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Factors influencing home-purchase decision of buyers of different types of apartments in India

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Abstract

Purpose – The purpose of this paper is to present partial results of a survey conducted in Pune, India. Its aim is to determine the importance of factors, other than the buyer-related factors, that influence the purchase of a flat/apartment, of buyers of different types of flats/apartments.

Design/methodology/approach – The author follows three hypotheses for recent buyers of three different types of flats/apartments, namely, 1 BHK, 2 BHK and 3 BHK (where 1, 2 and 3 indicate the number of bedrooms, H stands for hall and K stands for kitchen. Thus 1 BHK designates a flat/apartment with one bedroom, a hall and a kitchen). A total of 284 respondents from buildings located on the outskirts of Pune city participated in the questionnaire survey for this study. Ten factors have been considered.

Findings – From this study, it is concluded that price is significantly the most important factor for buyers of 1 BHK, followed by product, and then followed by location. For 2 BHK buyers, there is no single significantly most important factor. For 3 BHK buyers, there is no single significantly most important factor and the two most important factors are product and location.

Research limitations/implications – The results of this study show that buyers of different types of flats/apartments give different types of importance to the influencing factors. This study of buyer behavior will be helpful for the marketers of real estate companies, as they can identify the most important factors for various categories of buyers and implement those accordingly.

Originality/value – This study is the first to analyze the importance of the influencing factors for buyers of different types of flats/apartments. Also, it is the first to analyze the home-buying behavior for flats/apartments constructed in the outskirts, where most of the new constructions are taking place. This study will be useful to all the stakeholders of the housing industry.

Keywords Housing, Buyer behavior in real estate, Factors influencing home purchase, Home-buying, Mann–Whitney test, Wilcoxon rank sum test

Paper type Research paper

Introduction

Housing is the underpinning of human existence and congruous to many adjunct rudimentary frontiers. It is, thus, also the edifice of many concomitant needs while also furnishing usable inferences for some orthogonal consumption facets. That makes it a rich cornucopia of consumer-insights amplified by an incisive reckoning of human behavior in other dimensions of life, lifestyle and consumption. One could augur and wield forth a lot of insights and psycho-behavioral constructs by eking out a comprehension of a consumer's orientation to housing.

While in rural areas and smaller towns, ownership of independent housing is a common phenomenon to have independent houses, in cities, grave scarcity of land has engendered

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the concept of apartments – many housing units stacked in buildings. These buildings are constructed by developers and sold to different home buyers. Often, new construction expands into the outskirts of the city, as per easy availability of vacant land.

A salient feature in India is the classification plank of apartments. They are classified on the basis of the number of bedrooms, namely, 1 BHK, 2 BHK, 3 BHK, etc. 1 BHK indicates that the residence is composed of one bedroom (B), a hall (H) and a kitchen (K). In India, based on the income, middle class is divided into three sub-classes: lower-middle class, middle-middle class and upper-middle class. Generally, 1 BHK is bought by lower-middle class people, 2 BHK by middle-middle class people and 3 BHK by upper-middle class people. Poor people usually stay in rented houses or buy one room kitchen house and rich people usually stay in independent houses (bungalows). In India, 1 BHK, 2 BHK and 3 BHK dominate as the categories that cover the majority of the house construction sector; hence this study is confined only to 1 BHK, 2 BHK and 3 BHK home buyers. Its scope focuses on the outskirts of Pune, India.

An appropriate start here would be dwelling on a concatenation of buyer-related factors first. These comprise age and income of the home buyer, number of persons who will be staying in the home and the stage in the life-cycle; and they are very crucial in the decision-making process. However, they are beyond the scope of this study. This paper orbits around factors other than buyer-related factors. Many factors have implications on, before and during the purchase of a house, and this study considers ten such factors.

It is expected that this study will be useful to many stakeholders of the housing sector, namely, the housing developers, marketers, prospective homebuyers, municipal corporations and students of marketing. The developers could use the findings of this study in their future housing projects in meeting the differing expectations of buyers of different types of apartments and thus reduce the probability of unsold inventory. The marketers can come to know about the factors to be emphasized while marketing different types of houses. The prospective home buyers can become aware about the priority and weightage they need to accord to the various factors, before buying a house. The findings of this study may also help the municipal corporations, as they can better plan their developmental regulations and development charges, relating to housing. The students of marketing can gain insight that a house as a product is a special type of a consumer durable, for which some different factors have to be considered for marketing, and they can use this study for comparison of buyer behavior with buyers in the heart of the Pune city or with other cities.

Literature review and research gap

Finding the right house is equivalent to finding a needle in the haystack (IIRE, 2011). A home buyer has to prioritize the various factors that must be considered before buying a house (Deb, 2005).

There are many factors that are either pivotally or tangentially relevant during a house purchase. As a house is a big-ticket purchase, people tend to choose with extra caution and discretion. People may have various choice criteria (Park and Lutz, 1982). Tsai (2001) in his study considered 47 influencing factors that he categorized into eight groups: product, price, promotion, location, consumer socializing factors (Influencing Persons), hedonic factors, psychological factors and intuition.

Important considerations that can be distilled for buyers range from:

- "features of the property" (Japanese Ministry of Land, Transport and Tourism, 2009);
- physical characteristics of the house (Nelson and Rabianski, 1988);

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- quality of construction (Kivett, 1988; Kochera, 1999);
- size (Lindberg *et al.*, 1989; Saaty, 1990; Kochera, 1999; Chatzky, 2005; Grum, 2013);
- spacious feeling (Kivett, 1988);
- exterior appearance (Kochera, 1999; Rahadi *et al.*, 2015);
- room layout/convenient floor plan (Kivett, 1988; Kochera, 1999; Rahadi *et al.*, 2015; Katyal and Dawra, 2016);
- to ample storage space (Kivett, 1988); and
- balcony for drying clothes, plumbing fittings and parking space (Katyal and Dawra, 2016).

Some researchers have discussed the importance of good view (Kochera, 1999; Bond *et al.*, 2002; Bourassa *et al.*, 2005; Katyal and Dawra, 2016).

Another important factor influencing this decision is price (Gronhaug *et al.*, 1987; Kivett, 1988; Lindberg *et al.*, 1989; Bady *et al.*, 1998; Kochera, 1999; Kiesel *et al.*, 2003). It is critical for a customer to be cognizant of the price range he/she can afford (Morrow-Jones, 1988). Buyers may also look at the investment value here (Kivett, 1988).

Choice of a house can also have a proclivity toward marketing communications (Koklic and Vida, 2009) and word-of-mouth aspects (Herr *et al.*, 1991; Bady *et al.*, 1998). Word-of-mouth communication often exerts a strong influence on assessment of products and here negative information tends to be more important than positive or neutral information (Herr *et al.*, 1991). According to Ennew and Bannerjee (2000), positive comments from satisfied customers can increase the likelihood of purchase by others and negative comments can decrease the likelihood of purchase by others. Richins (1983) reported that those dissatisfied by a product tell others about their dissatisfaction, and such responses may have lasting effects often morphing into a negative image and reduced sales for a firm. Duhan *et al.* (1977) classified recommendation sources into two categories: strong tie sources (someone close to the customer) and weak tie sources (merely an acquaintance). If consumers feel the need for reassurance regarding some aspects of a decision, they are likely to seek out strong tie sources for information. According to Gong (2003), word-of-mouth recommendation is more credible because the marketer does not control it.

Location has been considered the most important factor influencing home purchase, by many researchers. According to a survey conducted by Morris (2005), 92 per cent of respondents believed that location is everything while purchasing a house. Kauko (2006) did a survey in Helsinki, and concluded that the location is conceded far more importance than the house itself. As the house is immovable, people will choose the house cautiously with respect to its location (Chang, 2008). Many researchers have emphasized the importance of neighborhood (Hempel and Jain, 1978; Nelson and Rabianski, 1988; Lindberg *et al.*, 1989; Saaty, 1990; Sirgy and Cornwell, 2002; Flurry and Burns, 2005; Morris, 2005; McDonell, 2006; Kintrea, 2007; Permentier *et al.*, 2007; Andersen, 2008; Chang, 2008; LeSage and Charles, 2008; Grum, 2013). A desirable location is determined by proximity (Bourassa *et al.*, 2005) to:

- place of work (Gronhaug *et al.*, 1987; Kivett, 1988; Lindberg *et al.*, 1989; Heffernan, 1997; Kochera, 1999);
- friends and relatives (Gronhaug *et al.*, 1987; Kivett, 1988; Lindberg *et al.*, 1989; Kochera, 1999; Rahadi *et al.*, 2015);
- recreation (Lindberg *et al.*, 1989);

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- leisure (Heffernan, 1997; Kochera, 1999);
- facilities (Sirgy and Cornwell, 2002);
- accessibility to green areas (Bourassa *et al.*, 2005) such as parks (LeSage and Charles, 2008);
- shops (Bourassa *et al.*, 2005; LeSage and Charles, 2008);
- public transportation (Bourassa *et al.*, 2005; LeSage and Charles, 2008);
- distance to a bus stop (Saaty, 1990; Levy and Lee, 2004); and
- good schools (Gronhaug *et al.*, 1987; Kivett, 1988; Lindberg *et al.*, 1989; Heffernan, 1997; Kochera, 1999; Levy and Lee, 2004; Bourassa *et al.*, 2005; Flurry and Burns, 2005; Zahirovic and Turnbull, 2008; LeSage and Charles, 2008).

According to Morris (2005), for families with school-aged children, "a good school" is the single most important determinant as compared with empty nesters (where it is the last priority). When weighing in housing price, location is again the most influential factor (Morrow-Jones, 1988; Kiesel *et al.*, 2003; Rahadi *et al.*, 2015). Places that are located in areas with enhanced hazards, such as flooding (or proximity to a chemical factory), are arguably low-priced (MacDonald *et al.*, 1987).

An important consideration for most buyers is the developer's reputation (Kivett, 1988; Urbany *et al.*, 1989; Bady *et al.*, 1998) as the brand name implies quality (Brucks *et al.*, 2000). Brown (1979) contended that Indians make decisions after consulting numerous people for advice, so that they do not lose face if their decision does not end up being as impeccable as expected. In many cultures, people try to seek the opinion of other people within their social group (Lowe and Corkindale, 1998). Gibler and Nelson (2003) opined that reference groups and family have a pronounced role in purchasing a house. A choice of house hinges on the confluence of many factors, including other people's opinion (Koklic and Vida, 2009). Sharp and Mott (1956) reasoned that if a decision carries great importance to a family, the need to arrive at a mutual agreement accentuates. Here it would be fascinating to ponder over another interstitial force: joint decision-making. This form of decision-making is the modern norm (Stafford, 1996). Decisions that relate to high involvement products are more likely to be a result of joint decision-making (Krampf *et al.*, 1993). In big-ticket purchases such as the purchase of a house, joint decisions are taken by a husband and wife (Hempel, 1974; Munsinger *et al.*, 1975; Brown, 1979; Kaur and Singh, 2004). When the eldest child is between 20 and 30 years of age, decisions are made by all members (Kaur and Singh, 2004). Children may not hold a direct influence but still hold a substantial level of indirect influence in purchase of house given the tendency of parents to anticipate their needs. Parents of a couple can also influence a decision (Levy and Lee, 2004).

Another facet that corresponds to such decisions is safety. Safety and security are major concern areas of homebuyers (Goodnough, 1984; MacDonald *et al.*, 1987; Lindberg *et al.*, 1989; McDonell, 2006; Japanese Ministry of Land, Transport and Tourism, 2009; Li, 2009; Grum, 2013; Rahadi *et al.*, 2015). People would not prefer to stay in areas having high noise level (Lindberg *et al.*, 1989; Kiesel *et al.*, 2003). Chang (2008) concluded that negative effects such as the crime rate are deterrents for people moving to those areas.

It would be apt to now cover another key aspect: a sense of privacy at home (Sirgy and Cornwell, 2002). If someone values privacy, he/she will have more rooms (Collen and Hoekstra, 2001). Parents of children may anticipate the needs of their children in ascertaining and ensuring a reasonable number of bedrooms (Levy and Lee, 2004).

Quite strikingly, many buyers may also choose a house based on their intuition. "What usually solidifies the buy is the gut-feeling one has when standing in the house, where they

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can picture that they are home" (Algazy, 2016). Although not much literature is available on the role of intuition in home buying, it cannot be dismissed as an unimportant factor in decision-making:

> In a survey of executives that Jagdish Parikh conducted when he was a student at Harvard Business School, respondents said they used their intuitive skills as much as they used their analytical abilities, but they credited 80 per cent of their successes to instinct (Matzler *et al.*, 2007).

For decision-making, top executives rely more on intuition than they admit (Drury and Kitsopoulous, 2005). Many executives have made multi-million dollar decisions, based on their gut-instincts (Hayashi, 2001). Quantitative analysts say that we use intuition because of our cognitive limitations (Maidique, 2011).

Many researchers (Taibah, 2002; Bitter *et al.*, 2007; Benefield, 2009; Guan, 2012; Zeng, 2013; Radetskiy *et al.*, 2015; Thaker and Sakaran, 2016; Katyal and Dawra 2016) have discussed the role of amenities such as swimming pools, tennis courts, etc. in residential real estate:

> Developers have begun seeking ways to enhance their competitive position versus other developments offering substantially similar elevation and floor plan. One way to attract attention is through a mix of amenities (Benefield, 2009).

Katyal and Dawra (2016) stated that if the location of the property is poor, home buyers desire clubs, swimming pools, tennis courts and more.

There are some other remarkable parameters that home buyers may put a thrust on. Chang (2008) concluded that most people generally buy a new house which is nearby to their existing residences, due to a greater sense of familiarity with the area. Fost (1993) deduced that many Asians who buy houses in the USA purchase good feng-shui-compliant house.

Although a considerable amount of literature is available on the factors considered by home buyers, a pertinent and actionable analysis of prioritization of factors has not been done for buyers of different types of homes. Thus a conspicuous research gap exists on reckoning the priority accorded to the factors by buyers of different types of homes.

Let us now delineate the hypotheses undertaken in this study:

H1. In the case of 1 BHK purchase, "price" is most important factor.

H2. In the case of 2 BHK purchase, "location" is most important factor (proximity to office, school, hospitals, shops, etc.).

H3. In the case of 3 BHK purchase, "location" is the most important factor (proximity to office, school, hospitals, shops, etc.).

Research methodology

Primary data

The target population is recent home buyers on the outskirts of Pune. The sample mainly consisted of men because in Indian culture, women are not comfortable talking to unknown men and the researcher is a male. In exceptional cases, single women and housewives were entailed as respondents. It is worth noting that in the current study, only those respondents who are the owners were taken as a sample. Also, only those people who had bought a new flat/apartment from a developer and were living in the new house were taken under the contours of population for the case of this survey. Those living in a new house were contacted, given the degree of constraint otherwise. Any house which was locked due to owners having gone out at the time the researcher approached was also consequently

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excluded. Among other off-radar elements, self-constructed housing was excluded. Tenants were excluded.

Sampling design

This was the outcome of the findings of the exploratory studies.

Stratification: it was wedged on two levels.

(1) Level 1: zone of the city (east, west, north and south)

(2) Level 2: type of the flat (1 BHK, 2 BHK and 3 BHK)

Level 1 stratification. Four geographic zones were limned for the study, namely, east, west, north and south. The primary objective of carving Pune in zones was to get a more representative sample as compared to a simple random sampling technique.

Level 2 stratification. Level 2 stratification is based on the type of flat/apartment, namely, 1 BHK, 2 BHK and 3 BHK.

Sampling technique: purposive sampling was used. New buildings, located outside a radius of 9 km from the center of the city, but falling in the jurisdiction of Pune Municipal Corporation, were targeted, because of the following four reasons:

(1) Most of the new constructions are occurring on the outskirts of Pune, as vacant land is easily available in outskirts.

(2) The cost of the land and hence the cost of flats/apartments near the center of the city are very high and not comparable to the cost of the flats/apartments in the outskirts.

(3) Amenities such as a swimming pool are rarely provided in the buildings located near the center of the city.

(4) To enable comparison of buyers of 2 BHK and 3 BHK flats/apartments with buyers of 1 BHK flats/apartments, as 1 BHK flats/apartments are rarely constructed toward the center of the city.

First, the author requested and received a list of buildings that had received "completion certificates' recently from the Pune Municipal Corporation. An initial reconnaissance was carried out to map possible buildings for the survey. Housing societies where access was not allowed automatically got excluded. In some cases, a contact was used (such as the developer or an occupant of the building, a broker, etc.) to get an introduction to the home owners. In some cases, referrals were used, where new leads were obtained from the respondents who filled the questionnaire, but they were diligently screened to avoid bias. To avoid meeting only housewives and retired people, the researcher went to the buildings in the evenings, on mornings and evenings on Saturdays, Sundays and holidays.

Each of the north, east, west and south zones of Pune was a stratum. In each stratum, 1 BHK, 2 BHK and 3 BHK buyers were targeted. Only new buildings were considered. Thus the sampling is stratified, multistage and purposive.

Sample size: the total sample size is 284 as per details given in Table I. As the cost of the house is very high, financing is very critical. Table II gives the profile of home buyers, regarding the financing of the purchase of the apartments

Questionnaire design

The secondary data and the exploratory and qualitative studies gave insights which were incorporated into the questionnaire design.

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From the secondary data and in-depth discussions with 50 home buyers in the exploratory studies, a list of 212 variables influencing the home-buying decision was edified. The entire list being very long would have made the questionnaire a tad lengthy, resulting in respondents refusing to fill out the questionnaire. Hence four focus groups were made in four different real estate projects. The participants were the recent home buyers living in those real estate projects. The discussions were held in the club house of their real estate project. The researcher acted as a facilitator and the participants were requested to deliberate and delete unimportant variables. Then, in-depth discussions were held with ten brokers and sales managers of four developers. Then, visits were made to three sites, each of the three types of apartments, by posing as a buyer to understand the factors emphasized by the sales people to convince a prospective customer to purchase from them. Thereafter the list was refined and re-arranged in ten groups called factors, to make it manageable. The total variables considered had a combined weight of about 90 per cent. Thus, variables having a total weight of about 10 per cent had to be ignored (which is an avowed limitation in this study).

Ranking method was used and respondents were asked to rank factors from 1 to 10, where 1 is the most important factor and 10 is the least important factor.

The ten factors considered were mainly based on the study by Tsai (2001) but with slight modifications based on the exploratory studies carried out by the author. Before the respondents started giving ranks, the constituents of each factor were listed and given to them:

- product (interior layout, exterior features and view from window);
- price (cost of the house, comparative neighborhood price and expected future appreciation in the price);
- promotion (advertisement in newspapers, on-site sales and word-of-mouth publicity);
- location (neighborhood quality and proximity to: nature, office, shops, leisure, schools, hospitals and relatives and friends);

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Zone/Type	1 BHK	2 BHK	3 BHK
East	24	24	20
West	22	25	26
North	23	25	24
South	24	23	24
Total	93	97	94

Table I. Number of respondents

Financing/Type	1 BHK	2 BHK	3 BHK	TOTAL
Financing by home loan	77	75	70	222
Financing from own funds only	3	2	5	10
Partial funding from relatives	10	11	8	29
Funding from sale of previous house	3	9	11	23
Total	93	97	94	284

Table II. Profile of home buyers, regarding method of financing for purchase of apartments

- influencing persons (broker, reputation of developer, friends, spouse and extended family members);
- security (24-hour patrol, CCTV cameras, traffic noise and pollution and crime in the area);
- privacy;
- intuition;
- amenities in the project (club house, swimming pool, children's park, gymnasium, badminton court, etc.); and
- auxiliary factor (nearness to previous house, expected future growth of the area and vastu).

Note: Vastu is the Indian equivalent of the Chinese feng-shui.

Testing of the questionnaire

Pretesting and pilot survey

After designing the questionnaire, pre-testing was done with 20 respondents. Pre-testing was followed by a pilot survey wherein the respondents were personally interviewed. A total of 50 respondents were approached for the pilot survey. Some deficiencies were noticed, for example, some questions were found to be unnecessary making the questionnaire lengthy and some questions were making the respondents uncomfortable. Such deficiencies were rectified and the modified questionnaire was then used for the main survey.

Data analysis and statistical tools used

First, medians were calculated for the ten factors, for the buyers of each of the three types of flats/apartments. Medians were then arranged in the ascending order. The hypothesis testing (test of statistical significance) was done by the Mann–Whitney (Wilcoxon rank sum) test. Paired data comparisons were done for factors whose medians were same or near each other. For deducing the weightage of the different factors, analytic hierarchy process (AHP) was used. As group aggregation was required, the geometric mean of the ranks accorded by the respondents was considered for making the AHP matrix, as recommended by some researchers, such as Crawford (1987), Saaty (2008), Dong *et al.* (2010), Saaty and Vargas (2012), Dijkstra (2013), Stirn and Groselj (2013), Thaker and Sakaran (2016) and Ossadnik *et al.* (2016). The AHP matrices were analyzed with the help of MATLAB.

Table III gives the list of the ten factors, and their medians, for 1 BHK buyers ($n = 93$).

To check whether the difference in median for different factors is significant, we apply the test for equality of medians (Mann–Whitney test, also known as Wilcoxon rank sum test).

The hypothesis to be tested is:

H0. Difference in median of Factor 1 and Factor 2 is zero (median rank of Factor 1 and Factor 2 is same).

HA. Median rank of Factor 1 is less than that of Factor 2 (and hence the first factor is significantly more important than the second factor).

At 95 per cent confidence interval:

If $p < 0.05$ then reject *H0* and accept *H1*,

i.e. the first factor is significantly more important than the second factor.

If $p \geq 0.05$, then we cannot reject *H0*

i.e. there is no significant difference in the importance of the first factor and the second factor.

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Table IV gives the result for pair-wise comparisons for 1 BHK buyers ($n = 93$).

From Table IV, we can draw the following conclusions with 95 per cent confidence for 1 BHK buyers:

- "Price" is significantly more important than "product."
- "Price" is significantly more important than "location."
- "Product" is significantly more important than "location."
- "Product" is significantly more important than "security."

Factor	Median
Price	1
Product	2
Location	3
Security	5
Privacy	6
Intuition	6
Promotion	7
Influencing persons	8
Auxiliary factor	8
Amenities	8

Table III. List of the ten factors and their medians for 1 BHK buyers

S. No.	Factor 1	Factor 2	Test Statistic (W)	*p*-value	Decision
1	Price	Product	6,860.0	0.000	Reject *H0*, accept *HA*
2	Price	Location	6,388.5	0.000	Reject *H0*, accept *HA*
3	Product	Location	7,812.0	0.008	Reject *H0*, accept *HA*
4	Product	Security	5,828.0	0.000	Reject *H0*, accept *HA*
5	Location	Security	6,616.0	0.000	Reject *H0*, accept *HA*
6	Location	Privacy	6,337.0	0.000	Reject *H0*, accept *HA*
7	Location	Intuition	6,124.5	0.000	Reject *H0*, accept *HA*
8	Security	Privacy	8,010.5	0.031	Reject *H0*, accept *HA*
9	Security	Intuition	7,618.0	0.000	Reject *H0*, accept *HA*
10	Security	Promotion	7,151.0	0.000	Reject *H0*, accept *HA*
11	Privacy	Intuition	8,292.0	0.136	Cannot reject *H0*
12	Privacy	Promotion	7,659.0	0.002	Reject *H0*, accept *HA*
13	Privacy	Influencing persons	7,684.0	0.000	Reject *H0*, accept *HA*
14	Privacy	Auxiliary factor	7,363.0	0.000	Reject *H0*, accept *HA*
15	Privacy	Amenities	7,030.5	0.000	Reject *H0*, accept *HA*
16	Intuition	Promotion	8,076.5	0.046	Reject *H0*, accept *HA*
17	Intuition	Influencing persons	7,939.0	0.020	Reject *H0*, accept *HA*
18	Intuition	Auxiliary factor	7,668.0	0.003	Reject *H0*, accept *HA*
19	Intuition	Amenities	7,498.0	0.001	Reject *H0*, accept *HA*
20	Promotion	Influencing persons	8,594.5	0.392	Cannot reject *H0*
21	Promotion	Auxiliary factor	8341.5	0.168	Cannot reject *H0*
22	Promotion	Amenities	8299.5	0.141	Cannot reject *H0*
23	Influencing persons	Auxiliary factor	8399.0	0.210	Cannot reject *H0*
24	Influencing persons	Amenities	8360.0	0.181	Cannot reject *H0*
25	Auxiliary factor	Amenities	8668.0	0.471	Cannot reject *H0*

Notes: W is the rank sum of the first factor; (decision criterion: reject *H0* if *p*-value is less than 0.05)

Table IV. Pair-wise comparisons of factors using Mann–Whitney test (Wilcoxon rank sum test) for 1 BHK buyers

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- "Location" is significantly more important than "security."
- "Location" is significantly more important than "privacy."
- "Location" is significantly more important than "intuition."
- "Security" is significantly more important than "privacy."
- "Security" is significantly more important than "intuition."
- "Security" is significantly more important than "promotion."
- There is no significant difference between the importance of "privacy" and "intuition."
- "Privacy" is significantly more important than "promotion."
- "Privacy" is significantly more important than "influencing persons."
- "Privacy" is significantly more important than "auxiliary factor."
- "Privacy" is significantly more important than "amenities."
- "Intuition" is significantly more important than "promotion."
- "Intuition" is significantly more important than "influencing persons."
- "Intuition" is significantly more important than "auxiliary factor."
- "Intuition" is significantly more important than "amenities."
- There is no significant difference between the importance of "promotion" and "influencing persons."
- There is no significant difference between the importance of "promotion" and "auxiliary factor."
- There is no significant difference between the importance of "promotion" and "amenities."
- There is no significant difference between the importance of "influencing persons" and "auxiliary factor."
- There is no significant difference between the importance of "influencing persons" and "amenities."
- There is no significant difference between the importance of "auxiliary factor" and "amenities."

Table V gives the list of the ten factors and their medians for 2 BHK buyers ($n = 97$).

Table V.
List of the ten factors and their medians, for 2 BHK buyers

Factor	Median
Product	2
Price	3
Location	3
Security	5
Privacy	6
Intuition	7
Influencing persons	7
Amenities	7
Promotion	8
Auxiliary factor	8

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Table VI gives the result of pair-wise comparisons for 2 BHK buyers ($n = 97$).

From Table VI, we can draw the following conclusions with 95 per cent confidence for 2 BHK buyers:

- There is no significant difference between the importance of "product" and "price."
- "Product" is significantly more important than "location."
- There is no significant difference in the importance of "price" and "location."
- "Price" is significantly more important than "security."
- "Location" is significantly more important than "security."
- There is no significant difference between the importance of "security" and "privacy."
- "Security" is significantly more important than "intuition."
- "Security" is significantly more important than "influencing persons."
- "Security" is significantly more important than "amenities."
- "Privacy" is significantly more important than "intuition."
- "Privacy" is significantly more important than "influencing persons."
- "Privacy" is significantly more important than "amenities."
- "Intuition" is significantly more important than "influencing persons."
- "Intuition" is significantly more important than "amenities."
- "Intuition" is significantly more important than "promotion."
- "Intuition" is significantly more important than "auxiliary factor."

S. No.	Factor 1	Factor 2	Test Statistic (W)	*p*-value	Decision
1	Product	Price	8,887.0	0.072	Cannot reject *H0*
2	Product	Location	8,722.5	0.030	Reject *H0*, accept *HA*
3	Price	Location	9,232.0	0.283	Cannot reject *H0*
4	Price	Security	6,786.5	0.000	Reject *H0*, accept *HA*
5	Location	Security	7,148.5	0.000	Reject *H0*, accept *HA*
6	Security	Privacy	9,319.0	0.362	Cannot reject *H0*
7	Security	Intuition	8,618.5	0.016	Reject *H0*, accept *HA*
8	Security	Influencing persons	8,037.5	0.000	Reject *H0*, accept *HA*
9	Security	Amenities	7,866.0	0.000	Reject *H0*, accept *HA*
10	Privacy	Intuition	8,758.5	0.037	Reject *H0*, accept *HA*
11	Privacy	Influencing persons	8,155.0	0.000	Reject *H0*, accept *HA*
12	Privacy	Amenities	8,004.5	0.000	Reject *H0*, accept *HA*
13	Intuition	Influencing persons	8,720.0	0.030	Reject *H0*, accept *HA*
14	Intuition	Amenities	8,658.0	0.021	Reject *H0*, accept *HA*
15	Intuition	Promotion	8,241.5	0.001	Reject *H0*, accept H_A
16	Intuition	Auxiliary factor	7,987.5	0.000	Reject *H0*, accept *HA*
17	Influencing persons	Amenities	9,449.0	0.492	Cannot reject *H0*
18	Influencing persons	Promotion	8,950.0	0.097	Cannot reject *H0*
19	Influencing persons	Auxiliary factor	8,648.0	0.019	Reject *H0*, accept *HA*
20	Promotion	Auxiliary factor	9,109.5	0.187	Cannot reject *H0*

Note: W is rank sum of the first factor (decision criterion: reject *H0* if *p*-value is less than 0.05)

Table VI. Pair-wise comparisons of factors using Mann–Whitney test (Wilcoxon rank sum test) for 2 BHK buyers

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- There is no significant difference in the importance of "influencing persons" and "amenities."
- There is no significant difference between the importance of "influencing persons" and "promotion."
- "Influencing persons" is significantly more important than "auxiliary factor."
- There is no significant difference between the importance of "promotion" and "auxiliary factor."

Table VII gives the list of the ten factors and their medians for 3 BHK buyers ($n = 94$).

Table VIII gives the result of pair-wise comparisons for 3 BHK buyers ($n = 94$).

From Table VIII, we can draw the following conclusions with 95 per cent confidence for 3 BHK buyers:

- There is no significant difference between the importance of "product" and "location."
- "Product" is significantly more important than "security."
- "Product" is significantly more important than "privacy."
- "Product" is significantly more important than "price."
- "Product" is significantly more important than "amenities."
- "Location" is significantly more important than "security."
- "Location" is significantly more important than "privacy."
- "Location" is significantly more important than "price."
- "Location" is significantly more important than "amenities."
- There is no significant difference in the importance of "security" and "privacy."
- There is no significant difference in the importance of "security" and "price."
- "Security" is significantly more important than "amenities."
- "Security" is significantly more important than "intuition."
- There is no significant difference between the importance of "privacy" and "price."
- There is no significant difference in the importance of "privacy" and "amenities."
- "Privacy" is significantly more important than "intuition."
- There is no significant difference between the importance of "price" and "amenities."

Table VII.
List of the ten factors and their medians, for 3 BHK buyers

Factor	Median
Product	3
Location	3
Security	4
Privacy	5
Price	5
Amenities	5
Intuition	6
Auxiliary factor	7.5
Influencing persons	8
Promotion	8

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S. No.	Factor 1	Factor 2	Test Statistic (W)	*p*-value	Decision
1	Product	Location	8,755.0	0.366	Cannot reject *H0*
2	Product	Security	7,758.5	0.001	Reject *H0*, accept *HA*
3	Product	Privacy	7,539.0	0.000	Reject *H0*, accept *HA*
4	Product	Price	7,650.0	0.000	Reject *H0*, accept *HA*
5	Product	Amenities	7,285.5	0.000	Reject *H0*, accept *HA*
6	Location	Security	7,797.5	0.002	Reject *H0*, accept *HA*
7	Location	Privacy	7,532.5	0.000	Reject *H0*, accept *HA*
8	Location	Price	7,695.5	0.001	Reject *H0*, accept *HA*
9	Location	Amenities	7,276.0	0.000	Reject *H0*, accept *HA*
10	Security	Privacy	8,533.5	0.175	Cannot reject *H0*
11	Security	Price	8,454.0	0.125	Cannot reject *H0*
12	Security	Amenities	8,086.0	0.016	Reject *H0*, accept *HA*
13	Security	Intuition	7,348.5	0.000	Reject *H0*, accept *HA*
14	Privacy	Price	8,807.0	0.420	Cannot reject *H0*
15	Privacy	Amenities	8,429.0	0.112	Cannot reject *H0*
16	Privacy	Intuition	7,733.5	0.001	Reject *H0*, accept *HA*
17	Price	Amenities	8,581.0	0.209	Cannot reject *H0*
18	Price	Intuition	8,015.0	0.010	Reject *H0*, accept *HA*
19	Amenities	Intuition	8,271.5	0.051	Cannot reject *H0*
20	Intuition	Auxiliary factor	7,595.5	0.000	Reject *H0*, accept *HA*
21	Intuition	Influencing persons	7,793.5	0.002	Reject *H0*, accept *HA*
22	Intuition	Promotion	7,211.5	0.000	Reject *H0*, accept *HA*
23	Auxiliary factor	Influencing persons	9,051.5	0.675	Cannot reject *H0*
24	Auxiliary factor	Promotion	8,491.0	0.147	Cannot reject *H0*
25	Influencing persons	Promotion	8,367.5	0.084	Cannot reject *H0*

Note: W is rank sum of the first factor (decision criterion: reject *H0* if *p*-value is less than 0.05)

Table VIII. Pair-wise comparisons of factors using Mann–Whitney test (Wilcoxon rank sum test) for 3 BHK buyers

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- "Price" is significantly more important than "intuition."
- There is no significant difference between the importance of "amenities" and "intuition."
- "Intuition" is significantly more important than "auxiliary factor."
- "Intuition" is significantly more important than "influencing persons."
- "Intuition" is significantly more important than "promotion."
- There is no significant difference between the importance of "auxiliary factor" and "influencing persons."
- There is no significant difference between the importance of "auxiliary factor" and "promotion."
- There is no significant difference between the importance of "influencing persons" and "promotion."

For finding the weightage of each factor in decision-making, AHP is to be used. As there are a large number of respondents, group aggregation is required to be adopted. Saaty and some other authors have recommended using the geometric mean.

Table IX gives the pair-wise comparison of the factors using the geometric mean for 1 BHK buyers (after arranging in ascending order) (Table X).

Findings: When buying an apartment, 1 BHK buyers in Pune give 24.92 per cent weightage to price, 15.75 per cent weightage to product, 13.15 per cent weightage to location,

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Table IX.
Pair-wise comparison of the factors using the geometric mean for 1 BHK buyers (after arranging in ascending order)

	Price	Product	Location	Security	Privacy	Intuition	Promotion	Auxiliary factor	Influencing persons	Amenities
Price	1.0000	1.5827	1.8957	3.1126	3.3340	3.5837	3.9666	4.1453	4.1942	4.5255
Product	0.6319	1.0000	1.1978	1.9667	2.1066	2.2644	2.5063	2.6192	2.6501	2.8594
Location	0.5275	0.8349	1.0000	1.6420	1.7587	1.8905	2.0924	2.1867	2.2125	2.3873
Security	0.3213	0.5085	0.6090	1.0000	1.0711	1.1513	1.2744	1.3318	1.3475	1.4539
Privacy	0.2999	0.4747	0.5686	0.9336	1.0000	1.0749	1.1897	1.2433	1.2580	1.3574
Intuition	0.2790	0.4416	0.5290	0.8686	0.9303	1.0000	1.1069	1.1567	1.1704	1.2628
Promotion	0.2521	0.3990	0.4779	0.7847	0.8405	0.9035	1.0000	1.0451	1.0574	1.1409
Auxiliary factor	0.2412	0.3818	0.4573	0.7509	0.8043	0.8645	0.9569	1.0000	1.0118	1.0917
Influencing persons	0.2384	0.3774	0.4520	0.7421	0.7949	0.8545	0.9457	0.9884	1.0000	1.0790
Amenities	0.2210	0.3497	0.4189	0.6878	0.7367	0.7919	0.8765	0.9160	0.9268	1.0000

Notes: Consistency index < 0.10; consistency ratio < 0.10

8.01 per cent weightage to security, 7.48 per cent weightage to privacy, 6.95 per cent weightage to intuition, 6.28 per cent weightage to promotion, 6.01 per cent weightage to auxiliary factor, 5.94 per cent weightage to influencing persons and 5.51 per cent weightage to amenities.

Table XI gives the pair-wise comparison of the factors using the geometric mean for 2 BHK buyers (after arranging in ascending order) (Table XII).

Findings: When buying an apartment, 2 BHK buyers in Pune give 18.34 per cent weightage to product, 15.84 per cent weightage to price, 15.07 per cent weightage to location, 8.56 per cent weightage to privacy, 8.44 per cent weightage to security, 7.54 per cent weightage to intuition, 6.85 per cent weightage to influencing persons, 6.58 per cent weightage to amenities, 6.49 per cent weightage to promotion and 6.29 per cent weightage to amenities

Table XIII gives the pair-wise comparison of the factors using the geometric mean for 3 BHK buyers (after arranging in ascending order) (Table XIV).

Findings: When buying an apartment, 3 BHK buyers in Pune give 16.11 per cent weightage to product, 15.26 per cent weightage to location, 10.84 per cent weightage to security, 10.70 per cent weightage to price, 10.07 per cent weightage to privacy, 9.38 per cent weightage to amenities, 7.97 per cent weightage to intuition, 6.98 per cent weightage to influencing persons, 6.36 per cent weightage to auxiliary factor and 6.33 per cent weightage to promotion

Table XV gives the weightage in percentage and nominal rank given to various factors by buyers of different types of apartments.

Conclusions

The following conclusions are summarized from this study:

For 1 BHK buyers, "price" is significantly the most important factor followed by "product," followed by "location," which is significantly more important than the remaining factors. Thus, the hypothesis that "price" is the most important factor for 1 BHK buyers fails to be rejected. The buyers give 24.92 per cent weightage to price; a higher weightage is not given because 1 BHK buyers are not poor but lower-middle class. The poorer can be expected to give higher weightage to price. The weightage given to security is low relative to 2 and 3 BHK buyers.

For 2 BHK buyers, "product" is significantly more important than "location." Thus the hypothesis that "location" is the most important factor for 2 BHK buyers is rejected. However, it must be noted that "product," "price" and "location" are the three most

	Principal Eigen Vector	Normalized principal Eigen vector
Price	0.6779	0.2492
Product	0.4283	0.1575
Location	0.3576	0.1315
Security	0.2178	0.0801
Privacy	0.2033	0.0748
Intuition	0.1892	0.0695
Promotion	0.1709	0.0628
Auxiliary factor	0.1635	0.0601
Influencing persons	0.1616	0.0594
Amenities	0.1498	0.0551
Total	2.7199	1

Table X. Calculation of normalized principal Eigen vector for matrix shown in Table IX for 1 BHK, with the help of MATLAB

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Table XI.
AHP Matrix using geometric mean for 2 BHK buyers (after arranging in ascending order) and comparison of each factor with other factors

	Product	Price	Location	Privacy	Security	Intuition	Influencing persons	Amenities	Promotion	Auxiliary factor
Product	1.0000	1.1579	1.2176	2.1424	2.1744	2.4325	2.6781	2.7880	2.8278	2.9146
Price	0.8637	1.0000	1.0516	1.8502	1.8779	2.1008	2.3130	2.4078	2.4422	2.5172
Location	0.8213	0.9510	1.0000	1.7595	1.7858	1.9978	2.1995	2.2897	2.3224	2.3937
Privacy	0.4668	0.5405	0.5684	1.0000	1.0150	1.1354	1.2501	1.3014	1.3200	1.3605
Security	0.4599	0.5325	0.5600	0.9853	1.0000	1.1187	1.2317	1.2822	1.3005	1.3404
Intuition	0.4111	0.4760	0.5006	0.8807	0.8939	1.0000	1.1010	1.1461	1.1625	1.1982
Influencing persons	0.3734	0.4324	0.4547	0.7999	0.8119	0.9083	1.0000	1.0410	1.0559	1.0883
Amenities	0.3587	0.4153	0.4367	0.7684	0.7799	0.8725	0.9606	1.0000	1.0143	1.0454
Promotion	0.3536	0.4095	0.4306	0.7576	0.7690	0.8602	0.9471	0.9859	1.0000	1.0307
Auxiliary factor	0.3431	0.3973	0.4178	0.7351	0.7461	0.8346	0.9189	0.9566	0.9702	1.0000

Notes: Consistency index < 0.10; consistency ratio < 0.10

important factors. 2 BHK buyers give less weightage to price *vis-à-vis* 1 BHK buyers, as 2 BHK buyers are financially well-off compared to 1 BHK buyers. The weightage given to security is slightly more than that given by 1 BHK buyers.

For 3 BHK buyers, there is no significant difference between the importance of "product" and "location," but these two factors are significantly more important than the remaining factors (including "amenities"). Thus, the hypothesis that "location" is the most important factor for 3 BHK buyers is rejected. 3 BHK buyers give lesser weightage to price than 1 and 2 BHK buyers give because despite the fact that 3 BHK buyers are middle class, yet they belong to upper-middle class and are financially well-off *vis-à-vis* 1 and 2 BHK buyers. The weightage given to security is higher *vis-à-vis* 1 and 2 BHK buyers.

Implications and recommendations

Following recommendations can be distilled for real estate companies (developers) based on some key gleanings gained in this study. These interpretations can be leveraged strongly given the rigor and robust methodology deployed, as well as some assumptions debunked during the course of this study:

When offering 1 BHK flats, developers should try to make them as low-priced as possible, but not at the cost of utility. As the cost of the land is a major component of the price of the apartment, the developer can reduce the price of apartment by purchasing a land which may be in a poor location and hence of low cost. The other ways in which the developer can reduce the price is by avoiding unnecessary atriums, etc., which might increase the super built-up area for buyers. They should instead create a no-frills product by reducing amenities and unnecessarily high specifications, etc. and keeping only staple elements. For example, instead of using black granite for kitchen platforms, they can use polished kadappa costing one-tenth, which looks similar to black granite, or instead of providing lustre-finish paint on the walls and ceiling, they can provide distemper.

For 2 and 3 BHK flats, the developers should curtail the amount of money planned to be spent for amenities such as a swimming pool, which can be termed as a white elephant. Consequently two options can be considered by the developers: either reduce the price of the apartment or keep the price same by diverting the money to improve the quality of the product (with costlier specifications) and buying land in better locations to increase the attractiveness quotient.

	Principal Eigen Vector	Normalized Principal Eigen Vector
Product	0.5323	0.1834
Price	0.4597	0.1584
Location	0.4371	0.1507
Privacy	0.2485	0.0856
Security	0.2448	0.0844
Intuition	0.2188	0.0754
Influencing persons	0.1987	0.0685
Amenities	0.1909	0.0658
Promotion	0.1882	0.0649
Auxiliary factor	0.1826	0.0629
Total	2.9016	1

Table XII. Calculation of normalized principal Eigen vector for matrix shown in Table XI for 2 BHK, with the help of MATLAB

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Table XIII.
AHP matrix using geometric mean for 3 BHK buyers (after arranging in ascending order) and comparison of each factor with other factors

	Product	Location	Security	Price	Privacy	Amenities	Intuition	Influencing persons	Auxiliary factor	Promotion
Product	1.0000	1.0553	1.4855	1.5058	1.5992	1.7162	2.0209	2.3090	2.5316	2.5433
Location	0.9476	1.0000	1.4077	1.4270	1.5155	1.6263	1.9151	2.1881	2.3990	2.4101
Security	0.6732	0.7104	1.0000	1.0137	1.0766	1.1553	1.3605	1.5544	1.7043	1.7122
Price	0.6641	0.7008	0.9865	1.0000	1.0620	1.1397	1.3421	1.5334	1.6812	1.6890
Privacy	0.6253	0.6599	0.9289	0.9416	1.0000	1.0731	1.2637	1.4439	1.5830	1.5903
Amenities	0.5827	0.6149	0.8656	0.8774	0.9319	1.0000	1.1776	1.3454	1.4751	1.4820
Intuition	0.4948	0.5222	0.7350	0.7451	0.7913	0.8492	1.0000	1.1426	1.2527	1.2585
Influencing persons	0.4331	0.4570	0.6433	0.6521	0.6926	0.7433	0.8752	1.0000	1.0964	1.1015
Auxiliary factor	0.3950	0.4168	0.5868	0.5948	0.6317	0.6779	0.7983	0.9121	1.0000	1.0046
Promotion	0.3932	0.4149	0.5841	0.5921	0.6288	0.6748	0.7946	0.9079	0.9954	1.0000

Notes: Consistency index < 0.10; consistency ratio < 0.10

Limitations of the study

This study acknowledges that it is restricted to recent home buyers of Pune, who have bought a flat/apartment from a developer. Independent houses (bungalows) and self-constructed houses have not been considered. Radical and upcoming categories of housing such as special-genre housing (for working females/senior citizens), minimal housing, portable housing, green-housing, alternative energy or solar panels as adjunct features, office habitats (as being experimented in the Silicon Valley), IoT (Internet of Things)-enabled housing etc. were beyond the scope of this research, but they certainly merit further studies.

Explanatory note: Although flats/apartments have been used interchangeably in this paper, there is a legal difference between them, in India: in case of flats, the ownership of the land and the building belong to the "cooperative housing society" and a flat-owner is a "shareholder." In case of apartments, each apartment owner is the absolute owner of his apartment. However, the difference is not reasoned to be pertinent for this study. Nowadays, some developers in India christen apartments as "condominiums."

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	Principal Eigen Vector	Normalized Principal Eigen Vector
Product	0.4842	0.1611
Location	0.4588	0.1526
Security	0.3259	0.1084
Price	0.3215	0.1070
Privacy	0.3028	0.1007
Amenities	0.2821	0.0938
Intuition	0.2396	0.0797
Influencing persons	0.2097	0.0698
Auxiliary factor	0.1913	0.0636
Promotion	0.1904	0.0633
	3.0063	1

Table XIV. Calculation of normalized principal Eigen vector for matrix shown in Table XIII for 3 BHK, with the help of MATLAB

	1 BHK		2 BHK		3 BHK	
Factor	Weightage in (%)	Nominal rank	Weightage in (%)	Nominal rank	Weightage in (%)	Nominal rank
Product	15.75	2	18.34	1	16.11	1
Price	24.92	1	15.84	2	10.70	4
Promotion	6.28	7	6.49	9	6.33	10
Location	13.15	3	15.07	3	15.26	2
Influencing persons	5.94	9	6.85	7	6.98	8
Security	8.01	4	8.44	5	10.84	3
Privacy	7.48	5	8.56	4	10.07	5
Intuition	6.95	6	7.54	6	7.97	7
Amenities	5.51	10	6.58	8	9.38	6
Auxiliary factor	6.01	8	6.29	10	6.36	9

Table XV. Consolidated table of weightage in percentage and nominal rank given to various factors by buyers of different types of apartments

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