Scope of Smart Home in Guwahati City

Rubi Gogoi Kagti[1], Rhea Kagti[2] and Anahita Kagti[3]

[1]Lecturer in Architecture, PCPS Girls' Polytechnic, Guwahati-21, Assam
[2]Solution Developer, Deloitte Consulting LLP Concord, NH 03301, USA
[3]Senior Associate, Korn Ferry International Toronto, Canada
E-mail: [1]rubikagti1@gmail.com, [2]rheakagti@gmail.com, [3]anahitakagti@gmail.com

Abstract—*Guwahati is one of 100 Indian Cities which will be upgraded to a smart city. Smart homes are top most requirement in a Smart City like Guwahati. Smart Home technology is not confined to science fiction any more. It is every architect's solution for a those who care security, safety and freedom. Earlier the home served the basic needs in Assam. However with time, it became a social status and taste of people who lived in it. Architecture has not been spared by the evolution of society. Once it was domain for the rich and famous, today most of buyers in Guwahati seek Smart Homes in some form or the other as automated home. Smart Homes idea is growing fast in Guwahati in the context of Smart City and the market is expanding at ten percent rate. The scope of Smart Home is very positive in Guwahati. A smart home is also one of the application of IoT which is the expansion of internet services. Smart Home is one of the focus area where latest trend is Machine–to-Machine (M2M) communication and Internet of Things which has shown a way to a new world of possibilities and opportunities. Do we need a Smart Home in Guwahati from Smart City point of view? A study was done by conducting a survey to get inputs from various owners with different back grounds. The main idea is to make people aware of Smart Homes and Why they should opt for a Smart Home? This Paper offers the necessity of Smart Home in current scenario where the lifestyle, independence of people is improving. The graphical methods are used to identify the importance Smart Home. From the result we can suggest that there is a need for Smart Homes which can contribute significantly to Smart City.*

Keywords: *Internet of things (IoT), Intelligent Remote Monitoring, Machine–to-Machine (M2M), Smart City.*

1. INTRODUCTION

Imagine how helpful it will be to able to monitor your home when you are away, How about having system will detect smoke, bugler attempts and movement in your home and alert you? This what Smart Home is about and there is no end to its application.

The first and foremost thing you desire when you think about your family and your home is their safety. And thus the idea of Smart Home comes into picture. Hence it allows us to make our home an active partner in managing busy life. The Smart Home is a necessity, not a luxury. The market is flooding with smart phones and internet services will enhance in development of eco system for various verticals of M2M/IoT domain along with Smart Homes. The concept home automation has been around since late 1970. But with time the advancement of technology, our necessities from home has changed tremendously and so have the idea of automation and security system. Smart Home technology is emerging in big way continuously. It is many architect's solution for those aspire security, safety and independence. With advancement of technology changes of very concept of home gone of phases evolution in society. Architecture is not spared by the evolution of society. It is architect's idea to look Smart Homes beyond the boundary of home equipment within their four walls. Today's architecture design demand more market oriented attitude. More emphasis is given to security, safety along with home aesthetically pleasing and comfortable to live in. They are responsive and connected to smart power grid, they interact with caretakers and occupants to empower them with broader levels of visibility and information. In Guwahati we hardly find very few Smart Homes with home security system with bugler alarm and high security gates. Few block of flats and hotels connected to CCTV camera in parking areas and lobbies are common in the city. The relationship between Smart City and Smart Home needs to be bridged together. In a Smart City key services are maintained to support smooth running of complicated infrastructure to provide a sustainable safe environment for better quality of life. Hence the view of building is having impact on the way we visualize at home designs and gradually sifting towards Smart Homes. This necessities, are extension of home automation, raise in incomes are supporting factors.

To do preliminary study for Smart Home in Guwahati City, survey of various owners of diverse background living in different typology houses were conducted. Evaluation of presently used system is done and tried find out different types smart technologies adopted by owners. Towards the end of the survey it will find out their awareness of Smart homes is positive for owners or not.

A Smart Home may have multiple synonym for different buyers and even different situations. For customers it is a very private space and they have different requirement and expectation depending on their taste and life style.

2. OBJECTIVES

- To review the existing Smart Home technologies through survey and analyzing the outcome by graphical method.

- An evaluation of scope of Smart Home from diverse background of people based on different income group and looking the impact of these parameters on their need to go for Smart home.

- To study the viability of Smart Home in urban and fringe area of the city.

- To study the tangible benefits from Smart Homes.

- Inclusion of Smart Homes with smart technologies in a Smart City.

3. THE BUYERS/ CUSTOMERS OUTLOOK

Today's information society relies heavily on information technology and hence the function of home has sifted towards a process of change. Smart Homes gives a platform of some very exciting opportunities to change the way we work and live and reduce energy consumption. The awareness of Smart Homes is there among all the buyers in the urban areas and slightly less in fringe area of Guwahati city interacted with as a part of the study.70% of prospective buyers whose budget is more then 75 Lakhs (INR) want opt for Smart Homes or Smart Home solutions. And very few buyers in this category do not want a Smart Home. For these category of buyers, the thresholds are a fear of stiff prices and a concern that they do not have clear picture of advantages from Smart Homes and there is no end to its application..
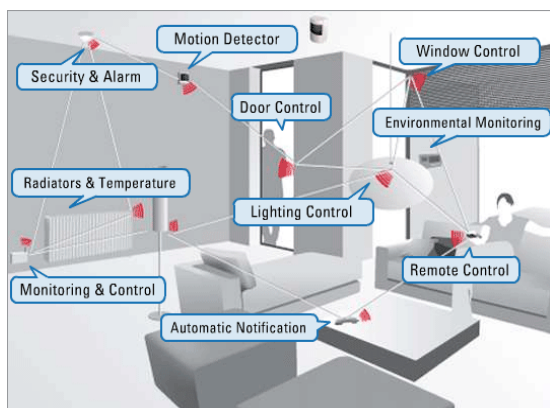

Fig. 1: Few examples of the smart devices in Smart Homes.

The main contributor for generating awareness of Smart homes are builders, electrical companies, security System and Smart City campaign in newspapers and internet. Earlier buyers were only familiar with security system and features. Now the high end buyers are sifting towards latest products and aspects. Safety and security is main concern of the customers in Guwahati market that they want have a Smart Home. Awareness of lighting control in is quite common amongst the buyers. Besides these two features, awareness of

climatic control, energy management and remote assistance features are negligible (Fig.1). Electricity and entertainment controls awareness is quite moderate. Services provider of Smart Homes are very less in Guwahati city. Customers are mostly apprised by the agents, brochures, architects and builders.

Awareness of some of few features from Smart Homes

- **Safety and Security features**: Gas leakage, fire control features, intruder sensor, video door

- **Entertainment:** Audio Visual control

- **Electrical Control.:** AC Controls and some Smart Gadget

- **Lighting Control:** Switching on and off lights through remote control

- **Communication Appliances :** Communicating security gate with owners entrance door

3.1 What is the view of Smart Homes for the people of Guwahati?

When discussed about Smart Homes, buyers mostly say about security system, buglers alarm, secured homes etc. Guwahati, 2018 Assam has been witnessing a significant rise in the number of crimes being reported .in the capital city. The year 2018 was marked by 1,24,413 cognizable crimes in the state. Guwahati has the highest number of cases, 1,034 burglary cases, 4,234 theft cases and 677 kidnapping cases. "The city also has the highest number robbery with 465cases cases during the one-year period with 79 killings. Frequency of crimes and burglaries is found to be more in the fringe area but even in the heart of the city. Most people in the city lives in bungalows and flats and they are not informed about their neighborhood and police patrolling. Miscreants take advantages of such unavoidable situations. By considering above matters, we start thinking about home security measures to protect our home from miscreants. However, apart from the security, people talk about conveniences and benefit of Smart Homes. As described by few elite buyers in Guwahati, "It is convenient to use and reduces work pressure, if we forget to close our garage or put off our lights means it will automatically do necessary things".

Beside safety, convenience and health, many buyers talk about energy saving that Smart Home can provide and reduces our electricity bills. Other relation that customers draws when visualizing Smart Homes are cameras, sensors, automation and present status etc. And these are fewer to be mentioned.

4. WHAT ARE THE INCENTIVES FOR OPTING SMART HOMES?

The main move for incentives of Smart Homes in the urban areas of Guwahati is security. All city dwellers who want opt for a Smart Home, about more than half of them are driven by the security guaranty that is available with Smart Homes. (Fig. 2.) & (Fig. 3)

The main incentives for opting of Smart Homes are as follows:

Fig. 2: Three incentives that buyers speak on Smart Homes.

a) Convenience b) Security c) Energy saving

There are no substantial threshold against Smart Homes in Guwahati market. The two main factors where people are opting out of Smart Homes are

a) *No perception of the cost*- The cost could be very stiff.

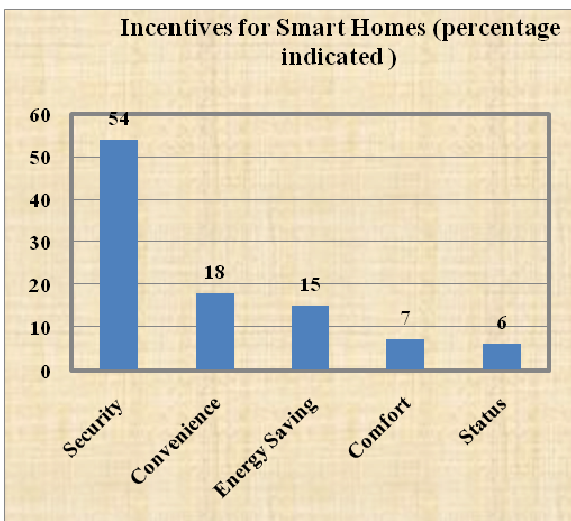b) *Not informed of what value addition it will add to property.*

Fig. 3: Bar Chart showing incentives for buyers opting to go in for smart Homes.

5. What are Buyers assumption from Smart Homes?

Smart home presents very exciting cutting edge opportunities (Fig. 4) to change the way we live and work. and further a Smart home is reliable and unifying gateway to the world for its owners, various features inside it(Fig. 5).
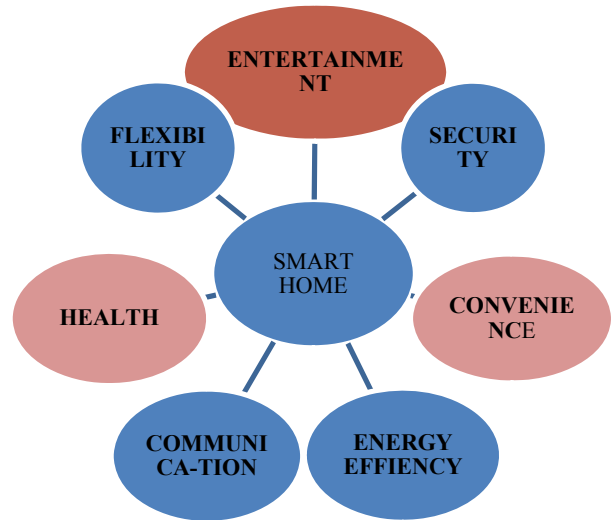

Fig. 4: Opportunities of Smart Homes.

Smart Home : Important Features

Smart phone and laptop can work any where inside and from any place where WI-FI connectivity is available.

IoT/ M2M Communication

IoT has heterogeneous network having IP Or Non IP devices through IP Gateways. Gateways are connected to IoT platform.

Technology that allows wired/wireless system to communicate with devices of same capacity. M2M uses a device (meter. Sensor) to frame an event (temp., movement , meter reading etc,) which can be relayed through network to an application based software that transform into needful information.

WI-FI Connectivity

This network is used by WI-FI enabled devices to communicate with Smart Home server. Broad band connectivity is to be provided to homes for faster access to Internet.

Push Button Emergency Call

This device will help us to make emergency call or send SMS using this unique button. The call is done automatically.

Smart Card Access to Home

Smart Card holders are allowed entry to the premises. In case of any anomaly, the owner is alerted through e-mail, SMS, phone call or informed automatically at the security gate or at entry point.

Digital answering machine

The Smart Home server can function as answering machine. Callers voice mails are stored in the respective user's inbox.

Security and visitor tracking system.

Camera fixed at the entrance gate or specific points captures visitor's picture and sends to owner with single button

operation and with a beep the owner can view the image on the display.

Lighting system (switching on/off lights)

Through the server it is possible to control electric fittings remotely from any where through Internet or by sending SMS. All appliances can be automatically switched off after exit.

Fire Alarm

Fire detection features are connected to the server. It can raise an alarm and can send messages during fire breakdown.

Event capturing/ tracking

On capturing a set events or moments in the main server box, reminders and voice messages are displayed promptly. The system can provide greetings on various occasions, like marriage anniversaries, independent day and happy birthdays.
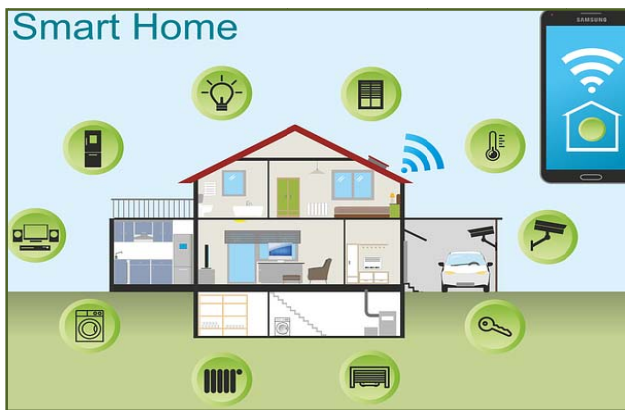
Fig. 5: Features in a Smart Home

Seasonal and dependent features

This will help to monitor our favorite Golmohar tree in our garden with sensors and computer or smart phone to provide watering and better landscaping during dry seasons. Home can adapt automatically to various circumstances (such as: by closing of curtains in hot summer and running fan automatically when it strike certain temperature).

Décor- Friendly Gadgets

The gadgets are aesthetically more appealing than the normal one. This makes a fashion trend as good looking sensors and various nodes placed at several location are desirable element. Smaller size further enhances to the feeling.

Customers expect all features which can aid in making their homes more secured. Electrical control like AC controls, Smart gadgets UPS control are desired factors. Entertainment controls AV control, blog sharing and web features like curtain control, video conferencing, web pages are delight factors. Buyers don't expect much added and communications between different floors

6. Idea behind the study / research and methodology

The primary intention of the study is to create a general awareness regarding safety and security measures that can be applied in a Smart Home in our daily life. The secondary intention was to focus on necessity of smart home which provides convenience, safety and energy efficiency. For collecting data from various owners a standard questionnaire of 10 (basic & necessary) questions evaluating many aspects of Safety, price, incentives and ……….. was provided.

The idea behind was give a overall glance of what Smart Home can provide?

There are 10 basic & necessary Questions:-
a. Are you aware of smart homes?

b. Mention the type of security measures in your home.

c. What type of house you live in (Bungalow / flat / row houses)?

d. Where is your house located (Fringe area/ near CBD)?

e. How many entry points are there in your residence?

f. What is your gross salary?

g. What type of monitoring system you have at home for children/elderly parents?

h. Do you like to have a Smart Home (budget above 50 lakhs / above 3 crore.) with security system and other controlled features?

i. What more percentage you are willing to pay for your Smart home than your estimated value?.

j. What type of features you require in a Smart Home (security/ lighting control/ communication tool/ entertainment/all)?
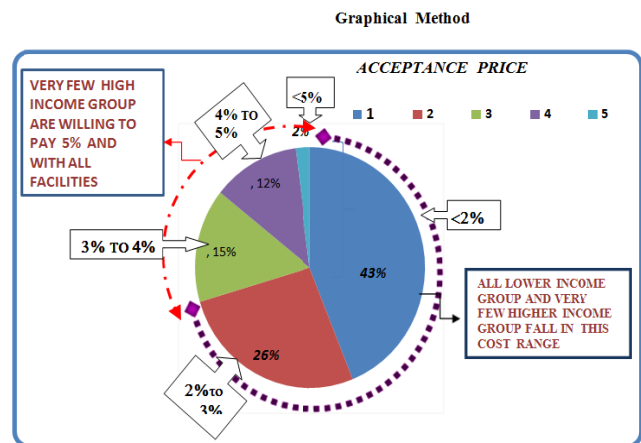
7. Results and Analysis

Fig. 4: Pie Chart showing home buyers willingness to invest for the Smart Home in Guwahati city.

How much a buyer can invest for Smart Home?

The Buyers/ customers of the study comprised of people of diverse back ground residing in Guwahati city. Every person was asked to fill up the questionnaire which was based on home security features and convenience related benefits etc.

All the owners /buyers who are interested to go for smart homes can spend 2% or more than the estimated value for the

house on Smart Home solutions. Most the prospective buyers interacted in this study are willing to spend 2 % 5% more than the house cost on the smart home solutions while many are willing to spend 3% to 5%. Many buyers from the elite class of society whose budget is more than 3crore (INR) are willing to pay5% more than the house cost on the smart home solutions.

They also prefer all features and all intelligent remote monitoring to be included in their dream Smart Home.

Majority of the buyers are always cost sensitive. They will require all solutions which are value for money that they are going to invest in the Smart Home. The scope Smart Home adaptation and penetration in the Guwahati will increase if the price reduced to some extent. And technology adaptation in Guwahati is quite fast which helps the market to prosper further and buyers of Guwahati will embrace Smart Home technology.

8. Conclusion and recommendations

Smart home is an intelligent home capable of monitoring various aspects of our daily life and enhance intelligent living. Smart home awareness is quite high among owners in Guwahati city. The scope Smart Home is is growing at faster pace than before and likely to double in Guwahati city in every 5 years. A smart home is a intelligent home with equipment which can be controlled remotely several aspects of daily living and operated from any location. Smart home technologies are the future need of our modern society. The inclination towards Smart Homes is positive with almost all high end buyers and homes opting to go for some extent of Smart Home features. Present expectations are security, convenience and energy saving. There are no threshold except fear of exorbitantly high price and not very certain of the value that would be added to the property. The Smart Home model 's true revolution and escalation rely on the End- to- End compatibility. Smart Home entity will see a boom in Smart City with Government support and hence Guwahati is favourable for Smart Home players. Smart Homes and Smart Cities should not be persuaded in isolation and should be interwoven with similar technologies in different domain making our planet ' Smart' and ' Secure' with a cloud platform. for sharing pool of resources and services like software.

Advantages:

- Reduces capital cost of home automation, management and network infrastructure in block of flats and large residential complexes..
- Improves health of the city dwellers and their sense of safety.
- Prove to be an asset for nuclear family with elderly parents, kids or differently able persons. .
- Are more sustainable in the longer run.
- More businesses will be covered under Smart Home Solutions that will facilitate engagement for literate

unemployed youth to develop skills for gainful employment.
- Confidentiality and Privacy
- Reduces time, effort and improves quality of life.
- Getting extended to automobile by synchronizing vehicles with smart home gadgets. Smart Home will provide charging to electric cars and simultaneously car roof may provide solar power to home etc.

Disadvantages :

- Smart Home has flip side too. Security can be major bottleneck. Hacking can remotely access and command many devices.
- People tend to be totally dependent on the Smart Home solutions. Health issue might crop up due to less mobility of people.
- Control system, security may be costly and difficult to maintain when it extends the home by other Networks.
- Learning to use a complex system effectively may take significant time and training.
- High penetration of internet is required.
- Lack of standardization.
- May not be very practical due to connectivity issues and speed.
- Huge investment will be required in retrofitting in converted properties like warehouses, mills etc. customaries to fulfil client's need.

So let us make maximum benefit for greater good of society that Smart Home to offer and make our lives better. And let us crack the myth Smart Home luxury to necessity.

References

[1]. http://en.wikipedia.org//org/home_automation
[2]. The Smarter way to live life – Time space and people June 2014
[3]. Smart home market in India- by Schneider Electric 2015
[4]. http://www-guwahatiplus.com (Guwahati Tops Crime Chart)
[5]. Questionnaire on Smart Homes
[6]. https://cda.iea-4e.org – Intelligent efficiency March 2018
[7]. -http://www.nvbr.com/the-mythical-value-of-smart-homes/. The Mythical Value of Smart Homes-
[8].- https://www.instructables.com/id/Powerful-Standalone- Home-Automation-System-Pi-Sono/- Stadalone automated Home
[9].- https://www.techtrader.com/uk/news/ikea-toinvest significantly-in-its-smart-home-future – IKEA to invest.
[10].-https://www.researchgate.net/publication/226581534   -Living inside a smart home-:A case study
[11]. Technical Report M2M/IoT Enablement in Smart Home Ministry of Communications ,Govt. of India -Release - 1.0, March 2017
[12].http://smart home-tech.com/