sustainability

MDPI

Article

Factors Affecting Residential Satisfaction in Slum Rehabilitation Housing in Mumbai

Bangkim Kshetrimayum [1,2], Ronita Bardhan [1,3,*] and Tetsu Kubota [2]

[1] Centre for Urban Science and Engineering, Indian Institute of Technology Bombay, Powai, Mumbai 400076, India; iitbangkim@gmail.com
[2] Graduate School for International Development and Cooperation, Hiroshima University, 1-5-1 Kagamiyama, Higashi-Hiroshima, Hiroshima 739-8529, Japan; tetsu@hiroshima-u.ac.jp
[3] Department of Architecture, University of Cambridge, 1-5 Scroope Terrace, Cambridge CB2 1PX, UK
* Correspondence: rb867@cam.ac.uk; Tel.: 01223-332969

Received: 1 February 2020; Accepted: 12 March 2020; Published: 17 March 2020

Abstract: Affordable housing for the low-income population, who mostly live in slums, is an endemic challenge for cities in developing countries. As a remedy for the slum-free city, most of the major metropolis are resorting to slum rehabilitation housing. Rehabilitation connotes the improved quality of life that provides contentment, yet what entails residential satisfaction in such low-income situations remains a blind spot in literature. The study aims to examine the factors affecting residential satisfaction of slum rehabilitation housing in Mumbai, India. Here, the moderation effects of sociodemographic characteristics between residential satisfaction and its predictors are elaborated using a causal model. Data on residents' perception of the residential environment were collected from 981 households in three different slum rehabilitation housing areas spatially spread across Mumbai. The causal model indicated that residential satisfaction was significantly determined by internal conditions of dwelling resulting from design, community environment and access to facilities. Gender, age, mother tongue, presence of children, senior citizens in the family, and education moderate the relationship between residential satisfaction and its predictors. The need for design and planning with the user's perspective is highlighted to improve the quality of life.

Keywords: slum; affordable housing; residential satisfaction; rehabilitation; Mumbai

1. Introduction

Housing is fundamental for the quality of life. With more than one-third of the world's urban population living in slums or slum-like settlements sans essential amenities, urbanization has now become a developing world phenomenon plagued with poverty, inadequate social and physical infrastructure and unsustainable energy crisis [1]. Providing affordable housing for the low-income population, who mostly live in slums, is an endemic challenge for cities in developing countries. Most governments in the global south are resorting to slum rehabilitation housing as a way of freeing the urban areas from slums [2–5]. New approaches are needed to find a framework for building quality affordable housing that takes care of the residents' satisfaction and well-being for achieving sustainable societies. Mumbai, which houses Asia's largest slum, has experienced large-scale redevelopment in the past 25 years. The housing choice in the rental market is not affordable to the urban poor who constitute over 42% of the Mumbai population. The government in Mumbai has been resorting to a slum rehabilitation housing program (providing mass low-cost affordable housing to selected people from a slum) in its ongoing planned modernization since 1995 [6]. One of the significant aspects of the sustainability of slum rehabilitation housing is the residential satisfaction from the residents' perspective. Rehabilitation connotes the improved quality of life that provides contentment, yet what

entails residential satisfaction in such low-income situations remains a blind spot in literature. There is a need to find ways to improve the housing conditions that take into consideration the satisfaction and well-being of the residents [7].

When moving from slums to newly built high-rise apartment buildings (slum rehabilitation housing), the residents' physical living conditions were certainly improved. Little is known regarding their social and economic changes. Would the residents sustain in the slum rehabilitation housing in the coming years? This study aims to find out the residential satisfaction of the urban poor living in the slum rehabilitation housing in Mumbai (that is, how satisfied are the residents with the dwelling, building, and neighborhood overall), and its determinants. In doing so, the study explores the moderation effects of sociodemographic characteristics on the relationship between residential satisfaction and its proposed predictors. The goal is to derive recommendations for improving the existing slum rehabilitation housing under the slum rehabilitation program. The results can impact 900 million people including the 5.2 million Mumbai population who live in urban informal settlements or slums [8]. Additionally, the study contributes to developing approaches for sustainable urban renewal. According to Renigier-Biłozor et al. [9], a rating system shortens the time and brings objectivity in the decision-making process. So, understanding the factors affecting residential satisfaction is crucial for planning an effective and sustainable rehabilitation housing policy.

The traditional mass housing design focuses on quantities focusing on repetition and economic scale rather than the quality of each dwelling unit [10]. Slum rehabilitation housing in Mumbai also follows the tradition of repetitive design for the economy of scale. This mass housing is of mid-rise buildings that primarily accommodate three categories of slum dwellers: a) project-affected people due to urban infrastructure projects, b) people displaced from their slums due to environmental issues, and c) people whose original land has been converted into a mixed-use commercial and residential zone. The rehabilitation can be "in situ", "in transit" or "off-site".

According to Vaid and Evans [11], slum rehabilitation in developing countries is aimed at improving the quality of life of the people through improved housing resulting in the well-being of the residents. In this type of public affordable housing development, the state government incentivizes private developers to use the land as a resource. Private developers are given incentives in the form of higher floor space index (FSI) and the transfer of development rights (TDR) that allow additional housing construction elsewhere within the city with the sole obligation to build the rehabilitation units [5]. Thus, the rehabilitation buildings in Mumbai are vertical high-rise. Each housing unit (21 square meters) consists of one common room with a kitchen, one bathroom, and one toilet. Typically, the units are laid sequentially adjoining a long corridor. The quality of construction for each dwelling unit uses the minimum prescribed building material.

To the authors' knowledge, the residential satisfaction of project-affected people living in slum rehabilitation housing has been unexplored. Only one study by Alam and Matsuyuki [12] was found that explored the dwellers' satisfaction in housing under the slum rehabilitation scheme of Mumbai. However, their study excluded project-affected people and renters. The present study is the first to explore residential satisfaction and moderation effect of sociodemographic characteristics of residents consisting of project-affected people (owners, renters, and others) living in slum rehabilitation housing of Mumbai. The majority of the variables used are different from the earlier study of slum rehabilitation housing. Firstly, this paper contributes to the housing literature by exploring the residential satisfaction perceptions of the residents in slum rehabilitation housing. Secondly, the paper contributes to housing literature by identification of factors affecting the residential satisfaction and the moderation effects of the sociodemographic characteristics between residential satisfaction and its predictors. The findings may help housing authorities, government and other stakeholders to better understand the end-users' needs and expectations. Additionally, this could aid in improving the quality of the residential environment and quality of life. This would further contribute to the sustainable development in slum rehabilitation housing, improving the positive image of the city.

The paper is organized as follows: First, we introduce the background of the study and literature review on residential satisfaction. Second, the materials and methods of the study are presented. Third, the determinants of residential satisfaction are predicted using structural equation modeling followed by the moderation effects of sociodemographic characteristics on the relationship between residential satisfaction and its predictors. The study is concluded by discussing the factors affecting residential satisfaction, the moderating effects of sociodemographic characteristics on the relationship between residential satisfaction and its determinants and probable future studies.

2. Literature Review

One of the basic human needs is to have a place to live in. UN recognizes the need for housing to have an adequate standard of living as everyone's right [13]. Maslow's hierarchy of needs theory also highlighted the need for shelter as the first and foremost place in the natural sequence of satisfaction of needs: physiological needs, safety needs, social needs, need of recognition and respect, and self-fulfillment needs [14]. Residential satisfaction is the notion of residents' state of fulfillment that emerges from the gap between expected and perceived residential conditions [15]. Riazi and Emami [16] defines residential satisfaction as the closeness to aspiration of residents' ideal dwelling concerning their present dwelling and the quality of the environment. In other words, a comparison between the user's actual and preferred situation gives the satisfaction level [17]. Galster and Hesser [18] conceptualized residential satisfaction as the difference between households' actual and expected housing and neighborhood conditions. When the actual condition is more than what the users expected or preferred, satisfaction is achieved. Residential satisfaction study is important as it impacts people's psychological well-being [19]. It is often used for measuring residential quality [20] and quality of life [21].

Jiboye [22] conceived residential satisfaction as a measure of people's attitudes towards certain aspects of their residential environment. Existing literature on factors affecting residential satisfaction mainly focuses on three aspects—housing characteristics, neighborhood characteristics and sociodemographic characteristics of the residents [23]. A residential environment consists of both physical and social components [24]. Neighborhood and dwelling characteristics are critical in predicting residential satisfaction [25]. Various studies found that different sociodemographic characteristics have different impacts on residential satisfaction [17,26,27]. However, the findings remain inconclusive [26].

2.1. Dwelling Characteristics

We can classify the housing environment into two categories—dwelling internal (DI) and dwelling external (DE). As to the DI, the attributes include floor area, room layout, quality of construction, privacy, indoor environment [28,29]. Mohit and Mahfoud [30] found that elements of DI, especially floor area, correlate positively with residential satisfaction with public housing in Kuala Lumpur, Malaysia, where dwelling size was found to be an important predictor of residential satisfaction. Dwelling size was also found to be an important predictor of residential satisfaction in the works of Ibem and Aduwo [31], Ibem and Amole [32,33] in the Nigerian context, Buys and Miller [25] in the Australian context, and Wang and Wang [34] in the Chinese context. Larger dwelling size may improve residential satisfaction [35,36]. However, Li et al. [37] found, in their study in the Chinese context, that dwelling size does not matter for the migrant workers who were living in the rental housing as temporary dwellers. Similarly, Tao et al. [27] found dwelling size and housing tenure to be insignificant. Functional space like the kitchen and washing areas is also an important predictor of residential satisfaction [38]. DE attributes include water supply, electric supply, electrical repair service, street lighting condition, plumbing repair service, garbage collection/disposal, and condition of the drain [30]. According to Alam and Matsuyuki [12], in their study of Mumbai slum rehabilitation housing, floor area and corridor were important predictors of residential satisfaction. Dwelling external (DE) elements such as electricity, power, and water were found to have a significant relationship with

residential satisfaction in the Malaysian context [26]. The cleanliness of the housing estate is also an important predictor of residential satisfaction [39,40]. For a developing country like India, a dwelling's external attributes are very relevant as the provision of such services is not established yet.

2.2. Community Environment

Community environment such as social networks, safety and security is a predictor of residential satisfaction [41,42]. Job opportunities in the neighborhood have an impact on neighborhood satisfaction [38,43] and residential satisfaction [31,44]. Community relationships or having friends in the neighborhood is a powerful predictor of neighborhood satisfaction [30,45]. Environmental quality, traffic, lack of community involvement, and lack of services and facilities in the neighborhood are the important predictors of neighborhood dissatisfaction [46]. Attributes including relations with neighbors and social relationships within the community are significant contributors to residential satisfaction [30,47].

2.3. Public Facilities

Various studies on housing focus on access to public facilities such as public transportation, schools, police stations, healthcare facilities, markets and food stalls [26,27,30,34,37,39,44,48–50]. According to Huang and Du [39], in their study in China, public facilities have a significant influence on residential satisfaction. Potter and Cantarero [47] also found transportation as a significant contributor to residential satisfaction. Findings indicate different results in different national contexts [51]. Mohit and Nazyddah [52] found that poorer locational accessibility of public rental housing leads to lower residential satisfaction.

2.4. Sociodemographic Characteristics of the Residents

In addition to dwelling and neighborhood determinants, households' socioeconomic and demographic variables ought to be taken into consideration in evaluating residential satisfaction. Important determinants identified by empirical studies include gender [32], age of the individual [15,32], housing tenure [53], educational attainment [32,51], length of residence [26], employment status [32,54], and income [15,55]. Gender was a significant predictor of residential satisfaction according to Lu [15] and Ibem and Amole [32]. Residents with a younger age group are likely to have lower residential satisfaction [56]. Lu [15] also found that age affects residential satisfaction positively while Mohit et al. [26] found the negative relationship between age and residential satisfaction. Some studies suggest that homeowners have a higher level of housing satisfaction than renters [57–59]. It is believed that homeowners are more likely to invest in the improvement of social capital and local amenities [59,60]. Gan et al. [28] found that migrants with high income and education were likely to have lower residential satisfaction with public rental housing in Chongqing, China. Employment was found to be insignificant in Tao et al. [27] in contrast to Wu [54]. Riazi and Emami [16] found that ethnicity moderates the relationship between interaction with neighbors and residential satisfaction in their study on Mehr housing in Iran.

Satisfaction also varies by type of housing, tenure, country, and culture [30]. Thus, there is a need to study the residential satisfaction study in slum rehabilitation housing, focusing especially on Mumbai. According to Evans et al. [61], there is a possibility of less socially supportive relationships with neighbors in high-rise housing. The study explores the residential environment factors including the social or community environment in the prediction of residential satisfaction of the slum rehabilitation housing in Mumbai. This will help the government and other stakeholders, like private developers, in bringing objectivity to the decision-making process in a short period of time. So, the study will help in improving the quality of life of the urban poor living in slum rehabilitation housing. This may help in bringing favorable conditions for investment and participation of various stakeholders.

2.5. Research Model and Hypotheses

2.5.1. Conceptual Model

The study is based on the conceptualization (Figure 1) that sociodemographic characteristics influence residential satisfaction through residents' perception of the residential environment. Residential satisfaction (endogenous variable) was measured through three questions: Overall how satisfied are you with your a) dwelling unit, b) the building and c) the neighborhood? that measure the liveability based on the resident's perception. The main components of the residential environment (exogenous variables) used in the research model are described below:

Dwelling internal (DI): This construct describes the internal environment of the dwelling unit.
Dwelling external (DE): This construct corresponds to the external environment of the dwelling like the service provided for the whole building.
Community environment (CE): This construct represents the social environment in the neighborhood, the livelihood, etc.
Access to facility (AF): This construct corresponds to the locational quality of the housing and the neighborhood concerning easy and affordable access to public facilities.

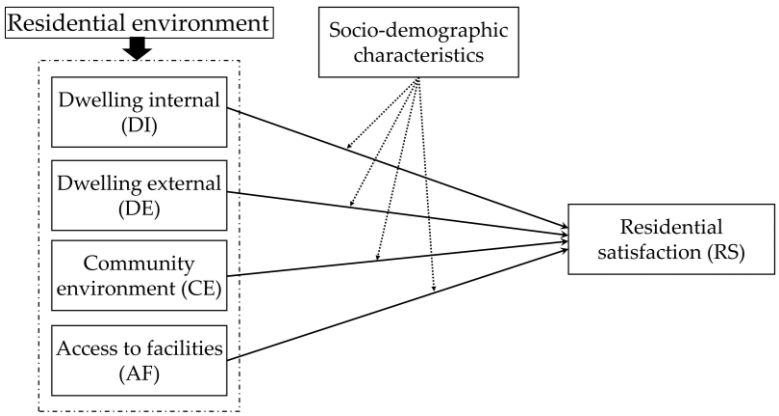

Figure 1. Conceptual framework.

2.5.2. Hypotheses

Based on the conceptual model, the following hypotheses were formulated:
H1: (a) Dwelling internal (DI), (b) dwelling external (DE), (c) community environment (CE), and (d) access to facilities (AF) will have a positive effect on residential satisfaction.
H2: Sociodemographic characteristics (a) gender, (b) age of the respondent, (c) mother's tongue/first language, (d) presence of children in the family, (e) presence of senior citizen in the family, (f) education, (g) housing tenure, and (h) length of residence in the present house moderate the relationship between residential satisfaction (RS) and its determinants.

3. Materials and Method

3.1. Study Area

The study areas are located in Mumbai (the financial and commercial capital of India). With rapid urbanization mainly led by the textile industry, Mumbai has grown from a cluster of seven islands in the early period to a port city, later becoming the most populated city in India with a population of 12.44 million including 5.2 million slum dwellers. Industrialization during the 1960s attracted a lot of people from all over the country contributing to making Mumbai the highest urban agglomeration in India. The urbanization in Mumbai is characterized by the growth of informal

settlements. Expansion of informal housing settlements beyond the state government's control or regulation is a major challenge.

Computer-based personal interviews with the help of eight research assistants (residents of slum areas in Mumbai) were conducted in three different slum rehabilitation housing areas (Figure 2) spatially spread across Mumbai. The slum settlements in Mumbai are mainly along the transport lines and in the environmentally sensitive, vulnerable areas. The authors, therefore, considered accessibility to the city center, and public transportation as the main factors in the selection of the three neighborhoods to represent typical slum rehabilitation housing. After exploration of various slum rehabilitation housing areas in Mumbai, we narrowed down to the following three neighborhoods where each building has eight floors; each dwelling unit designed for a household, irrespective of the household size, is 3 meters in height, 21 square meters in carpet area with one room, kitchen, bathroom, and toilet. The typical layout of the dwelling unit is shown in Figures 3–5.

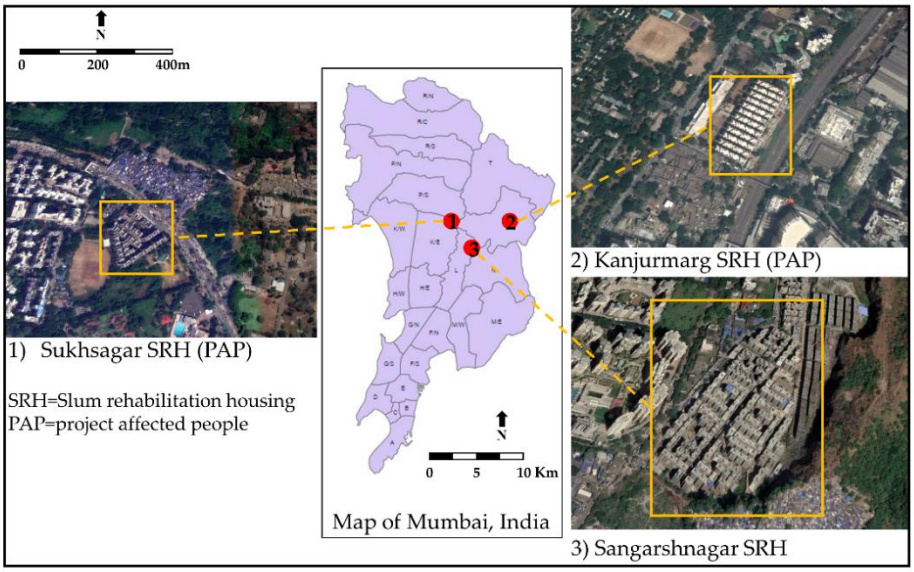

Figure 2. Location of the three selected slum rehabilitation housing areas in Mumbai.

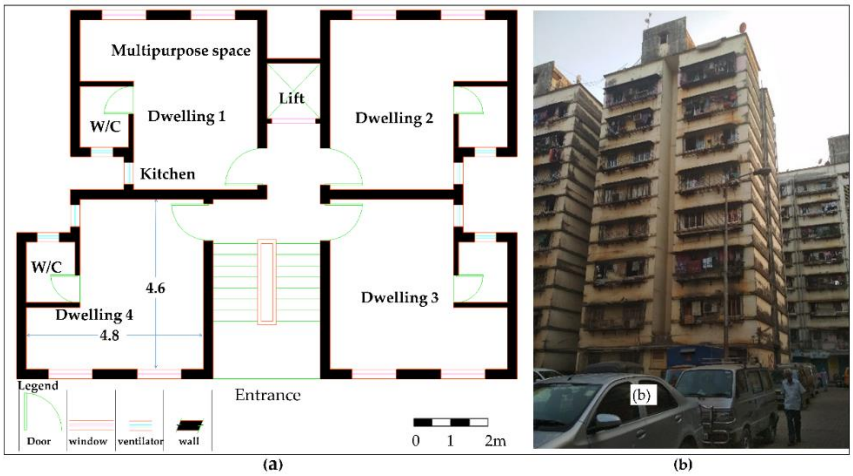

Figure 3. (**a**) Typical floor plan and (**b**) image of a typical G+7 apartment at SSSRH.

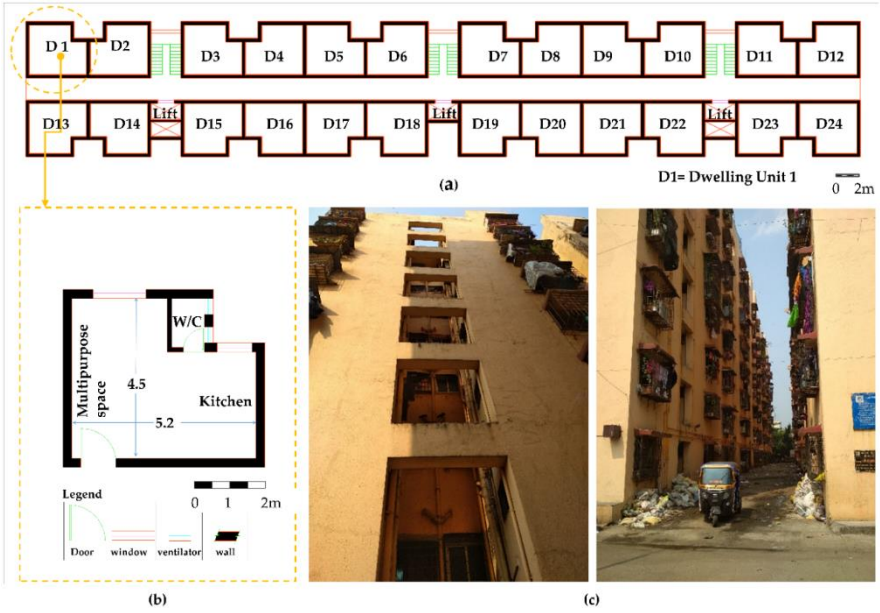

Figure 4. (**a**)Typical floor plan, (**b**) typical dwelling unit floor plan and (**c**) images of KMSRH.

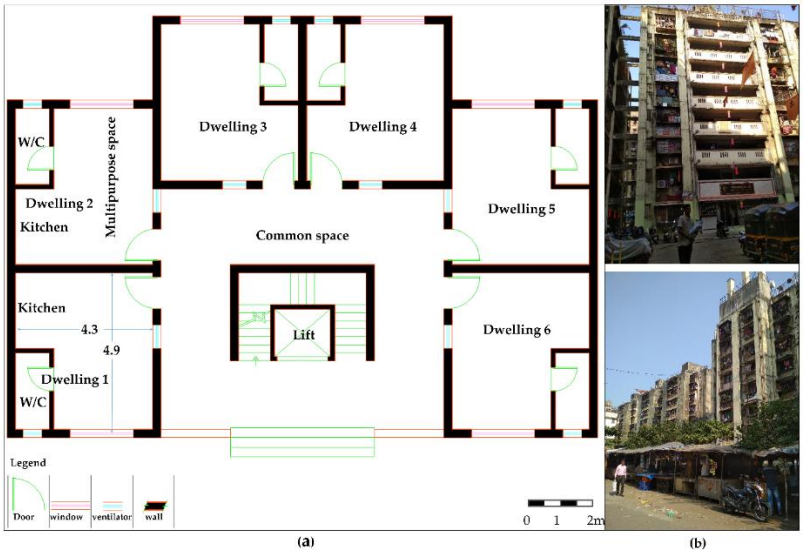

Figure 5. (**a**) Typical floor plan and (**b**) image of typical G+7 apartment at SNSRH.

The first neighborhood, Sukhsagar slum rehabilitation housing (SSSRH), near Durganagar public bus station was selected to represent a typical slum rehabilitation housing area for project-affected people due to road construction and expansion (Figure 3). SSSRH was meant for the slum dwellers affected by the Jogeshwari-Vikhroli Link Road (JVLR) project under the Mumbai Urban Transport Project (MUTP) funded by the World Bank. It may be noted that MUTP has displaced over 120,000 slum dwellers (24,000 households). A total of 1072 households live in this neighborhood consisting of 34 clusters of buildings. Each cluster is made up of four dwelling units on each floor. Ground floors are characterized by grocery shops, community offices, study centers for small children and other commercial shops.

The second neighborhood, Kanjur Marg slum rehabilitation housing (KMSRH), near Kanjur Marg railway station in the suburb of Mumbai, was selected to represent a typical slum rehabilitation housing area for the project-affected people due to railway modernization (to facilitate the laying of railway tracks between Thane and Kurla stations on the central line in Mumbai). Under MUTP,

this [62] project will benefit over 6 million people who commute daily by the suburban railway system in Mumbai. KMSRH example led to the resettlement of 10,000 families from along the railway track [62]. KMSRH comprises 12 eight-storied buildings having similar floor plans (as shown in Figure 4) accommodating a total of 2232 households. Each building has 24 identical dwelling units on each floor served by 3 staircases, 2 lifts, and a double-loaded corridor. The residential colony has grocery shops, a community office, a study center for small children and other commercial shops on the ground floor of each building.

The third neighborhood, Sangarshnagar slum rehabilitation housing (SNSRH), was selected as it is considered to be a typical large-scale slum rehabilitation project in India accommodating a total of 18,362 households. Moreover, this neighborhood is located close to the city center. People from various slums in Mumbai (mainly from slum areas near the Sanjay Gandhi National Park) were relocated here, resulting in a mix of different communities. Further, new buildings are under construction for future rehabilitation of slum dwellers. The typical buildings in SNSRH are formed by 6 dwelling units on each floor, forming a cluster with lift and staircase in the middle as shown in Figure 5. Converting the dwelling units on the ground floor into commercial shops is a common practice in this neighborhood.

3.2. Sampling Design

In this study, stratified random sampling followed by convenience sampling had been used to select the samples for the questionnaire survey. For this purpose, the residents of the three neighborhoods were stratified according to floor levels to ensure the representation of the sample in proportion to their numbers within the population. Later a convenience sampling approach was adopted to select respondents from each floor. Regular adult residential households who have been staying in their present house for more than one year were considered valid respondents. Data collection was done from October to December 2018 through face to face interviews in the respondent's house. To maximize the response rate, the interviews were done during weekdays and weekends. As a result, a sample of valid responses from 981 households (n = 981) was successfully selected based on Yamane [63] from a total of 21,666 dwelling units (N = 21,666). The sample size represents 4.5% of the total housing population with a 95% confidence level, indicating that in 95 out of 100 repetitions of the survey, the results will not vary more than ±5%. The total sample (n = 981) consists of 207 households from SSSRH, 323 households from KMSRH, and 451 households from SNSRH. We kept a minimum requirement of 200 samples from each neighborhood following Kline [64] who established a minimum sample size requirement of 200 when using structural equation modeling (SEM).

3.3. Questionnaire Design

A comprehensive literature review was done to enable the assemblage of factors affecting residential satisfaction in slum rehabilitation housing in Mumbai (as shown in Table 1). The conceptual framework was materialized on the notion of residential satisfaction as a composite construct of the satisfaction indices which residents perceive with their dwelling environment (both internal and external) and neighborhood characteristics. The structured questionnaire used for the interview includes three parts. The first part includes the sociodemographic characteristics of the household. The second part reflects residents' perceived satisfaction level with 45 items of the residential environment and residential satisfaction (Table 1) which were measured using a five-point Likert scale (1 for very dissatisfied/strongly disagree to 5 for very satisfied/strongly agree). The last part asked about the modification in the present house and satisfaction with the present house compared to their previous house. Literature shows that the Likert scale is often used by researchers for measuring people's perception, preference, opinion, etc. In total, there are 59 variables (including the sociodemographic characteristics) that require at least 590 valid responses for regression analysis [27]. Thus, the combined sample of 981 is just valid for causal analysis and multi-group analysis using SEM in AMOS.

Table 1. Items of residential satisfaction used in the study.

Code	Items	Key References
di1	Comfort in the house	Tao et al. [27], Amérigo and Aragones [65], Jonsson and Wilhelmsson [66]
di2	Privacy in the residence	Ibem and Amole [32]
di3	Natural lighting inside the house	Ibem and Aduwo [31]
di4	Adequacy of number of rooms	Ogu [53]
di5	Location of your residence in the building	Ibem and Aduwo [31]
di6	Toilet	Gan et al. [28], Ibem and Aduwo [31], Ibem and Amole [32,33]
di7	Kitchen	Gan et al. [28], Ibem and Aduwo [31], Ibem and Amole [32,33]
di8	Bathroom/washing areas	Gan et al. [28], Ibem and Aduwo [31], Ibem and Amole [32,33]
de1	Water supply	Mohit et al. [26], Mohit and Mahfoud [30]
de2	Staircase	Mohit et al. [26], Mohit and Nazyddah [52]
de3	Electrical repair service	Mohit and Mahfoud [30]
de4	Electric supply	Mohit et al. [26], Mohit and Mahfoud [30]
de5	Corridor	Alam and Matsuyuki [12], Philips et al. [19], Mohit et al. [26]
de6	Lift	Mohit and Nazyddah [52]
de7	Access road	Ogu [53]
de8	Street lighting	Mohit and Mahfoud [30]
de9	Plumbing repair service	Mohit and Mahfoud [30]
de10	Garbage collection/disposal	Mohit and Mahfoud [30]
de11	Condition of the drain	Mohit and Mahfoud [30]
de12	Parking facilities	Jiboye [22], Gan et al. [28]
de13	Cleanliness of the housing estate	Mohit and Mahfoud [30]
de14	Noise level in the locality	Mohit and Mahfoud [30]
ce1	Relation/contact with neighbors	Mohit and Mahfoud [30], Potter and Cantarero [47]
ce2	In this neighborhood, residents treat each other pleasantly.	Adriaanse [20]
ce3	Relation/contact with community	Mohit et al. [26], Gan et al. [28]
ce4	I really care about this neighborhood.	Abass and Tucker [67]
ce5	I trust my neighbors.	Abe and Kato [68],Young et al. [69]
ce6	Business and job opportunity	Gan et al. [28], Ibem and Aduwo [31],Ibem and Amole [32,33]
af1	Distance to post office	Jiboye [22], Philips et al. [70]
af2	Distance to metro	Abbaszadegan et al. [71]
af3	Distance to fire station	Mohit and Mahfoud [30]
af4	Distance to government health center	Mohit and Mahfoud [30]
af5	Distance to bank	Jiboye [22], Philips et al. [70]
af6	Distance to train station	Mohit and Mahfoud [30]
af7	Distance to bus stop/station	Mohit and Mahfoud [30]
af8	Distance to police station	Mohit and Mahfoud [30], Philips et al. [70]
af9	Distance to private health center	Mohit and Mahfoud [30]
af10	Distance to market	Jiboye [22], Mohit and Mahfoud [30]
af11	Distance to school	Mohit and Mahfoud [30], Philips et al. [70]
af12	Distance to place of worship	Mohit and Mahfoud [30]
af13	Distance to food stall	Mohit and Mahfoud [30]
af14	Distance to children's play area	Mohit and Mahfoud [30], Philips et al. [70]
rs1	Overall dwelling satisfaction	Adriaanse [20], Galster [72], Li and Song [73],
rs2	Overall building satisfaction	Jiboye [22], Bonaiuto and Fornara [74], Liu [75]
rs3	Overall neighborhood satisfaction	Buys and Miller [25], Bonaiuto and Fornara [74]

Note: di = dwelling internal, de = dwelling external, ce = community environment, af = access to public facilities, rs = residential satisfaction.

3.4. Residential Satisfaction Determinants

Analysis of the data was done using Statistical Package for Social Science (SPSS) and structural equation modeling (SEM) in AMOS-20. The moderation effect of sociodemographic characteristics was tested through multi-group analysis in AMOS.

4. Results

4.1. Sociodemographic Characteristics

The sociodemographic characteristics of the respondents are given in Table 2. Overall, the sample consisted of 66.5% male and 33.5% female. 59% of the respondents were 40 years and above. The majority of the respondents, 86.5%, were married. 55% of the respondents had Marathi as their first language while about 41% had Hindi as their first language. The median household size was 5. The majority of the households (61.6%) had one or more children in their house. 27.9% of households had a senior citizen in the family. About 38% were class X pass out, whereas 19.8% were class XII pass out. About 15% had primary level education, whereas about 13% were graduates. 2.5% had a diploma while 11.6% were illiterate. 36.5% of the respondents were unemployed. Only 2% were government employees. The remaining 61.5% were engaged in private jobs. 92.7% had a household annual income below three lakhs INR (approximately 4186 USD), i.e., they were low-income people. 84.7% were owners, and 14.5% were renters. About 70.1% had lived in the present house for more than 10 years. The results show that the respondents have nearly proportional distribution on each floor (Table 2), indicating that the results will not be biased towards any specific floor. The study found that 65% of the respondents had modified their dwelling units in the present house.

Table 2. Sociodemographic characteristics of the respondents (n = 981).

Characteristics	Variables	Sukhsagar SRH (n = 207)		Kanjur Marg SRH (n = 323)		Sangarshnag-ar SRH (n = 451)		Total (n = 981)	
		freq.	%	freq.	%	freq.	%	freq.	%
Gender	Male	144	69.6	167	51.7	341	75.6	652	66.5
	Female	63	30.4	156	48.3	110	24.4	329	33.5
Age (years)	18–29	40	19.3	49	15.1	78	17.2	167	17.0
30–39	44	21.3	94	29.1	97	21.5	235	24	
	40–49	62	30.0	80	24.8	123	27.3	265	27
	50–59	34	16.4	61	18.9	106	23.5	201	20.5
	>59	27	13.0	39	12.1	47	10.4	113	11.5
Marital status	Single	44	21.2	49	15.1	39	8.6	132	13.4
	Married	163	78.7	274	84.8	412	91.4	849	86.5
Mother tongue	Marathi	109	52.7	228	70.6	203	45.0	540	55
	Hindi	90	43.5	77	23.8	234	51.9	401	40.9
	Others	8	3.8	18	5.86	14	3.1	40	4.1
	≤ 4	124	59.9	126	39	236	52.3	486	49.5
Household size	5	43	20.8	70	21.7	107	23.7	220	22.4
	≥ 6	40	19.3	127	39.3	108	23.9	275	28
	Mean	4.35		5.27		4.69		4.81	
	Median	4.00		5.00		4.00		5	
No. of children	0	94	45.4	103	31.9	180	39.9	377	38.4
≥ 1	113	54.6	220	68.1	271	60.1	604	61.6	
Senior citizen	0	150	72.5	189	58.5	368	81.6	707	72.1
	≥ 1	57	27.5	134	41.5	83	18.4	274	27.9
Education	Illiterate	17	8.2	60	18.6	37	8.2	114	11.6
	Primary school	21	10.1	36	11.1	91	20.2	148	15.1
	Class X	67	32.4	103	31.9	203	45.0	373	38
	Class XII	54	26.1	67	20.7	73	16.2	194	19.8
	Diploma	6	2.9	11	3.4	8	1.8	25	2.5
	Graduate	31	15	42	13.0	35	7.8	108	11
	PG	11	5.3	4	1.2	4	0.9	19	1.9
Occupation	Unemployed	62	30.0	151	46.7	145	32.2	358	36.5
	Government	3	1.4	12	3.7	5	1.1	20	2
	Others	142	68.6	160	49.5	301	66.7	603	61.5
	<15,000	49	23.7	99	30.7	158	35.0	306	31.2
Income (INR)(1USD = 71.74INR)	15,000–25,000	142	68.6	179	55.4	283	62.7	603	61.5
	>25,000	16	7.7	45	13.9	10	2.2	71	7.2
Tenure	Owner	170	82.1	292	90.4	369	81.8	831	84.7

Table 2. *Cont.*

Characteristics	Variables	Sukhsagar SRH (n = 207)		Kanjur Marg SRH (n = 323)		Sangarshnag-ar SRH (n = 451)		Total (n = 981)	
		freq.	%	freq.	%	freq.	%	freq.	%
	Rented	35	16.9	31	9.6	76	16.9	142	14.5
	Others	2	1.0	0	0	6	1.3	8	0.8
Length of residence in present house	< 10 years	76	36.7	55	17	162	35.9	293	29.9
≥ 10 years	131	63.3	268	83	289	64.1	688	70.1	
Households on each floor	ground floor	6	2.9	24	7.4	33	7.3	63	6.4
first floor	30	14.5	36	11.1	62	13.7	128	13	
	second floor	29	14	43	13.3	56	12.4	128	13
	third floor	31	15	42	13	59	13.1	132	13.5
	fourth floor	31	15	49	15.2	61	13.5	141	14.4
	fifth floor	26	12.6	51	15.8	64	14.2	141	14.4
	sixth floor	25	12.1	33	10.2	56	12.4	114	11.6
	seventh floor	29	14	45	13.9	60	13.3	134	13.7

Note: *SRH—Slum Rehabilitation Housing;* Source: Field survey, October-December 2018.

4.2. Latent Factors of Residential Satisfaction

To examine the latent factors of residential satisfaction level, a series of multi-dimensional statistical techniques were performed. First, exploratory factor analysis (EFA) using the Maximum Likelihood Estimation method with Promax rotation and reliability analysis through Cronbach's alpha was performed. Variables with communalities less than 0.3 were deleted from the set. Finally, 27 variables were retained whose factor loadings were above 0.3 following Hair et al. [76]. We got a total of 24 items under four factors of residential environment (7 items of DE, 6 items of DI, 5 items of AF, and 6 items of CE) and 3 items under residential satisfaction factor (Table 3). The reliability values for the factors range from 0.763 to 0.869. The factors have a significant relationship with each other (Table 4). The variables could explain 50.92% of the variance and the Kaiser-Meyer-Olkin (KMO) value was 0.924.

Table 3. Factor loadings of the items under five latent constructs.

		Factors				
		DE	DI	AF	CE	RS
Code	**Items Cronbach Alpha**	**0.869**	**0.833**	**0.834**	**0.816**	**0.763**
de1	Water supply	0.958				
de2	staircase	0.830				
de3	Electrical repair service	0.763				
de4	Electric supply	0.683				
de5	Corridor	0.554				
de6	Lift	0.523				
de7	Access road	0.502				
di2	Privacy in the residence		0.841			
di1	Comfort in the house		0.828			
di3	Natural lighting inside the house		0.657			
di4	Adequacy of number of rooms		0.657			
di5	Location of your residence in the building		0.596			
di6	Toilet		0.345			
af1	Distance to post office			0.831		
af2	Distance to metro			0.784		
af3	Distance to fire station			0.770		
af4	Distance to government health center			0.603		
af5	Distance to bank			0.495		
ce1	Relation/contact with neighbors				0.849	
ce2	In this neighborhood, residents treat each other pleasantly.				0.736	

Table 3. *Cont.*

Code	Items Cronbach Alpha	Factors				
		DE	DI	AF	CE	RS
		0.869	**0.833**	**0.834**	**0.816**	**0.763**
ce3	Relation/contact with community				0.690	
ce4	I really care about this neighborhood.				0.523	
ce5	I trust my neighbors.				0.518	
ce6	Business and job opportunity/ livelihood				0.387	
rs1	Overall dwelling satisfaction					0.901
rs2	Overall building satisfaction					0.705
rs3	Overall neighborhood satisfaction					0.550

Note: DE = dwelling external, DI = dwelling internal, AF = access to facilities, CE = community environment, RS = residential satisfaction.

Table 4. Descriptive statistics and factor correlation matrix.

Construct	Items	Mean	SD	α	DE	DI	AF	CE	RS
DE	7	4.77	0.4	0.869	1				
DI	6	3.74	0.54	0.833	0.645 ***	1			
AF	5	3.59	0.7	0.834	0.459 ***	0.248 ***	1		
CE	6	3.78	0.45	0.816	0.706 ***	0.439 ***	0.555 ***	1	
RS	3	3.59	0.64	0.763	0.504 ***	0.415 ***	0.462 ***	0.641 ***	1

Note: *** Significant at the 0.01 level. DE = dwelling external, DI = dwelling internal, AF = access to facilities, CE = community environment, RS = residential satisfaction. Source: Field Survey, October - December 2018.

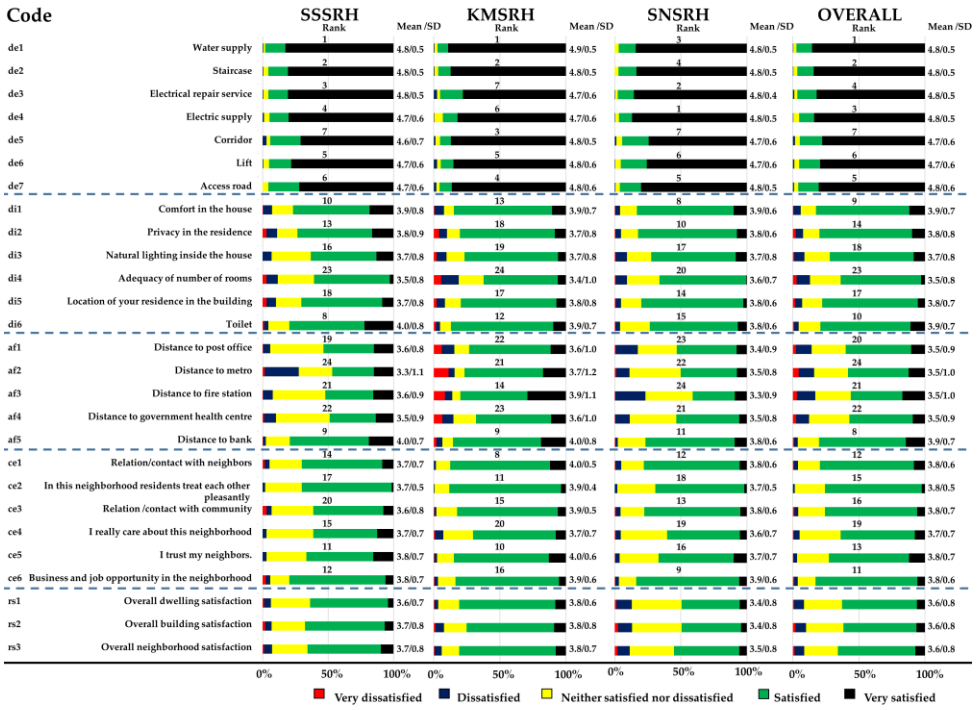

Figure 6. Residents' satisfaction with residential environment factors. (Source: Field survey, October-December 2018).

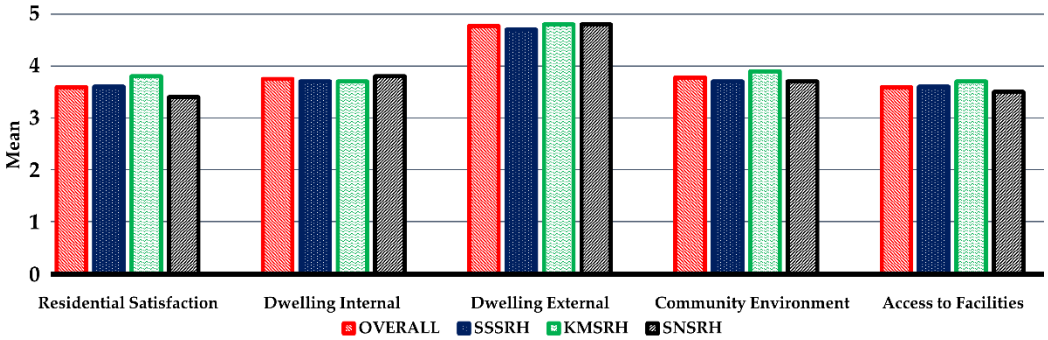

Figure 7. Overall residents' satisfaction with residential environment factors (Source: Field survey, October-December 2018).

All the items under each factor were averaged to get the overall satisfaction level. The results of descriptive analyses of the residents' satisfaction with the residential environment factors are presented in Figures 6 and 7. This was followed by the confirmatory factor analysis to confirm the latent variables followed by the structural model and path analysis to test the moderation effects of sociodemographic characteristics on the relationship between residential satisfaction and its predictors.

4.3. Residents' Satisfaction with Residential Environment Factors

The study found a similar pattern of satisfaction level with each residential environment item among the three housing areas (Figure 6). Residents have rated high satisfaction with a dwelling's external (DE) items like water supply, electricity, staircase, lift, and corridor, etc. Compared to the satisfaction level with a dwelling's external environment (mean score of 4.77), residents expressed a lower level of satisfaction with other residential environment factors (mean score ranges from 3.59 for access to a facility to 3.78 for community environment). Each item had a score above 3 indicating satisfaction. Among the 24 residential environmental factors, the factor with the highest mean was water supply (de1), followed by "staircase (de2)" and "electric supply (de4)" as second; third, respectively, for the overall sample. Meanwhile, the factor with the lowest score was "distance to metro (af2)", followed by "adequacy of number of rooms (di4)", and "distance to government health center (af4)" for the overall sample. The factors with the highest mean for SSSRH and KMSRH samples were the same as those for the overall sample. For SNSRH, however, electric supply (de4) has the highest satisfaction level. Meanwhile, the factor with the lowest score for SSSRH was "distance to metro (af2)", "adequacy of number of rooms (di4)" for KMSRH and "distance to fire station (af3)" for SNSRH.

The study found no significant differences in residents' satisfaction with the residential environmental factors among the three slum rehabilitation housing areas (Figure 7). Overall residential satisfaction was found to be moderate (mean score of 3.59). Residents' satisfaction level on the ground floor was found to be moderate but relatively low compared to the higher floor level. The service provided to the dwelling is very good at each floor level. Overall, the satisfaction with a dwelling's external environment is the highest at each floor followed by satisfaction with community environment and a dwelling's internal environment.

4.4. Structural Model

Confirmatory factor analysis (CFA) for the measurement model was performed with the Maximum Likelihood Estimation method using AMOS version 20. A total of 27 items under 5 factors (as shown in Table 3) were subjected to CFA. The factor loading for each item was more than 0.5, so unidimensionality was achieved. The model fit was improved through modification by covarying the error terms among the items of a factor using the modification indices. It was further improved by removing items having low factor loadings. The validity and reliability of the measurement model were also achieved for the model as shown in Table 5. Composite reliability exceeds 0.7 and the average variance extracted was

above 0.5 for each construct. Thus, convergent validity was achieved following Hair et al. [76]. To achieve discriminant validity, we needed the square root of AVE for each construct to be greater than the squared correlation between the constructs [77].

Table 5. The Convergent and Discriminant Validity.

Construct	CR	AVE	AF	DE	DI	RS	CE
AF	0.839	0.513	0.716				
DE	0.874	0.504	0.406	0.710			
DI	0.839	0.515	0.180	0.582	0.718		
RS	0.772	0.533	0.423	0.439	0.342	0.730	
CE	0.813	0.523	0.490	0.685	0.401	0.624	0.723

Note: CR = Composite reliability = (Square of the summation of factor loadings) / (square of the summation of factor loadings) + (summation of error variances); AVE = Average variance extracted = (Summation of the square of factor loadings) / (summation of the square of factor loadings) + (summation of error variances); Diagonals represent the square root of average variance extracted and other entries represent squared correlations.

The diagonals in Table 5 representing the square root of average variance extracted were greater than squared correlations between the constructs. Thus, discriminant validity for all the constructs was established. The goodness of fit indices results were found to be within the acceptable range with ChiSq/df = 3.265, GFI = 0.939, AGFI = 0.923, CFI = 0.950, TLI = 0.942, NFI = 0.929 (ideal standard is > 0.90), and RMSEA = 0.048 (ideal standard is < 0.08). So, the results of the CFA suggest that the measurement model has a good fit.

The structural model in AMOS is shown below in Figure 8. The model had a good fit as all the indices were within the recommended values.

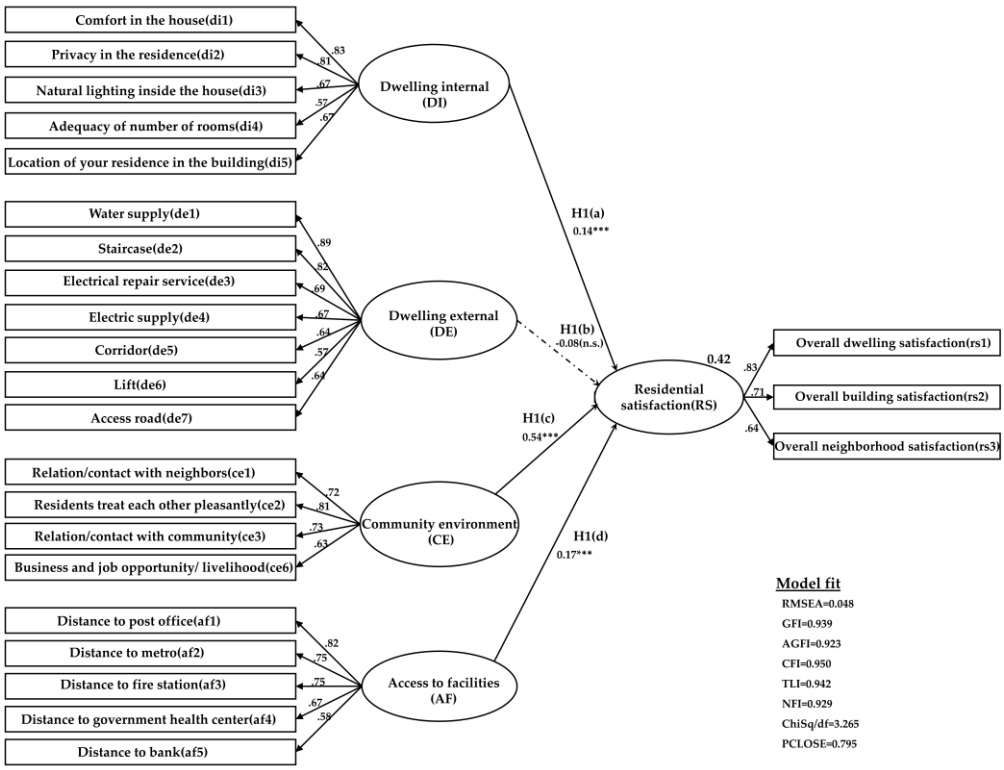

Figure 8. Structural equation model for residential satisfaction among residents of slum rehabilitation housing in Mumbai (standardized estimate).

The hypotheses were tested using path analysis. The regression weights for the parameters along with the critical ratios and P values are given in Table 6. The results of the research model with the

standardized path coefficients and the explanatory power (R^2) for endogenous variable—residential satisfaction are shown in Figure 8. Except for the factor of dwelling external (DE), all other factors significantly predict residential satisfaction (RS). The results of the research model supported H1(a), H1(c), and H1(d) with path coefficients of 0.14, 0.54 and 0.17 ($p < 0.01$) respectively. However, the results indicated that H1(b) was rejected. The model explained 42% of the variance in residential satisfaction (RS). Findings indicated that among the three predictors of residential satisfaction (RS), community environment (CE) had the highest positive impact with a direct effect of 0.54 followed by access to facilities (AF) and dwelling internal (DI) with direct effects of 0.17 and 0.14, respectively. We also found that access to facilities such as post office, metro station, fire station, government health center and bank, play a significant role in improving residential satisfaction. Further, we found that improving comfort, privacy, natural lighting inside the house, increasing the number of rooms, and allowing residents to choose the location of the dwelling unit in the building can improve the residential satisfaction. Housing policy should consider the community environment, access to facilities and design of the dwelling unit for future rehabilitation housing in order to improve the quality of life. This will help in achieving affordability and energy reduction while meeting residents' expectations and need, thus, improving residential satisfaction.

Table 6. Results of hypotheses testing.

Hypotheses	Path			Path Coefficient (β)	S.E.	C.R.	P	Results
H1(a)	RS	<—	DI	0.144	0.043	3.331	***	Supported
H1(b)	RS	<—	DE	−0.084	0.089	−1.44	0.15	Not supported
H1(c)	RS	<—	CE	0.542	0.08	8.983	***	Supported
H1(d)	RS	<—	AF	0.166	0.033	4.087	***	Supported

*** Significant at the 0.001 level.

4.5. Moderation Effects of Sociodemographic Characteristics

The dwelling external (DE) factor was excluded from the moderation test as it had no significant relationship with residential satisfaction (RS). The model fit was achieved for each group of the moderator except one group of "housing tenure-on rent". The result of the moderation test for each moderator variable having a model fit is presented in Table 7. The study found gender, age, first language, presence of children in the family, and education as significant moderators of the relationship between dwelling internal (DI), community environment (CE), access to facilities (AF) and RS. Thus, we fully accept the hypotheses H5(a), H5(b), H5(c), H5(d), and H5(f). However, for hypothesis H5(e), the presence of a senior citizen moderates only along two paths, namely DI to RS and AF to RS, while for hypothesis H5(h), length of residence moderates one path, namely AF to RS only.

As concerns, "gender" as the moderator, the effect of DI on RS, and that of AF on RS are more pronounced in males compared to females while the effect of CE on RS is more pronounced in females compared to males. As concerns, "age" as the moderator, the effect of DI on RS, and that of CE on RS are more pronounced in the lower age group compared to the upper age group while the effect of AF on RS is more pronounced in the upper age group compared to the lower age group. As concerns, "first language" as the moderator, the effect of DI on RS and that of AF on RS are more pronounced in other languages compared to Marathi while the effect of CE on RS is more pronounced in Marathi. As concerns, the "presence of children" as the moderator, the study found that the effect of DI on RS and that of AF on RS are more pronounced in the family having no children compared to the family having children while the effect of CE on RS is more pronounced in the family having children. As concerns, the "presence of senior citizens" as the moderator, the effect of DI on RS and that of AF on RS are more pronounced in the family having no senior citizens compared to the family having senior citizens. As concerns, "education" as the moderator, the effect of DI on RS is more pronounced in the education group "above class X". The effect of CE on RS and that of AF on RS is more pronounced in

the education group "below class X". As concerns, "length of residence" as the moderator, the effect of AF on RS is more pronounced for the younger group "less than 10 years".

Table 7. Moderation effect of sociodemographic characteristics.

Moderator		DI to RS		CE to RS		AF to RS	
		Chi-Square Difference	*p*-Value	Chi-Square Difference	*p*-Value	Chi-Square Difference	*p*-Value
Gender	Male	188.7	0.000	15	0.000	129.6	0.000
	Female	99.6	0.000	6.7	0.010	94.7	0.000
Age	≤ 40	96.5	0.000	7.5	0.006	102.0	0.000
	> 40	140.6	0.000	15.0	0.000	180.8	0.000
First language	Marathi	124.9	0.000	9.7	0.002	125.2	0.000
	Others	91.9	0.000	13.2	0.000	82.2	0.000
Presence of children	No	117.9	0.000	9.1	0.003	100.4	0.000
Yes	126.5	0.000	12.0	0.001	127.1	0.000	
Presence of a senior citizen	No	23.6	0.000	16.9	0.000	114.9	0.000
Yes	15.5	0.000	2.2	0.134	22.4	0.000	
Education	≤ class X	113.9	0.000	5.6	0.019	188.0	0.000
	> class X	102.9	0.000	5.1	0.023	119.5	0.000
Length of residence	< 10 years	3.3	0.067	2.4	0.117	17.8	0.000
	≥ 10 years	25.6	0.000	0.4	0.522	62.9	0.000

5. Discussion

The majority of the residents were found to be moderately satisfied with the housing. This may be due to various reasons. Firstly, the residents in the study have been rehabilitated near public transport facilities such as railway stations and bus stations and/or near the city center which increases their job/economic opportunities, improving their affordability, resulting in improved quality of life. Secondly, they know that many other slum dwellers have been rehabilitated in the outskirts of the city of Mumbai without proper facilities and amenities. Thirdly, this may also be due to the possible low aspiration of the people, knowing the reality and their background. The findings are in line with the work of Phillips et al. [19], that lower expectations or making realistic expectations may increase the satisfaction level.

The study found that modification of the interior room layout (like partitioning to make a separate bedroom) was implemented by 64.5% of the residents. This may be due to a mismatch between perceived attributes and expectations. So, the designers need to understand the end-users' requirements. Different people may have different expectations which change with time [78]. So, the scope for improving the dwelling design exists.

The study found DI, CE, and AF as predictors of residential satisfaction. The findings agree that satisfaction level varies among various components of the residential environment [79]. The results agree with the findings of [12,26,28], that dwelling unit internal conditions had a direct impact on the residential satisfaction of the residents. So, for example, it can be seen that improving the daylight inside the dwelling can not only improve residential satisfaction but also save energy which, in turn, saves the residents' hard-earned income (spent for lighting during daytime). Since the adequacy of rooms was found to have an impact on residential satisfaction similar to the work of Mohit et al. [26], while contrasting with the work of Li et al. [37], the scope for future floor space expansion needs to be explored in rehabilitation housing. The current proposal for increasing the dwelling unit's floor area to 300 square feet by the government, through incentives such as increasing transfer of development rights (TDR) from 20% to 30%, will likely have a positive impact on the residential satisfaction. DE was found to be insignificant in predicting residential satisfaction in our study, though it was found as a predictor of residential satisfaction in double-storey housing in Malaysia by Mohit and Mahfoud [30]. CE was found to have the highest impact on residential satisfaction. This finding supports the finding of Mohit and Mahfoud [30] and Bruin and Cook [45], and Tao et al. [27]. Therefore, improving the social relationships with neighbors, relationships with community and availability of job opportunities in the neighborhood, are crucial for achieving a good community environment which will have a positive

impact on residential satisfaction. Community space such as corridors can encourage social interactions among the residents, increasing social sustainability in the neighborhood. The findings support the work of Potter and Cantarero [47] regarding attributes including the relationship with neighbors, and transportation as significant contributors to residential satisfaction. Housing location becomes very important for mass housing in view of the study findings. So, keeping the community intact and relocating in areas having access to public facilities are very important for successful rehabilitation. Housing policy should consider the community environment, design of the dwelling unit and the access to public facilities for future rehabilitation housing to improve the quality of life. Attempts should be made to achieve affordability and energy reduction while meeting residents' expectations and need.

The study found that gender moderates the relationship between RS and its determinants, DI, AF and CE. This is in line with the findings of Ibem and Amole [32] and Lu [15]. The findings indicate that women play a significant role in improving the community environment. So, their participation in the planning of slum rehabilitation housing is crucial. This is in line with the findings of Bardhan et al. [80].

Concerning age as moderator, the study agrees with the work of Baum, Arthurson, and Rickson [56] for the path AF to RS, that residents with younger age groups are likely to have lower residential satisfaction. However, for the other two paths, DI to RS and CE to RS, younger residents are likely to have higher residential satisfaction. However, the findings are different from the works of Tao et al. [27], where they found that age had an insignificant impact on the residential satisfaction of migrant workers on rental housing. The significant association of gender and age with residential satisfaction in the study contradicts the work of Zanuzdana et al. [81].

The difference in the moderation effects of the first language highlights the difference among different ethnicities in residential satisfaction. This finding is in line with the works of Riazi and Emami [16]. The study found that the presence of children in the household moderates the relationship between DI, AF, CE, and RS. Families having no children in their families are more satisfied with DI and AF, whereas families having children are more satisfied when it comes to CE. So, the presence of children is important for improving the community relationships, though it may lead to overcrowding.

The presence of a senior citizen in the family reduces the satisfaction level with DI. This may be due to space constraints as the mobility of the senior citizen is limited. People are happier with access to public facilities when they do not have a senior citizen in their house. The presence of a senior citizen in the family has no impact on the relationship between community environment and residential satisfaction.

Education moderates the relationship between DI and RS, where we found that the impact of higher education is likely to be more pronounced, similar to the work of Zanuzdana et al. [81]. However, for the other two paths, i.e., AF to RS and CE to RS, the moderations exist and were more pronounced in the lower education group. Thus, higher educated people are more concerned about the dwelling's internal environment. This may be due to the fact that the higher educated people keep low aspirations from the government, knowing the reality, while lower educated people are more concerned about access to facilities and community relationships and opportunities in the locality. However, the findings are different from the works of Tao et al. [27], where they found that education had an insignificant impact on the residential satisfaction of migrant workers.

Length of residence in the present house does not moderate the relationship between DI and RS, and the relationship between CE and RS. However, the study found that the length of the residence moderates the relationship between AF and RS. The younger residents are more satisfied in terms of access to public facilities improving their residential satisfaction.

It may be noted that slum rehabilitation housing is meant for owning and, hence, 142 households on rent in our sample of 981 highlights that the ultimate legitimacy/purpose of giving a house to the former slum-dweller is in question. The policymakers need to know where the original owners are. The government can promote energy efficiency measures such as daylighting in the construction, operation, and maintenance of slum rehabilitation housing in Mumbai. Such promotion of passive

architecture can balance sustainability and affordability in slum rehabilitation housing developments. Improving the residential satisfaction for sustainable development in slum rehabilitation housing requires participation from all stakeholders from the planning and design phase.

We have seen from the earlier studies [62], on the social and economic aspects of slum rehabilitation housing, that the involvement of social organizations like Mahila Milan helps in the successful resettlement of the slum dwellers. We believe that strengthening community organizations in the three neighborhoods may play a crucial role in improving the social life and economic environment. This would help in improving the quality of life of the residents necessary for achieving sustainable societies.

6. Conclusions

Residential satisfaction of slum rehabilitation housing serves as one of the significant aspects of sustainable slum rehabilitation housing developments. In this study, we surveyed three slum rehabilitation housing areas located in Mumbai, India, to understand residential satisfaction and its determinants through the residents' perception. The study further examines the moderation effects of sociodemographic characteristics on the relationship between residential satisfaction and its proposed determinants. The study found that a majority of the residents are moderately satisfied with the housing (with a mean score of 3.59). The study also found that the level of satisfaction with the present house compared to the previous house was moderate (with a mean score of 3.78). Findings from the structural equation model indicate that the CE has the highest impact on residential satisfaction followed by AF and DI. Thus, the study highlighted the need for both the design of the house and the planning of the housing environment with users' perspective through public participation in improving the quality of life of the residents in slum rehabilitation housing.

The study indicates that the rehabilitation policy in Mumbai is moderately good. However, there is scope for improvement. So, the study recommends finding out ways to improve the satisfaction by taking on board public participation from the design and planning phase of any rehabilitation program for urban renewal. Strengthening the community organization in each neighborhood may improve the social, economic and environmental aspects of the neighborhood. This would lead to the sustainable development of slum rehabilitation housing.

The study highlights the importance of better design for dwelling units with larger floor areas to accommodate some rooms/spaces for different activities while keeping an affordable distance from public amenities in relocation. Regarding the present rehabilitation housing (which is already occupied), we need to improve the design of the dwelling unit.

Overcrowding is an issue in slum rehabilitation housing for low-income people. In the warm, humid climate of Mumbai, the thermal comfort of the residents and how they adapt to the indoor living environment needs to be explored. Adaptive thermal comfort in rehabilitation housing will be explored in future studies. Researchers may also explore ways to incorporate energy efficiency measures and the impact of such measures on the investment market environment. Such research may improve the slum rehabilitation housing policy as the government depends on the private market for making slum-free cities. Concerning the private market, Renigier-Biłozor et al. [82] emphasized the need for integrating spatial analysis with market ratings for richer information to monitor the real estate market.

The paper contributes to the literature by (1) adding empirical evidence about the residential satisfaction of slum rehabilitation housing located in Mumbai, India, which has not been well-documented in literature, (2) highlighting the importance of improving community environment, and (3) highlighting the importance of an internal dwelling environment and access to public facilities in improving the quality of life of the residents.

Author Contributions: All authors have contributed to this paper. B.K. proposed the main idea. B.K., R.B. and T.K. were involved in the design of methodology and performed the analyses. B.K. drafted the manuscript. R.B. and T.K. provided supervision and contributed to the final version by reviewing and editing of the paper. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the Ministry of Human Resource Development (MHRD), Government of India (GoI) project titled CoE FAST, grant number 14MHRD005 and IRCC-IIT Bombay fund, grant number 16IRCC561015.

Acknowledgments: The authors are grateful for the valuable comments of the three anonymous referees of the review. Many thanks to Krishnan Narayanan and Arnab Jana from IIT Bombay for their valuable suggestions in the study.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Bardhan, R.; Kurisu, K.; Hanaki, K. Does compact urban forms relate to good quality of life in high density cities of India? Case of Kolkata. *Cities* **2015**, *48*, 55–65. [CrossRef]
2. Ren, X. Governing the informal: Housing policies over informal settlements in China, India, and Brazil. *Hous. Policy Debate* **2018**, *28*, 79–93. [CrossRef]
3. Jones, P. Formalizing the informal: Understanding the position of informal settlements and slums in sustainable urbanization policies and strategies in Bandung, Indonesia. *Sustainability* **2017**, *9*, 1436. [CrossRef]
4. Mahadevia, D.; Bhatia, N.; Bhatt, B. Private Sector in Affordable Housing? Case of Slum Rehabilitation Scheme in Ahmedabad, India. *Environ. Urban. ASIA* **2018**, *9*, 1–17. [CrossRef]
5. Nijman, J. Against the odds: Slum rehabilitation in neoliberal Mumbai. *Cities* **2008**, *25*, 73–85. [CrossRef]
6. Bardhan, R.; Sarkar, S.; Jana, A.; Velaga, N.R. Mumbai slums since independence: Evaluating the policy outcomes. *Habitat Int.* **2015**, *50*, 1–11. [CrossRef]
7. Debnath, R.; Bardhan, R.; Sunikka-Blank, M. Discomfort and distress in slum rehabilitation: Investigating a rebound phenomenon using a backcasting approach. *Habitat Int.* **2019**, *87*, 75–90. [CrossRef] [PubMed]
8. Corburn, J.; Sverdlik, A. Informal settlements and human health. In *Integrating Human Health into Urban and Transport Planning*; Springer: Berlin/Heidelberg, Germany, 2019; pp. 155–171.
9. Renigier-Bi\lozor, M.; Wisniewski, R.; Kaklauskas, A.; Bilozor, A. Rating methodology for real estate markets–Poland case study. *Int. J. Strateg. Prop. Manag.* **2014**, *18*, 198–212. [CrossRef]
10. Bunster, V.; Bustamante, W. Structuring a Residential Satisfaction Model for Predictive Personalization in Mass Social Housing. *Sustainability* **2019**, *11*, 3943. [CrossRef]
11. Vaid, U.; Evans, G.W. Housing quality and health: An evaluation of slum rehabilitation in India. *Environ. Behav.* **2017**, *49*, 771–790. [CrossRef]
12. ALAM, S.S.B.; Matsuyuki, M. Dwellers' Satisfaction on Slum Rehabilitation Scheme and its Affecting Factors in Mumbai, India. *Urban Reg. Plan. Rev.* **2018**, *5*, 67–86.
13. Universal Declaration of Human Rights. Available online: https://www.un.org/en/universal-declaration-human-rights/index.html (accessed on 13 March 2020).
14. Renigier-Bilozor, M.; Wisniewski, R.; Bilozor, A. Rating attributes toolkit for the residential property market. *Int. J. Strateg. Prop. Manag.* **2017**, *21*, 307–317. [CrossRef]
15. Lu, M. Determinants of residential satisfaction: Ordered logit vs. regression models. *Growth Chang.* **1999**, *30*, 264–287. [CrossRef]
16. Riazi, M.; Emami, A. Residential satisfaction in affordable housing: A mixed method study. *Cities* **2018**, *82*, 1–9. [CrossRef]
17. Jansen, S.J.T. The impact of the have–want discrepancy on residential satisfaction. *J. Environ. Psychol.* **2014**, *40*, 26–38. [CrossRef]
18. Galster, G.C.; Hesser, G.W. Residential satisfaction: Compositional and contextual correlates. *Environ. Behav.* **1981**, *13*, 735–758. [CrossRef]
19. Phillips, D.R.; Siu, O.; Yeh, A.G.; Cheng, K.H. The impacts of dwelling conditions on older persons' psychological well-being in Hong Kong: The mediating role of residential satisfaction. *Soc. Sci. Med.* **2005**, *60*, 2785–2797. [CrossRef]
20. Adriaanse, C.C.M. Measuring residential satisfaction: A residential environmental satisfaction scale (RESS). *J. Hous. Built Environ.* **2007**, *22*, 287. [CrossRef]
21. Andrews, F.M.; Withey, S.B. *Social indicators of well-being: Americans' perceptions of life quality*; Plenum Press: New York, NY, USA, 2012.

22. Jiboye, A.D. Post-occupancy evaluation of residential satisfaction in Lagos, Nigeria: Feedback for residential improvement. *Front. Archit. Res.* **2012**, *1*, 236–243. [CrossRef]
23. Li, Z.; Wu, F. Residential satisfaction in China's informal settlements: A case study of Beijing, Shanghai, and Guangzhou. *Urban Geogr.* **2013**, *34*, 923–949. [CrossRef]
24. Francescato, G.; Weidemann, S.; Anderson, J.R. Evaluating the built environment from the users' point of view: An attitudinal model of residential satisfaction. In *Building Evaluation*; Springer: Berlin/Heidelberg, Germany, 1989; pp. 181–198.
25. Buys, L.; Miller, E. Residential satisfaction in inner urban higher-density Brisbane, Australia: Role of dwelling design, neighbourhood and neighbours. *J. Environ. Plan. Manag.* **2012**, *55*, 319–338. [CrossRef]
26. Mohit, M.A.; Ibrahim, M.; Rashid, Y.R. Assessment of residential satisfaction in newly designed public low-cost housing in Kuala Lumpur, Malaysia. *Habitat Int.* **2010**, *34*, 18–27. [CrossRef]
27. Tao, L.; Wong, F.K.; Hui, E.C. Residential satisfaction of migrant workers in China: A case study of Shenzhen. *Habitat Int.* **2014**, *42*, 193–202. [CrossRef]
28. Gan, X.; Zuo, J.; Ye, K.; Li, D.; Chang, R.; Zillante, G. Are migrant workers satisfied with public rental housing? A study in Chongqing, China. *Habitat Int.* **2016**, *56*, 96–102. [CrossRef]
29. Sarkar, A.; Bardhan, R. Optimal interior design for naturally ventilated low-income housing: A design-route for environmental quality and cooling energy saving. *Adv. Build. Energy Res.* **2019**, 1–33. [CrossRef]
30. Mohit, M.A.; Mahfoud, A.-K.A. Appraisal of residential satisfaction in double-storey terrace housing in Kuala Lumpur, Malaysia. *Habitat Int.* **2015**, *49*, 286–293. [CrossRef]
31. Ibem, E.O.; Aduwo, E.B. Assessment of residential satisfaction in public housing in Ogun State, Nigeria. *Habitat Int.* **2013**, *40*, 163–175. [CrossRef]
32. Ibem, E.O.; Amole, D. Residential satisfaction in public core housing in Abeokuta, Ogun State, Nigeria. *Soc. Indic. Res.* **2013**, *113*, 563–581. [CrossRef]
33. Ibem, E.O.; Amole, D. Subjective life satisfaction in public housing in urban areas of Ogun State, Nigeria. *Cities* **2013**, *35*, 51–61. [CrossRef]
34. Wang, D.; Wang, F. Contributions of the usage and affective experience of the residential environment to residential satisfaction. *Hous. Stud.* **2016**, *31*, 42–60. [CrossRef]
35. Dinç, P.; Özbilen, E.; Bilir, M.B. A multi-dimensional scale for measuring residential satisfaction (rs) in mass housing projects. *Indoor Built Environ.* **2014**, *23*, 864–880. [CrossRef]
36. Makinde, O.O. Influences of socio-cultural experiences on residents' satisfaction in Ikorodu low-cost housing estate, Lagos state. *Environ. Dev. Sustain.* **2015**, *17*, 173–198. [CrossRef]
37. Li, D.; Chen, H.; Man Hui, E.C.; Yang, H.; Li, Q. A methodology for ex-post assessment of social impacts of an affordable housing project. *Habitat Int.* **2014**, *43*, 32–40. [CrossRef]
38. Teck-Hong, T. Housing satisfaction in medium- and high-cost housing: The case of Greater Kuala Lumpur, Malaysia. *Habitat Int.* **2012**, *36*, 108–116. [CrossRef]
39. Huang, Z.; Du, X. Assessment and determinants of residential satisfaction with public housing in Hangzhou, China. *Habitat Int.* **2015**, *47*, 218–230. [CrossRef]
40. Lai, J.H. Comparative evaluation of facility management services for housing estates. *Habitat Int.* **2011**, *35*, 391–397. [CrossRef]
41. Salleh, A.G. Neighbourhood factors in private low-cost housing in Malaysia. *Habitat Int.* **2008**, *32*, 485–493. [CrossRef]
42. Fernandes, D.A.; Costa, A.A.; Lahdenperä, P. Key features of a project alliance and their impact on the success of an apartment renovation: A case study. *Int. J. Constr. Manag.* **2018**, *18*, 482–496. [CrossRef]
43. Cai, W.; Lu, X. Housing affordability: Beyond the income and price terms, using China as a case study. *Habitat Int.* **2015**, *47*, 169–175. [CrossRef]
44. Ibem, E.O.; Alagbe, O.A. Investigating dimensions of housing adequacy evaluation by residents in public housing: Factor analysis approach. *Facilities* **2015**, *33*, 465–484. [CrossRef]
45. Bruin, M.J.; Cook, C.C. Understanding Constraints and Residential Satisfaction Among Low-Income Single-Parent Families. *Environ. Behav.* **1997**, *29*, 532–553. [CrossRef]
46. Howley, P.; Scott, M.; Redmond, D. An examination of residential preferences for less sustainable housing: Exploring future mobility among Dublin central city residents. *Cities* **2009**, *26*, 1–8. [CrossRef]

47. How Does Increasing Population and Diversity Affect Resident Satisfaction? A Small Community Case Study - James Potter, Rodrigo Cantarero. 2006. Available online: https://journals.sagepub.com/doi/abs/10.1177/0013916505284797 (accessed on 26 December 2019).
48. Jana, A.; Bardhan, R.; Sarkar, S.; Kumar, V. Framework to assess and locate affordable and accessible housing for developing nations: Empirical evidences from Mumbai. *Habitat Int.* **2016**, *57*, 88–99. [CrossRef]
49. Debnath, R.; Bardhan, R.; Sunikka-Blank, M. How does slum rehabilitation influence appliance ownership? A structural model of non-income drivers. *Energy Policy* **2019**, *132*, 418–428. [CrossRef] [PubMed]
50. Lueker, J.; Bardhan, R.; Sarkar, A.; Norford, L. Indoor air quality among Mumbai's resettled populations: Comparing Dharavi slum to nearby rehabilitation sites. *Build. Environ.* **2020**, *167*, 106419. [CrossRef]
51. Gan, X.; Zuo, J.; Baker, E.; Chang, R.; Wen, T. Exploring the determinants of residential satisfaction in public rental housing in China: A case study of Chongqing. *J. Hous. Built Environ.* **2019**, *34*, 869–895. [CrossRef]
52. Social Housing Programme of Selangor Zakat Board of Malaysia and Housing Satisfaction | SpringerLink. Available online: https://link.springer.com/article/10.1007/s10901-011-9216-y (accessed on 26 December 2019).
53. Urban Residential Satisfaction and the Planning Implications in a Developing World Context: The Example of Benin City, Nigeria: International Planning Studies: Vol 7, No 1. Available online: https://www.tandfonline.com/doi/abs/10.1080/13563470220112599 (accessed on 26 December 2019).
54. Migrant Housing in Urban China: Choices and Constraints - Weiping Wu. 2002. Available online: https://journals.sagepub.com/doi/abs/10.1177/107808702401097817 (accessed on 26 December 2019).
55. Baker, E.; Bentley, R.; Lester, L.; Beer, A. Housing affordability and residential mobility as drivers of locational inequality. *Appl. Geogr.* **2016**, *72*, 65–75. [CrossRef]
56. Happy People in Mixed-up Places: The Association between the Degree and Type of Local Socioeconomic Mix and Expressions of Neighbourhood Satisfaction - Scott Baum, Kathryn Arthurson, Kara Rickson. 2010. Available online: https://journals.sagepub.com/doi/abs/10.1177/0042098009351941 (accessed on 26 December 2019).
57. Elsinga, M.; Hoekstra, J. Homeownership and housing satisfaction. *J. Hous. Built Environ.* **2005**, *20*, 401–424. [CrossRef]
58. Analyzing Migration Decisionmaking: Relationships between Residential Satisfaction, Mobility Intentions, and Moving Behavior - M Lu. 1998. Available online: https://journals.sagepub.com/doi/abs/10.1068/a301473 (accessed on 26 December 2019).
59. Diaz-Serrano, L. Disentangling the housing satisfaction puzzle: Does homeownership really matter? *J. Econ. Psychol.* **2009**, *30*, 745–755. [CrossRef]
60. DiPasquale, D.; Glaeser, E.L. Incentives and Social Capital: Are Homeowners Better Citizens? *J. Urban Econ.* **1999**, *45*, 354–384. [CrossRef]
61. Evans, G.W. The built environment and mental health. *J. Urban Health* **2003**, *80*, 536–555. [CrossRef] [PubMed]
62. Burra, S. Towards a pro-poor framework for slum upgrading in Mumbai, India. *Environ. Urban.* **2005**, *17*, 67–88. [CrossRef]
63. Yamane, T. *Statistics: An Introductory Analysis*, 2nd ed.; Harper and Row: New York, NY, USA, 1967.
64. Kline, R.B. *Principles and Practice of Structural Equation*, 4th ed.; The Guildford Press: New York, NY, USA, 2015.
65. Amérigo, M.; Aragones, J.I. A theoretical and methodological approach to the study of residential satisfaction. *J. Environ. Psychol.* **1997**, *17*, 47–57. [CrossRef]
66. Zalejska-Jonsson, A.; Wilhelmsson, M. Impact of perceived indoor environment quality on overall satisfaction in Swedish dwellings. *Build. Environ.* **2013**, *63*, 134–144. [CrossRef]
67. Abass, Z.I.; Tucker, R. Residential satisfaction in low-density Australian suburbs: The impact of social and physical context on neighbourhood contentment. *J. Environ. Psychol.* **2018**, *56*, 36–45. [CrossRef]
68. ABE, R.; KATO, H. Built Environment, Travel, and Residential Satisfaction in a Developing City: Can Residents under Rapid Urbanization Agree with a Sustainable Urban Form? *Asian Transp. Stud.* **2017**, *4*, 481–498.
69. Young, A.F.; Russell, A.; Powers, J.R. The sense of belonging to a neighbourhood: Can it be measured and is it related to health and well being in older women? *Soc. Sci. Med.* **2004**, *59*, 2627–2637. [CrossRef]
70. Phillips, D.R.; Siu, O.-L.; Yeh, A.G.; Cheng, K.H. Factors influencing older persons' residential satisfaction in big and densely populated cities in Asia: A case study in Hong Kong. *Ageing Int.* **2004**, *29*, 46–70. [CrossRef]
71. Abbaszadegan, M.; Rezazadeh, R.; Mohammadi, M. An investigation on the social and traffic effects of metro stations on neighborhoods. *Iran Univ. Sci. Technol.* **2011**, *21*, 45–51.

72. Galster, G. Identifying the correlates of dwelling satisfaction: An empirical critique. *Environ. Behav.* **1987**, *19*, 539–568. [CrossRef]
73. Li, S.; Song, Y. Redevelopment, displacement, housing conditions, and residential satisfaction: A study of Shanghai. *Environ. Plan. A* **2009**, *41*, 1090–1108. [CrossRef]
74. Bonaiuto, M.; Fornara, F. Residential satisfaction and perceived urban quality. *Encycl. Appl. Psychol.* **2004**, *3*, 267–272.
75. Liu, A.M.M. Residential satisfaction in housing estates: A Hong Kong perspective. *Autom. Constr.* **1999**, *8*, 511–524. [CrossRef]
76. Hair, J.F.; Black, W.C.; Babin, B.J.; Anderson, R.E. *Multivariate Data Analysis*, 7th ed.; Pearson Prentice Hall: Upper Saddle River, NJ, USA, 2010.
77. Structural Equation Models with Unobservable Variables and Measurement Error: Algebra and Statistics - Claes Fornell, David F. Larcker. 1981. Available online: https://journals.sagepub.com/doi/abs/10.1177/002224378101800313 (accessed on 26 December 2019).
78. Carr, A.J.; Gibson, B.; Robinson, P.G. Is quality of life determined by expectations or experience? *BMJ* **2001**, *322*, 1240–1243. [CrossRef]
79. Djebarni, R.; Al-Abed, A. Satisfaction level with neighbourhoods in low-income public housing in Yemen. *Prop. Manag.* **2000**, *18*, 230–242. [CrossRef]
80. Bardhan, R.; Sunikka-Blank, M.; Haque, A.N. Sentiment analysis as tool for gender mainstreaming in slum rehabilitation housing management in Mumbai, India. *Habitat Int.* **2019**, *92*, 102040. [CrossRef]
81. Housing Satisfaction Related to Health and Importance of Services in Urban Slums: Evidence from Dhaka, Bangladesh | SpringerLink. Available online: https://link.springer.com/article/10.1007/s11205-012-0045-5 (accessed on 26 December 2019).
82. Renigier-Bilozor, M.; Bilozor, A.; d'Amato, M. Residential market ratings using fuzzy logic decision-making procedures. *Econ. Res.-Ekon. Istraživanja* **2018**, *31*, 1758–1787. [CrossRef]

© 2020 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).