the benefits among all segments and be tailored for each resident without creating a bias toward the residents who reject the NIMBY facilities most vehemently. Design/methodology/approach-Most of the previous studies on NIMBY-related issues have conducted gap analysis based on explicit demographic traits of local residents. However, an effective and holistic policy must pass through shallow claims and target the implicit desires of residents. In this study, cluster analysis, analysis of variance, regression, and classification analysis are conducted on 273 samples collected from residents of a typical industrial zone. Findings-Results indicate that portions of residents are highly sensitive to compensation, trust, and perceived risk, which implies the existence of multilevel requirements among the diverse composition of residents. Originality/value-In contrast to previous studies on segmentation by demographics, the current study segments similar residents based on discriminative characteristics of latent variables, which reflect the motivation traits of residents. Then, a balanced policy can equally emphasize each latent characteristic for each type of resident.

INTRODUCTION

The traditional decision theory that human decisions are rational, so the same message content, the persuasiveness of different frameworks should be the same (Avineri E and Waygood O, 2013). However, Levin et al., (1998) indicated that influence to convince the message will be the message frame behavior knot at the statement or object used to affect. The phenomenon is called the goal framing effect. Goal framing has the following characteristics: (1) negative framing more effective than positive framing (2) positive framing earnings performance available to carry out an act about, or loss avoided; besides, the negative framing can also be expressed as to not gain or loss suffered by an act of the abandoned.

In real life, people often influenced by the goal framing effects. For example, the decision-making in the environmental field, in a

negative framing make people more efficiently recognize that different type of Patterns of carbon dioxide emissions (Avineri E and Waygood O, 2013). In addition, the public policy aspects, provide an opportunity more than the way of creating risk caused by the people support (Schuck and Vreese, 2006).

Since environmental sustainability is a global issue, the stringent environmental regulations currently been reinforced in EU countries will be adopted or adapted in other parts of the world (Yu et al., 2009). With the advancement of socioeconomic structures, living standards and environmental consciousness in Taiwan have improved considerably. However, A finding by Tseng et al. (2010) indicated that a majority of enterprises in Taiwan could not implement corporate social responsibility from the employee perspective. Therefore, the concept of “not in my

*Corresponding author: Kuang-Chung Huo
E-mail: margareth.gfrerer@uinjkt.ac.id

backyard" (NIMBY) has become increasingly prominent because people demand a better living environment (Dear, 1992). NIMBY refers to plans and facilities that are necessary for the public but are not welcomed by residents. In other words, most residents do not want these facilities to be located within their neighborhood. These facilities have potential high risk, high uncertainty, and threats of possible pollution. In particular, NIMBY facilities are likely to generate negative external effects. Thus, NIMBY facilities are undesired by local residents. The benefits provided by NIMBY facilities are shared by the entire society, but the external subsurface effect is borne by residents of nearby communities (O'Hare, 1977). The implementation of such a facility may be rejected by local residents who care only about maximizing their own utilities. This instance could lead to the inability of society to collaborate as a whole to address such a problem. However, NIMBY facilities are occasionally indispensable for the well-being of the community and residents, and dwellers near the community must endure the negative external effects of such facilities. This tradeoff renders the acceptance of NIMBY installations difficult for residents (Groothuis and Miller, 1994, Lake, 1993). For example, a funeral parlor is a facility that provides interment services, and an incinerator is an installation that enables highly efficient garbage disposal. However, these facilities are usually unwelcomed by local residents. The broad range of NIMBY facilities includes destructor plants, landfill sites, nuclear power plants, petrochemical plants, mental hospitals, and prisons. The quality of the living environment is one of the main causes of the NIMBY phenomenon (Dear, 1992). NIMBY facilities may affect the security of residents, peacefulness of the environment, and sanitation within the community, or may generate other adverse effects.

The inability of NIMBY facilities to maintain public safety increases the discontent of the residents, who are provoked to protest against the construction of these facilities. Protests concerning NIMBY problems occur frequently. For example, conflicts between the police and residents during a demonstration in which protestors demanded indemnification for pollution caused by a petroleum corporation in Dalinpu, Taiwan, engendered serious concerns.

In this study, we aimed to ascertain whether the traits of residents can be determined with a classification analysis of latent variables. We also intended to determine whether differences between classification based on latent variables and classification based on demographic variables exist and whether a significant difference in the levels of acceptance of residents toward NIMBY facilities exists. Residents from a typical industrial zone were sampled. A total of 426 questionnaires were administered to participants, but only 292 questionnaires were faithfully collected.

Of these returned questionnaires, 273 were considered valid after filtering and were measured by using a certain set of standards.

Descriptive statistics, chi-square test, cluster analysis, ANOVA, multiple comparisons, and regression analysis were applied to obtain a better understanding of the different levels of acceptance of residents toward NIMBY facilities. Latent traits were categorized and matched to the manifest traits of each group to classify the characteristics of the residents effectively. Previous studies on NIMBY-related topics focused primarily on the use of manifest demographic variables for segmentation to determine the different levels of acceptance of residents toward NIMBY facilities for each segment. Then, corresponding strategies for different demographic segments were developed (Cheng and Chang, 2009). However, considering the demographic variables in segmentation alone cannot identify the combinatorial structures of diversified local residents. Thus, in this study, a classification analysis of latent variables was used. This method provides an understanding of the relationship between latent variables and different levels of acceptance. Another relevant set of manifest variables was derived subsequently. In addition, tests of independence were employed to examine the causality of manifest and latent variables.

The results of this study indicate that a group of people were highly sensitive to perceived risk, whereas other groups were sensitive to other characteristics. If a suitable good-neighborliness policy can be designed to decrease the perceived risk of the group, then the level of acceptance of residents toward NIMBY facilities could increase. This finding indicates that multilevel demands exist within a group and that residents can be classified based on the characteristics of their demands. The multilevel demands can be categorized more effectively by latent characteristics, thereby enabling easier recognition of the demographic variables. Then, a classification analysis of latent variables was adopted in this study to facilitate the effective development and implementation of NIMBY measures. Residents can acquire appropriate treatment methods through the platform for different positions. The mechanisms for decreasing perceived risk include regular announcements of environmental monitoring information and allowing the residents to visit the facilities and factories occasionally. These methods would enable this group to understand the operation of NIMBY facilities more clearly, thereby reducing their perceived risk.

Neighborliness is the common operational definition of community, which includes informal social relationships, social assistance, and reciprocity (Beaudoin, 2009). No previous studies have posited that maneuverability may be located limitedly in terms of a harmonious mix of bonding and bridging social capital. Instead, the combination of social capital has measured communities in terms of trust participation in formal groups of people with similar ethnicity but different ages (Beaudoin, 2009),

informal groups of people with different ethnicities, and formal groups of people with different races, gender, and educational backgrounds (Kim and Kawachi, 2006).

Clustering has been applied in studies on NIMBY to understand the characteristics of various groups of residents to satisfy the expectations of each group and develop the most suitable strategy for each group. The same principle also applies to our study. If diversified residents can be clustered effectively, then not only can their acceptance of NIMBY facilities be increased but the facilities can also be operated normally. In this case, a win-win situation between local residents and NIMBY facilities can be achieved.

Public policy segmentation is distinct from market segmentation. Consequently, solutions that target public policy on NIMBY cannot be developed. Public policy segmentation ensures that each solution corresponds to a segment and maximizes the acceptance level. The results of this study show that factors affecting the level of acceptance of residents toward NIMBY facilities vary because of the different needs of residents. Moreover, these factors have a tendency toward strategic segmentation.

The methods of promoting positive interaction between residents and NIMBY facilities, reducing conflicts, and increasing the acceptance of residents toward NIMBY facilities are a crucial research topic. When implementing the good-neighborliness policy, the differences in segments of public policy and targeted marketing programs imply that residents cannot be separated into various groups and their concerns addressed individually. The results of this study emphasize that various groups are concerned with distinct problems. Moreover, each solution can satisfy only one group of people and correspondingly improve their level of acceptance. Therefore, a comprehensive level of acceptance should be considered in practical operations to satisfy the needs of all groups. Effective strategies can be applied accurately to multilevel residents when the good-neighborliness policy is enforced. The concept of cost-benefit can also be considered in deciding the order of numerous types of solutions. The balance between overall benefits and costs of both sides can be attained by focusing on the easiest and most beneficial aspect.

LITERATURE REVIEW

Numerous previous studies on NIMBY compensation policies are related to this study. The majority of these studies relevant to the present study are insufficient in data and difficult to access. Most studies in this field have focused around the issues of NIMBY facilities. Examples of these studies include cognition and attitude of residents toward NIMBY facilities, compensation system analysis, spillover effect of NIMBY facilities, NIMBY conflict management, relationship between NIMBY facilities and the community, management strategy of NIMBY facilities, and other

topics concerning environmental policy, environmental protection, and sustainable development. Studies on the meaning and features of NIMBY facilities, relationship between NIMBY facilities and the community, factors of residents rejecting NIMBY facilities, policies implemented in response to conflicts, causes and factors of the NIMBY phenomenon, and the use of compensation measures are examined to serve as the basis of the current study and were used for subsequent comparison.

Based on the meaning, features, and relationship of NIMBY with the community, NIMBY facilities require detailed implementation policies to increase the level of acceptance of residents and reduce their resistance. Various factors should first be considered prior to developing such policies. Regarding the reason why NIMBY facilities are opposed, the position of residents can be divided into external and internal factors (Kunreuther and Easterling, 1996). External factors, such as health and safety risks, socioeconomic problems, and reduction in the convenience and ease of conducting daily tasks, negatively affect local residents. Internal factors comprise information or knowledge, motivation, attitude toward the environment, experience, commercial districts, and personal property of residents (Zeithaml *et al.*, 1996; Ryu *et al.*, 2012).

In addressing the opposition of residents, Chung and Kim (2009) believe that compensation is the most crucial policy tool. The compensation system has long been used as the method for increasing the level of acceptance of residents toward NIMBY facilities. When the amount of compensation exceeds the losses that local residents incur, they frequently change their position from opposing to supporting NIMBY facilities. Therefore, governments and companies in numerous countries have frequently adopted the compensation system.

This study recognizes that compensation can be a crucial aspect. However, this factor is only suitable for satisfying the needs of certain residents. The effects of and experiences with the compensation system among several regions, facilities, and communities have been varied (Kasperson *et al.*, 1992). Although compensation is often an effective method, conflicts related to NIMBY continue to occur frequently. For example, regarding an incineration plant in Germany, local residents in the town of Bergkamen opposed the compensation system because they believed it was a strategy used by the company to bribe the government to construct the incineration plant. Versatile residents exist, and thus, a single program cannot satisfy the needs of all groups (Kunreuther and Easterling, 1996). Moreover, residents react differently to the method of using compensation in exchange for implementing NIMBY facilities. In this event, a single compensation plan cannot satisfy the needs of all levels of residents (Lesbirel, 2003).

Multilevel residents have varying characteristics, and not all residents require money as compensation. Kunreuther and

Easterling (1996) assert that using money as compensation may considerably affect certain residents, but may have a limited effect on other residents. If part of the monetary compensation is used to construct public facilities, such as libraries and parks, then intellectual needs may be satisfied. In addition, donating the remaining portion of the compensation to those who need it also improves their acceptance. Guaranteeing the prices of houses can also be considered as a method of compensation because NIMBY lowers the price of neighboring houses and lands.

The authors of previous studies and the current study have concluded that, in addition to developing a complete compensation system, providing the public with information and efficiently communicating with them increase their trust on the benefits of NIMBY facilities. Eiser *et al.* (2007) report that the lack of trust of residents was caused mainly by a trust gap that signifies that residents typically do not believe that the installation of NIMBY facilities would be beneficial to the community. In general, residents do not accept the improvement plan established by the government. In this case, a wide trust gap emerges.

NIMBY may induce various effects on risk mitigation. Residents accept a risk mitigation strategy based on the information provided to them. NIMBY facilities endanger the safety of local residents because such facilities affect levels of air pollution, wastewater discharge, and industrial safety. If residents possess insufficient information on the operation of NIMBY facilities, potential conflicts become severe and the level of acceptance decreases. According to Chung and Kim (2009), when the perceived risk of the residents is higher, their level of acceptance is lower. Programs involving advocacy (visiting factories), security guarantees, environmental standards, and environmental monitoring can be adopted to reduce the risk and increase the level of acceptance of residents toward NIMBY facilities. In this study, NIMBY behavior is investigated based on reported factors and then extends to a subtle way of segmentation. The effects of these factors on various types of residents are also examined comprehensively.

In extant literature on clustering segmentation, demographic attributes have been used for segmentation. This approach differs from the method used in the current study. For example, Kunreuther and Easterling (1996) report that the tolerance in pollution is positively correlated with age and socioeconomic status. Chilton and Boodgood (2010) assert that those who have received higher education or those who have served in the military, government, or schools hold high standards regarding their living environment. This condition indicates that

socioeconomic status is a critical factor for the satisfaction of people with the environment. However, numerous studies have also shown that residents do not exhibit only one characteristic that induces a multilevel influence on NIMBY. Park and Yoon (2009) believe that classification should be conducted based on the combination of multiple properties, and the hidden properties of each group should be considered. Accordingly, Park and Yoon (2009) support the argument of the current study that residents have diverse characteristics. McCarthy's theory states that consumers are diverse. If consumers are properly grouped and distinct marketing solutions are designed to satisfy the needs of these groups, then the responses to their needs are improved (Dominici and Palumbo, 2013).

Governments cannot diversify several different policies to satisfy residents in different preferences; thus, a holistic strategy must be utilized (Beaudoin, 2009). Governments should ensure that the identified segments can sufficiently reflect the hidden emotion of residents and then enact a balanced and tailored policy for all segments of residents (Kotler and Armstrong, 2013).

The difference between the present study and previous research is the segmentation strategy used. In this study, we assert that an elaborated strategy can be provided for residents with distinct characteristics to satisfy their needs fairly. In addition to general strategies, such as social, economic, and political strategies, the attitude of residents toward NIMBY facilities is examined. Consequently, the related problems are addressed properly.

Kahneman and Tversky issued a "prospect theory" in 1979, the study concluded that: people at risk in the process of decision-making is not entirely rational, may be due to different risk situations, the presentation of the problem, resulting in reversal of the decision-making preferences result, this phenomenon is called "framing effect".

Framing is controlled by the manner in which the choice problem is presented as well as by norms, habits, and expectancies of the decision maker (Kahneman and Tversky, 1986). Levin, Schneider and Gaeth (1998) reports that the framing theory is divided into three categories : Risk choice framing, Goal framing, Attribute framing. Goal framework will be affected, including the credibility of information sources, types of behavior, the level of involvement, emotions and gender.

METHODOLOGY

The structure of the current study (Figure 1) is based on the aforementioned background, motivation, purpose, and discussion of previous studies.

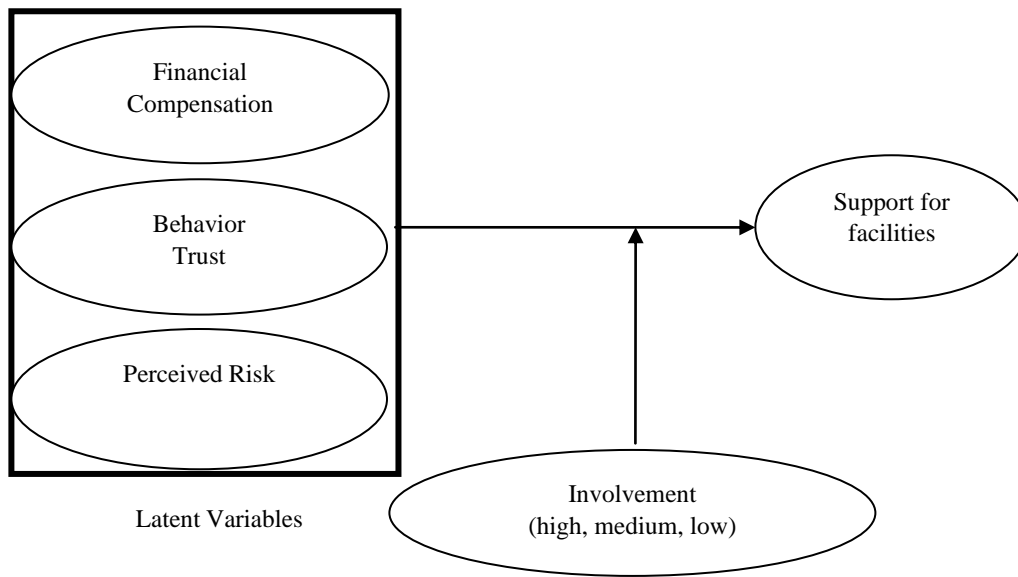


Figure 1. Research framework

The variables of this study include financial feedback, trust, perceived risk, and support of facilities, with involvement as moderator. Gregg et al., (2013) initially examines customer effort, expectations, and satisfaction and asserted that every person has a different background and personality, with a distinct attitude and preference toward a certain subject. Given that businesses offer different services and have distinct properties, the satisfaction of customers varies.

Bian and Moutinho (2011) reports that involvement is the degree of how a person feels one thing is related to him/her because of his/her needs, values, and interests. The degree of involvement can explain the participation of residents. Previous studies have revealed that the influence of various dimensions on the acceptance of NIMBY facilities may be affected by the participation of residents. This premise indicates that the degree of involvement influences the level of acceptance of residents toward NIMBY facilities. For example, high-involvement residents understand their needs more comprehensively and are more aware of the compensation system than low-involvement residents; thus, the former group accepts NIMBY facilities more easily than the latter group does. A questionnaire with four dimensions is used in this study to examine whether residents accept NIMBY facilities. In particular, the questionnaire is combined with other external control variables (degree of involvement) to construct a model for the acceptance level of residents toward NIMBY facilities.

Questionnaire design

Respondents and Range

This study excludes other possible interferences to confirm the relationship between residents and facilities. Therefore, we select

a community in the neighborhood of Coastal Industrial Park. The community is remote and has exhibited slow economic growth with the continuance of tension between the residents and a state-run oil refinery.

The questionnaire administered via interview was accomplished in six districts within Dalinpu and Fengpitou, particularly in crowded areas. Lucrative commercial activities abound in Dalinpu, where various goods are sold and the quality of life is high. Locals in this area consist mostly of laborers because Dalinpu is located near the Coastal Industrial Park. At the time when the questionnaire was administered, the “South Star Project” and a container terminal were under construction. At times, local residents were temporary workers or recruits in companies or engineering programs near or in the Coastal Industrial Park because they lived nearby.

The questionnaires were completed during the interviews, and the time during which the questionnaires were distributed influenced the types of residents who completed them. Therefore, the timing of questionnaire administration was crucial. The questionnaires were typically administered in the morning to respondents who were unemployed in the area. Respondents employed by companies in the neighborhood accomplished the questionnaire at noon. The demographic data provided in response to the questionnaires were observed. Thus, most people were determined to be accessible after 2:30 PM. These people may be workers who have rotational leave or are self-employed. Thus, various types of residents were interviewed at different times of the day and in different places.

Research Design

The questionnaire was designed based on related literature from journals, newspapers, magazines, and reports on comprehensive interviews. Numerous related ideas, concepts, and perspectives were examined in the design of each item in the questionnaire. Interviews were conducted before the pilot questionnaire was distributed in Dalinpu and Fengpitou to develop related cognition. A total of 25 questionnaires were administered for the first time. Then, the questionnaire was revised to suit the conditions of local residents based on the difficulties and setbacks as well as on the thoughts or suggestions expressed by the residents during the first

distribution of questionnaires. The language of the questionnaire was written in a simple and clear manner to enable the respondents to understand the content without explanation. After the pilot questionnaire was distributed and revised, the final version was developed.

This questionnaire consist of four major sections, such as basic information, cognition of information, satisfaction with the good-neighborliness compensation system, and level of acceptance toward facilities. These four categories are generated based on related literature mentioned previously. The detailed questionnaire content is shown in Table 1.

TABLE 1
HIGHLIGHTS AND CONTENTS OF THE QUESTIONNAIRE

Dimensions of the questionnaire	Highlights of the questionnaire
First section: Basic information	Basic information and background of an individual would influence his/her perspective on the issue.
Second section: Cognition of information	Many compensation systems are available for NIMBY; however, the views of residents toward these systems are unknown. Therefore, the participation and awareness of the residents on the system for NIMBY would be determined through the contents of the questions.
Third section: Satisfaction of good-neighborliness compensation system	The satisfaction of residents with the recent NIMBY compensation system should be determined beforehand to discover their needs. The favorable parts should be maintained, whereas the unfavorable aspects should be revised and improved. This undertaking may not only improve the satisfaction of residents but also increase the acceptance level of residents toward NIMBY facilities.
Fourth section: Level of acceptance toward facilities	This section aims to understand the factors that influence the residents' level of acceptance toward NIMBY and how much the residents are influenced. This part also intends to determine specific solutions to increase the acceptance level of residents based on identified factors.

The respondents were selected via street interviews, and the data collected were analyzed and processed. A total of 426 questionnaires were administered, of which 292 was returned. However, only 273 were considered valid after filtering and measuring using the standard criteria.

Sample representativeness analysis

The demographic structure of this region was the major background variable examined in this study. The distribution of the valid sample (sex distribution and distribution of residents among neighborhoods) was determined in a manner similar to the matrix after comparing the data. Regarding education, residents who were too young or too old were not included because only those who could answer the questions properly were selected. The distribution of the residents' residence location, gender, and

education were compared with the aforementioned matrix. The results demonstrated that the samples were similar to the matrix, implying that the sample used in this study was representative.

Based on the retrieved questionnaires, 273 residents were sampled, of whom 137 (50.2%) were male and 136 (49.8%) were female. The ages of the respondents in this study were categorized into five intervals: 51 respondents were under 20 years old (18.7%), 37 were between 21 and 35 years (13.6%), 144 were between 36 and 50 years (52.7%), 28 were between 51 and 65 years (10.3%), and 13 were over 66 years (4.8%). Respondents under 50 years constituted 85% of the sample.

The majority of the respondents (183; 67.1%) were junior high school or high school graduates. The education level of the respondents was deemed generally low as predicted because the surveyed respondents were residing near a NIMBY facility. The

age and education data corresponded to that of the Xiaogang household registration office, which signified that the age of the residents in the area 6 km along the coast ranged from 36 to 50 years, and the residents were mostly high school graduates.

Regarding vocation, the residents were employers, self-employed, unpaid family workers, employed workers, and other types of workers. According to the frequency allocation table, most respondents (104; 38.1%) were employed workers.

In terms of the residency period in the area, 39.6% of the respondents have lived in the area for 21 to 30 years. The residents who had a longer residency period exhibited more affection toward the neighborhood. This condition suggested that the responses given by these residents were highly constructive. Among the respondents, 21% had family members or relatives working in the NIMBY facility, implying that the NIMBY facility provided job opportunities to local residents.

ANALYSIS

Factor Analysis

Factor analysis is conducted on the questionnaire items. Common factors are extracted and the dimension is downscaled to maintain the original data. Validation is performed to understand the relevance of the content and to examine the hypotheses. This study adopts the spherical test introduced by Kaiser–Meyer–Olkin (KMO) and Bartlett. The KMO test for this scale generates a value of 0.91, which exceeds the 0.5 reference value suggested by Kaiser. The KMO spherical test also produces favorable results, indicating that the common factors used in this study are suitable for the factor analysis.

Common factors are extracted by conducting principal component analysis during the factor analysis. The largest variation method in the orthogonal rotation method is adopted to apply the factor shaft, and 5 dimensions are produced. The variable is 70%.

After rotation, the component matrix is ordered according to the amount of load from the common factors, thereby facilitating the examination of the dimension contained in the common factors. Among the common factors, the fifth factor only contains c1 (Table 2). Therefore, the dimension is extremely small at this level and is inappropriate to construct a single factor. Thus, this dimension is removed. This deletion changed the entire structure of the factor. A second factor analysis is successfully conducted, and the reliability analysis produces satisfactory results. The Cronbach's α value for all the factors is above 0.7, implying that the questionnaire survey used in this study is reliable.

Factor analysis is conducted according to the 21 NIMBY variables, and 4 factors are theorized. All the factors correspond to the originally designed scale. Thus, the factors are named based on the original designs, namely, compensation, acceptance of facilities, perceived risk, and trust.

The connection between two variables can be discussed using Pearson's correlation analysis. Yavas (1998) asserts that the related threshold should be set from 0.3 to 0.8; if the correlation coefficient is over 0.8, then the threshold should be discussed further to consider the collinearity problem. Four dimensions are identified via correlation analysis. The results of the operating correlation analysis indicate an obvious positive correlation. All the correlation coefficients are determined to be within the range of 0.3 to 0.8, affirming that the collinearity problem is inconsequential.

TABLE 2
COMPONENT MATRIX ROTATION

	Factor loadings				
	1	2	3	4	5
b5	0.8234	0.0682	0.1218	0.0010	-0.0226
b2	0.8011	0.1160	0.2748	0.1928	-0.0210
b3	0.7663	0.1455	0.1245	0.1256	-0.1086
b1	0.7480	0.0892	0.1700	0.2945	0.0274
b4	0.6507	0.4891	0.2195	0.2507	0.0860
b6	0.5464	0.3236	0.3517	0.2814	-0.1082
c3	0.0118	0.8824	0.0420	0.0607	0.0707
c2	0.0526	0.8638	0.1143	0.0608	0.0636
c5	0.2417	0.7499	0.2736	0.1764	-0.1186
c6	0.2243	0.7239	0.2961	0.0959	-0.0493

c4	0.2924	0.5775	0.2397	0.2125	-0.1916
a9	0.2775	0.3134	0.7410	0.1776	-0.1693
a1	0.1038	0.2513	0.7242	0.2408	0.2235
a3	0.1561	0.1568	0.6916	0.2844	0.2446
a10	0.4031	0.0800	0.6666	0.0805	-0.2460
a2	0.2733	0.3212	0.6166	0.3866	0.1287
a8	0.2832	0.1966	0.4688	0.3654	-0.2073
a6	0.1877	0.0802	0.1883	0.8461	-0.0466
a5	0.1934	0.1596	0.1513	0.8421	-0.0408
a4	0.0848	0.1213	0.2024	0.7531	0.1657
a7	0.2877	0.0874	0.3826	0.5582	-0.3412
c1	-0.0459	-0.0230	0.0838	0.0043	0.8617

Note: a, b, and c denote the second, third, and fourth parts of the questionnaire, respectively; the numbers represent the items (e.g., a1 refers to the first item in Section 2)

Cluster analysis

In this study, a two-stage cluster analysis is adopted and Ward’s method is applied to determine the number of groups. All 4 variables are used to perform k-means cluster analysis to

determine the clustering of the samples. The results reveal that the first, second, and third groups comprised 83 (30.4%), 133 (48.7%), and 57 (20.9%) respondents, respectively.

**TABLE 3
AVERAGE SCORE OF EACH CLUSTER IN EACH DIMENSION**

Cluster 1	Avg	Cluster 2	Avg	Cluster 3	Avg
Perceived risk (a4 to a8)	3.98	Perceived risk	3.10	Perceived risk	1.60
Trust (a1 to a3,a9,a10)	3.56	Trust	2.86	Trust	2.11
Support for facilities (c2 to c6)	3.25	Support for facilities	2.40	Support for facilities	1.42
Compensation (b1 to b6)	3.64	Compensation	3.26	Compensation	1.95

Collinearity Test

Before performing regression analysis, this study first determines whether every variable possessed collinearity and whether the residuals are mutually independent; otherwise, bias would occur

in the following inference. Table 4 shows that the value of collinearity tolerance is between 0 and 1. If the number approaches 0, the estimate of the variable regression coefficient is

insufficiently stable and may cause serious error. Table 4 shows that the tolerance level is over 0.7, closer to 1 than to 0. A small variance inflation factor (VIF) is generally favorable, and a value exceeding 10 indicates collinearity problems. Table 4 demonstrates that the VIF value is small. Therefore, no problem relates to design collinearity occurred in this study. In terms of whether the residuals are independent, the statistical values

derived from the Durbin–Watson test for the 3 clusters are all close to 2, and when these statistical values approach 2, the connection among the residuals is reduced. Therefore, the residuals are independent. This finding coincides with the regression analysis and indicates that the proposed model had high credibility and limited error.

TABLE 4
COLLINEARITY AND DURBIN-WATSON STATISTICS

	Cluster 1		Cluster 2		Cluster 3	
	D–W = 2.111		D–W = 2.175		D–W = 2.074	
	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF
Perceived risk	0.891	1.121	0.995	1.005	0.883	1.133
Trust	0.710	1.408	0.977	1.023	0.986	1.014
Compensation	0.949	1.054	0.978	1.022	0.890	1.123

Moderator variable and subgroups

Degree of involvement is considered to influence the level of acceptance, suggesting that various degrees of involvement are associated with distinct levels of concern regarding the perspectives and feelings toward different dimensions. In practice, ANOVA and regression analysis are conducted on clustered data. ANOVA is particularly conducted to determine whether the intensity of the reaction of every factor is unique in different clusters. Regression analysis is performed to examine the analysis results and realize the meaning of these results from a practical perspective.

One-way ANOVA is performed in this study to determine whether degree of involvement influences the external factor variables (perceived risk, trust, and compensation). The results are shown in Table 5, indicating that the intensity of the influence of the three variables on various clusters clearly differ. Regression analysis is conducted to determine whether the influence of the three variables on the level of acceptance for facilities and the value of the coefficient of these variables differ because of various degrees of involvement.

TABLE 5
ANOVA OF THE INFLUENCE ON EACH VARIABLE FROM THREE DEGREES OF INVOLVEMENT

Dimension	Cluster	Average	SD	F test	Sig.	Scheffe’s test
Perceived risk	Cluster 1	19.108	2.141	146.328***	0.000	high > mid
	Cluster 2	15.511	2.707			high > low
	Cluster 3	10.579	4.067			mid > low
Trust	Cluster 1	19.145	2.586	226.335***	0.000	high > mid
	Cluster 2	14.308	2.643			high > low
	Cluster 3	9.439	2.866			mid > low
Compensation	Cluster 1	23.892	3.283	251.808***	0.000	high > mid
	Cluster 2	18.857	2.965			high > low
	Cluster 3	18.894	3.402			mid > low

Note: p* < 0.05, p** < 0.01, p*** < 0.001

Table 5 shows that the three clusters differed on perceived risk, trust, and compensation. These differences indicate that various groups reacted differently to the intensity of these influential

variables. The results of the Scheffe multiple comparison method reveal that the intensity of the reaction of Cluster 1 on perceived

risk, trust, and compensation is greater than that of Clusters 2 and 3.

Subsequently, the clusters, the relation among the three influential variables, and the level of acceptance are discussed. The variables used in individual regression analysis are shown in Table 5, where the variables in each cluster that attained a significant level ($p < 0.05$) are shaded.

The cognition of perceived risk among the residents in Cluster 1 notably influences the level of acceptance of facilities of the residents. Under the condition that the standardized coefficient β is positive, the level of acceptance is higher when the level of cognition of the dimension of perceived risk is higher.

In Cluster 2, the cognition of compensation among the residents influences the residents' level of acceptance of facilities. Similarly, given that the standardized coefficient β is positive, the level of acceptance is higher when the level of cognition of the compensation dimension is higher.

Finally, the cognition of trust among residents in Cluster 3 influences the residents' level of acceptance of facilities. When the standardized coefficient β is positive, the level of acceptance is also higher when the level of cognition of the trust dimension is higher.

TABLE 6
INFLUENCE ON SUPPORT FOR FACILITIES FROM CLUSTERS WITH DIFFERENT INVOLVEMENTS

	Cluster 1		Cluster 2		Cluster 3	
	$R^2 = 0.615$		$R^2 = 0.627$		$R^2 = 0.609$	
	β	P	β	P	β	P
Perceived risk	0.369**	0.001	0.015	0.912	0.146	0.109
Trust	0.131	0.124	0.162	0.209	0.276**	0.002
Compensation	0.066	0.535	0.370**	0.008	0.077	0.392

Note: $p^* < 0.05$, $p^{**} < 0.01$, $p^{***} < 0.001$

The results reveal that the three dimensions notably affected the level of acceptance of the residents toward the facilities. However, a different explanation is developed after a moderator

variable is incorporated into the study. Such change signifies that various clusters placed importance on different dimensions, thereby affecting the residents' acceptance of NIMBY facilities.

TABLE 7
DISTRIBUTION OF PERCENTAGE OF PEOPLE WORKING FOR NIMBY AND EDUCATION

	Cluster 1	Cluster 2	Cluster 3
Not working in NIMBY	21.19%	52.56%	23.26%
Working in NIMBY	53.45%	34.48%	12.07%
Higher than college	77.42%	30.00%	71.43%
Lower than high school	22.58%	70.00%	28.57%

Preliminary analysis demonstrates that the above clusters can be further named. Table 7 shows that the score acquired by each cluster in every dimension is directly associated with the number of local workers in the NIMBY facility. This observation indicates that when the score is higher, the proportion of locals working in the NIMBY facility is higher. Moreover, according to the analysis on the distribution of education (Table 7) is examined based on the number of workers in the NIMBY facility, the proportion of workers who received higher education is larger

than those who attained low education in Cluster 1. By contrast, the proportion of workers who received higher education is less than those who had low education level in Cluster 2. The results for Cluster 3 are similar to that of Cluster 1.

Table 7 also demonstrates that Cluster 1 scored 3.98 for the dimension of perceived risk. The score is the highest among the 3 clusters, indicating that perceived risk is the factor that had the most influence on the level of acceptance dimension of Cluster 1. The highest score in Cluster 2 is 3.26, which corresponded to

financial support, signifying that compensation is the factor that had the greatest influence on the level of acceptance dimension of Cluster 2. The highest score for Cluster 3 is 2.11, which corresponded to trust, indicating that the dimension of trust influenced the level of acceptance of Cluster 3.

The aforementioned observations further indicated that Cluster 1 had the highest number of people working in the NIMBY facility, indicating that these people had a positive attitude toward the NIMBY facility. Moreover, education is considered as a factor that influences the degree of concern and understanding of the residents toward the NIMBY facility. This factor also indicates that people working for the NIMBY facility are highly educated. A formal name is therefore generated for the group that exhibited a positive attitude and is highly educated, that is, the high-involvement group. Table 7 shows that this group focuses on the dimension of perceived risk.

Cluster 2 has the second highest number of people working in the NIMBY facility; thus, the attitude in Cluster 2 toward the NIMBY facility varies, whereas the distribution of the education level in this cluster is low. Accordingly, this group with varied attitudes and low education level is formally named the low-involvement group. Table 7 indicates that this group focuses on the dimension of compensation.

The results of this study further reveal that Cluster 3 has the lowest number of people working in the NIMBY facility. The attitude of these residents toward the NIMBY facility is deemed neutral, and the education level in Cluster 3 is similar to that of Cluster 1. Although considerable differences in attitude toward the NIMBY facility are observed, the factor of education level enhances the positive attitude of Cluster 3 toward the NIMBY facility. Therefore, this group is formally named the medium-involvement group. Table 7 demonstrates that this group focuses on the dimension of trust.

Characteristic of residents

The potential clusters are used to accurately determine the level of acceptance of the respondents. However, the methods to

develop an effective NIMBY system in practice could not be identified. If residents can be clustered based on manifest traits, then the expected effect can be achieved.

Table 8 summarizes the residents’ age, education level, business environment, income, and residence period in the study region. The degree of involvement of latent traits is matched based on manifest traits.

The traits of the high-involvement group are exhibited by residents with the following characteristics: over 35 years old, attained an educational level higher than high school, resided in a prosperous business district, have an income of more than TWD 40,000, and have lived in the area for more than 21 years. The residents that belong to this group are highly aggressive in expressing individual views and are sufficiently aged to have obtained considerable living experience and form judgments. Given the high level of education of the residents, these individuals have higher cognition of NIMBY. Compared with residents in other clusters, these residents have sufficient knowledge of NIMBY, have lived in the neighborhood of an NIMBY facility for a longer period, and facilitate easier communication in this study.

The low-involvement group comprises residents less than 34 years of age, with education level lower than junior high school, live in a normal business district, and does not have an opinion on the NIMBY facility. The education level of this group is low and incomes ranges between TWD 20,000 and 40,000; the residents in this group have lived in the area for less than 20 years. The real status corresponds to the inference results.

The medium-involvement group consists of residents aged over 35, high school graduates, residing in a normal business district, have an income of more than TWD 40,000, and have lived in the area for more than 21 years. These residents exhibit traits different from those of both clusters because the education levels of these residents are between that of the high- and low-involvement clusters.

**TABLE 8
ANALYSIS OF RESIDENTS' TRAITS**

		High involvement	Low involvement	Medium involvement	Total	Statistics
Age	Less than 34	27 (32.5)	47 (35.3)	14 (24.6)	88	$\chi^2 = 9.21, p < 0.05$
	Over 35	56 (67.5)	86 (64.7)	43 (75.5)	185	
Education	Lower than junior high school	37 (44.6)	67 (50.3)	20 (35.5)	124	$\chi^2 = 8.73, p < 0.05$
	Higher than high school	46 (55.4)	66 (49.6)	37 (64.9)	149	
Business environment	Low prosperity	5 (6.0)	19 (14.3)	8 (14)	32	$\chi^2 = 16.79, 21, p <$

	Medium prosperity	47 (56.6)	58 (43.6)	23 (40.4)	128	0.05
	High prosperity	31 (37.3)	56 (42.1)	26 (45.7)	113	
Income per month	Less than 20,000	26 (31.3)	40 (30.1)	13 (22.8)	79	$\chi^2 = 14.37, p < 0.05$
	20,000 to 40,000	22 (26.5)	50 (37.6)	21 (36.8)	93	
	More than 40,000	35 (42.2)	43 (32.2)	23 (40.4)	101	
Length of residence	Less than 20 years	36 (43.4)	63 (47.3)	21 (36.8)	120	$\chi^2 = 8.14, p < 0.05$
	More than 21 years	47 (56.6)	70 (52.6)	36 (63.2)	153	

Finally, to infer the level of involvement based on manifest traits, the causality between two sets of variables should be independent. Consequently, we apply χ^2 test (test of independence) to determine whether these clusters are independent. Independence implies that no notable difference among these clusters exists, whereas dependence signifies that a notable difference exists; a difference among the clusters

indicates that the residents' traits could be determined based on the residents' manifest traits.

The results of the χ^2 test indicate that the p value is 0.048; when the external level $\alpha = 0.05$, the p value is $0.048 < 0.05$. Therefore, the null hypothesis is rejected (two clusters are independent), which indicates that the clusters exhibited a notable difference. Figure 2 shows the inference results.

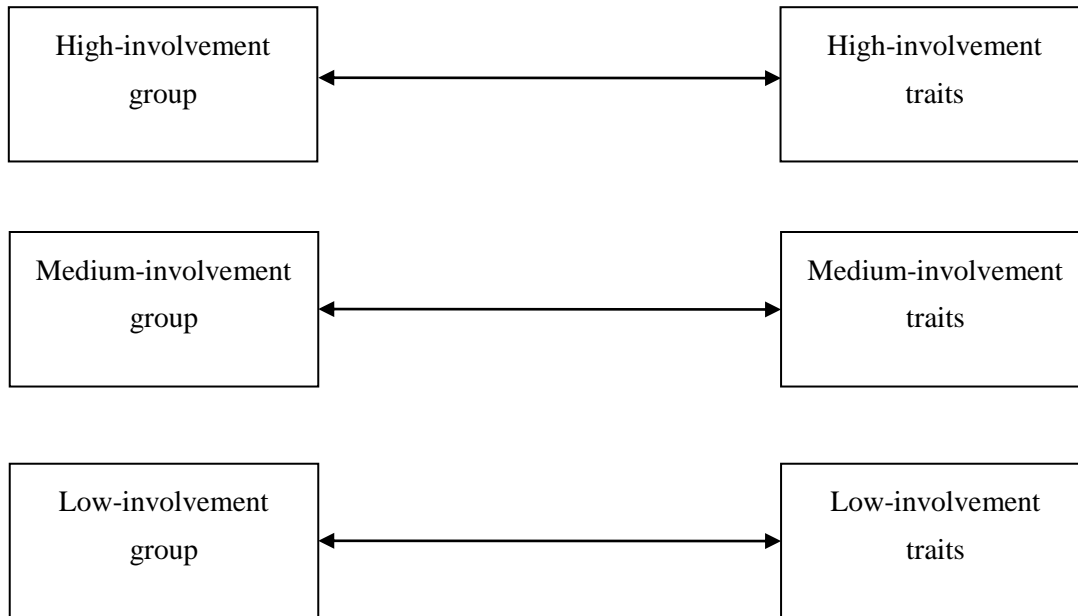


Figure 2.Two-way relation between the levels of involvement and manifest traits

CONCLUSIONS

Goal framing effect throughout many areas of decision-making. Sources individual psychological message will have an impact, especially when there is a strong individual the level of involvement , will be more pursuit of the message framing with a

given set and adjust item, showing a stronger goal framing effects.

Latent variable analysis is performed in this study to obtain an accurate analysis of the level of acceptance of a set of people

toward NIMBY facilities. Previous studies on NIMBY did not consider the diversity of residents. Thus, the structure of the constitution of the clusters could not be fully understood, resulting in the occurrence of NIMBY-related conflicts.

Through target marketing strategies, this study reveals that the residents affected by NIMBY facilities could be divided into several clusters, with each group displaying distinct latent and corresponding traits. The residents are particularly categorized into high-involvement, medium-involvement, and low-involvement clusters. Based on these clusters, the dimensions of perceived risk, trust, and compensation exhibit varying degrees of influence on the level of acceptance of facilities.

The results reveal that the high-involvement group focuses on perceived risk, indicating that when perceived risk increased in this group, the acceptance of facilities of the group also increases. The methods to increase perceived risk include publishing environmental monitoring information regularly and arranging occasional visits by residents to the factories. These activities can enable the residents to comprehensively understand the operation of the factories, thereby reducing the residents' perceived risk. The medium-involvement group focuses on trust; thus, if the facility considers the needs of local residents under the premise of trust and full public participation, trust can be deemed positive or beneficial toward improving the value of the community. Thus, the success of the site can be easily increased. If the trust gap is reduced, the acceptance of the residents toward the NIMBY facilities increases. Finally, the low-involvement group focuses

on compensation, indicating that these residents demand compensation measures to obtain tangible compensation in return for allowing the operation of NIMBY facilities.

In this study, the segmentation criteria of the residents are identified, including external traits that are determined corresponding to latent variables. Thus, an informative way of segmentation is developed based on the manifest traits of the residents.

The methods to apply the results of this study are crucial in maintaining a close relationship between the residents and the NIMBY authorities, as well as in reducing the conflicts between the residents and the authorities to increase the acceptance level toward NIMBY facilities. Therefore, the findings of this study can serve as a reference when developing suitable strategies for all levels of residents. Given that the residents exhibit distinct traits and have varying concerns, a holistic policy can be developed to satisfy the various needs of the residents, thereby increasing the overall level of acceptance. The results of this study emphasize that various clusters have distinct demands; therefore, only one group is attracted by a certain strategy that can increase the residents' level of acceptance. Therefore, the results of this study may be regarded as targets of programs that may determine whether the system is complete. The concepts addressed in this study may also be considered when these systems are practiced to ensure that the total benefits and costs are balanced.

REFERENCES

- Amos, T. & Daniel, K. (1986). The behavioral foundations of economic theory. *The Journal of Business*, 59(4), 251-278.
- Avineri, E., & Waygood, E. O. D. (2013). Applying valence framing to enhance the effect of information on transport-related carbon dioxide emissions. *Transportation Research Part A: Policy and Practice*, 48, 31-38.
- Beaudoin, C. E. (2009). Bonding and bridging neighborliness: an individual-level study in the context of health. *Social science & medicine*, 68(12), 2129-2136.
- Bian, X., & Moutinho, L. (2011). The role of brand image, product involvement, and knowledge in explaining consumer purchase behaviour of counterfeits: Direct and indirect effects. *European Journal of Marketing*, 45(1/2), 191-216.
- Cheng, S. L., & Chang, H. C. (2009). Performance implications of cognitive complexity: An empirical study of cognitive strategic groups in semiconductor industry. *Journal of Business Research*, 62(12), 1311-1320.
- Chung, J. B., & Kim, H. K. (2009). Competition, economic benefits, trust, and risk perception in siting a potentially hazardous facility. *Landscape and Urban Planning*, 91(1), 8-16.
- Dear, M. (1992). Understanding and overcoming the NIMBY syndrome. *Journal of the American Planning Association*, 58(3), 288-300.
- Dominici, G., & Palumbo, F. (2013). How to build an e-learning product: Factors for student/customer satisfaction. *Business Horizons*, 56(1), 87-96.
- Eiser, J. R., Stafford, T., Henneberry, J., & Catney, P. (2007). Risk perception and trust in the context of urban brownfields. *Environmental Hazards*, 7(2), 150-156.
- Groothuis, P. A., & Miller, G. (1994). Locating hazardous waste facilities: the influence of NIMBY beliefs. *American journal of economics and sociology*, 53(3), 335-346.
- Kasperson, R. E., Golding, D., & Tuler, S. (1992). Social distrust as a factor in siting hazardous facilities and communicating risks. *Journal of social issues*, 48(4), 161-187.
- Kim, D., & Kawachi, I. (2006). A multilevel analysis of key forms of community- and individual-level social capital as predictors of self-rated health in the United States. *Journal of Urban Health*, 83(5), 813-826.
- Kotler, P. and Armstrong, G. (2013). *Competition in the Global Market, Principles of Marketing* (15th ed.): Pearson Education.
- Kunreuther, H., & Easterling, D. (1996). The role of compensation in siting hazardous facilities. *Journal of Policy Analysis and Management*, 15(4), 601-622.

- Lake, R. W. (1993). Planners' alchemy transforming NIMBY to YIMBY: Rethinking NIMBY. *Journal of the American Planning Association*, 59(1), 87-93.
- Lesbirel, S. H. (2003). Markets, transaction costs and institutions: compensating for nuclear risk in Japan. *Australian Journal of Political Science*, 38(1), 5-23.
- Levin, I. P., Schneider, S. L., & Gaeth, G. J. (1998). All frames are not created equal: A typology and critical analysis of framing effects. *Organizational behavior and human decision processes*, 76(2), 149-188.
- O'hare, M. (1977). Not on my block you don't: Facility siting and the strategic importance of compensation. *Public Policy*, 24(4), 407-458.
- Park, D. B., & Yoon, Y. S. (2009). Segmentation by motivation in rural tourism: A Korean case study. *Tourism management*, 30(1), 99-108.
- Schuck, A. R., & De Vreese, C. H. (2006). Between risk and opportunity news framing and its effects on public support for EU enlargement. *European Journal of Communication*, 21(1), 5-32.
- Fen Tseng, Y., Jim Wu, Y. C., Wu, W. H., & Chen, C. Y. (2010). Exploring corporate social responsibility education: The small and medium-sized enterprise viewpoint. *Management Decision*, 48(10), 1514-1528.
- Yavas, A. (1998). Does too much government investment retard economic development of a country?. *Journal of Economic Studies*, 25(4), 296-308.
- Yu, V., Ting, H. I., & Jim Wu, Y. C. (2009). Assessing the greenness effort for European firms: a resource efficiency perspective. *Management Decision*, 47(7), 1065-1079.
- Zeithaml, V. A., Berry, L. L., & Parasuraman, A. (1996). The behavioral consequences of service quality. *the Journal of Marketing*, 31-46.