An Elaborative Study in the Market Potential of Home Automation and Security Products: A Case Study of Chitwan District in Urban Nepal

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Abstract

The objective of this study was to make people aware of automation products and its importance in the field of human convenience and security and also to focus on security, energy management and comfort. Quantitative research approach was used in this study. The research was conducted in two phases, i.e. collective interview with the guardians of the students by distributing the questionnaire to the students and providing them necessary guidance to fill the questionnaire and field visit to different institutes, banks, homes, hotels, industries in the year of 2018. The sampling technique was Random, Quota and convenience sampling. The results show that around 78.2 % families had Wi-Fi connection in their homes where 61.3 % was male and 37.1 % was female. Out of 124 members participating in research, 48.4 % of respondent was graduate student. The results show that approximately 96.8 % respondents show their interest in technology product. Among them 60.2 % respondents were between the age group of 30-50. The results also show that 90.3 % of family had more than three family members where 27.3 % respondents had monthly income above Nepalese Currency 90,000. About 51.7 % respondents perceived that security was the key feature of automation products whereas only 17.7 % responded that energy management and comfort were major issues for automation. The results importantly highlighted that approximately, 82.3% were familiar with home automation and 89.5 % respondents trusted in home automation products. The results also show that 84.7 % people showed interest in keeping home automation products. The empirical studies reveal that home automation is the most customized and reliable automation services. This study has tried to relate the advancement in the field of automation and the market potential of those products in Chitwan, Nepal. The implication of this research will be beneficial to city people who have the lack of deep knowledge of automation products and uses. The limitation of this study is the concern of proportion of the sample population of male and female participants.

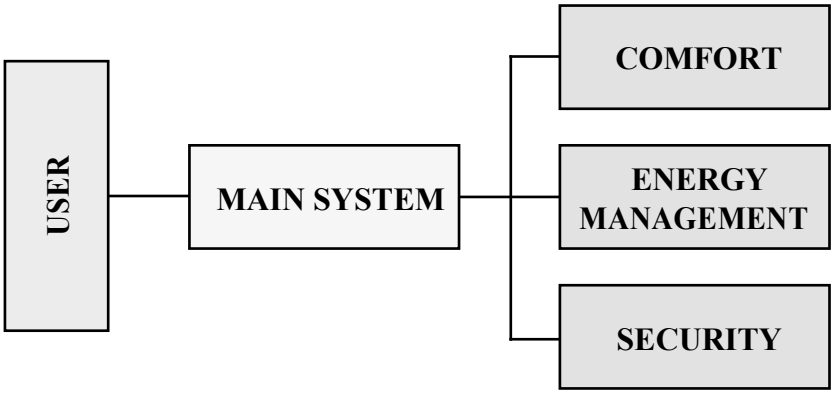
Keywords: *Home Automation, Security, Comfort, Smart Home*

Introduction

Background of Study

Home automation is derived from two different words “Home” and the “Automation” where home is the place where we live inside the four walls and “Automation” means the act of implementing the controls of equipment with advance tech usually involving electronic hardware (Asadullah & Raza, 2016). Therefore “Home automation” gives the sense of smart house. All home automation system controls the lighting, temperature, comfort, entertainment and other appliance inside house and with essential features about

security such as fire alarm and cctv cameras which are getting popularity now days (Asadullah & Raza, 2016). The objective of home automation is all about comfort, efficient operation, reduction in energy consumption and increasing the life standard. Certainly, with elderly and disabled people can get quality of life because of the home automation (Asadullah & Raza, 2016). It is doubtless to say that a home automation is connected with the "server" which is also known as hub. User can control home activities within one click, even it he is far away from his house. The user needs to connect with any internet source from anywhere so he/she can get notification instantly gadgets like cell phone laptops etc. Where every gadgets and house equipment are connected with IOT so that every object can complete task and communicate with user each other. The table below shows more clearly how automation is connected with user. The control & automation is limted to the user alone (Asadullah & Raza, 2016).



Block diagram Home Automation

The automation industry is in a re-evaluation stage with significant technological advancements. Developments in automation industry, introduction of upgraded devices and technology, also known as Smart Home and Smart Building, has changed the way products and services are being delivered. With focus on enhancing consumer experience, these technologies are witnessing continues research and development to equip the products as per compatibility with Smart & Sustainable Home and Building projects (YANG, 2005). The market for home automation is forecast to grow steadily to become US$ 116.26 Billion by 2026 from US$ 64.67 Billion in 2017, at a CAGR of 6.8 % (Transparency Market, 2017)

Moreover, the market for home automation products and solutions in developing economies across the globe such as China, India, and Brazil, are witnessing increasing adoption due to significant rise in disposable income of the mid-income group and rising preference for luxurious lifestyle (Transparency Market, 2017). Furthermore, other Asian countries, for instance Indonesia, Taiwan, and South Korea, are projected to fuel the growth of the home automation market during the forecast period in this geography (Transparency Market, 2017). This research is initially trying to understand the necessary outlet showing, 55.6 % choose online store, showing people interest in using technology with 46 % people thought that this kind of product is very preferable to Home. Respondents view on the Products like automatic water pumps which are available in the market with the price ranging from NRs. 1500-2500 Nepalese Rupees (NRs) and remote-controlled lights and fans whose price in the market is NRs 15000-20000 were about 10.5 % people strongly agreed in the requirement of automatic water pump in present scenario. Products like. Market research showed that about 72.7 % people had income level less than NRs. 90,000. Even though people of Chitwan are aware of automation, Home automation is a completely new market.

Problem Statement

Problem definition

We are living in the 21st century but still follow traditional methods for comfort, security, and energy management. Presently we have system that can be easily installed, cost efficient, and able to provide genuine home automation to consumers. We are wasting the energy (more specifically electrical energy) in different fields such as Agriculture, Hospitals, Education, and Apartments etc (Transparency Market, 2017). which can be due to unwanted operation of different loads or equipment.

The market of Home solution is wide and includes variety of consumers of different age group starting from kids to senior citizens. The demand and type of solutions vary as per the consumer. The main problem we encountered from the on-field survey was problems with an integrated system capable of controlling their comfort, security, and energy management issues. This research surveyed for the likeliness of a single integrated system incorporating all the components of a home network which solves the issues of comfort, security, and energy management to fit the present scenario.

Market Potential:

The market potential of is very high as it consists of 579,984 population (Statistics, 2017).

Target Market: Map of Nepal showing Chitwan

It has an area of 2,238.39 km^2 and in 2011 had a population of 579,984 (279,087 male and 300,897 female) (Statistics, 2017). Chitwan has a huge opportunity for home automation product. Bharatpur is major commercial and service Centre of Chitwan as well as Nepal and major destination for higher education, health care and transportation in the region (UNFCO, 2009). At present Bharatpur is the largest business area of Chitwan. Chitwan district is also known as the medical city of Nepal. There are many top-rated medical institutions in the district are located in Bharatpur. High rank schools, hotels, apartments, hospitals and industries are also present in abundant amount (UNFCO, 2009). Hence market potential of home automation products in Chitwan is very high.

Research Methodology

Research Approach

Initially exploratory design procedure was used for convenience and to get tentative idea about the market. Later conclusive research was conducted to get precise idea of the market. Under conclusive research design procedure, we conducted causal research procedure by formulating questionnaire that was asked to 120 respondents.

Population and Sampling

The population of Chitwan is 579,984 population (Statistics, 2017) which is relatively larger as compared to other cities of Nepal. But for our convenience we selected 120 samples for our research. The sample included respondent from Bharatpur and its nearby areas. The sampling was carried out through convenience, quota and random sampling procedure.

Questionnaire and Administration

Home automation (HA) is one of the new concepts for comfort, security and energy management. After the formulation of questionnaires, the research was divided into two parts. In first part different students at Oxford College of Engineering and Management were included by providing them questionnaire. Each and every student of the class was provided with proper instruction and was asked to fill the questionnaire through their guardian. The answered questionnaire was collected in the next day.

In second part the research was conducted on targeted area like hotel and restaurant, educational institute, home etc. Both the approach gave positive and sound feedback regarding the need of automation products. This research was based on the study of demand of technology so the prepared questionnaires were for urban area pertaining to high class and middle-class family.

The research was conducted relating to technology and taking reviews through well-structured and chronological questionnaires. The questionnaire was divided into three parts (consent, screening and respondent field questions). The time of interview was around 10-15 minutes. On screening part, personal and demographic information of the respondent as well as their willingness in the technology was taken. It clarifies which income group, gender and what age group of people was interested in technology products.

Data Analysis

A separate column is provided for unanswered questions (unanswered questions have no label in the figure)

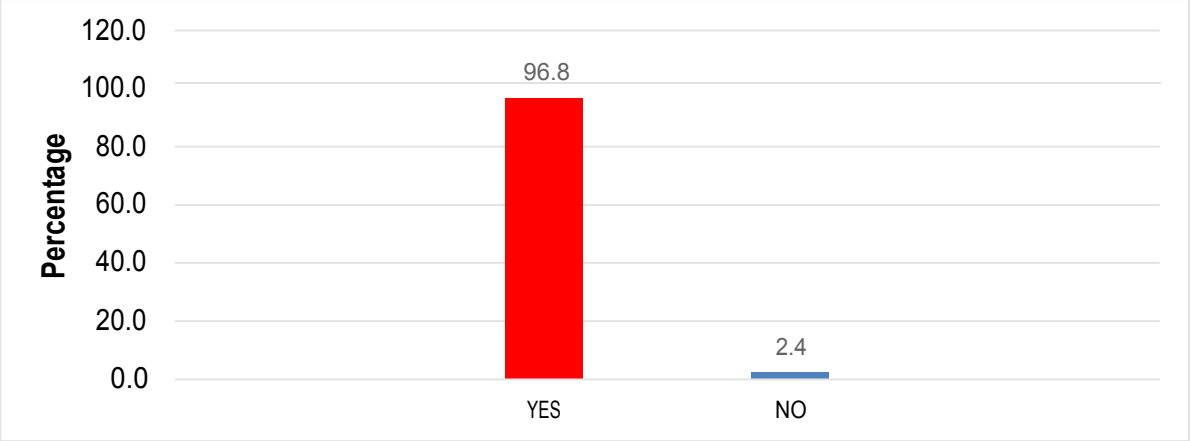


Figure 1 : Interest in keeping the technology Products

The bar diagram indicates that out of 120 respondents taken into our survey 96.8 % showed interest in technology products. This result supports the cause of our research as people are preferring technological products over traditional products like conventional switches.

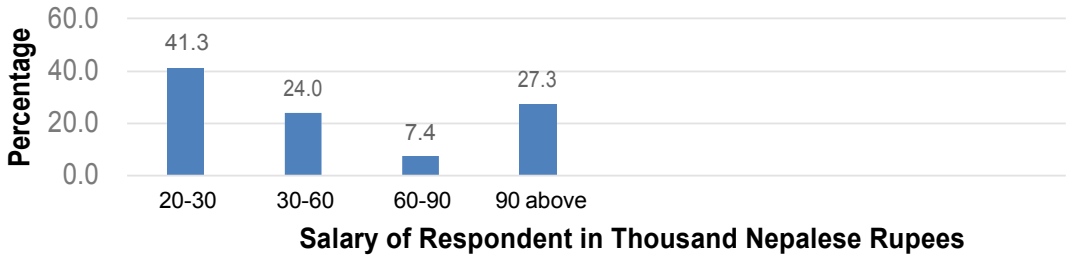


Figure 2 : Salary Level of the Respondent

If salary of the respondent were below 60-90 limit there would have been no reason for us to carry out the survey as our products targeted to preferably middle-class and high-class people. As in the graph it is clearly shows that our 7.4 % of respondents had salary above 60-90 thousand and 27.3 % had salary above 90 thousand which clearly indicates the interest and inclination of people with high income towards the technology products.

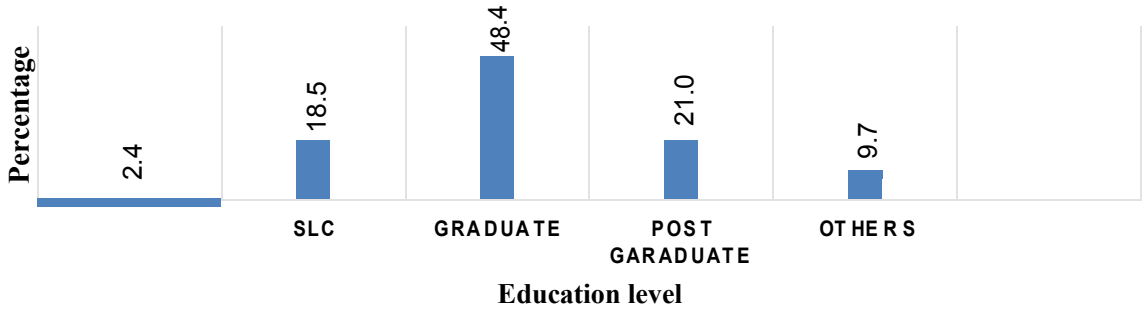


Figure 3 : Respondent Education Level

The survey that we carried also tried to corelate the tendency of respondents to use technology products with education. As the bar depicts, only 18.5 % were just SLC passed also showed their interest in technology products. This clearly indicates the possibility in that areas.

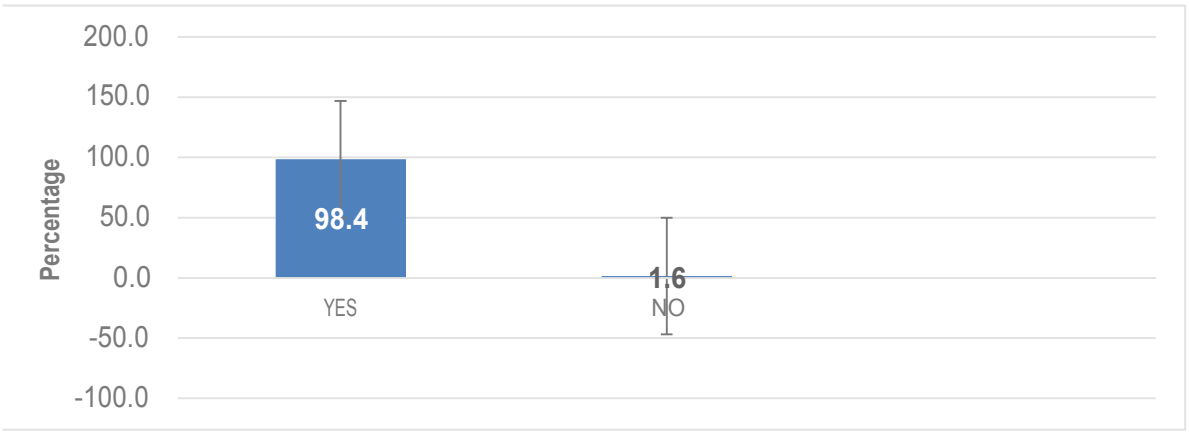


Figure 4 : WIFI Connection in Respondent House

As our product was based on Wi-fi so we had to understand the popularity of internet among our respondents, almost every respondent had a Wi-Fi connection at their home or using any forms of internet services.

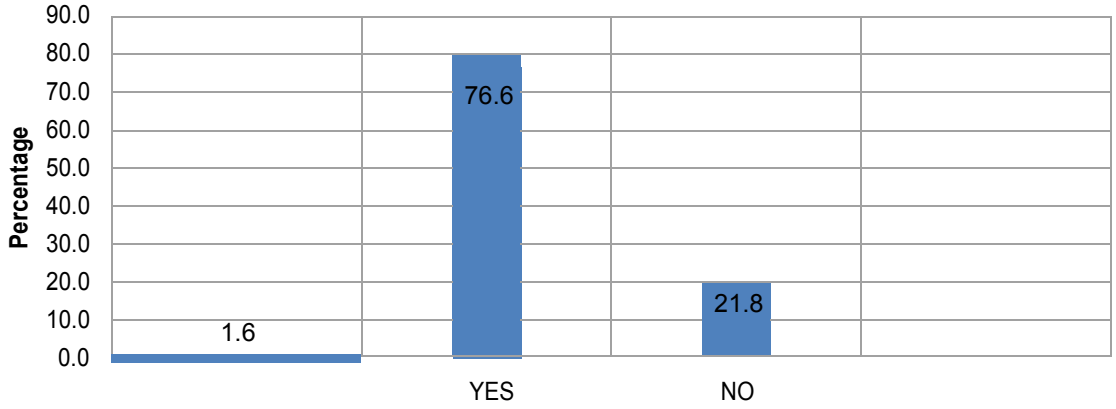


Figure 5 : Ownership of the house

In this section respondent had to verify whether they owned any house, if the respondents had no house then probably there was no need to keep any automation products. Surprisingly 76.6 %v respondents had their own house.

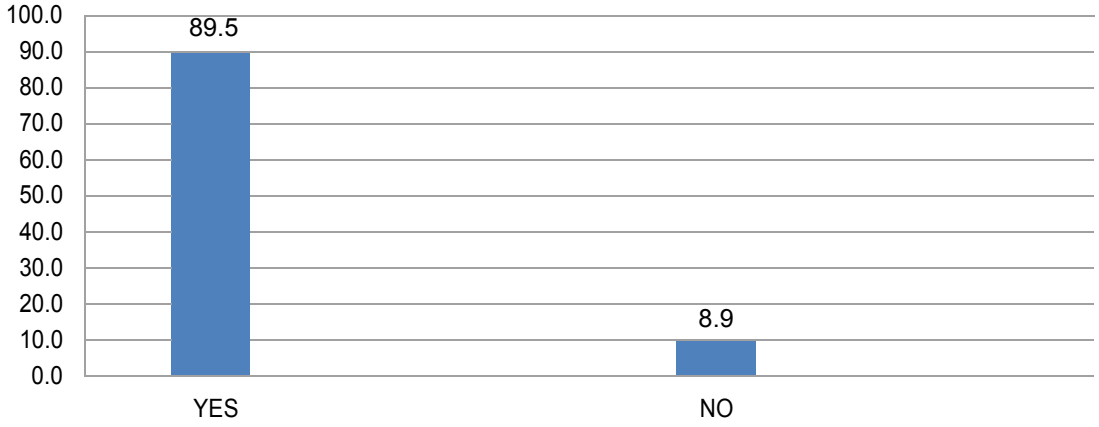


Figure 6 : Respondents Home Automization Product

8.9 % respondents did not trust the reliability of automation products rest of the respondents showed their trust in these kinds of products.

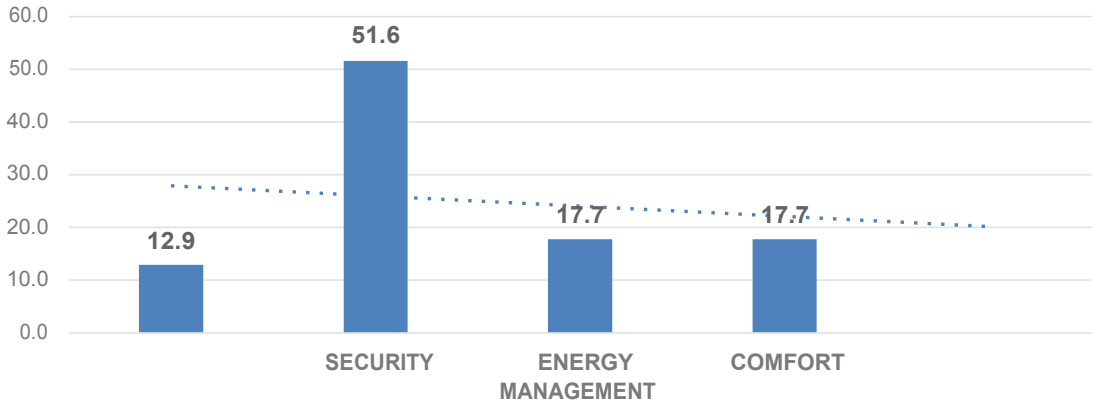


Figure 7 : Respontent's Rating for Automization System

As the main agenda of our research was to identify whether the respondents find security, energy management or comfort as main priority of automation products. 51.6 % of the respondents explained and answered in the favor of security and 17.7 % respondents answered in the favor of energy management and comfort. Rest 12.9 % did not find any of them important.

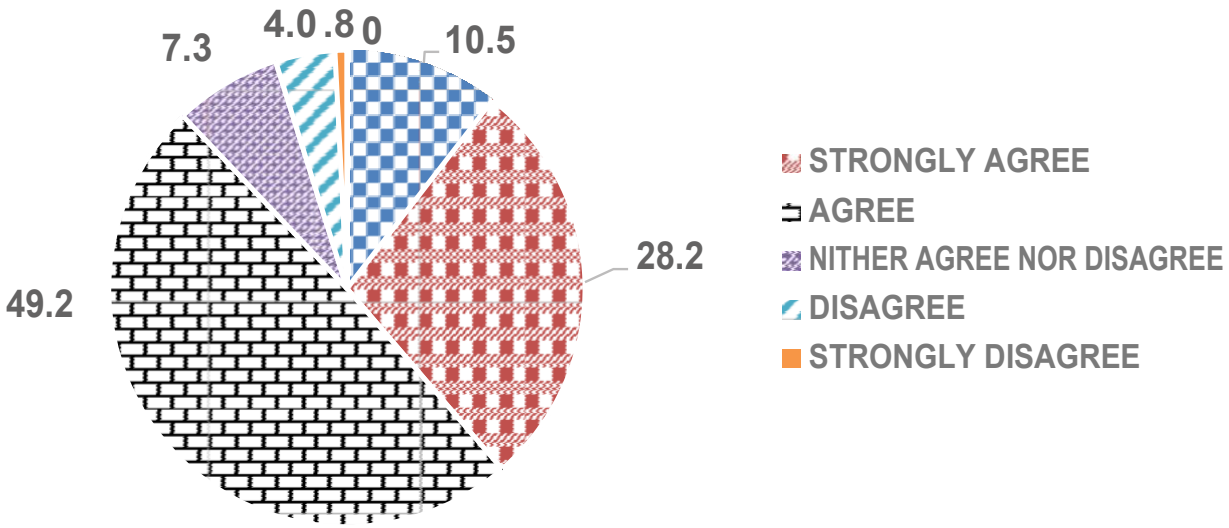


Figure 8 : Respontent's Mentality in the Workability in terms of Security by Home Products

49.2 % respondents agreed that home automation kept their home secure only 4 % showed dis-agreement in the workability of automation products. But 28.2 % respondent strongly agreed to the workability in terms of security.

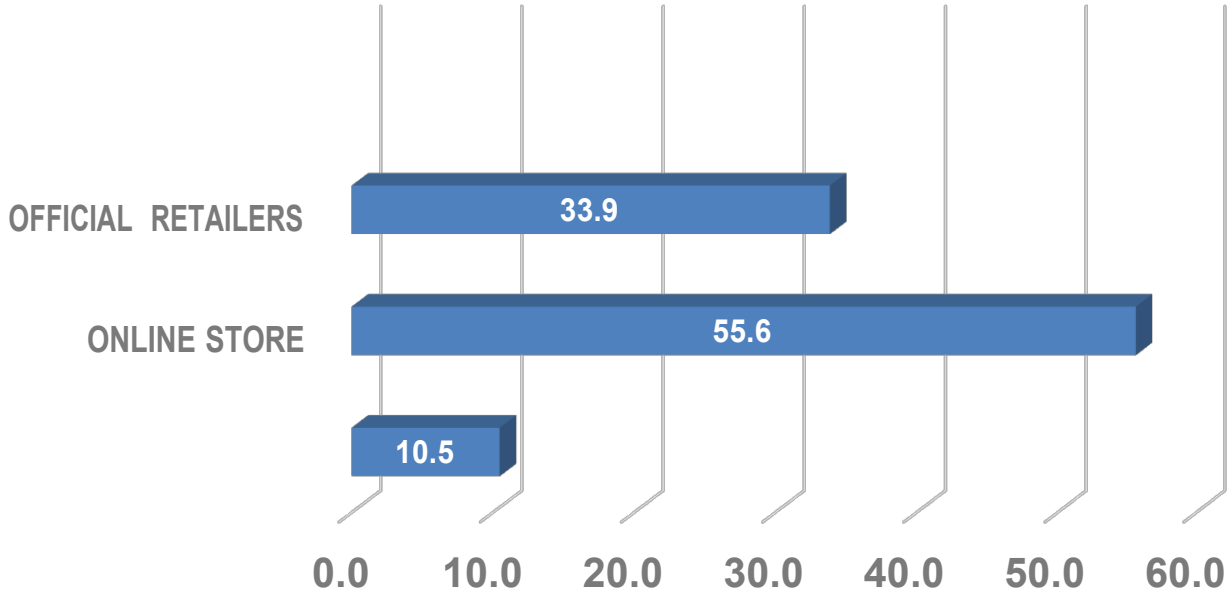


Figure 9 : Respontent's Choice of Outlets

On the todays competitive market there are two types of outlets namely: official retailers and online store. As anticipated by the people's interest in technology products 55.6 % respondents chose online store over official retailers. But around 10.5 % of respondents did not like to answer the question.

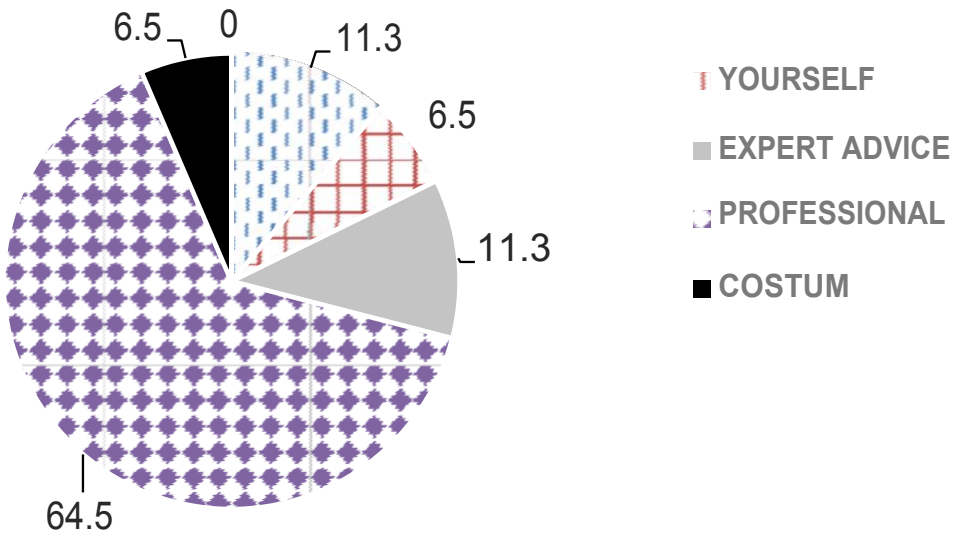


Figure 10 : Method of Installation of Home Automization Product

As Nepal being a developing country, we hoped that no respondents would like to install these automation technologies by themselves but interestingly about 6.5 % of respondents find installing these automation products by themselves. But 64.5 % would seek professional's help to install these automation products in their home. Some 11.3 % would seek expert advice and rest 6.5 % respondent would like to take the custom service provided by the company.

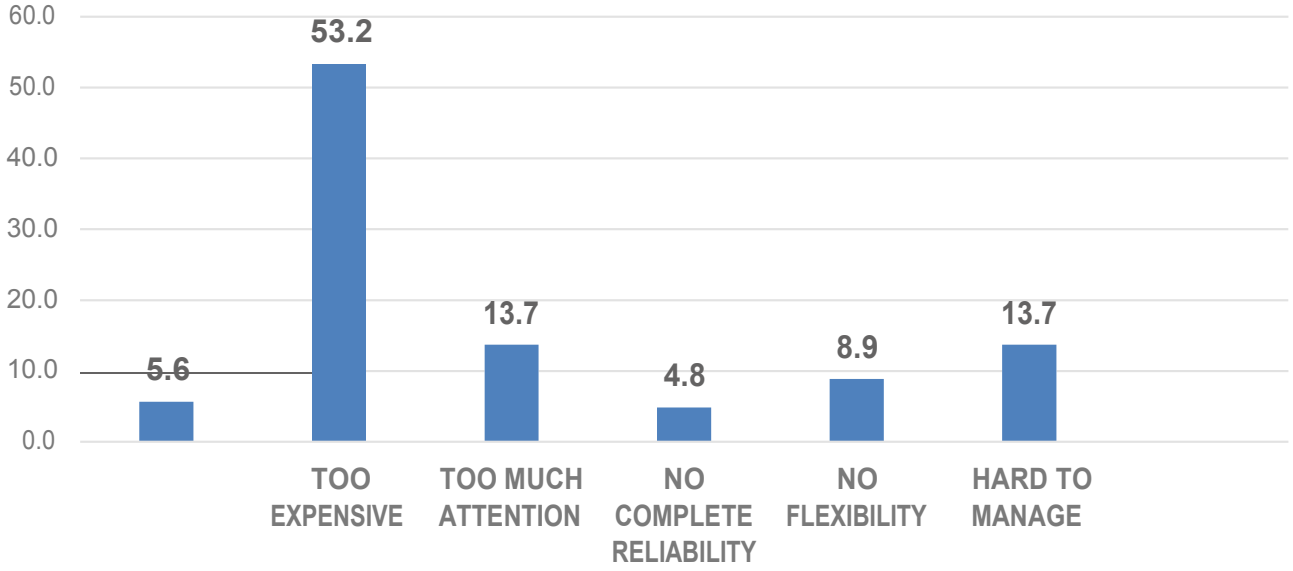


Figure 11: Expectation of Respondents to adopt Home Automization

As 41.3 % of our respondents had their income level between 20-30 thousand Nepalese rupees, around 53.2 % respondent marked "Too Expensive" as the main reason of not buying the automation products. Around 13.7 % thought it requires too much attention where as 13.7 % thought it would be hard to mange despite showing interest in technology. Others choices like no complete reliability and no flexibility we not the major concerns of the respondents.

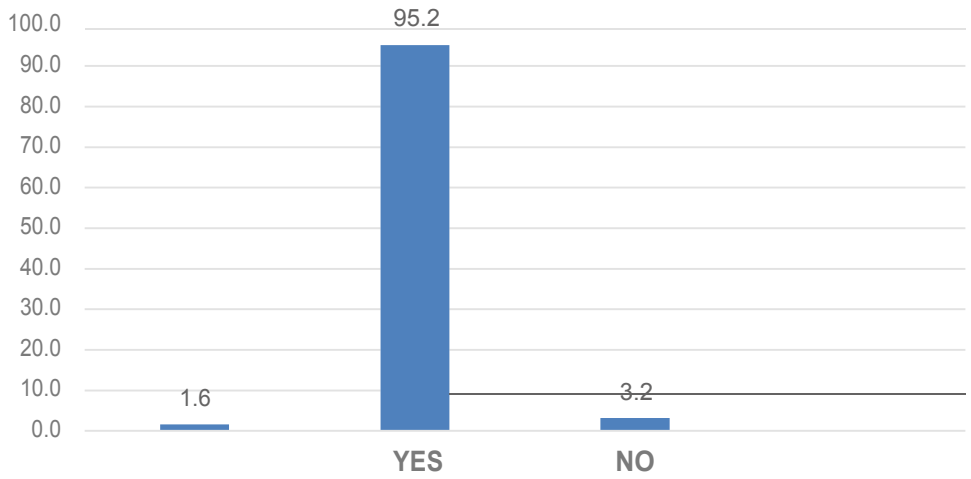


Figure 12: Recommendation of Automization

As this was the main question in our entire survey, 95.2 % respondents would like to recommend the automation products to their friends and relatives.

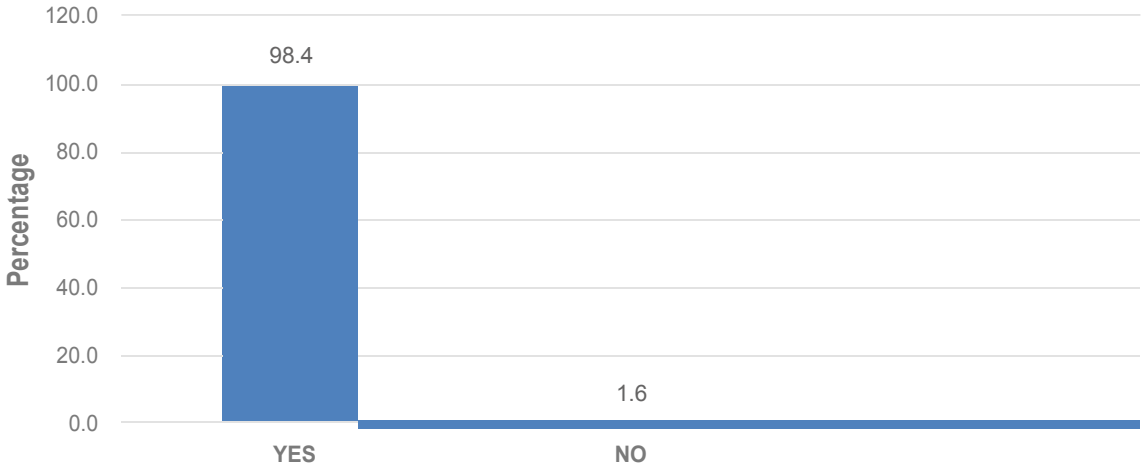


Figure 13: Demand of Automization Product in Future

98.4 % of the respondents answered YES to the question regarding the demand of automation in future, what we conclude out of this huge sublimation that they don't think that automation is the present need of general public of Chitwan, rather it to be a future need.

Summary of Findings

As seen from the data which was gathered from the survey it is clear that there is huge potential of automation products in Chitwan district of Nepal. Many respondents showing interest in technology products proves the future of these technologies in Nepal as well. This research also shows that with the increase in the salary of respondents the tendency to use automation for comfort and energy management increases. But as if for moderate respondents with salary of 60-90 thousand Security remains to be most important. Ownership of a house, Wi-Fi connections and educational qualifications of respondents had direct connections with the whether to select or not select automation for their household. But as most respondents answered NO for the possibility of using automation products in the present scenario, we found the research to be far cited than for this present scenario.

Discussion

From our survey we concluded that Home Automation could be a well-suited technology in near future. Reasons monitored that people are not likely to purchase Digital security system and Home Automation System includes-they are expensive, hard to maintain, high false alarm rate etc. Major sector where future of product can be seen includes home, industries, schools etc. Only 6 % of people disagreed to use products made in Nepal which put light on the interest of Nepalese people to use Nepalese products. During our survey respondent's we found that price of the product played a vital role for 47.6 % of our respondent. 53.2 % people thought that the expense of automation product will be the main aspect of not using automation product, but unexpectedly only 13.7 % thought that this kind of product will be hard to manage at the first place. We also tried to find that what would change the mind of respondent for adopting automation products, impressively 41.9 % agreed in transparency of the investment and cost rather than affordable price which was just 29.8 %.

Our plan is to generate awareness and find out the market potential for the need of home automation system. The home automation revenue is expected to rise as people become aware of its capabilities. Some recommendations that this research provides that will ensure good customer relations are as regular maintenance, relevant percentage of discount, a year warranty and scheme for custom installments, easy graphical user interface and application control system, security and EMI scheme and remote info sharing.

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Appendix 1

One question had relations with other, so that there will be uniformity of response.

On the session 1:

Answers to the questions below were our key concerns.

1. Are you interested in technology products?
   Reason: It shows will of the respondent in buying home automation products.
2. Family Monthly Income (in thousands, Nepalese rupees)
   Reason: Family income determines the capacity of the respondent to buy our product.
3. Gender
   Reason: Which gender is more likely to buy our products?

4. Whether they own that house or not?
5. Education status of the respondent.
6. Do they have Wi-Fi connection in the house?

   Reason: Our product as a full package is internet based hence Wi-Fi is the essential part of the survey

On the session 2:

Following questionnaire had important role:

1. Do you trust in home automation products?
2. How would you like to link with us?
3. If you were to install home automation products, how would you prefer to do?
4. Which of these places you prefer to have automation systems?
5. Do you recommend automation products to your friends/relatives?
6. Do you see demand of home automation products in FUTURE?
7. If this product is available in the market from today, how likely would you be to buy the product?
8. What would change your mind about adopting automation?
9. Are Automatic water pumps the most essential product in today's scenario?
10. Will Home automation would make your home secure?

Code Book for questionnaires

We used code book for coding and to serve as documentation of the layout and code definition of the data file. It will ease us on data analysis and decoding of the survey research. Code book is given below**.**

Concerns

We discussed on the behavior categories for the data analysis because it is not easy to determine the respondent response in demographic classification. Demographic classification is also included so that more accurate analysis of data is obtained.

To obtain the effective output of the data of HA we revised the questionnaires many times consulting with senior and our team members. The main purpose of analyzing data is to obtained useable and useful information. Questionnaires was made to analyze the each of the response of the individual so data were analyzed by using frequency distribution and visual technique based upon the behavior classification and draw inference. We used statistical analysis (regression) to relate dependent and independent variable.