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Assessment of obstacles in implementing construction technologies: A decision-making framework

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Abstract

Infrastructure development plays major role in sustainable development, construction the innovations construction technology at different level plays major role in it. innovations in products, processes, and services are the most crucial activities under the umbrella of construction technology. However, there are certain obstacles which limits the full usage of technology. The current work deals with identification of blockade which limits the usage of technology to its fullest. A thorough literature work has been done to assess aforementioned objective. 20 different parameters have been identified and classified in five different categories. The Analytical Hierarchy Process (AHP) has been used to further assign ranking to these four major categories viz. Market and Policy Restraints Barriers to finance and the economy, Educational, promotional and informational barriers, Barriers in management and organizations. The pairwise comparison were conducted based on the recommendations of specialists. The results indicates that the most significant aspect of hurdles to construction technology has been identified as ‘Barriers in Management and Organizations.

1. Introduction

The government of India voluntary commitment to lower the levels of domestic emission along with the 12th five-year plan which focuses on inclusive development, low-carbon development highlights the value of the building sector as a mitigating strategy. India has created a bold Intended Nationally Determined Contribution, which aims to reduce the nation's GDP-based emissions intensity by 32–37% by 2030. Government programmers, like India's 100 "Smart Cities," strive to create climate-resilient urban areas based on sustainable urban development principles, including garbage recycling and reuse, the utilization of renewable energy sources, and environmental protection [1]. The construction sector as a whole, which includes the building sector, is growing in India at a 10% annual rate. Through the application of energy-saving technology, the substitution of raw materials, energy efficiency and waste management, low emissions, and the reduction of the use of hazardous materials, green buildings offer potential options for the least expensive adaptation to climate change and opportunities to stop the accumulation of GHGs (Green House Gases). In the continuous efforts to reduce and to combat climate change, the use of green structures in both residential and commercial sectors can be very important [2].

In India, LEED (Leadership in Energy and Environmental Design) under Indian Green Building Council and GRIHA (Green Rating for integrated Habitat Assessment) are currently the two main green building evaluation methods that promote the use of sustainable, energy-efficient constructions. Although there is a lot of general literature on energy efficiency hurdles, there are few research specifically on green construction barriers in India. Studies on environmentally

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friendly structures that offered helpful information. However, given the paucity of research in the Indian context, hurdles in favour of implementing green structures must be thoroughly determined and investigated [3]. There are some examples found in literature where various researcher explored difficulties associated with implementation of infrastructure projects.

Othman et. al. [1] examined the difficulties using value management (VM) in Egyptian building projects. The findings represent obstacles to the use of VMs the country, however, the policy change will greatly boost the use of virtual machines both within the country and in other developing countries where similar projects are being carried out. Moreover, it was found that the idea of VM technology within a firm has a significant impact on expertise and managerial skills. Shah et. al. [2] studied availability of clean and renewable energy sources in Pakistan. The outcomes showed that the category of political and legal obstacles ranked greatest among the key categories, while the total barrier rankings suggested that the sub-barrier of political instability is quite significant. Joyram et. al. [4] has evaluated upscaling the concrete masonry modules used in Mauritius' construction sector. However, due to a lack of product awareness, Mauritius is currently falling behind in the use of eco-block. The assessment offers a critical insight on using eco-block to construct sustainable structures material in response to these conundrums.

Agyekum et. al. [5] has examined the obstacles to Ghana's acceptance of green building certification. The study's findings suggest that there are number of obstacles to building green certification. In light of more related investigations and cutting-edge expertise on the subject, four of the eight hurdles found are unique. Martek et. al. [6] has found the hurdles in Australian building industries. The building industry in Australia hasn't made enough efforts towards sustainability, according to studies. While research has confirmed a number of technical issues that are impeding the sustainability transition, it has also revealed a deeper obstacle: the existence of a broken ecology that is sustainable in which separate vested interest groupings take advantage the unsuccessful transition in Australia policies for their own benefit. Hwang et. al. [7] has concluded that there have been many studies on the implementation of green construction, but few have sought to analyze it from the standpoint of small contractors. By examining the challenges and remedies for independent contractors implementing this research broadens understanding of sustainable building. The study's findings are beneficial to industry professionals as well since they can improve their comprehension of the constraints and assist policymakers in developing more effective strategies to overcome them. Durdyev et. al. [8] has focused on barriers to Malaysia's construction industry adopting the triple-bottom-line approach to sustainability are examined. According to the findings, an efficient and transparent legislative procedure is crucial for ensuring that Sustainable Construction (SC) materials are included and practices together with financial incentives, which will ultimately lead to the effective use of resources and the successful implementation of SC initiatives.

Ganiyu et. al. [9] did formal assessment of impact building operations on greenhouse gas emissions. This investigation tries to identify the variables that affects acceptance of green construction technologies, which typically lower greenhouse gas emissions. According to the report, there should be significant political will on the part of the government to create institutions that develop regulations for green building technologies. Adabre et. al. [10] has found that Sustainable housing for low-income people at affordable prices workers is necessary for a large global flourish towards sustainable growth through his research. Mahat et. al. [11] has focused on Malaysian govt. policy on greenhouse technology. Theoretically, study advances knowledge of the most effective methods for encouraging the application of green building techniques, which adds to the body of knowledge on the subject. Azeem [12] found that main obstacles to implementing green construction practices in Pakistan as well as the necessary policy changes.

Abraham et. al. [13] has concluded that the top seven particular barriers include a lack of knowledge of lifecycle expenses, a dearth of information regarding the advantages of green buildings, a lack of labelling system, infrastructural deficiencies, and a lack of training. Osuizugbo et. al. [14] showed that if sustainable construction methods were utilized, greenhouse gas emissions from the building sector would be greatly reduced. The impediments to the use of sustainable building methods in Nigeria have been identified, and recommendations have been made to reduce these barriers. Kamranfar et. al. [15] shown that there is a lot of interest in analyzing environmental pollution-free and sustainable impediments to construction and development in order to recognize and rate them. In light of the results and outcomes, the hurdles as well as sub-barriers suggested that is study the ability to design and produce strategic planning as the growth of green construction for our Iranian capital of Tehran case study.

Chan et. al. [16] concluded that construction industry is increasingly accepting of green building as a workable answer to the rising demand for healthy or ecologically friendly structures. The results of this research could be used by makers of policies to pinpoint specific issues with the implementation of GB technologies and create effective plans for their widespread adoption. Chan et. al. [17] focused on enumeration and assessment of benefits and challenges due to the adoption of BIM in the building industry in Hong Kong. Improved cost estimation and control, effective planning and management of the construction process, and higher design and project quality are some of the main advantages. Chan et. al. [18] identified that the most significant obstacles towards the adoption of GBTs in Ghana are their rising prices, the absence of government rewards, and the lack of finance plans.

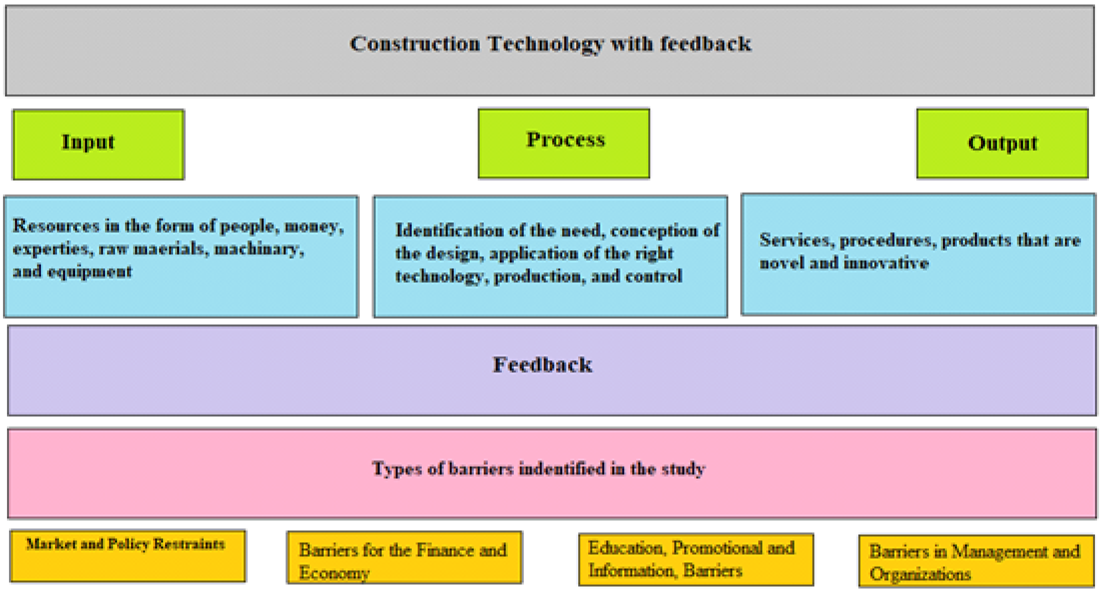

Fig. 1. Model of construction technology's inputs and outputs

Cristiano et. al. [19] found that the absence of a market for recycled goods, the dearth of information on recycling at the end of its useful life, and the prevalence combined C&DW, which reflects the poor decrease adopted methods on C&D sites. The proposed the remedies intended to better realign the C&DWM framework in accordance with the CE standards and to promote sustainability. Darko A and Chan [20] This study might provide a useful platform for scholars and business professionals to understand the trends and advancements in GB research. Darko et. al. [21] This study enhances knowledge of the primary DFs for GBT adoption, serving as a useful resource for professionals and policymakers to encourage implementing GBTs more widely. Further in their research they established that the results can aiding practitioners and decision-makers in encouraging the usage of GBTs in the construction sector. Considering the results, a promotion method for the adoption of GBTs is put forth by Darko et al. [22]. In order to identify potential obstacles to the Ghanaian building sector's adoption of sustainable in addition to Dzokoto et. al. [23] examined the notion of sustainability in that sector. According to the findings, there is a lack of interest in sustainable structures, a lack of a marketing approach to encourage sustainable building, greater starting costs, both a lack of government funding and popular awareness. Fathalizadeh et. al. [24] concluded that by analyzing the relationships between barriers and dividing them into five main categories problem a contribution to the field in several aspects. Gan et. al. [25] has analyzed that Off-site building has been acknowledged as a strategy for transforming the labor-intensive construction industry into a modern, environmentally friendly one. The findings suggest that particular emphasis should be paid to insufficient policies and regulations, a lack of knowledge and competence, a project process that is dominated by old methods, and a lack of standardization. There have been few literatures which focuses on implementation of digital technology as barrier along with other traditional barrier [26, 27,28]

Fig.1 depicts an input-output model for building technology that emphasizes the significance of enablers for the construction process. The authors were motivated to conduct the current research since it was necessary to assess the significance of enablers as they were described in this input-output paradigm. According to the literature research, it is evident that although building technology is a complex process, it is vital from the perspective of organizations. Identification of obstacles to efficient construction technology is thus important. The next section focuses on the naming of technological barriers in building [29,30]. Even though construction technologies are receiving more attention, there are still a number of important research gaps, such as:

- Absence of complete frameworks: The majority of the literature lacks a thorough framework for decision-making that is specifically designed to evaluate and rank barriers to the use of technology in the construction industry.
- Limited quantitative analysis: many studies do not use multicriteria decision analysis techniques that can handle complexity and interrelationships among barriers, instead depending on qualitative descriptions or basic surveys.
- Integration with implementation strategies: It is uncommon for previous research to link the identification of barriers to useful frameworks that assist decision-makers in overcoming these difficulties.
- Dynamic and changing barriers: Not many studies take into consideration how barriers alter over time in response to developments in industry practices, laws, and technology.
  - Although a number of hurdles to adoption of building technologies have been identified by previous research, there aren't many integrated, decision-oriented framework that enable stakeholders to systematically evaluate, prioritize, and overcome these challenges. By creating and implementing a systematic framework for decision-making, this study fills this knowledge gap and provides new perspectives and useful resources for the efficient application of technology in the building industry.
  - This study presents a novel combination of quality expert judgment and quantitative multi-criteria decision making (MCDM) mythologies for systematically identifying, ranking, and evaluating barriers to the adoption of current building technology.
  - Contrasting past research, which often examines technical establishment difficulties in isolation, this work creates a structured and holistic approach that combines multiple stakeholder perspectives-including engineers, contracture, project managers, and policymakers.
  - Additionally, the paper presents a context specific application of MCDM approaches (such as AHP, TOPSIS of DEMATEL). Finally, an implication-based design is recommended in order to facilitate the smooth integration of SETs in India's construction sector.

2. Materials and Methods

Determine a wide variety of obstacles by a review of the literature and expert assistance in the exploratory study design as shown in Fig. 2. To ascertain the importance of each obstacle, gather and examine stakeholder input.

- Identification of barriers: List the technological, financial, policy-related, and organizational obstacles that have been reported in earlier research.
- Consultation with experts: Consult experts to guarantee contextual relevance and improve the list.
- Dat collection: Give out structured questionnaires with ratings on a Likert scale. For a deeper understanding.
- Analysis of data: Mean and standard deviation are used in descriptive statistics to rank barriers.

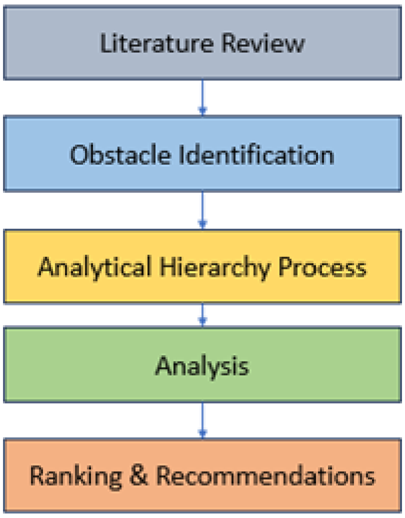

Fig. 2. Mythology for work

2.1 Obstacle Identification

For both technologists and managers, facilitating the effective use of construction technology has grown in importance, necessitating the identification and management of critical factors (CFs). The four barriers' dimensions were identified as mentioned in subsequent sections further their subdivision is also discussed. Below is the list of the twenty constructions that were selected after reading the literature review and input from experts.

2.1.1 Market and Policy Restraints (MPRB)

An external hindrance brought on by insufficient regulation as a result of inadequate rewards for the development of green construction, insufficient enforcement, the application of a structure, codes, and power codes, subpar standards for commissioning of buildings, etc [31-32]. Ratings for green products are not common since the tiny size of the demand for green structures; hence the cost and resale value are not the same alluring to attract investors.

- A lack of financial incentives (FI).
- Ineffective building code enforcement (EB).
- The underutilized nature of green rating systems (GRS).
- There isn't a significant market demand for or supply of green buildings (SM).
- Poor quality and a lengthy commissioning process (QLS).

2.1.2 Barriers to finance and the Economy (FEB)

The usage of green buildings is hindered by a lack of funding, a limited budget, and a high initial expenditure. A shortage with soft loans, a lengthy payback period, and difficulties quantifying benefits are among other challenges the sector must overcome. High construction expenses and a long repayment term are seen as possible roadblocks for green buildings. Due to the client's financial investments and the banks' view of risk ' unclear profitability among green investments, a possible obstacle exists. Split incentives arise in this industry because various players use the funds and investors gain from investments in different ways. In a green building, these resources are conserved while also being used as efficiently as possible. Quantifying the value of investments in green buildings is frequently a challenge.

- Exorbitant startup costs (ES).
- The challenge of obtaining financing for green investments (COP).
- Low returns and a long payback period for green building (LR-LP).
- Individuals from two separate categories, including investors and occupants (IIO).
- It's challenging to determine whether an investment is worth it (CDI).

2.1.3 Educational, Promotional and Informational Barriers (EPIB)

The difficulties are a result of internal information asymmetry, a lack of knowledge and expertise with building life cycle pricing, among other things. The industry has numerous asymmetries in the information it provides regarding technical and managerial issues, which affects the investment choices of different companies and stakeholders [33]. The information is asymmetric and concerns things like power effectiveness, energy labelling, building laws, wastage, etc.

- Lack of experience using materials' life cycle costs and energy efficiency practices in the housing industry (LEE)
- High expenses for information brought on by the absence of green product and material labels (HIM)
- A lack of knowledge about the advantages of green investment (KGI)
- Additional infrastructure and training needs for green construction (AIT) Green rating systems lack lucidity (GRS)

2.1.4 Barriers in Management and Organizations (MOB)

Internal managerial and organizational hurdles that decrease shareholder motivation and produce insufficient investing in green structures are another from which these obstacles. For instance, these challenges are brought on by capital budgeting, routine task scheduling on a daily basis, timetable conflicts, and worry over exceeding budget and schedule, and industry fragmentation and proliferation [34], which frequently cause stakeholders under pressure and inertia, which results in compromises on environmental goals.

- Strict guidelines on the capital budget and worry that it will be exceeded (SCE).
- Schedule disputes and delays when introducing new styles (SDD).
- Resistance to change and clinging to "day to day" routine (RCC).
- Conflicts brought on by stakeholder dissolution and industrial fragmentation (LFIS).
- Lack of financial or other incentives for stakeholders to secure ideal outcomes (FAS).

2.2. Analytical Hierarchy Process (AHP)

Cultural opposition to adopting green energy technologies over traditional technologies, a lack of Analytical Hierarchy Process has been used to address the ranking issue for the evaluation of construction technology barriers. Twenty construction technology constructs have been sorted after thorough review, validated by the opinions of experts, and divided into four categories, namely Market and Policy Restraints, Barriers to finance and the economy, Educational, Promotional and Informational Barriers, Barriers in Management and Organizations.

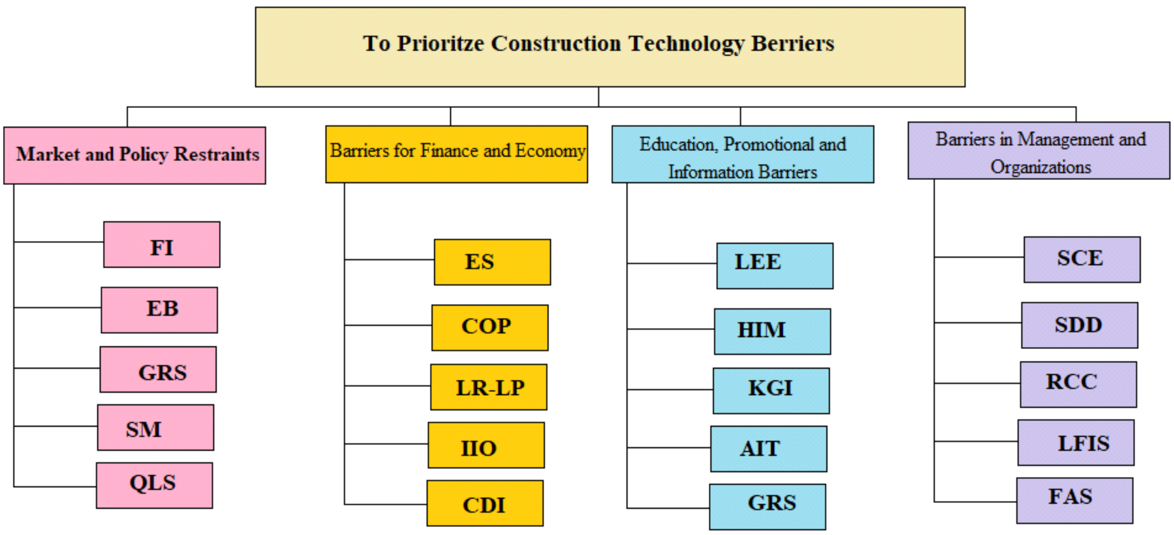

Fig. 3. AHP-based hierarchical models to assess barriers to construction technologies.

The academic community provided three specialists, and the Indian manufacturing sector provided two. Additionally, the constructions under each of these barriers' aspects have been ranked using the AHP technique. There are three stages in the AHP framework for assessing impediments to construction technology goal [34]: To priorities the four types of obstacles, the constructs under each type of barrier, and technological barriers. Fig.3 depicts a research framework for evaluating the technological hurdles in the construction industry.

2.2.1 AHP

In order to aid in decision-making, the AHP compares potential options and criteria in pairs with respect to a given criterion. The resulting final comparison matrix can then be used to rank options. An AHP decision making process involves following steps.

- Create a structure containing decision-making components which are hierarchical in nature.
- Create matrices for pairwise comparisons.
- Determine the consistency ratio and Consistency index by using following equations.

$$CI = \frac{(\lambda_{max} - n)}{(n-1)} \tag{1}$$

$$CR = \frac{CI}{RI} \tag{2}$$

Where, CI: consistency index, CR is consistency ratio, RI is random index, λ_{max} maximal eigen value, and n is the dimension of matrix. The size matrix affects the value of RI. Table 1 provide RI values for matrices with orders (n) ranging from 1 to 8.

Table 1. Random index

n	1	2	3	4	5	6	7	8
RI	0	0	0.58	0.90	1.12	1.24	1.32	1.41

3. Results and Discussion

3.1 Analysis of AHP

Matrices are created according to the ratings gained from expert input, and then calculations are made using the AHP methodology to determine priorities. AHP uses a hierarchical framework with three stages to assess construction technology barriers: the evaluation of technological hurdles in construction; identified four difficulties at the second level: The hierarchy of market and policy constraints, financial and economic barriers, educational, promotional, and informational barriers, as well as management and organizational barriers, has been examined. Pair-wise comparison matrix (PWCM) data in Table 2 displays expert-provided weights for various dimensions.

Table 2. Pair-wise comparison matrix

	MPRB	FEB	EPIB	MOB	Matrix of Priorities	Rank
MPRB	1.00	2	2	0.3333	0.2484	2
FEB	0.5	1	0.2	1	0.13	4
EPIB	0.5	5	1	0.3333	0.2209	3
MOB	3.00	1	3	1	0.4005	1

According to the analytical findings displayed in Table 2, " Barriers in Management and Organizations 0.4005" was the most significant dimension of a Barriers in construction technology, followed by " Market and Policy Restraints (0.2484)," " Barriers to finance and the economy (0.13)," " Educational, Promotional and Informational Barriers (0.2209). Different barriers to construction technologies have been ranked for each dimension at the next level of decision-making or third level. The parameter values for the dimension “Market and Policy Restraints" were evaluated and checked for hierarchy in Table 3. government and economic barriers were identified to be critical in research carried out elsewhere [35]. The most significant constructions in Market and Policy Restraints were 'There isn't a significant market demand for or supply of green buildings (0.47)', A lack of financial incentives (0.19), The underutilized nature of green rating systems (0.14), Poor quality and a lengthy commissioning process (0.11) and Ineffective building code enforcement (0.1), according to Table 3. Table 4 shows that the hierarchy of the constructs under the dimension " Barriers to finance and the economy". A similar work has been carried out [35]. They have identified various hurdles using AHP.

Table 3. PWCM for the Market and Policy Restraints dimension

	FI	EB	LR-LP	SM	QLS	Matrix of Priorities	Rank
FI	1.00	2.00	2.00	0.33	2.00	0.19	2
EB	0.50	1.00	1.00	0.20	1.00	0.1	5
LR-LP	0.50	1.00	1.00	0.33	3.00	0.14	3
SM	3.00	5.00	3.00	1.00	5.00	0.47	1
QLS	2.00	1.00	0.33	0.20	1.00	0.11	4

As shown in Table 4, the most significant constructs in " Barriers to finance and the economy" barriers of construction technology were " it's challenging to determine whether an investment is worth it " (0.29) followed by " Low returns and a long payback period for green building " (0.23), " Exorbitant startup costs " (0.18216), "Penetration in new areas" (0.11), and " The challenge of obtaining financing for green investments " (0.09).In the following Table 5, the hierarchy of the structures under the dimension " Educational, Promotional and Informational Barriers " have been verified. Similar research shows that most critical factors technology transfer are 'International bodies', 'Government authorities' and 'Environmental concerns [36].

Table 4. PWCM of barriers to finance and the economy dimension

	ES	COP	LR-LP	IIO	CDI	Matrix of Priorities	Rank
ES	1.00	2.00	0.20	0.20	1.00	0.11	4
COP	0.50	1.00	0.50	0.50	0.25	0.09	5
LR-LP	5.00	2.00	1.00	1.00	1.00	0.28	2
IIO	5.00	2.00	1.00	1.00	0.33	0.23	3
CDI	1.00	4.00	1.00	3.00	1.00	0.29	1

Table 5. Educational, promotional and informational barriers dimension

	LEE	HIM	KGI	AIT	GRS	Matrix of Priorities	Rank
LEE	1.00	2.00	2.00	2.00	3.00	0.33	1
HIM	0.50	1.00	3.00	4.00	4.00	0.33	2
KGI	0.50	0.33	1.00	1.00	2.00	0.14	3
AIT	0.50	0.25	1.00	1.00	1.00	0.11	4
GRS	0.33	0.25	0.50	1.00	1.00	0.09	5

The most significant construct in the " Educational, Promotional and Informational Barriers " dimension of the barriers of construction technology, as shown in Table 5, was Lack of experience using life cycle costing of materials and energy-efficient practices in the building sector (0.33), which was followed by High expenses for information brought on by the absence of green product and material labels (0.33), A lack of knowledge about the advantages of green investment (0.14), observe-ability (0.12643), Additional infrastructure and training needs for green construction (0.11), and Green rating systems lack lucidity (0.09). Table 6 shows that the hierarchy of the constructs under the dimension " Barriers in Management and Organizations". According to the Barriers in "Management and Organizations" in Table 6, the construct " Resistance to change and clinging to "day to day" routine " (0.25) and “Lack of financial or other incentives for stakeholders to secure ideal outcomes” (0.25) was deemed to be the most significant in " followed by " Schedule disputes and delays when introducing new styles " and “Conflicts brought on by stakeholder dissolution and industrial fragmentation” (0.19). Strict guidelines on the capital budget and worry that it will be exceeded (0.11). A conceptual model of construction technology and dimension barriers has been developed, and it is shown in Fig.4. It is based on rankings of "barriers of construction technology (twenty) and dimensions (four)" and "subsequent discussions with experts."

Table 6. Barriers in Management and Organizations

	SCE	SDD	RCC	LFIS	FAS	Matrix of Priorities	Rank
SCE	1.00	1.00	0.50	0.25	0.50	0.11	5
SDD	1.00	1.00	1.00	1.00	1.00	0.19	3
RCC	2.00	1.00	1.00	2.00	1.00	0.25	1
LFIS	4.00	1.00	0.50	1.00	0.50	0.19	4
FAS	2.00	1.00	1.00	2.00	1.00	0.25	2

The authors also suggest that the weight of each building technology's global dimension should be multiplied by its local weight to get the technology's overall weight. These total construction technology weights have been tallied in Table 7 after calculation. This demonstrates that the top three barriers overall, based on the construction technology's overall weight values, are "International bodies," "Government authorities," and "Environmental concerns."

Table 7. Weighting of construction technique overall, calculated and ranked.

S. N. Dimension	The extent to which construction technologies	Dimensions' total weight at completion	Rank	Local weight	Overall ranking
1	Market and Policy Restraints	0.2484	2	0.19	9
				0.1	18
				0.14	12
				0.47	1
				0.11	14
2	Barriers to finance and the economy	0.13	4	0.11	15
				0.09	19
				0.28	5
				0.23	8
				0.29	4
3	Educational, Promotional and Informational Barriers	0.2209	3	0.33	2
				0.33	3
				0.14	13
				0.11	16
				0.09	20
4	Barriers in Management and Organizations	0.4005	1	0.11	17
				0.19	10
				0.25	6
				0.19	11
				0.25	7

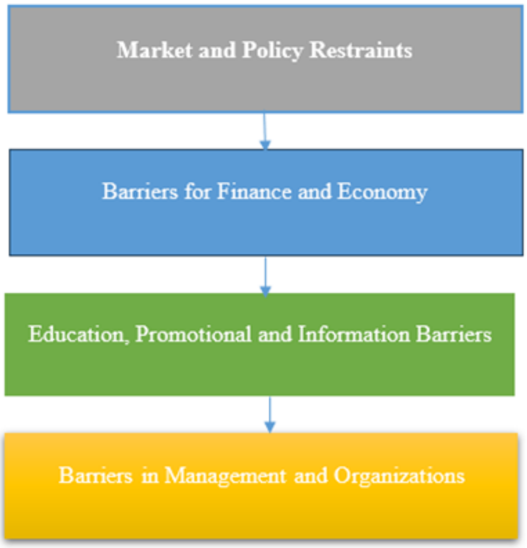

Fig. 4. Conceptual representations of barriers to construction technology.

3.2 Recommendations

An effort has been made to pinpoint obstacles to effective technology implementation; evaluate the significance of CT using the AHP technique; and develop a conceptual framework by including advice from experts. Here, we offer a framework with role actors, expected roles, role performances, role performance metrics, and an action plan to help you grasp the advantages, practical uses, and lessons learned from this suggested strategic framework [37-38]. The Highest ranking was observed for barriers in management and organizations with rating points of 0.4005 and was assigned primary hurdles. Followed by Market and Policy Restraints with rating points of 0.2484, Educational, Promotional and Informational Barriers with rating points of 0.2209 and Barriers to finance and the economy with rating points of 0.13. A research work conducted shows a similar finding with “Managerial” and “Inadequate resources” categories was critical factor with a rating of 0.361 and 0.309 respectively. A provides a succinct strategic framework for implementing technology processes.

4. Conclusions

Construction technology has gained recognition as a strategy with high value for outperforming competitors and as a current and important study subject in emerging countries. Construction technology may benefit developing nations like India since the recipients have the know-how, experience, and operational skills necessary to integrate and use the technology in order to create newer production capacity. The goal of this study was to categories, assess, and analyses obstacles to effective construction technology from an Indian perspective. A literature research methodology and the opinions of experts have been used to find the most efficient construction technology.

- In order to determine the relative importance of each building technology and established mythology, an idea engineering workshop was held to determine the weight/ranking of the four dimensions under twenty constructions technology have been categorized, as well as the local and using an acceptable and recognized.
- Utilizing the Analytical Hierarchy Process, the highest ranking was noted for barriers related to management and organizations, which received a rating of 0.4005 and were identified as primary obstacles. This was followed by Market and Policy Restraints, which had a rating of 0.2484, Educational, Promotional, and Informational Barriers with a rating of 0.2209, and finally, Barriers to finance and the economy, which received a rating of 0.13.
- There isn't a significant market demand for or supply of green buildings, it’s challenging to determine whether an investment is worth it, Lack of experience using life cycle costing of materials and energy-efficient practices in the building sector and Resistance to change and

clinging to "day to day" routine in their respective dimension considering local weight of Construction technology.
- AHP depends on the knowledge of specialists, and the opinions of these specialists may be skewed. AHP matrices were created using the rating experts obtained throughout an idea engineering process, in which experts were not selected at random.

5. Future Direction

Following a discussion of the strategic and tactical consequences, a visual presentation of the strategic action plan is made. We think that our research work could be used as a springboard for further technology-related research, particularly in developing nations like India. The following constraints have been noted as a result of the attempt in this research to priorities the crucial components of an efficient construction method.

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Nomenclature

AHP	Analytical hierarchy process	MPRB	Market and policy restraints
VM	Value management	FEB	Barriers to finance and the economy
C&DWM	Construction and demolition management	EPIB	Education promotional and information barriers
CI	Consistency index	MOB	Barriers in management and organizations
CR	Consistency ratio	n	Order range
TOPSIS	Technique for order preference by similarity to ideal solutions	RI	Random index
SET	Sustainable energy technology	WPM	Weighted Product Method
MCDM	Multi criteria decision making	λ_{max}	maximum eigen value

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