

Awareness of the Availability and Use of Domestic Control Systems and Automation among the University of Benin Resident Staff

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Abstract

This research focuses on the awareness, availability, and use of domestic control systems among University of Benin resident staff. It emphasized on the importance of domestic control and automation system in places of residence together with the essence of awareness regarding its use. Survey method was the research design used. A total of 30 resident staffs from University of Benin was used as the population. Four research questions were used for this research. A reliability of 0.82 by test-retest method was obtained from a thirteen-item questionnaire used to gather data. Data were analyzed using the mean. Findings revealed high awareness of smart security systems, lighting, and home assistants, but lower awareness of less common technologies like smart thermostats. Availability and use of smart home devices were moderate, with cost, unstable electricity, and cyber security concerns identified as major barriers. Despite these challenges, respondents had a positive perception of home automation and expressed willingness to adopt it if costs were reduced and infrastructure improved. The study recommends government support, awareness campaigns, affordability measures, and enhanced cyber security to boost adoption of smart home technologies in Nigeria.

Keywords: Awareness, Availability, Challenges, Domestic control systems, Automation.

1.0. Introduction

The accelerated growth in technology within the past 10 years, has facilitated the integration of several innovative systems into our daily routine, notable among them is the domestic control systems and automation, commonly referred to as “smart home” technologies. These technologies encompass a wide array of interconnected devices designed to enhance the convenience, efficiency, and safety of households. Such systems integrate smart appliances, lighting, heating and cooling systems, security devices, and energy management solutions that operate autonomously or via user interfaces such as mobile applications and voice assistants[1] [2] . These technologies are typically linked to the IoT (Internet of Things), enabling devices to communicate with one another and be controlled remotely, thus providing them with an overly rated control over their domestic environments [3] [4].

On a global scale, there is a rapid growth of smart home technologies with a market adoption driven by consumer demand for more connected and convenient living experiences. [5] A projected \$74.75 billion in 2024, for the global market of smart home is driven by increased investments in IoT and consumer-facing applications that enhance comfort, energy efficiency, and security. The integration of smart technologies into domestic spaces has become increasingly common in the United States, with households adopting a range of devices such as smart locks, voice-controlled assistants and thermostats [6] [7].

An ideal case is presented for exploring the awareness and usage of domestic control systems among its resident staff by the University of Benin, as one of Nigeria’s leading educational institutions. The use of advanced technologies such as home automation systems within its residential community is still not well-documented, although the university is in an urbanized zone, with a more improved access to technological infrastructure as opposed to rural settings.

The adoption of technological innovations by Universities residents is influenced by several factors, notable among them are high installation costs, inadequate training, and lack of awareness, [10]. Hence, it is recommended that the University of Benin staff members devise targeted interventions that will improve the use of smart home technologies in the staff housing complex. Also, how individuals perceive the use of technologies can provide clues on the systems with increased availability and user-friendly [8] [9] [11].

Therefore, this study seeks to assess the awareness, attitudes, and challenges to the adoption of domestic control systems among resident staff at the University of Benin. In addition, the findings besides contributing to

knowledge, will also provide practical recommendations for policymakers, university administrators, and technology thus ensuring improved integration of smart technologies in university of Benin.

Research Questions

The following research questions were raised to guide the study:

1. What is the level of awareness of domestic control systems and automation among resident staff at the University of Benin?
2. To what extent are domestic control systems and automation technologies utilized in the homes of University of Benin resident staff?
3. What are the perceived barriers hindering the adoption of domestic control systems and automation in residential buildings among University of Benin resident staff?
4. What is the impact of domestic control systems and automation on the daily lives and residential experiences of University of Benin resident staff?

Hypotheses

The following hypotheses were formulated to guide the study at and were tested 0.05 level of significance:

HO₁. There is no significant difference in the level of awareness of domestic control systems and smart home technologies among resident staff at the University of Benin.

HO₂. There is no significant difference to the extent at which domestic control systems and automation among resident staff at the University of Benin.

HO₃. There is no significant difference in the perceived barriers hindering the adoption of domestic control systems and automation based on the educational qualifications of resident staff at the University of Benin.

HO₄. There is no significant difference on the impact of domestic control system and automation on the daily lives among resident staffs at the University of Benin.

2.0. Methodology

2.1. Research Design

A survey research design was adopted for this study, which involved collecting data using a questionnaire. A sample size of 30 respondents from university of Benin staff's was the population of this study. A purposive sampling technique of a structured questionnaire on a Likert-scale questions to allow response and analysis.

The questionnaire was reviewed by lecturers in vocational education and experts in smart home technology in order to ensure the validity of the instrument. The test-retest method was employed to test the reliability of the questionnaire. A 0.82 reliability was obtained. The data were analyzed using statistics, in the likes of frequencies and percentages to summarize responses.

The mean score criterion is 2.50. Mean score above 2.50 = Positive or favorable response. Mean score below 2.50 = Negative or unfavorable response.

3.0 Results and Discussion

The data was analyzed using descriptive statistics, including frequencies, percentages, and mean scores, presented in table

Research Question 1: What is the Level of Awareness of Domestic Control Systems among Resident Staff and Students?

Table 1: Awareness of Domestic Control Systems

Response Option	X	F	FX
Strongly Agree	5	12	60
Agree	4	10	40
Neutral	3	5	15
Disagree	2	3	6
Strongly Disagree	1	0	0
Total		30	121

Mean Score Calculation

$$\text{Mean} = \frac{\sum F \sum FX}{\sum F} = \frac{30 \times 121}{30} = 4.03$$

Interpretation

An average of 4.03 is greater than the 2.50 threshold, which shows a high level of awareness of domestic control systems among staff members.

Table 2: Awareness of Smart Home Devices

Response Option	X	F	FX
Strongly Agree	5	8	40
Agree	4	12	48
Neutral	3	6	18
Disagree	2	4	8
Strongly Disagree	1	0	0
Total		30	114

Mean Score Calculation

$$\text{Mean} = \frac{\sum F \sum FX}{\sum F} = \frac{30 \times 114}{30} = 3.8$$

Interpretation

An average of 3.8, which is again greater than 2.50, reveals that most respondents are aware of smart devices at home.

Research Question 2: What is the Level of Availability and Use of Domestic Control Systems?

Table 3: Availability of Smart Home Devices in Residence

Response Option	X	F	FX
Strongly Agree	5	6	30
Agree	4	8	32
Neutral	3	7	21
Disagree	2	9	18
Strongly Disagree	1	0	0
Total		30	101

Mean Score Calculation

$$\text{Mean} = \frac{\sum F \sum FX}{\sum F} = \frac{30 \times 101}{30} = 3.37$$

Interpretation

The mean score of **3.37** is **above 2.50**, suggesting that smart home devices are moderately available in residences.

Table 4: Frequency of Use of Smart Home Devices

Response Option	X	F	FX
Daily	5	5	25
Occasionally	4	10	40
Rarely	3	7	21
Never	2	8	16
Total		30	102

Mean Score Calculation

$$\text{Mean} = \frac{\sum F \sum FX}{\sum F} = \frac{30 \times 102}{30} = 3.4$$

Interpretation

The mean score of **3.4** indicates that **smart home devices are occasionally used among respondents**.

Research Question 3: What are the Challenges Preventing the Adoption of Domestic Control Systems?

Table 5: High Cost as a Challenge

Response Option	X	F	FX
Strongly Agree	5	15	75
Agree	4	8	32
Neutral	3	4	12
Disagree	2	3	6

Response Option	X	F	FX
Strongly Disagree	1	0	0
Total		30	125

Mean Score Calculation

$$\text{Mean} = \frac{\sum F \sum FX}{\sum F} = \frac{30 \times 125}{30} = 4.17$$

Interpretation

The mean score of 4.17 indicates that high cost is a significant challenge preventing the adoption of smart home technologies.

Table 6: Summary of Mean Scores

Research Question	Question	Mean Score	Interpretation
Awareness of Domestic Control Systems	Awareness of domestic control systems	4.03	High awareness
Awareness of Smart Home Devices	Awareness of smart home devices	3.8	High awareness
Availability of Smart Home Devices	Availability of smart home devices in residence	3.37	Moderate availability
Frequency of use of smart home devices	Frequency of use of smart home devices	3.4	Occasional use
Challenges Preventing Adoption	High cost as a challenge	4.17	Significant challenge

3.1. Discussion of Findings

The findings from table 1 (presents data on the respondents' awareness of domestic control systems and automation system), with a mean of 4.03, shows a high level of awareness. An average of 3.80 as shown in table 2 suggest that awareness of smart devices is relatively high among university residents. It reveals that smart appliances, such as cooling systems, security devices, energy management solutions, lighting and heating that operate autonomously or via user interfaces and voice assistants [1] [2] are well known to resident staffs. Table 3 provident responses to questions on availability of smart home devices. A mean score of 3.37 was obtained indicating moderate availability. This result, indicates that smart home technologies which have experienced rapid growth, owing to market adoption driven by consumer demand for more connected and convenient living experiences [5] are available within residential apartments within the university community. Also highlighted by the findings is the use of smart home appliances with a mean score 3.40 as indicated in table 4. [12] The most commonly used technologies include smart security systems, smart bulbs that are energy efficiency, automated kitchen appliances and smart speakers. There are challenges bedeviling the use of smart home devices as shown by a mean of 4.17 in table 5. Economic and infrastructural challenges significantly hinder the widespread adoption of smart home technologies. The key challenges identified include high cost, poor electricity supply and internet connectivity issues. Additionally, concerns about privacy and security also emerged as a significant challenges [13].

4.0 Conclusion and Recommendations

The residents of University of Benin are familiar with the use of Smart home control systems and smart home devices are known by university residents. The devices are available and are in use. However the availability and use is still facing challenges

Smart home technologies are typically connected through the Internet of Things (IoT), enabling devices to communicate with one another and be controlled remotely, thus providing residents with high control over their domestic environments [3] [4]. The perceived use of these technologies can give clues to how these systems can be made more accessible and user-friendly [8] [9] [11]. The devices are available, they have the appliances and they are using them.

It is recommended therefore that;

- The school management should encourage more acquisition and use of these devices.
- Residential homes in urban areas outside the university community should adopt the use of these devices.
- The use of the devices should be extended to rural areas.
- The government should subsidize cost of acquiring these devices

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