

## **ANALYSIS OF FACTORS OF FEASIBILITY ASSESMENT OF INTELLIGENT BUILDING CONCEPT IN CONSTRUCTION SECTOR WITH CONTEXT OF CENTRAL GUJARAT USING RII METHOD**

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**Abstract**— A building that uses both technology and process, to create a facility that is safe, healthy, comfortable and enables productivity, well-being of its occupants is called intelligent building. It exhibits key attributes of environmental sustainability to benefit present and future generations. The notion of the Intelligent Building is the modern civil engineer's big idea of tackling these deficiencies. Therefore, it is necessary to analyze the intelligent building in the construction industry. However, past research has been done on intelligent building are mostly qualitative and there is a lack of quantitative research. Due to this lack of quantitative research, there is no good-developed framework for factors affecting intelligent building (I.B) in the construction industry. This paper presents the analysis of factors affecting intelligent building of 98 respondents from various construction firms of central Gujarat region using RII method.

**Keywords**- Factors, Intelligent Building, Construction, Relative Importance Index (RII)

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### **I. INTRODUCTION**

An intelligent building can be defined as “the building that combines the best available concepts, designs, materials, systems and technologies in order to provide an interactive, adaptive, responsive, integrated and dynamic, intelligent environment for achieving the occupants' objectives over the full life span of the building.”

### **II. OBJECTIVES OF THE STUDY**

This paper has an objective to act as a foundation for future studies and its results will become worthwhile information in efforts to improve the Intelligent Building (I.B) practices in the construction industry.

### **III. RESEARCH METHODOLOGY**

The data collection to determine the most influential factors on I.B practices of construction firms was done through a survey by explorative questionnaire to the respondents involved in daily activities of construction firms in various regions in the central Gujarat region of India. The questionnaire was designed so that respondents can give the rank to their answers based on the Likert scale. The analysis of these data was done by Relative Importance Index (RII) method using Microsoft Excel.

#### IV. DATA COLLECTION

A total number of 98 respondents were surveyed from the central Gujarat region of India, namely cities like Ahmedabad, Anand, Nadiad and Vadodara out of which 18 respondents were Architects, 24 were Engineers, 24 were Contractors and 22 were Clients. A ranking of the factors was achieved from the Relative Importance Index (RII) method.

#### V. DATA ANALYSIS BY RELATIVE IMPORTANCE INDEX (RII) METHOD

The data collected was manually analysed by the RII method with the help of which a decimal figure for each factor is obtained which is known as its Relative Importance Index. This index is used to rank the factors.

Total 73 factors were analysed using RII Method and ranked as shown in Table 1.

TABLE 1: - RANKING OF FACTORS AFFECTING INTELIGENT BUILDING

Factors	RII	RANK
Lift Management	0.824	1
Parking	0.824	1
Lighting Control	0.816	2
Use of light emitting diode (LED) and compact fluorescent lamp (CFL) Lighting	0.803	3
Efficient Use of Water	0.775	4
Sourcing Local Construction Materials	0.769	5
Maintaining Air Quality	0.769	6
Optimum Use of Day Light	0.767	7
Natural Air Flow	0.759	8
Heating, Ventilation, Air Conditioning And Cooling (HVAC) System	0.759	8
Information Management	0.739	9
Building Automation System	0.739	9
Energy Management	0.739	9
Alarm Monitoring	0.737	10
Controlled Air Exhaust	0.735	11
Programmable Logic Controller, Supervisory Control And Data Acquisition (PLC SCADA) Software	0.735	11
Handling Unit	0.733	12
Energy Efficient Building Services	0.733	12
System Integration	0.731	13
Installation Air	0.729	14
Technology Management	0.727	15
Materials: Fly ash bricks, aluminum, frames, glass,	0.725	16
Solid Waste Control Strategies	0.723	17
Intelligent Building Technology & Design	0.722	18
Water Efficient Landscaping	0.706	19
Communication Wiring System & Network Design	0.706	20
Water Efficient Plumbing and Fixtures	0.705	21
Facility Management	0.703	22
Ingress Protection: Preventing dust and the external elements from entering the building	0.686	23
Water Treatment, Recycling & Minimal Disposal	0.680	24
Separation of non-bio degradable disposables	0.674	25
Gray Water Handling	0.670	26
Rain Water Harvesting	0.657	27

## VI. CONCLUSION

The construction industry is considered as an important sector in the world as it develops and achieves the goals of society. A questionnaire-based survey was used to judge the attitude of architects, engineers, contractors, and clients towards factors affecting the intelligent building of construction firms in central Gujarat Region. 95 questionnaires were distributed out of which 88 questionnaires were returned as follows: 18 respondents were Architects, 24 were Engineers, 24 were Contractors and 22 were Clients. The respondents were asked to indicate the level of importance of each of the 33 factors as not impact, very less impact, less impact, moderate impact, high impact and very high impact on I.B construction. The results indicated that the most important factors affecting I.B of construction firms are: Lift Management, Parking, Lighting Control, Use of light emitting diode (LED) and compact fluorescent lamp (CFL) Lighting, Efficient Use of Water, Sourcing Local Construction Materials, Maintaining Air Quality, Optimum Use of Day Light, Natural Air Flow, Heating, Ventilation, Air Conditioning and Cooling (HVAC) System etc. Also, the values of RII for all factors is higher than 0.7 which indicates that Intelligent Building are the very significant resources in the construction firm to manage because they are influenced significantly by most of factors.

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