



STUDY OF SMART BUILDING COMPONENTS AND ANALYZING FACTORS FOR ITS NON- IMPLEMENTATION

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Abstract: Smart building is a building with useful and cost efficient through the building elements like structure, services management and systems with their inter relationship. It helps the owners and occupants to realize their goals for cost comfort convenience and safety. Smart Buildings are occupied with telecommunication systems, reduces energy consumption and increase the cheerful and secure its occupants. Smart buildings are the ones which tend to perform better at cost lesser and easier to maintain. It helps in easy and scheduled maintenance of all the equipment or components provided in a building. To manage the energy use effectively smart buildings are very much helpful that energy use pattern of the building is well diminished. Aim is to optimize the building energy use by suggesting and implementing various alterations or equipment in the building and change in user behavior in order to make it sustainable as well as reducing cost of building energy use. Thus the use of components and managed building control systems with technological awareness to create environment which is cheer-full, efficient with secure a cost effective to satisfy the needs while reducing energy and water consumption [1].

Key Words: Smart building, smart building components and Analysis, Sustainability.

1. INTRODUCTION

A Smart Building provides a productive, cost effective environment through the optimization of structure, systems, services and management furthermore because the interrelationship between them. It integrates various systems (such as lighting, heating, air-con, voice and digital communication and other building functions) to effectively manage resources during a coordinated mode to maximise occupant performance, investment and operating expense, savings and suppleness They also guard against repair costs, employee time, productivity loss, revenue loss and therefore the loss of consumers to competitors. The following attributes indicates the necessity for varied technology and management systems.

The flourishing integration of those systems can turn out 3 dimensions of building intelligence.

1. Building ought to grasp what's happening within and forth with outside.
2. Building ought to decide the foremost effective manner of providing a convenient, comfy and productive setting for its occupants.
3. Building ought to respond as quickly as potential to the occupant's requests. [2]

Important Dimensions of Smart Building:

1. Building Automation System: Building Automation System permits the building to retort to external factors and conditions (like environmental condition variations, fire etc.), coinciding sensing, management and watching of the inner surroundings and also the storage of the info generated.
2. Workplace Automation: System and native space Network: It provides management info and call support aids with link to the central ADPS.
3. Advanced Telecommunication: It permits speedy communication with outside world, via the central ADPS mistreatment fibre installations, microwave and standard satellite links.. [2]

2. RESEARCH METHODOLOGY

Problem statement

Traditionally no smart components for a building are used as the initial cost is high. The market needs for components are still not up to the mark. The gap between the non-implementation of the smart building components can be found out by studying each of the components and their life cycle cost can be analyzed to check the components in comparison with traditional methods that are readily available.

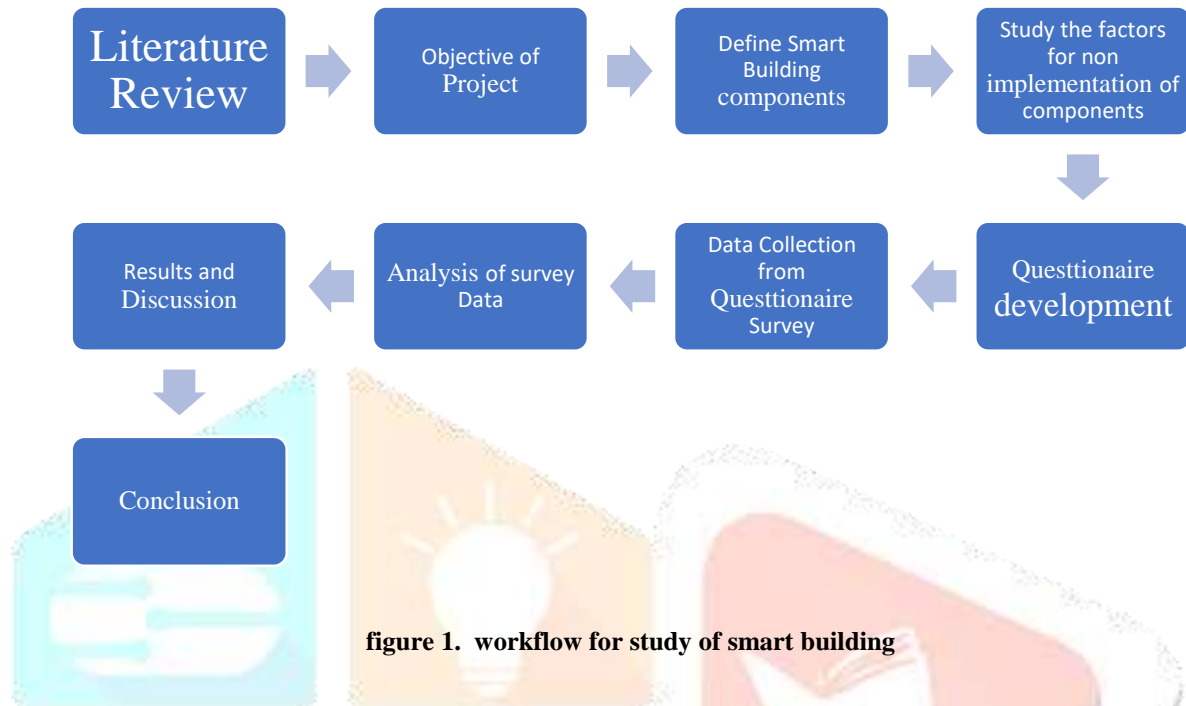


figure 1. workflow for study of smart building

Objectives of Study

To study the data of smart building and the components of a smart building.

To determine the Factors for non-implementation of smart components along with questionnaire survey and analysis for implementation of smart building.



Figure 2: Different aspects of smart building

Study for non-implementation of smart building components

The purpose of the site visits and survey questionnaire was to explore major technical, legislative, and socio-economic issues associated with future redevelopment and examine the current structural and infrastructure conditions of residential building of housing society located in Pune City. The researcher needed the knowledge and opinions of experts, residents and some government authority personnel with regard to sustainable residential redevelopment. The researcher conducted interviews with five government authority personnel's and five community representatives, and obtained responses for survey questionnaire from 75 apartment's residents in the selected residential building. These collected data analysed by computer software and used for strategy framework development at the later stage. Subsequently, they will be comprehensively analysed to articulate the major issues and possible solutions.

Questionnaire Development

One of the goals of this chapter is to present an overview of questionnaire development in this research study.

Customer Centric Questionnaire

1] Customers are familiar with technology innovation related to Smart buildings?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

2] Does the platform enable you to control equipment from within the platform itself, via the Internet, from anywhere?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

3] Can analytics be done within the platform? The goal is to look at multiple data points and compare them in a way to tell when things are not working properly?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

4] Are technologies implemented in smart building user-friendly?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

5] Are safety measures taken during the implementation and execution of Smart Building?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

6] All products used in Study is fire resistance.?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

7] Balance between the Smart building Technologies and energy efficiency?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

8] Are smart technologies affecting overall Study design at some point?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

Construction centric Questionnaire

1] Project goals are clearly defined at start-up?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

2] Project has clear deliverable objectives?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

3] Project goals are made clear to all employee/workers?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

4] Project risk is identified?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

5] Customers/users are involved in the project?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

6] Business model is well determined?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

7] Local government support the project?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

8] Citizen support the project?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

9] Available policies don't encounter with the project agenda?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

10] Activities are well defined?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

11] Smart Building project brand is developed?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

12] Training is provided for all project team members?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

13] Project create a positive impact on environment?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

3. Analysis of Data

Table1: Analysis of factors from Questionnaire Survey

Sr. No.	Factors	N	Minimum	Mean	Rank
1	Customers are familiar with technology innovation related to Smart buildings?	52	1	2.1923	12
2	Does the platform enable you to control equipment from within the platform itself, via the Internet, from anywhere?	52	1	2.2308	11
3	Can analytics be done within the platform? The goal is to look at multiple data points and compare them in a way to tell when things are not working properly?	52	1	2.2885	9
4	Are technologies implemented in smart building user-friendly?	52	1	2.0385	16
5	Are safety measures taken during the implementation and execution of Smart Building?	52	1	2.2885	9
6	All products used in Smart building are fire resistance.?	52	1	2.4423	3
7	Balance between the Smart building Technologies and energy efficiency?	52	1	2.3846	6
8	Are smart technologies affecting overall project design at some point?	52	1	2.4038	5

9	Project goals are clearly defined at start-up?	52	1	2.2692	10
10	Project has clear deliverable objectives?	52	1	2.5192	1
11	Project goals are made clear to all employee/workers?	52	1	1.9808	17
12	Project risk is identified?	52	1	2.2885	9
13	Customers/users are involved in the project?	52	1	2.5192	1
14	Business model is well determined?	52	1	2.1346	14
15	Local government support the project?	52	1	2.4231	4
16	Citizen support the project?	52	1	2.5000	2
17	Available policies don't encounter with the smart building project agenda?	52	1	2.4423	3
18	Activities are well defined?	52	1	2.1731	13
19	Smart Building project brand is developed?	52	1	2.3269	8
20	Training is provided for all project team members?	52	1	2.3645	7
21	Project create a positive impact on environment?	52	1	2.0577	15

4. Result and Discussion:

The factor analysis is done using descriptive statistics using SPSS software and the ranks of factors are obtained according to their mean. The means are calculated according to their respective importance given by the respondents. The top eight factors having greater mean are considered and shown in the table.

Table no.2 : Rank of Factors

Sr.No.	Factors	Mean	Rank
1	Customers/users are involved in the smart building project?	2.5192	1
2	Smart building has clear deliverable objectives?		
3	Citizen support the project?	2.5000	2
4	Available policies don't encounter with the smart building project agenda?	2.4423	3
5	All products used in smart building project are fire resistance.?		
6	Local government support the project?	2.4231	4
7	Are smart technologies affecting overall project design at some point?	2.4038	5
8	Balance between the Smart building Technologies and energy efficiency?	2.3846	6
9	Training is provided for all project team members?	2.3645	7
10	Smart Building project brand is developed?	2.3269	8

KMO Test Values

KMO TEST FOR	KMO VALUE
Factors	0.506

5. Conclusion

The majority of the people that answered my questionnaire are civil engineers working in the field. On the basis of the questionnaire it was an attempt to find that the people do really know of all the smart building components and also to know the various reasons for still using the traditional components instead of the smart ones.

The main 3 outcomes are that first: customers/ owners are involved in the project this clearly states that for any smart components it's the sole decision of the owners for the implementation.

The second outcome which comes out is project has project has clear deliverable objects from all the mentions in the of the components. It is clear that all the people are aware that if the project of smart building is implemented it will have a clear and better view. They are also aware of the future economics.

The third also stands most important as it clearly specifies that the project if implemented will be supported by the citizens. The citizens are utmost important for all the future maintenance and policies

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