Original Article

Homebuyers' Expectations for the Affordable Housing in Kolkata, India: A Kano–Kendall Approach

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Abstract - This study examines what homebuyers expect from affordable houses in a Tier-1 city. It also examines whether homebuyers' expectations exhibit any shared patterns. Eighty-three housing attributes, identified from the literature, were used to assess homebuyers' expectations. Using a 5-point Likert-type scale, satisfaction and dissatisfaction responses were gathered from the residents of 32 housing complexes across the Kolkata Metropolitan Area. The reliability and validity of the questionnaire were checked using Cronbach's Alpha and Bivariate Pearson's correlation. The housing attributes were further grouped into the Kano Model, using a Continuous Scale method, and the coefficient of concordance (W) was used to test users' consensus. The results show only 20 parameters displayed strong consensus ($W = 0.501–0.917, p < 0.05$). Features such as natural ventilation, good roads, street lighting, and proximity to a fire station or local market were classified as 'must-be'. Attributes such as a robust sewer system, a potable water supply in the kitchen, smooth lift operation, on-time transfer of possession, traffic-free surroundings, the absence of obnoxious activities, proximity to a police station, and festive celebrations showed proportional influence and were grouped into the 'performance' category. Only one parameter (absence of neighbourhood noise) emerged as an attractive feature. Features such as furnished interiors, street furniture, and proximity to a few local commercial outlets showed negligible influence and were grouped into the 'indifferent' category. The study applies a unique approach to measure homebuyers' expectations by integrating the Kano Model and Kendall's Concordance test, and ultimately deriving practical, evidence-based recommendations for developers and policymakers.

Keywords - Residential Real Estate, Homebuyers' Expectations, Kendalls' Concordance, KANO Model, Kolkata.

1. Introduction

Affordable housing remains one of the most pressing urban challenges worldwide. Across rapidly urbanising regions, governments and private developers alike have pursued large-scale housing provision to meet the needs of lower- and middle-income households. In India, national programmes such as the Pradhan Mantri Awas Yojana (PMAY) and the Real Estate Regulation Act (R.E.R.A.) have accelerated both supply and regulatory oversight [1]. However, despite this policy and market momentum, a paradox still persists: many 'affordable' housing units remain unsold even when priced within the reach of their intended buyers [2]. This highlights that 'housing affordability' in monetary terms does not necessarily explain 'desirability' in lived terms [3].

Previous studies in housing studies mentioned that housing choices are a multidimensional phenomenon. Beyond the 'price' aspect, other factors such as neighbourhood safety, accessibility to services, environmental quality, and design features strongly influence the housing satisfaction and purchase decisions [4-6]. These intangible features are particularly salient as essential infrastructural provisions cannot be missed out [7, 8]. Some studies revealed that not all features are equally valued; some are seen as non-negotiable, while others contribute incrementally to satisfaction, and a few remain negligible [9, 10]. Understanding these distinctions and the extent to which they are shared across homebuyers becomes essential for both developers and policymakers to seek design interventions and regulate marketing strategies for affordable housing more effectively.

According to Knight Frank reports, the Kolkata Metropolitan Area (KMA) has experienced strong supply growth, but uneven absorption of completed housing units. Prior research studies have begun to unveil the reasons behind this market mismatch. Biswas and Mukerji [11] found that the sales performance of affordable housing is significantly associated with buyers' perceived housing satisfaction related to certain levels of housing characteristics. From an initial pool of over a hundred potential housing attributes, they identified 83 parameters across three spatial levels, namely building, neighbourhood, and miscellaneous, that influence

sales performance. This insight becomes a valuable empirical foundation for a deeper investigation.

1.1. Research Gap

A critical *contextual gap* remains in previous housing studies. Most housing studies have compared housing attributes to price or cost by determining how they influence the housing market. But none have explored what buyers expect. How do residents treat certain features as non-negotiable, or proportional satisfiers, or as negligible? More importantly, how much consensus do the buyers display? Addressing these gaps becomes necessary, as the shared expectations regarding a housing feature establish the effectiveness of design standards, regulatory interventions, and sales strategies [4]. The methodological gap is further presented in Section 2.3, followed by the literature review.

1.2. Research Question

This study addresses the research gap by re-examining the 83 significant attributes identified by Biswas and Mukerji [11]in the context of buyer expectations in KMA's affordable housing market segment. The research question can be framed as follows:

- *R.Q.*: *What are the buyers' expectations regarding affordable housing, and to what extent do homebuyers share consensus?*

This study compares empirical findings on housing expectations with context-specific evidence by integrating Kendall's concordance analysis with the Kano Model classification.

Section 2 of this paper presents the literature review. Section 3 outlines the methodology, and Sections 4 present the results and discussions, which are followed by the conclusion in Section 5.

2. Literature Review

The significant parameters identified in the previous study [11] form the foundation for the current study. 83 parameters, categorised under building level, neighbourhood level, and miscellaneous, are used to analyse homebuyers' expectations in the KMA's affordable housing market. The parameters are presented in the following sub-sections:

2.1. Parameters for Analysing Homebuyers' Expectations

Building-level characteristics (see Table 1) influence users' satisfaction in four key aspects: spatial adequacy, quality, energy efficiency, and services provided. The 'spatial features' refer to the functionality of the spaces of a house, where room sizes, number of bedrooms, and features such as balconies enhance homebuyers' perceived value and overall liveability. The 'construction quality' accounts for both structural aspects as well as aesthetic appeal of a house. Standard construction practices, attractive finishing, and

pleasant exteriors contribute to homebuyers' perceived satisfaction and property value. The 'energy efficiency' aspect emphasises efficacy and users' comfort, as daylighting, ventilation, and efficient energy appliances, which reduce costs and improve indoor environments. The 'services' aspect includes a potable water supply, an uninterrupted electricity supply, and a robust drainage system, which is essential for desired habitability. The 'circulation features' include well-designed staircases, adequate signage, and smooth operations of lifts, further enhancing the users' accessibility and their overall well-being.

These building-level characteristics directly influence homebuyers' perceptions of cost-effectiveness and liveability, and make them crucial to buyers' perceived satisfaction in affordable housing.

Table 1. Building-level parameters are grouped under categories and aspects

Category	Aspect	Variables
Physical	Space Provision	1. Provision of parking
		2. Number of bedrooms
		3. Number of bathrooms
		4. Number of balconies
		5. Compliance with Vastu
	Size	6. Size of balcony
		7. Size of bedroom
		8. Carpet area of the house
	Construction Quality	9. Furnished interior
		10. Exterior aesthetics of the building
		11. Finishing or built quality
	Energy efficiency	12. Natural daylighting
		13. Natural ventilation
		14. Building illumination
		15. Presence of Solar panels
		16. Provision of energy-efficient electrical appliances
Infrastructure	Services	17. Drainage facility
		18. Sewerage facility
		19. Electricity supply
		20. Water supply system
		21. Fibre optic broadband service
	Ease of circulation	22. Availability of Lifts
		23. Comfort associated with the lift's usage
		24. Ease of using the staircase
		25. Signages
Source: [11-14]		

Neighbourhood characteristics (see Table 2) influence buyer satisfaction through five critical dimensions. They are

environmental aspects, urban appeal, access to healthcare facilities, community amenities, and socio-economic factors. Inconveniences due to urban issues, such as noise, untidy surroundings, ineffective drainage, and pungent odours, degrade homebuyers' comfort and create health-related issues, while nuisances like flooding, litter, or heavy traffic reduce homebuyers' desirability for that neighbourhood. Aesthetic appeal from green cover such as trees and bushes, well-maintained roads with no potholes, and thoughtful street design create safe and socially attractive surroundings, thereby increasing homebuyers' well-being. Access to healthcare facilities, such as hospitals, clinics, and pharmacies, increases homebuyers' perceptions of a healthy lifestyle. Several community amenities, such as schools, playgrounds, post offices and banks, gyms, and emergency services, provide daily convenience and promote social benefits. Socio-economic activities in neighbourhoods, such as local shops, marketplaces, and petty businesses, contribute to livelihood opportunities and community cohesion, which impact homebuyers' perceived satisfaction.

Overall, neighbourhood-level attributes shape lifestyle, social status, and daily convenience, making them crucial in affordable housing studies.

Table 2. Neighbourhood-level parameters are grouped under categories and aspects

Category	Aspect	Variables
Physical	Urban-level issues	26. Inconvenience due to traffic congestion
		27. Inconvenience due to smell
		28. Inconvenience due to waterlogging
		29. Inconvenience due to litter
		30. Inconvenience due to noise
	Landscaping	31. Proximity to park/ garden
		32. Street furniture
		33. Road conditions in the neighbourhood
		34. Urban beautification
		35. Street lights
Infrastructure	Healthcare	36. Proximity to the hospital
		37. Proximity to the primary health centre
		38. Proximity to the veterinary Clinic
		39. Proximity to pharmacy
		40. Proximity to a diagnostic centre
	Community amenities	41. Proximity to a place of worship
		42. Proximity to sports facility/playground
		43. Proximity to the gym and fitness facility
	Public services	44. Proximity to school
		45. Proximity to the post office
		46. Proximity to the courier service
		47. Proximity to a bank or ATM
		48. Proximity to the Fire station
		49. Proximity to Police Station
Commercial	Beauty and care	50. Proximity to parlours or saloons
		51. Proximity to a cosmetics store
		52. Proximity to the photo studio
		53. Proximity to a jewellery shop
	Eateries	54. Proximity to sweet and confectionery
		55. Proximity to roadside eateries (stalls)
		56. Proximity to bakery
		57. Proximity to the restaurant
	Daily needs	58. Proximity to a vegetable, fish, or meat market
		59. Proximity to a dairy booth (milk/bread/egg)
		60. Proximity to a fruit seller's shop/stall
		61. Proximity to photocopy shop/Xerox
		62. Proximity to the general store
	Local shops	63. Proximity to a clothing store
		64. Proximity to a gift shop
		65. Proximity to a bookstore or stationery
	Service centres	66. Proximity to a mobile service centre
		67. Proximity to a cycle and bike repair
		68. Proximity to an electrical shop
		69. Proximity to a hardware shop
		70. Proximity to 4-wheeler repairing
Social	Crowd behaviour	71. Obnoxious activities in the neighbourhood
		72. Ethnic diversity
		73. Cultural inclusiveness
		74. Festive celebrations

Source: [11-14]

Miscellaneous features, which are intangible (see Table 3), influence buyer satisfaction through financial or legal aspects, as well as in experiential terms. Financial aspects, such as the absence of hidden charges and marketing behaviour by developers, are critical in buying decisions. Legal aspects, such as on-time possession, timely updates on construction status, easy complaint lodging, and smooth arbitration, are essential for homebuyers while buying a property. Accessibility to amenities also enhances perceived investment value. Unique property features, such as scenic views, vibrant and family-friendly environments, become Unique Selling Points (USP) for a property, and create a sense of delight among the homebuyers while buying a house.

These miscellaneous features ensure affordability, a sense of secure ownership, and unique living experiences become crucial for homebuyers while buying an affordable house.

Table 3. Miscellaneous parameters are grouped under categories and aspects

Category	Aspect	Variables
General	Financial	75. Price of property
		76. Marketing/sales personnel behaviour
		77. Hidden charges
	Legalities	78. Registered under WB-HIRA (R.E.R.A.)
		79. Dispute-free ownership
		80. Timely possession
	Psychological	81. View from the apartment
		82. Vibrant and lively place
		83. Family-friendly haven
Source: [11-14]		

2.2. Housing Studies Using the Kano Model

Nine research articles were found over the past decade (since 2015) that used the Kano Model in housing studies and categorised various housing attributes into four Kano categories. They are presented sequentially in ascending order as follows.

Ek and Çıkış [16] in Turkey identified balconies as a performance feature, open kitchens as attractive, and two bathrooms as indifferent. Juan et al. [17] in Taiwan classified multi-purpose spaces, energy-efficient and adaptable design, and crime prevention as must-be. In Bangkok, Tochaiwat et al. [18] found that parking and outdoor lighting were essential, as well as attractive garden fountains. Encinas et al. [19] in Chile reported that pools, terraces, and investment potential were attractive, energy efficiency was indifferent, and thermal comfort was must-be. Wu et al. [20] found that for luxury apartments, maintenance and security were mushaves, service responsiveness was a performance factor, and community activities were indifferent. Xu et al. [10] identified medical and health facilities, water quality, spatial organisation, air quality, and electricity as must-be, in rural China, while noise absence, parking, and green space were performance factors; cultural facilities and police stations were attractive; and education was indifferent. Bao et al. [21] reported that function was a must-have feature, the indoor environment was performance-oriented, and spatial organisation was indifferent. Altuwaim et al. [22] in Saudi Arabia classified safety and affordability as must-be and space utilisation as a performance factor. Wei et al. [23] in Beijing found that space planning was a must, services were attractive, and external amenities were indifferent.

The previous studies confirm that the Kano Model is a robust technique for measuring homebuyers' expectations in various contexts (different countries and housing typologies), and distinguishes homebuyers' preferences of housing attributes as essential, market performers, delighters, and negligible.

2.3. Methodological Gap

The literature review identified that all the studies consist of the Kano Model application in different contexts (different countries and housing typologies), but none of them used Kendall's Concordance test to assess the significant sample consensus.

3. Methodology

The survey was conducted across thirty-two private affordable housing complexes in Kolkata, selected from 259 projects identified via magicbricks.com and 99acres.com. Because access to the housing complexes and conducting social surveys required the consent of developers or housing associations, the sample was shaped by the permissions granted (*purposive sampling*); however, the selected complexes were geographically and typologically diverse. These complexes contained 4,549 affordable units (41.13% of all units in the complexes), of which 4,152 were sold. Using Cochran's formula for small populations with 95% confidence and 5% error, the required minimum sample was 352 [24]. An additional 10% was added to account for attrition (~390 respondents), and ultimately, 383 valid responses were considered. Affordable units were defined as those priced up to ₹50 lakh and with a carpet area of < 60 m² [1, 25]. While not designed for strict population generalisation, this heterogeneous sample is appropriate for identifying shared patterns, consistent with an exploratory, theory-building approach [26].

The 83 parameters from [11] were then reframed into functional–dysfunctional pairs, where functional items measured satisfaction when a feature was present and dysfunctional items measured dissatisfaction when it was absent. This step was necessary to align the homebuyers' responses to the Kano Model framework. The reframed parameters are listed in the later section along with the study's findings.

The study adopted a 5-point Likert-type scale to capture the homebuyers' responses. For the functional questions the scale-points were mentioned as '1: Disliked', '2: Tolerated', '3: Neutral', '4: Expected', and '5: Liked', whereas for the dysfunctional questions the scale-points were reversed and articulated as '1: Liked', '2: Expected', '3: Neutral', '4: Tolerated', and '5: Disliked'.

The reliability and validity of the data collection instrument (questionnaire) were calculated using Cronbach's alpha and the bivariate Pearson correlation test. The Cronbach's alpha ($\alpha = 0.767$) for *functional* questions and $\alpha = 0.744$ for *dysfunctional* questions showed acceptable reliability, as both exceeded the recommended threshold of 0.7 [27, 28].

The bivariate Pearson's correlation coefficient $|r_{calc.}|$ for each functional *question score* and the *total score* falls in the range of 0.031 and 0.779, whereas $|r_{calc.}|$ for each dysfunctional question score and the total dysfunctional score falls between 0.044 and 0.826. With a total of N=383 respondents, a degree of freedom of df=381, and a level of significance of 0.05, the critical value is $|r_{crit}| = 0.0201$. Since $|r_{calc.}| > |r_{crit.}|$ for all questions of both types, there is a significant correlation, which indicates validity. To assess consensus, Kendall's coefficient of concordance ($\mathcal{W}$) was calculated for each parameter separately for functional and dysfunctional responses across the thirty-two complexes, using:

$$\mathcal{W} = \frac{12 \sum R_j^2 - 3n^2(m + 1)^2}{m^2 (n^2 - n)} \qquad (1)$$

Where $\mathcal{W}$ = Kendall's coefficient of concordance, m = number of respondents, n = number of housing complexes ranked per question (separately for function and dysfunction), R_j = Sum of ranks for the jth complex. For each Kano question, the associated *Chi-square (χ^2)* value was computed using:

$$\chi^2 = m(n - 1)\mathcal{W} \qquad (2)$$

With $df = 31$, parameters with $\mathcal{W} > 0.5$ and $p < 0.05$ were deemed to show strong concordance [29]. Although Kendall's $\mathcal{W}$ is traditionally applied to explicit rankings, this study treated Likert-type responses as implicit rankings, a pragmatic and precedent-supported adaptation [30, 31]. The purpose was not to replicate a Friedman model but to establish whether evaluations converged enough to consider an attribute a shared concern [29]. Finally, attributes were categorised using DuMouchel's continuous scale analysis [32], which scores responses from −2 to 4 (Table 4).

Table 4. Scores for each response to functional or dysfunctional questions in continuous scale analysis

Question Type	Kano Score				
Response	Dislike	Live with	Neutral	Must-be	Like
1. Functional (**y value**)	-2	-1	0	2	4
Response	Like	Must be	Neutral	Live with	Dislike
2. Dysfunctional(**x value**)	-2	-1	0	2	4
Source: [32]					

The focus on core categories leads to asymmetrical scaling, where the negative end of the scale (which includes Reverse and Questionable) is simplified, and the scale begins at 0 rather than a more extreme value, such as 4, reflecting the reduced emphasis on these negative categories [32].

Therefore, the focus remains on the four core categories (must-be, performance, attractive, indifferent), which have the most substantial relevance for policy and design [33, 34].

Only attributes with positive mean values were plotted on a two-dimensional Kano grid, with functional means (Y_{avg}) on the vertical axis and dysfunctional means (X_{avg}) on the horizontal axis. The classification rules were as follows: must-be ($2 < X_{avg} \leq 4$, $0 < Y_{avg} \leq 2$), attractive ($0 < X_{avg} \leq 2$, $2 < Y_{avg} \leq 4$), performance ($2 < X_{avg} \leq 4$, $2 < Y_{avg} \leq 4$), and indifferent ($0 < X_{avg} \leq 2$, $0 < Y_{avg} \leq 2$). By focusing on positive means, the analysis prioritised attributes relevant to improving minimum service standards in affordable housing in the KMA.

4. Results and Discussion

Eighty-three housing attributes were analysed and classified in four Kano model categories (Must-be, Performance, Attractive, Indifferent). Of these, 20 parameters exhibited significant consensuses (p-value < 0.05) with Kendall's $\mathcal{W}$ ranged from 0.501 to 0.917 for both functional and dysfunctional aspects (see Table 5), which were further plotted in the Kano co-ordinate system (presented in Figure 1). Corresponding χ^2 values also indicated high agreement, supporting response strength and data reliability.

Parameters such as natural ventilation, good road conditions, street lighting, proximity to a fire station, local market, and vibrant/lively surroundings show baseline (essential) expectations, and the absence of these produced dissatisfaction without proportionate gains from their presence. Therefore, grouped as *'must-be'* attributes. Parameters such as proper sewerage, potable kitchen water, smooth lift operations, timely possession, traffic-free

surroundings, absence of obnoxious activities, proximity to a police station, and support for festive/cultural events showed a proportional effect on satisfaction and dissatisfaction. Therefore, grouped as *'performance'* attributes.

The absence of unwanted noise was the sole *'attractive'* attribute as it elevated the homebuyers' satisfaction when present, but was not expected by them in general.

Parameters such as built-in furnishings (e.g., kitchen cabinets, wardrobes), street furniture, and nearby niche retail (e.g., cosmetics shops, photo studios), located within a radius of ~300 m, had a negligible effect on homebuyers' satisfaction and dissatisfaction as well. Therefore, these are grouped as *'indifferent'* attributes.

4.1. Comparison with Previous Literature

Good roads and street lighting were found to be essential features in this study, which differs from the findings of Xu et al. [10] (found these features to be 'performance' category), while aligning with Tochaiwat et al. [18] (identified outdoor lighting as must-be). Fire stations within 3 km were found to be a must-have feature in this study, but it differs from Xu et al. [10] (identified as attractive), possibly due to contextual differences in the homebuyers' preferences regarding the emergency services. The features like robust sewer system, and provision of potable water in kitchens were found to be performance features in this study, aligning with Xu et al. [10] and Altuwaim et al. [22] regarding the robust sewer facility, while differing from Xu et al. [10] (as they have categorised potable water supply as must-be).

A police station within 5 km was found to be a performance feature in this study, which differs from Xu et al. [10] (categorised as attractive). Festive celebrations were found to be a performance feature in the current study, differing from Wu et al. [20] (categorised as an indifferent feature), possibly due to cultural and contextual variations.

This study identified the absence of unwanted noise as an attractive feature. In Indian urban contexts, noise from traffic, construction, and social events is often tolerated; quieter areas, therefore, add a 'bonus' level of comfort rather than meeting a minimum standard. Xu et al. [10] instead classified noise absence as a performance metric. Indifferent attributes—built-in furnishings, street furniture (e.g., benches, dustbins), and niche outlets (such as cosmetics stores and photo studios within a radius of ~300 m)—had little influence. Indifference to furnishings likely reflects post-possession customisation and the growing standardisation of such items by developers; this contrasts with Ek and Çıkış [16], who found open kitchens with cabinets attractive in Turkish mass housing. Street furniture may be viewed as a municipal (not developer) responsibility and is often under-maintained. Few local shops (cosmetic stores and photo studios) were found to be

indifferent, possibly due to the rise of online retail and multifunctional stores.

These findings would help in strategising the development activities in the future, and are presented in the following sub-sections.

4.2. Justification of Homebuyers' Expectations with Concordance

The high concordance W confirmed robust, shared judgements: must-be items were baseline requirements whose absence caused dissatisfaction; performance items (sewerage, potable kitchen water, smooth lifts, timely possession, policing proximity) affected satisfaction proportionally; the absence of unwanted noise was appreciated but not expected; and indifferent items had negligible impact. While Biswas and Mukerji [11] linked some such characteristics to sales in specific contexts, the present concordance evidence indicates limited policy relevance for attractive/indifferent items.

4.3. Practical Implications

The high concordance W across categories provides a straightforward and dependable guide for decision-making. For developers, must-be and performance attributes should be prioritised as top investment, ensuring that projects meet essential expectations and directly influence buyer satisfaction.

The parameters identified by Biswas and Mukerji [11] as significant housing characteristics influencing sales in privately developed affordable housing in the Kolkata Metropolitan Area (KMA) might not always translate into considerations for policy change or implementation.

The attractive feature identified in the study can be considered as an optional add-on, with the flexibility given to the homebuyers to include. While the indifferent features will not add to satisfaction much, they incur costs that should be avoided.

4.4. Guidelines for Developers and Policy Makers
4.4.1. Must be Attributes
Developer Guidelines

Developers should ensure provision of good road conditions, adequate street lighting (inside the housing complex, as at neighbourhood level these features cannot be modified), and natural ventilation (by improving WWR or better cross-ventilated layout designs).

Policy Recommendation

The Government body should mandate these in building codes and approval checklists as part of minimum housing standards. Further, road conditions and lighting should be improved.

Table 5. Categorisation of significant parameters (asymp. P-value < 0.05) having strong users' concordance ($\mathcal{W}$ > 0.5) using continuous scale analysis

Functional and Dysfunction Questions classified into Kano Categories (using Continuous Scale Analysis)	Functional			Dysfunctional			Continuous scale analysis	
	Asym (*p*-value)	Kendall's $\mathcal{W}$	Chi-sq. $\chi2$	Asym (*p*-value)	Kendall's $\mathcal{W}$	Chi-sq. $\chi2$	Xavg	Yavg
Must-be category								
Building level characteristics								
How satisfied would you be with natural cross ventilation in rooms, and how dissatisfied would you be if this were absent?	0.000	0.748	278.256	0.000	0.631	234.732	3.0938	1.9531
Neighbourhood level characteristics								
How satisfied would you be with good road conditions (no potholes or cracks) in your neighbourhood, and how dissatisfied would you be if roads were in poor condition?	0.000	0.831	309.732	0.001	0.641	238.452	2.3594	0.2969
How satisfied would you be if your streets were well-lit with working streetlights (URDPFI 2015), and how dissatisfied would you be if streets were poorly lit at night?	0.000	0.659	245.148	0.000	0.560	208.32	2.6302	1.4089
How satisfied would you be living within 3 km of a fire station (URDPFI 2015), and how dissatisfied would you be if emergency response services were far away?	0.000	0.790	293.88	0.000	0.722	268.584	2.3281	1.6042
How satisfied would you be living within 300 meters of a vegetable, fish, or meat market (URDPFI 2015), and how dissatisfied would you be if such markets were not easily accessible?	0.000	0.612	227.664	0.000	0.594	221. 0	3.0833	1.6927
Miscellaneous characteristics								
How satisfied would you be living in a vibrant and lively area, and how dissatisfied would you be if the surroundings felt dull and inactive?	0.000	0.663	246.636	0.000	0.836	310.992	2.7604	1.7526
Performance category								
Building level characteristics								
How satisfied would you be with a well-functioning sewerage system with no blockages, and how	0.000	0.795	295.74	0.000	0.752	279.744	3.9323	3.7135

dissatisfied would you be if it failed frequently?							
How satisfied would you be with a safe and clean water supply system in your kitchen and bathroom, and how dissatisfied would you be if this were not ensured?	0.000	0.605	225.06	0.000	0.917	341.124	3.7604	2.2969
How satisfied would you be with the smooth operation of lifts through regular maintenance, and how dissatisfied would you be if maintenance were neglected?	0.000	0.766	284.952	0.000	0.695	258.54	2.4063	2.2969
Neighbourhood level characteristics							
How satisfied would you be living in an area free from traffic congestion, and how dissatisfied would you be if traffic were frequently jammed around your home?	0.000	0.612	227.664	0.000	0.648	241.056	2.0911	3.1042
How satisfied would you be living within 5 km of a police station (URDPFI 2015), and how dissatisfied would you be if law enforcement services were inaccessible?	0.000	0.700	260.4	0.000	0.645	239.94	2.6771	2.4922
How satisfied would you be if your neighbourhood were free from obnoxious or disruptive activities, and how dissatisfied would you be if such incidents occurred regularly?	0.000	0.637	236.964	0.000	0.810	301.32	3.6250	2.2031
How satisfied would you be living in a neighbourhood that actively celebrates festivals and events, and how dissatisfied would you be if such engagement were absent?	0.000	0.657	244.404	0.000	0.586	217.992	3.2031	2.1510
Miscellaneous characteristics							
How satisfied would you be if your housing unit were handed over to you on time, and how dissatisfied would you be if timely possession were delayed?	0.000	0.595	221.34	0.000	0.536	199.392	3.8646	2.9349
How satisfied would you be with the view from your apartment, and how dissatisfied would you be if the view were obstructed or unpleasant?	0.000	0.689	256.308	0.000	0.728	270.816	2.0938	2.1979

Attractive Category							
Neighbourhood characteristics							
How satisfied would you be if your neighbourhood were quiet and free from unwanted noise, and how dissatisfied would you be if noise disturbances were frequent?	0.000	0.730	271.56	0.000	0.657	244.404	1.9635	2.8620
Indifferent Category							
Building level characteristics							
How satisfied would you be with including basic furnishings like kitchen cabinets and wardrobes, and how dissatisfied would you be if these were not provided?	0.000	0.764	284.208	0.001	0.613	228.036	1.7083	0.4531
Neighbourhood level characteristics							
How satisfied would you be with the availability of well-maintained street furniture like benches and dustbins, and how dissatisfied would you be if such amenities were absent?	0.000	0.790	293.88	0.000	0.547	203.484	1.9844	0.2786
How satisfied would you be living within 300 meters of a cosmetics store, and how dissatisfied would you be if such a store were inaccessible?	0.000	0.741	275.652	0.000	0.501	186.372	0.7526	1.0938
How satisfied would you be living within 300 meters of a photo studio, and how dissatisfied would you be if such services were not nearby?	0.000	0.566	210.552	0.000	0.574	213.528	1.3438	0.9974
NOTE: Asymptotic p-value, Kendall's $\mathcal{W}$, and Chi-sq. $\chi 2$ values were calculated using IBM-SPSS software.							
X_{avg} and Y_{avg} were calculated using MS-Excel software.							
Source: Authors' calculation outcomes							

4.4.2. Performance Attributes
Developer Guidelines

Developers should provide reliable and robust sewer systems connected to municipal sewer lines, a potable water supply in kitchens, regular maintenance of lifts to have smooth operations, transfer possession on time to the owners, and select sites near police stations. Developers can explicitly advertise these features to acquire more buyers.

Policy Recommendation

The Government body can ensure filtered water supply quality (municipal supply), mandate regular lift maintenance, and robust sewer facility line (municipal sewer). The online portal of R.E.R.A. must be updated and monitored regularly (showing updates on project completion, provision of online portals for customer grievance, and support team), and legal aspects such as transfer of possession and ownership can be fast-tracked.

4.4.3. Attractive Attributes
Developer Guidelines

Developers can include noise-reduction measures as optional add-ons to create a competitive edge in sales. They can use these as a marketing feature by ensuring cost-efficiency.
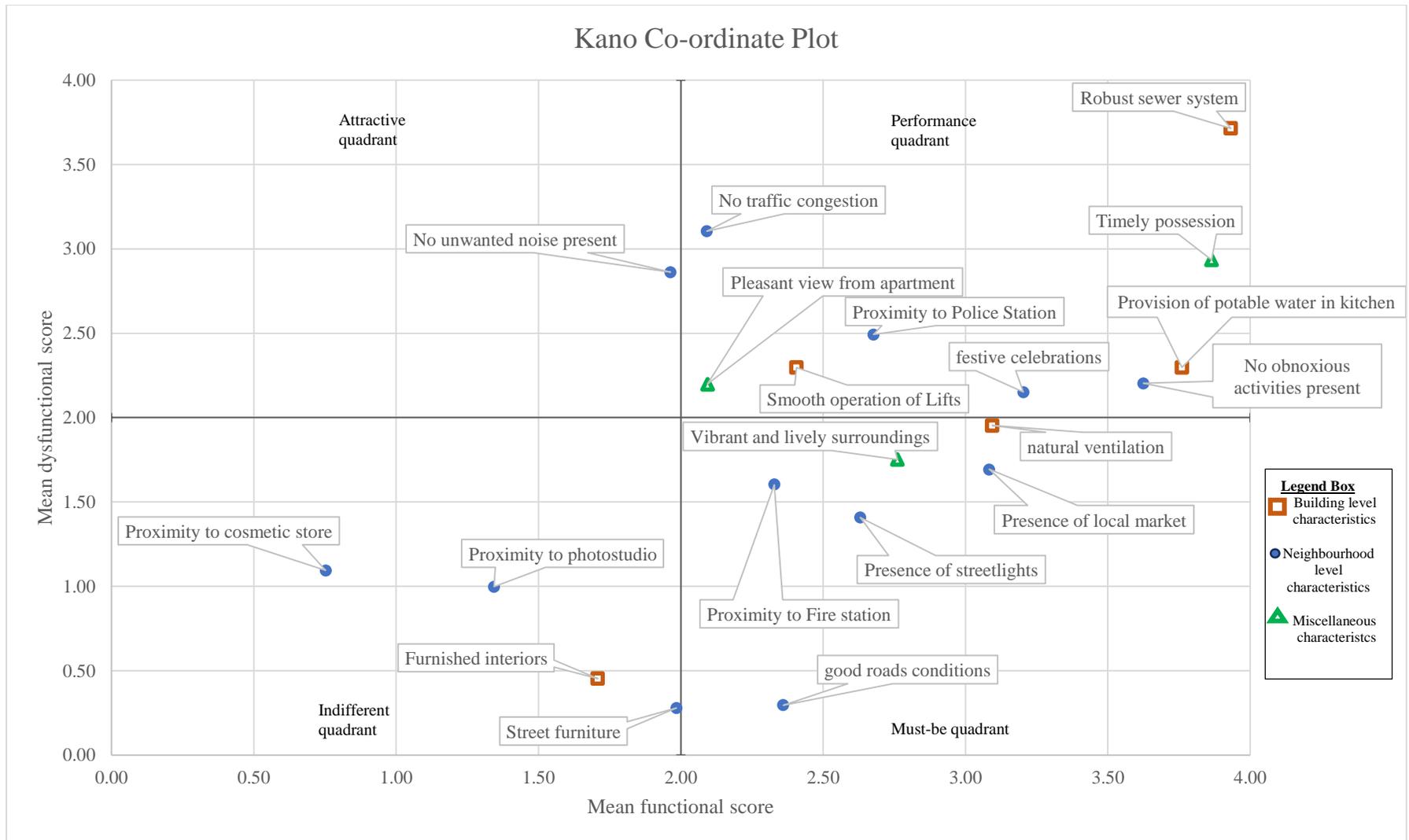
Fig. 1 Kano co-ordinate plot

Policy Recommendation

The Government can provide some subsidies to the developers to promote noise cancellation windows and can mandate a thicker green buffer around the housing complexes to cut the outside noise.

4.4.4. Indifferent Attributes
Developer Guidelines

Developers can avoid built-in furnishings and street furniture. They must allow the owners to develop their own interiors as per their own preferences and choices.

Policy Recommendation

The Government must not include these features as mandatory policies for the housing market.

4.4.5. Core Distinctions

Market Impact $\neq$ Policy Priority: As Biswas and Mukerji [11] identified, certain parameters, which were grouped under building, neighbourhood level, and miscellaneous factors, were significantly impacting sales of affordable housing in KMA, but these do not necessarily align with homebuyers' expectations. Henceforth, they do not necessarily warrant any policy interventions or developers' guidelines.

Developer Takeaway*: Developers can* use these findings to implement in their upcoming projects and gain a competitive advantage in project design and sales strategy.

Policy maker takeaway: Government bodies can provide some incentives on must-be and performance housing features to ensure better homebuyers' satisfaction.

5. Conclusion

This study examined whether homebuyers in the Kolkata Metropolitan Area (KMA) share consistent expectations regarding residential parameters that influence sales, and how these expectations can guide the design and policy of affordable housing.

The research (i) reframed 83 parameters from Biswas and Mukerji [11] into functional–dysfunctional pairs under the Kano model, (ii) surveyed households of affordable units across thirty-two private affordable complexes, and (iii) quantified agreement using Kendall's coefficient of concordance ($\mathcal{W}$) with statistical significance tests. Two key findings emerge.

First, buyers showed moderate to high consensus on 20 parameters ($\mathcal{W} > 0.5$, p < 0.05), confirming that expectations are broadly shared. Second, Kano classification revealed a hierarchy: must-be attributes (e.g., natural ventilation, good roads, street lighting, proximity to fire station and local market) define baseline liveability; performance attributes (e.g., sewerage, potable kitchen water, lift reliability, timely

possession, policing proximity, festive support) scale satisfaction proportionally; attractive attributes were rare (notably absence of unwanted noise); and indifferent attributes (e.g., built-in furnishings, street furniture, niche retail) had little effect on satisfaction.

5.1. Contributions
The study contributes (novelty) by:

- Integrating Kano categorisation with Kendall's $\mathcal{W}$, moving beyond descriptive lists to test whether expectations are shared;
- Proposing a decision rule (consensus filter + Kano quadrant) that distinguishes enforceable baselines from optional differentiators; and
- Providing a reproducible methodology for measuring homebuyers' expectations in other Indian cities or even in an international scenario. Together, these findings guide from customer expectations to policy prioritisation.

5.2. Limitations and Future Scope
A few limitations must be acknowledged, and are presented as follows;

While this study offers significant insights into affordable housing expectations in Kolkata, several *limitations* should be acknowledged:

- Social desirability bias: Household interviews were conducted inside respondents' homes; some participants may have provided socially acceptable answers, potentially inflating reported satisfaction.
- Survey timing constraints: Data were collected during the daytime and early evening, which may have underrepresented night-shift workers and others unavailable at those times.
- Limited focus on socio-demographics: The analysis centred on physical/amenity attributes and did not model household socio-demographics (e.g., income, age, tenure length), which can condition satisfaction.
- Context-specific scope: The findings pertain to privately developed affordable housing complexes in Kolkata and may not be generalisable to other cities, government/informal housing, or income groups, although the methodology is replicable elsewhere.
- Cross-sectional design: A single time-point snapshot cannot capture changes in satisfaction as neighbourhood or infrastructure conditions evolve.

Future work should: Incorporate buyer heterogeneity (income, age, tenure, household size); adopt longitudinal designs; link satisfaction to revealed behaviour (transactions, inventory); pair perceptions with objective environmental metrics (noise, air, lighting, traffic); analyse design–cost trade-offs; test policy instruments targeting high-concordance must-be and performance features; expand to other cities and

housing types; and integrate Kano with QFD or MCDA for design and procurement applications. In summary, this study identified and classified core satisfaction attributes in Kolkata's private affordable housing market, demonstrating that must-be and performance features—rather than attractive or indifferent ones—form the foundation of liveability and should anchor both development practice and regulatory standards.

Acknowledgement

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