

## Perceived Risk of Adopting Wood Based Thermal Insulation for Residential House: A Study of Kolkata

**Soumik Gangopadhyay<sup>1</sup>; Sayan Karmakar<sup>2</sup>; Samriddhi Das<sup>3</sup>**

<sup>1</sup>Professor, Institute of Engineering & Management, Saltlake, Kolkata, India.

<sup>2</sup>Assistant Professor, Institute of Engineering & Management, Saltlake, Kolkata, India.

<sup>3</sup>Final year student of Business Administration, Institute of Engineering & Management, Saltlake, Kolkata, India.

### Abstract

Global warming has forced the society to adopt several potential changes in their infrastructure. This has led to a demand for customized solutions that are tailored to the actual preferences of consumers. Wood-based hollow bricks for thermal insulation of roofs and walls are one such example. This innovation is efficient in lowering energy consumption and capital costs, and it can also enhance indoor temperature and air quality. However, the adoption of this innovation is yet to show an encouraging trend among engineers and contractors. Therefore, a thorough analysis of these stakeholders is necessary. This study aims to reveal the perceived risk of adopting hollow bricks for residential building construction among engineers, architects, and building contractors. The broader objectives of the study are to identify the perceived value of installing wood based hollow bricks for thermal insulation among prospective customers and to analyze the essential factors affecting the decision of recommending the purchase of such products among architects, engineers, and contractors.

### Introduction

The study used primary data from a survey of 312 engineers, architects and contractors to investigate the factors affecting the adoption of hollow bricks for residential construction in Kolkata. The result observed that functional value, conditional value, social value, and epistemic value impact the decision to install hollow bricks in their residential house during construction. The most important factor is functional value, followed by conditional value. Epistemic value has a negative effect on purchase intention, while social value has a limited effect. The study concludes that marketing of wooden hollow bricks is beyond value for money or value of money.

In this decade, civilization has witnessed certain engineering marvels. Many among them were executed due to technological advancement. Further, global warming has forced the society to adopt several potential changes in their infrastructure. Wood based Hollow bricks for thermal insulation of roof and wall introduced by Indian corporates are one such example. Even, on many occasion it is a customised demand of the consumers. The innovation is efficient to lower energy consumption for cooling and heating costs resulting in energy savings and have efficiency in capital cost savings. Moreover, this can enhances indoor temperature & air quality thereby resulting in better health & productivity for the occupants and or enhance building marketability to the owners and tenants.

Although, this innovation is highly beneficial for people but, its adoption is not showing an encouraging trend among engineers and contractors. Therefore, thorough analyses of these stakeholders are necessary. Further, it is also essential to delve down into the perceived risk of adoption of the customers on this. A dissection of

Published - Dec 09, 2023

Correspondance to: **Samriddhi Das**

Final year student of Business Administration, Institute of Engineering & Management, Saltlake, Kolkata, India.

Email: [samriddhidas08@gmail.com](mailto:samriddhidas08@gmail.com)

**Copyright:** © Das S (2023). This Article is distributed under the terms of Creative Commons Attribution 4.0 International License

**Cite:** Gangopadhyay S, Karmakar S, Das S. Perceived risk of adopting wood based thermal insulation for residential house: A study of Kolkata. Business Dev. 2023; 2(1): 1011.

customer psyche may open up the perceived value of adopting such innovation. Due to this reason every industry needs to provide customised solutions tailoring their products based on actual preferences rather than on generalised assumptions. For this reason there is regular study being conducted on customer satisfaction and their expectations. This in turn helps an organisation to seek a favourable image among the public. Current study is an attempt to reveal the perceived risk of adopting Hollow bricks for residential building construction among the engineers, architect and building contractors. The broader objectives of the study are to identify the perceived value of installing new bricks among the prospective customers and to analyse the essential factor affecting the decision of recommendations of purchase of such products among architects, engineers and contractors.

**Survey of literature**

The customers or prospective users of any product are the best promoters for an organisation. This in turn helps an organisation to seek a favourable image among the public. Hence, brand name (Aaker, 1996), price [1], promotion (Cherniawski & Maloney, 1999), and quality stimulates brand loyalty. Even, expectations also serve as a major determinant of a customer’s service quality evaluations and satisfaction (O’Connor et al, 2000). So, “Voice of the customer” should be considered during design process using advanced techniques [2]. However, fundamental basis of consumer’s values of a brand is a unique combination of perceived quality and perceived price (Mowen and Minor, 2006) that influence prepurchase behavior of a customer [3]. Lower income groups of Indian consumers are becoming the target of the corporate managers as they purport significantly greater materialistic value than the higher income group in the post globalization era [4]. Different researchers defined and redefined several buying situations depending on the problem faced, information influenced to the buyer and consideration of new alternatives by the decision maker of a buying process [5]. Marketers must understand the factors that provoke a feeling of risk in consumers & provide information & support to reduce perceived risk. Risks experienced by the customer collects information from personal source, market controlled sources, public sources, personal experiences. Study of [6] revealed that evaluations, choice and behaviours are the fundamental theme of customer’s perception regarding risk which is defined in the form of uncertainty and consequences. Higher the level of uncertainty is, more the risk is perceived and creates greater negative consequences [7]. The amount of perceived risk varies with the amount of money at stake, the amount of attribute uncertainty & the amount of consumer self-confidence. Consumer develops routines for reducing the uncertainty, & negative consequences of risk, such as decision avoidance, information gathering from friends, & preference for national brand names & warranties. As described by [8] that, consumer’s decision to modify, postpone, or avoid a purchase decision is heavily influenced by perceived risk. Consumer may perceive many type of risk in buying & consuming a product i.e. functional risk, physical risk, social risk, psychological risk and time risk (Gemuden, 1985).

Construction of residential building is a function of several factors i.e location, economic value [9]. Present need of energy efficient material has been considered by prospective consumers due to cost affectivity and to maximise the cooling effect on building roof [10]. Recent research has revealed that Perceived value and perceived risk potentially impacted by perceived ben-

efit of environmental concern for selecting green friendly construction (Zhao et al., 2021). Preference of environment friendly construction has also been observed to minimize rebound effect while considered long term cost [11].

Therefore, an interesting avenue of research confines in exploring the influence of Functional value (complexity, difficulty in installation, long term infrastructural compatibility) Social value (peer recommendation, trend, and status), Epistemic value (emerging trend, creative design) and Conditional value (long term, short term affordability) on prospective customer’s adoption intension of hollow bricks.

**Methodology of the study**

Present study is based on both secondary as well as primary data. Secondary Sources were from books, magazines, brochures and web sites. Primary data was collected by a well-structured questionnaire prepared by the authors. The engineers, architect and contractors available and responded at several construction site constitute the sample. The entire study was carried out in two stages.

**Stage I:** A survey was undertaken among 312 Architects, Engineers, and Contractors with structured questionnaire at Rajarhat, Kolkata. The area has been chosen due to ongoing massive construction at the location.

**Stage II:** Extensive analysis was done in this stage based on the primary data collected from the field survey and suggestions were made to the management for implementing strategies for improvement.

Tabulations of data collected through questionnaire, graphs and charts for representation purpose using the statistical software. Simple percentage calculations, logical regression analysis (logit) have been applied.

The relationship between the dependent & independent variable factors can be assumed as,

$$Y = a + b X(1) + c X(2) + d X(3) + e X(4) \text{ where,}$$

$$X(1) = \text{Functional Value}$$

$$X(2) = \text{Social value}$$

$$X(3) = \text{Epistemic value}$$

$$X(4) = \text{Conditional Value}$$

$$Y (PI) = \text{Customer’s adoption intension.}$$

a is the constant and b, c, d, e are said to be the coefficients.

Y is the dependent variable, whereas X(1), X(2), X(3), X(4) are independent variables

As the dependent variable is a binary variable we cannot apply OLS method to estimate the model. A logit model is accordingly used to estimate the above model. Thus,

The dependent variable is binary taking a value of 1 for the satisfied patient and 0, otherwise.

$$P = \frac{1}{1 + e^{-Y}}$$

**Data interpretation and analysis**

93% of the respondents were male and only 7% were female. 56% were either engineers or architects whereas, 44% respondents were contractors. 73% respondents were graduate

and 27% were diploma holders. 33% belonged to be the age group of 50yrs. or more. 67% respondents were belonged to be the age group of 35-50 yrs.

Demographical and psychographic analysis of the study has explored the following results, P value emanated from the study is 0.000 and having R-square is 73%, justifies absolute reflect opinion of the studied population and thus successfully explain relationship among depended and in depended variable. The logit analysis has been done at 95% confidence level. P value is showing less than 0.05. Moreover the R-square is also 74.63%. All these are indicating rational justification of the result.

**Table 1:** Opinion of the respondents.

Opinion of the Respondents	Yes	No
Hollow bricks will be a good insulator	70 %	30 %
Hollow bricks reduce the temperature during summer	55 %	45 %
Hollow bricks reduce the maintenance cost	54 %	46 %
Hollow bricks offers long term cost reduction	80 %	20 %
Hollow bricks is an identification of rich class	40 %	60 %
Use of Hollow bricks helps to improve the status in the society	71 %	29 %
This product is an advanced product	96 %	04 %
If the product fails, neighbour may criticize me!	54 %	46 %
Hollow bricks protect the expansion of various layers of roof	54 %	46 %
Hollow bricks protect the wall from the water (damp proof).	63 %	37 %
Hollow bricks is a good return on investment	34 %	63 %
Hollow bricks will be an alternatively of A.C.	100 %	0 %

**Table 2:** Logit table.

Q1	Coefficient	Standard error	t	P> t
<b>Constant</b>	-6.267973	1.031026	-6.08	0.000
<b>Functional</b>	0.3738262	.0240732	15.53	0.000
<b>Social</b>	0.2786722	.0677576	4.11	0.000
<b>Epistemic</b>	-0.0250673	.0182609	-1.37	0.037
<b>Conditional</b>	0.0030499	.0166797	0.18	0.042

$$P.I = - 6.2679 + 0.3738*Functional Value + 0.2787*Social Value - 0.0250*Epistemic Value + 0.0031*Conditional Value.$$

The analysis of logit regression (logit) is indicating that functional value, conditional value, social value and epistemic value directly affect the recommendation of purchase of hollow bricks by the engineers, architect, site in charge to the prospective customer. The responded population is indicating the necessity of functional value of hollow bricks as the prime factor controlling the purchase decision. Due to conventional practice customers are denoting this purchase as a risky proposition. Second important factor is conditional value which is having a positive effect on the purchase of hollow bricks. The product will be an important alternative of air condition or any such if it functions successful. Hence, it can also be a successful product if the cost of application justifies the legitimate demand among the prospective customers. Even, epistemic value is also a crucial factor of success as it inversely affects the purchase interest of hollow bricks. Due to traditional practice Indians are careful about their one time investment, peer recognition. Hence, social value is also having a limited effect on the purchase intension of hollow bricks. Here the epistemic value regarding the product if increases may create functional suspicion among the

customer as hollow bricks works differently, so it is showing a negative relationship with purchase intension of the product.

### Conclusion

Study denotes that, purchase decision of hollow bricks is influenced by functional value, conditional value, epistemic value and social value. The most important factor of installing wood based hollow bricks for thermal insulation is functional value. The studied respondents seem to be unsure regarding infrastructural compatibility of the product. It also indicates a fear psychosis of the traditional minds. So, the functional value of the product can be presented for value addition in the form of highlighting the unique selling proposition of the product by using different marketing mix. Eminent technicians, architects employed in construction business must be approached and their views should be presented before the prospective customers as references. Wood based hollow bricks installed in important buildings and its durability can also be presented as success stories to convince new prospective customers. All the mentioned techniques can be used to improve the epistemic value of the product.

### References

1. Cadogan JW, Foster BD. Relationship selling and customer loyalty: an empirical investigation, *Marketing Intelligence and Planning*, 2000; 18(4): 185-199.
2. Pakdil F, Aydin S. Expectations and perceptions in airline services: An analysis using weighted servqual scores, *Journal of Air Transport Management*. 2007; 13(4): 229-237.
3. Wall M, Liefeld J, Heslop LA. Impact of country-of-origin cues on consumer judgments in multi-cue situations: a covariance analysis, *Journal of the Academy of Marketing Science*. 1991; 19(2): 105-13.
4. Gupta Nitin. Globalization does lead to change in consumer behaviour: An empirical evidence of impact of globalization on changing materialistic values in Indian consumers and its after-effects, *Asia Pacific Journal of Marketing and Logistics*. 2011; 23(3): 251-269.
5. Sudar SCA, Reddy RV. A Review on Factors Affecting Buying Situations. *International Journal of Research Excellence in Management*. 2012; 1(1): 1-5.
6. Dowling G, Staelin R. A model of perceived risk and risk-handling activity. *Journal of Consumer Research*. 1994; 21(1): 19-34.
7. Oglethorpe JE, Monroe KB. Determinants of perceived health and safety risks of selected hazardous products and activities. *Journal of consumer affairs*. 1994; 28(2): 326-347.
8. Kotler Philip, Keller Kevin Lane. "Marketing Management", Prentice Hall of India Pvt. Ltd. 2006; 240-646.
9. Siahaan E, Khaira AF, Sibarani MLL. Evaluating customer perceived value of housing based on location factor and economic value. *Problems and perspectives in management*. 2019; 17(3): 196-206.
10. Napier JL, Azhar S, Farooqui RU. Perceived Value of Energy Efficiency Investments in Residential Construction. In 53rd ASC Annual International Conference Proceedings. 2017.
11. Scheepens AE, Vogtländer JG. Insulation or Smart Temperature Control for Domestic Heating: A Combined Analysis of the Costs, the Eco-Costs, the Customer Perceived Value, and the Rebound Effect of Energy Saving. *Sustainability*. 2018; 10(9): 3231. <https://doi.org/10.3390/su10093231>.