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IoT Adoption by the Young Consumer: An Extended ASE Perspective

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ABSTRACT

Home theft and burglary are prevalent in Dhaka city. Internet of things (IoT), in contrast, is commonly recognized as among the most advanced home security systems. However, the factors that attract young people to use IoT for household security have yet to be examined. Consequently, the purpose of this article is to validate the attitude-social influence-self-efficacy (ASE) model with personal innovativeness and perceived trust. We collected data from Dhaka citizens aged 15 to 24 using a purposive sample technique and 370 valid responses were chosen for the study. According to the analysis, all of our proposed hypotheses were found significant with a 73.6% variance. Furthermore, the effects of attitude and social influence were shown to be the highest and lowest, respectively, and trust and innovativeness were both nearly strong main predictors of ASE. Significantly, since this is one of the few studies in the technology adoption domain using this model, a solid foundation for IoT adoption for security purposes is established.

Keywords: ASE Model, IoT, Perceived Trust, Personal Innovativeness, Young Consumer

Ⅰ. Introduction

Theft and burglary are widespread in both developed and developing countries, and Dhaka is no exception. To put it simply, the Economist conducted a poll in 60 cities between 2017 and 2019 on several security concerns such as technology, health, infrastructure, and personnel. Notably, Dhaka city ranked 58th and 56th overall in 2017 and 2019, respectively (The Economist intelligence unit, 2017; The Economist intelligence unit, 2019). In addition, in 2016, 2017, 2018, and 2019, the Dhaka Metropolitan Police Department registered 1516, 1197, 1290, 127 theft crimes and 547, 554, 613, 49 burglary cases, correspondingly (Crime Statistics, 2019). Unfortunately, the actual reality is considerably worse because many illegal

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actions go unreported (Islam et al., 2018; Khan, 2015).

It is evident that regular monitoring and investment in security technologies can help drastically reduce criminal activities (Tseloni et al., 2017). A customary security system may include, among other things, a CCTV monitoring system, an alarm system, and a door-window lock. Internet of things (IoT) security appliances, on the other hand, are regarded as among the most modern, efficient, and powerful technology for securing homes, employing several sensors to keep track of homes from afar (Ijaz et al., 2016). As a result, if a suspicious incident occurs, this technology may alert customers in real-time where customary security systems are unable to execute these tasks. As a result, Surantha and Wicaksono (2018) have proven that IoT security is considerably superior to conventional security. Importantly, in Los Angeles and Dubai, this strategy reduces domestic crime by 55% and 20%, respectively (Harris, 2018; Ramahi, 2018). As a result, assessing the adoption of IoT-enabled security devices in Dhaka is critical, particularly from the standpoint of the younger generation. If IoT-enabled security systems were widely used in Dhaka city households, burglaries, theft, and other criminal attempts against residences would be decreased to levels comparable to those recorded in industrialized countries, and inhabitants would benefit greatly.

According to Kim et al. (2018), young people have different attributes and skills than older generations, and earlier research has indicated that they are more open to new and creative technologies. Furthermore, increasing youthful awareness is crucial for any company's future success. However, if new customers are not developed, the number of loyal customers will diminish in the future (Barua and Zaman, 2019). Many studies, including mobile applications (Mehra et al., 2020), mobile wallets (Shaw and Kesharwani, 2019), and purchasing behavior (Dharmesti et al., 2019) is aimed specifically at these young consumers. Furthermore, Bangladesh's young population is almost 48 million which has the potential to drive the country's consumer market (Empowering Youth through Volunteerism, Bangladesh, 2017). According to Albert et al. (2019), the younger generation is more acquainted with IoT devices than previous generations, and they are exposed to these devices more frequently. As a result, this generation has a better knowledge of how these technologies function and is more motivated to adopt them in comparison to other generations. Therefore, we are interested in analyzing their IoT usage for security concerns because they are educated, their thinking is different, and their responsible mentality is richer than before (Ali, 2017).

Moreover, a mixed finding has been identified from the viewpoint of young consumers' sensitivity towards security. According to Tiwari and Joshi (2020), generation z, or the young, is just as worried about security problems as any other age. Kanthawongs et al. (2021) have backed up these assertions, stating that security is a major issue for young people while purchasing online. Furthermore, in comparison to older responders, these folks feel a better feeling of confidence in the security of a smart home (Klobas et al., 2019). Adult clients, on the other hand, are highly security conscious, according to Dixit and Saroj (2010). Biselli and Reuter (2021) go on to say that young persons with a low level of education have reported far less security behavior in comparison to elder people with a higher level of education. Furthermore, the value of security among the young has been determined to be insignificant (Kim et al., 2021). In any case, Gkioulos et al. (2017) have discovered that owing to their strong self-confidence, young people prefer to overlook security risks in their daily lives. When security dangers are directly obvious, however, these people appear to take a more cautious approach. Finally, greater security knowledge does not always imply improved security conduct, according to Herbert et al. (2020), and so the security knowledge of young people may not always be properly transformed into behavior. As a result, evaluating the performance of young customers in the context of this study would be fascinating.

It's now more important than ever to pick the correct theory to assist consumers to understand how systems are accepted and used (Momani and Jamous, 2017). Several studies on users' willingness to accept new technologies have been undertaken using models such as TRA, TAM, TPB, UTAUT, and others (Nur and Panggabean, 2021). However, there are certain problems with these models. Importantly, when it comes to measuring usage behavior, however, the two elements that attract the most attention are attitude and social impact. To develop the attitude, social influence, and self-efficacy (ASE) paradigm, another cognitive factor, self-efficacy, is incorporated (de Vries et al., 1988). As confirmed by Chan et al. (2015), this ASE model can efficiently determine user intention and behavior. A more innovative person, on the other hand, will have a more positive attitude toward adopting new technologies such as IoT, which may lead to consumer acceptance (Pal et al., 2019; Sung and Jo, 2018). Furthermore, a higher level of trust enhances the likelihood of new technology adoption (AlHogail, 2018; Pal et al., 2019). As a result, integrating personal innovativeness and perceived trust as ASE model predictors should have a considerable impact on the adoption intentions of young potential users. Therefore, the study's objectives are as follows:

- To determine the influence of ASE model variables (attitude, social influence, and perceived self-efficacy) on the adoption intention of IoT for security reasons.
- To determine the influence of perceived trust on the ASE model variables (attitude, social influence, and perceived self-efficacy).
- To determine the influence of personal innovativeness on the ASE model variables (attitude, social influence, and perceived self-efficacy).

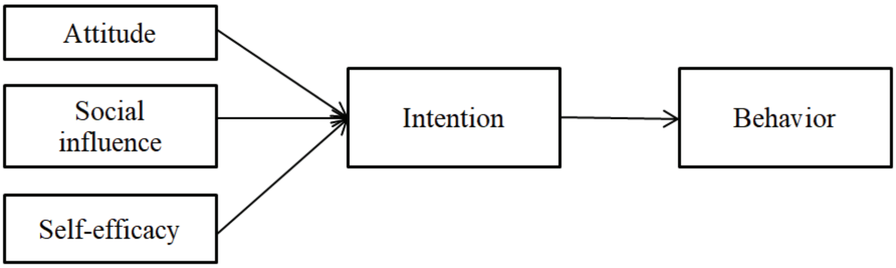
The remainder of this paper is organized as follows: The second section would briefly describe ASE's important information, contribution to its domain, previous studies on IoT adoption along with personal innovativeness and perceived trust. Following the list of hypotheses, a conceptual model would be provided in section 3. The study's methodology would be explained in Section 4. The analyses of the results would then be provided in section 5. The final sections (6 and 7) would include the conclusion as well as the study's proposals for future research.

Ⅱ. Conceptual Background

2.1. Overview of the ASE model

According to Ajzen (1991), when a person's attitude and social influence improve, they are more likely to enforce the conduct. Furthermore, self-efficacy refers to perceptions about one's ability to perform specific tasks under specific conditions (de Vries et al., 1988). The first two variables were inspired by Fishbein and Ajzen's TRA model, while self-efficacy was sparked by Bandura's social learning theory. As a result, De Vries introduced the ASE model in 1988, which was based on TRA and social learning theory (de Vries et al., 1995). In the ASE paradigm (see <Figure 1>), a given behavior is defined by an individual's action to carry out the activity, which is determined by attitude (ATT), social influence (SI), and self-efficacy (PSE).

Attitude is defined by the extent to which a person is motivated to harmonize with other people's ideas along the grounds for compliance, and social influence defines the extent to which a person is motivated to synchronize with other people's ideas. Furthermore, self-efficacy refers to a person's belief in the ability to carry out the planned action (de Vries et al., 1988). It is important to note that the



<Figure 1> ASE Model (Zwerver et al., 2011)

<Table 1> ASE Model in Different Papers

No	Reference	Year	Journals	Country	Sample Type	Sample Size	Citation	Application
1	Choi and Kim (2016)	2016	Osong Public Health and Research Perspectives	Korea	Nurse	215	20	Health
2	Goossens et al. (2019)	2019	Midwifery	Belgium, Sweden, and Ireland	Reproductive-Aged Men	304	4	Health
3	van Bree et al. (2015)	2015	Psychology of Sport and Exercise	Netherlands	Older Adult	1976	36	Health
4	Rodríguez-Calvillo et al. (2011)	2011	Health Policy	Spain and UK	General Practitioners	486	31	Health
5	Schellart et al. (2011)	2011	BMC Public Health	Netherlands	Insurance Physicians	231	09	Health
6	Schellart et al. (2013)	2013	BMC Health Services Research	Netherlands	Insurance Physicians	42	08	Health
7	Sandvik et al. (2010)	2010	Health education research	Norway	Sixth Graders	962	51	Health
8	Lotrean et al. (2013)	2013	Child: care, health and development	Romania and Netherlands	Junior High School Students	504	10	Health
9	Melbye et al. (2013)	2013	Appetite	Norway	10 - 12-Year-Olds And Their Parents	796 Child And 963 Parent	46	Health

three ASE constructs are similar to TPB variables. To demonstrate, social influence and self-efficacy play the roles of subjective norms and perceived behavior control, respectively, in maintaining a consistent attitude (Chan et al., 2015; Schellart et al., 2011). Unlike TPB, ASE is largely used to treat only health-related concerns, as seen in <Table 1> below. Notably, we have used Google Scholar to find out the number of citations.

2.2. Literature Review of IoT Adoption

Educationists, researchers, entrepreneurs, and professionals are all exhibiting a keen interest in IoT at the moment, owing to its huge potential in a variety of sectors across the globe (Suppatvech et al., 2019). Menard and Bott (2020) identified the privacy of IoT devices in improving respondents' comprehension of data sharing mechanisms. In addition, the APCO model was utilized to reveal the unexpected and significant variations in internet privacy from the IoT context. On the other hand, BRT and EPAM were utilized to focus on healthcare and fintech services, respectively (Lim et al., 2018; Sivathanu, 2018). Indeed, most of the IoT-related papers used the TAM to address different applications like smart home, smart watches, etc. (Al-Emran et al., 2020; Nikou, 2019; Shuhaiber and Mashal, 2019). Shin et al. (2018) noticed a vital scenario where, unlike other sophisticated ICT goods and services, older customers were more inclined to buy the smart home sooner than young customers. On the flip side, Sohn and Kwon (2020) claimed that the TAM may not be the appropriate paradigm to describe new technologies like AI-based intelligent technologies.

Consequently, Al-Momani et al. (2018) integrated TAM and UTAUT where adoption intention was predicted by all of the proposed factors except social influence. Both Yang et al. (2017) and Klobas et al. (2019) studied the adoption of the smart home utilizing two different models TPB and TRA, respectively. Mobility, trust, privacy, and security were found to be the influencing factors in the first paper whereas attitude, behavioral control, and risk were significant in the latter one. On the other hand, perceived ease of use, perceived usefulness, and attitude had a substantial favorable impact on the desire to adopt IoT in the future (Narakorn and Seesupan, 2019). Surprisingly, Sung and Jo (2018) claimed that all of the hypothesized variables influenced intention but not attitude. Furthermore, consumer innovativeness had a moderating effect on attitudes regarding IoT services and intentions to adopt them.

Both Rajmohan and Johar (2020) and Beh et al. (2019) utilized the UTAUT2 model in IoT-based studies. The first paper found that the technology is highly linked to uncertainty, thus physicians considered their mindset before deciding to implement IoT. In contrast, the findings of the second paper helped smart-watch developers, and advertisers create more successful gadgets and tactics and thereby promote smart watches for health applications. Finally, Vishwakarma et al. (2020) claimed their study to be the first research to look at customer perceptions of the benefits and drawbacks of virtual reality using VAM. Notably, the findings of these IoT-related papers are summarized and included in <Appendix>.

2.3. Perceived Trust

The assumptions that a system has all of the required components to perform as predicted under varied scenarios are known as trust (McKnight et al., 2011). San-Martín and Camarero (2012) have discovered that, regardless of where they are from, trust is a central determinant of loyalty among young customers. Furthermore, Bryce and Fraser (2014) have reported that trust is particularly crucial for young people in online interactions. In addition, various studies have found the importance of trust among youths. Consider the following examples: e-commerce (Bylok, 2020), mobile payments (Khalilzadeh et al., 2017), and financial institutions (Shim et al., 2013). Trust, on the other hand, is typically defined as the desire to depend on something or someone for security (Safa and Ismail, 2013). This is also known as 'hard trust,' which is founded on concrete security measures and usually supported with assurance (Nagarajan and Varadharajan, 2011). It is also critical in relation to information security (Safa and Solms, 2016). When there is no risk, trust is unnecessary; nonetheless, it may be an effective technique for dealing with an unpredictable situation (Kim et al., 2008). In uncertain situations, trust helps people grasp the broader aspects of technology and reduces their susceptibility (AlHogail, 2018). Recent research on technology adoption has emphasized trust as a critical aspect of user behavior. Consider shuttle service (Chen, 2019), online shopping (Rehman et al., 2019), and social commerce (Sheikh et al., 2019). Importantly, human psychology research has emphasized the need of including trust in adoption studies to fully understand the key factors that influence consumer acceptance and consumption of IoT commodities (AlHogail, 2018; Gao and Bai, 2014; Pal et al., 2019).

2.4. Personal Innovativeness

Personal innovativeness (PI) is defined by Agarwal and Prasad (1998) as a person's readiness to adopt new technologies. Early adopters of technologies are more innovative than others (Kalinic et al., 2019). Young people are said to be more innovative than their elders (Schwieger and Ladwig, 2018; Vandecasteele and Geuens, 2008) and they are the first ones to accept new technologies (Ramgade and Kumar, 2021). This innovativeness has been connected to young consumers in different research, such as the adoption of smart wearables (Jeong et al., 2017), electronic devices (Nasution and Astuti, 2013), mobile banking (Lim et al., 2020), and so on. Furthermore, consumers with a high PI level are more likely to comprehend and appreciate emerging innovations than others, although there are hazards. These people have a stronger capacity for accepting security and dealing with uncertainty since they prefer the novelty that almost any modern technology delivers (Pal et al., 2019). Additionally, this component has recently been included in several technology adoption studies, including mobile payment (Patil et al., 2020), m-commerce (Sair and Danish, 2018), and digital marketing (Bhagat et al., 2019). Importantly, PI can help consumers embrace IoT technologies and services too (Sung and Jo, 2018; Pal et al., 2019).

In short, PT and PI have been included in the proposed model since they are highly associated with young consumers' behavior. On the other hand, these two variables have been identified to be the efficient predictors in the information security and IoT adoption domain that corresponds to our study context.

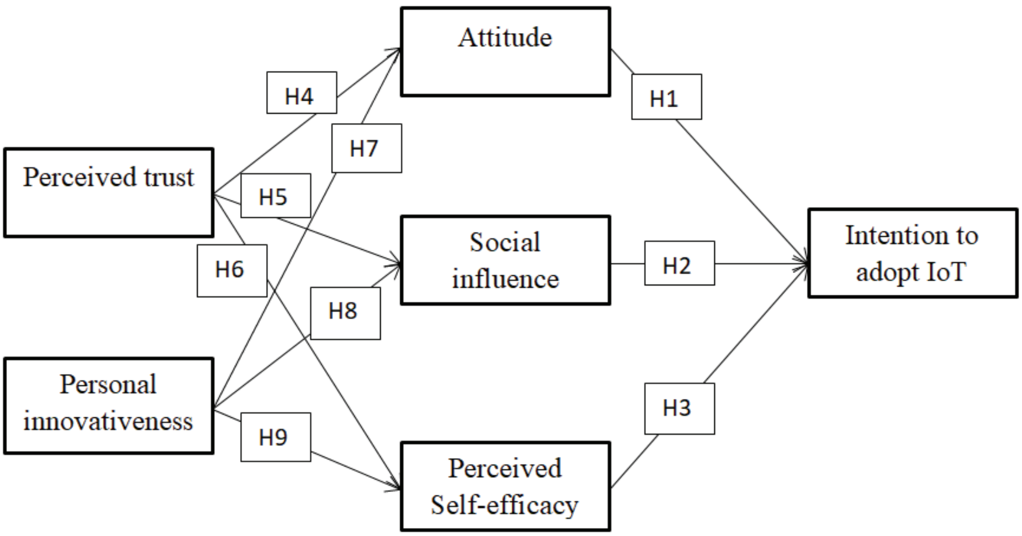
2.5. Research Gaps

This research contributes to the corpus of knowledge by addressing the following crucial gaps. Firstly, there has been no special emphasis on IoT security in the household. Dhaka residents, on the other hand, are inexperienced with IoT. As a result, it is understandable that the researchers have not done much study on how IoT security equipment is used in their homes. Secondly, even though young consumers are more willing to absorb new technologies on the one hand and have a greater consumer market involvement on the other, there has been little research on this demographic in Bangladesh. Thirdly, the ASE model has not been thoroughly researched to assess the adoption of any technology. Though TPB and ASE models are equally capable, the contribution of the ASE model is limited in the technology adoption domain. Finally, the influence of perceived trust and personal innovativeness on the ASE model is almost unknown in this context. As a result, these are the research gaps in this field that must be filled.

Ⅲ. Research Model and Hypotheses

We have suggested the following model in <Figure 2> based on the research goals, in which the ASE model has been expanded to include PT and PI as predictors. Initially, the conceptual model shows how the ASE factors influence IoT adoption intentions for security concerns. Afterward, how the PT and PI impact ASE variables independently are demonstrated. In the conceptual model, ASE factors have a direct impact on the intention to adopt IoT (AI). PT and PI, on the other hand, predict ASE model components and have an indirect impact on AI.

Attitudes toward information security, also known as intrinsic motivation, have a strong connection with the behavioral intention of young university students (Farooq et al., 2019). According to Prakash and Pathak (2017), understanding young customers' attitudes about environment-friendly packaged commodities is crucial in increasing their intention to consume them. Individuals, on the other hand, will have a positive attitude to security standards if they are concerned about security flaws (Ryutov et al., 2018). Individuals pay more attention to the attitude in the acceptance of IoT devices, which is important (Karahoca et al., 2018). Besides, it has been observed that one's attitude has a positive impact on one's intention to participate in m-learning (Azizi and



<Figure 2> Proposed Extended ASE Model

Khatony, 2019), mobile payment (Khayer and Bao, 2019), online purchases (Chatterjee et al., 2019), and science service (Kao et al., 2019). As a result, we can put up the following hypothesis:

H1: Attitude has a positive effect on the intention to adopt IoT for security reasons.

Before using a wearable IoT device, young people usually seek advice from their friends and relatives to avoid regret (Pal et al., 2019). It is necessary to handle the social impact part of IoT technology in order to promote its utilization (Gao and Bai, 2014). Hasbullah et al. (2016) have looked at internet purchasing through the eyes of Malaysian young and has supported that assertion. Farooq et al. (2019) have found that social impact is one of the key determinants of Kenyan students' security behavior, as well as BYOD security regulations (Cho and Ip, 2018). In addition, this social influence is observed to impact positively the intention of e-learning (Samsudeen and Mohamed, 2019), mobile payment (Oliveira et al., 2016), and the educational system (Ebardo et al., 2019). As a result, we may make the following hypothesis:

H2: Social influence has a positive effect on the intention to adopt IoT for security reasons.

In comparison to older adults, young people show more self-efficacy (Fan et al., 2020). It enables individuals to respond to the threat of information disclosure by taking action (Wang and Liu, 2014). It also has a positive effect on the intention to adopt preventative actions, with stronger self-efficacy resulting in a greater intention to battle the threat (Roberto et al., 2019). This variable, on the other hand, has a direct influence on whether or not people adopt IoT technology, according to Alhasan et al. (2020). Besides, this is found as one of the most vital predictors of intention in the study of computer safety (Berthevas, 2018), IoT systems (Dupuis and Ebenezer, 2018), and mobile payment (Wang, 2019). As a result, we may formulate the following hypothesis:

H3: Perceived self-efficacy has a positive effect on the intention to adopt IoT for security reasons.

Trust is one of the most effective ways for reducing uncertainty and dangers while providing a sense of security. As a result, customer trust in IoT technology is expected to have a significant impact on adoption plans for security reasons (Gao and Bai, 2014). When it comes to security issues, having trust in purchasing services has a positive impact on e-commerce attitudes (Chakraborty et al., 2016). Young clients' faith in the internet, on the other hand, is important to the expansion of e-commerce in terms of transaction security (Bylok, 2020). Similarly, in order to protect their safety, young clients must put their trust in banks and financial organizations (Shim et al., 2013). Furthermore, a critical factor that influences a person's attitude toward taking action should be trusted (Kasilingam, 2020). With a coefficient of 0.62, Wang and Tseng (2011) have identified that trust is the biggest predictor of attitude. Furthermore, there is a positive link between these factors (Shin, 2010). ß = 0.387, on the other hand, implies a considerable positive relationship between trust and social influence (Chin et al., 2009). Furthermore, trust has a favorable correlation with social impact (Borhan et al., 2017). Finally, users acquire self-efficacy in their capacity to solve challenges when they establish trust in a system's operation. As a result, trust takes precedence over self-efficacy (Craig et al., 2010), and it has been proven to be a good predictor of self-efficacy (Olagoke et al., 2020). As a result of the above debate, the following hypothesis may be proposed:

H4: Perceived trust has a positive effect on attitude to adopt IoT for security reasons.
H5: Perceived trust has a positive effect on social influence to adopt IoT for security reasons.
H6: Perceived trust has a positive effect on perceived self-efficacy to adopt IoT for security reasons.

Younger individuals are more innovative, and they view technology as more useful and enjoyable than their elders. Therefore, they are more accustomed to new technologies and have better attitudes to use them. Besides, when it comes to a new product or service, innovativeness is the most crucial factor for youthful customers (Kasilingam, 2020). This author has also investigated the influence of young consumers' innovativeness on their intention to use IoT services as a consequence. A person with a high degree of technical innovativeness, on the other hand, is more likely to notice new circumstances or risk perceptions earlier and engage in early adoption. To put it another way, innovative people are more likely to accept the security risks associated with the adoption of new technologies (Wang and Lee, 2020). Importantly, younger customers who are more innovative, experience favorable attitudinal shifts (Amoroso and Lim 2015). Therefore, personal innovativeness has been performed as a predictor of attitude in several studies (Aydin and Burnaz, 2016; Kasilingam, 2020). On the other hand, for creative individuals, social influence is a crucial topic. Individuals easily embrace the new system when their important ones advise them to utilize it (Turan et al., 2015). In addition, this innovativeness is noticed to be positively related to social influence in some studies (Akar, 2019; Pandey and Chawla, 2018). Finally, innovative people have greater degrees of self-efficacy while completing new activities or entering new situations (Thatcher and Perrewe, 2002). So, innovativeness is found to predict self-efficacy positively (Kim and Park, 2018; Sombat et al., 2018). As a result of the above debate, we may state the following hypothesis:

H7: Personal innovativeness has a positive effect on attitude to adopt IoT for security reasons.
H8: Personal innovativeness has a positive effect on social influence to adopt IoT for security reasons.
H9: Personal innovativeness has a positive effect on perceived self-efficacy to adopt IoT for security reasons.

Ⅳ. Research Methodology

4.1. Instrument Development

The instruments for the Extended ASE variables were adapted from prior research as can be seen in <Table 3>. Before that, minor adjustments were made to the components to ensure that they fit inside the model's structure using a pre-test. Besides, the operational definition of each variable can be found in <Table 2> which was followed during the adaptation of items.

Scales for measuring ATT (4 questions), PSE (6 items), PT (4 items), and AI (4 items) were adapted from Iranmanesh et al. (2017), Thompson et al. (2017), Mashal and Shuhaiber, (2019) and Zhou et al. (2020) respectively. Besides, Magotra et al. (2016) provided SI (6 items) and PI (5 items). In addition, the self-administered, quantitative, and cross-sectional survey employed a 7-point Likert scale

<Table 2> Operational Definition of Variables

No	Constructs	Definition
1	Attitude	It defines as an assessment of beneficial or harmful feelings experienced by young users when adopting the IoT for security objectives (Fishbein and Ajzen, 2010).
2	Social Influence	It defines the extent to which a young is motivated to synchronize with other people's ideas to adopt IoT for security reasons (de Vries et al., 1988).
3	Self-Efficacy	It denotes a young user's belief in his/her capacity to use IoT devices to take the appropriate security precautions (de Vries et al., 1988).
4	Perceived Trust	It is characterized as a young consumer's reliance on the IoT for security purposes (Currall and Judge, 1995).
5	Personal Innovativeness	It indicates that a young is more advanced in using IoT for security considerations than others (Agarwal and Prasad, 1998).

<Table 3> Survey Items

Variable	No	Items	Adapted from
Attitude	ATT1	Using IoT devices in my household for security purposes would be a good idea.	Iranmanesh et al. (2017)
	ATT2	Using IoT devices in my household for security purposes would be a wise idea.	
	ATT3	I like the idea of using IoT devices in my household for security purposes.	
	ATT4	Using IoT devices in my household for security purposes would be a pleasant experience.	
Social Influence	SI1	I would use the IoT devices in my household because as persons who play important role in my life want me to use them.	Magotra et al. (2016)
	SI2	I would use the IoT devices in my household because my friends want me to use them.	
	SI3	I would use the IoT devices in my household because as people who are valuable to me recommend me to use it	
	SI4	I would use the IoT devices in my household because people who inspire me are using them.	
	SI5	I would use the IoT devices in my household because my family members want me to use them.	
	SI6	I would use the IoT devices in my household as other persons in my social circle want me to use them.	
Perceived Self Efficacy	PSE1	Taking the necessary security measures using IoT devices would be entirely under my control.	Thompson et al. (2017)
	PSE2	I have the resources and the knowledge to take the necessary security measures using IoT devices.	
	PSE3	Taking the necessary security measures would be easy using IoT devices.	
	PSE4	I would be able to protect my house by myself using IoT devices.	
	PSE5	I would be able to enable security measures using IoT devices in my house.	
Perceived Trust	PT1	I feel IoT devices for security purposes in my household would be trustworthy.	Mashal and Shuhaiber (2019)
	PT2	I feel IoT devices for security purposes in my household would be reliable.	
	PT3	I feel IoT devices for security purposes in my household would be controllable.	
	PT4	I feel IoT devices for security purposes in my household would be efficient.	

<Table 3> Survey Items (Cont.)

Variable	No	Items	Adapted from
Personal Innovativeness	PI1	The latest technologies allow me to work more in lesser time.	Magotra et al. (2016)
	PI2	I am interested to search for the latest technological developments taking place around me.	
	PI3	I keep myself up with the latest technological developments which provide better results with fewer efforts.	
	PI4	Other people come to me for advice on the usage and benefits of the latest technologies.	
	PI5	In general, I am among the first in my social circle to acquire new technology whenever it is available.	
Adoption Intention	AI1	I am willing to adopt IoT devices for household security purposes.	Zhou et al. (2020)
	AI2	I intend to adopt IoT devices for household security purposes in the future.	
	AI3	I predict I would adopt IoT devices for household security purposes.	
	AI4	I think I will always try to adopt IoT devices for household security purposes.	

(strongly disagree to strongly agree). In addition, we conducted a pre-test and a pilot survey on the selected respondents of 8 and 35 individuals to ensure the validity and reliability of the adapted instruments. The participants double-checked the language and length of the items during the pre-test. Besides, they commented on the items and make them more acceptable. However, following the pilot survey, one PSE item was eliminated due to a low factor loading score. For the remaining 28 items, indicator reliability, internal consistency, discriminant reliability, and convergent validity were all determined to be adequate from the pilot test.

4.2. Data Collection

To acquire data from our target respondents, we employed a purposive sampling method. Data was obtained solely from participants who were between the ages of 15 and 24, Dhaka city residents, and potential users of this system. Notably, according to the United Nations report (Youth and the 2030 Agenda, 2018), youth should be between the ages of 15 and 24. To choose our preferred participants, we utilized the following questions:

- Do you use IoT devices for security purposes in your households?
- Are you aware of using IoT devices for security purposes in your households?
- Do you live in Dhaka city?
- Is your age between 15-24 years?

The participants who answered negatively to the 1st question and positively to the rest other questions were allowed to complete the questionnaire. Before the final data collection through the survey, the minimal number of samples was calculated using the G*Power 3.1 tool and it was determined to be 119. The data were collected from April 6 to May 29, 2021. Because of the epidemic (Covid-19), all data were collected online using a Google Form. Anyway, 576 people were polled through email, messenger, and WhatsApp. Following that, 370 authentic responses were picked for review, producing a response rate of 64.2%.

Ⅴ. Data analysis and results

Among the respondents, 260 were males and 110 were females. According to the sample demographics, the bulk of participants was between the ages of 20 and 24, with those between the ages of 15 and 19 coming in second. Furthermore, a large pool of participants was students, with 136 and 184 Bachelors and HSCs, respectively. Furthermore, the utmost young people were single. In addition, most respondents claimed to have a moderate to excellent comprehension of computers and the internet. Furthermore, maximum of them were familiar with internet technology, having experience with it for more than 4 years and utilizing it for more than 4 hours/day for a range of activities (see <Table 4>).

The SPSS v26 was used to analyze the demographic questionnaire and preliminary data screening. Furthermore, Harman's single factor was used to calculate the independent sample t-test, which provided a value of roughly 36.9%. Therefore, no common method bias problem was detected. It is worth mentioning that CMV occurs when only one item accounts for more than half of the item (50%) covariance (Podsakoff and Organ, 1986). In the online survey, however, all questions were required to be answered. As a result, there were no concerns with missing values. In addition, partial least squares of structured equation modeling were used to test our proposed extended ASE framework. Furthermore, our model's data was validated using the Smart PLS 3.3.3 software, which is commonly preferred by academicians (Wong, 2013). This evaluation strategy was divided into two phases: an assessment of the measurement model to verify reliability and validity, and an examination of the hypotheses using a structural model.

Factor loading is a statistic that measures the

<Table 4> Demographic Characteristics of the Respondents

Category	Group	Frequency	Percentage
Gender	Women	110	29.73%
	Men	260	70.27%
Age (In Years)	20 to 24	251	67.84%
	15 to 19	119	32.16%
Educational Experience	Post Doctorate	0	0.00%
	PhD	0	0.00%
	Masters	10	2.70%
	Bachelors	136	36.76%
	Diploma	14	3.78%
	Higher Secondary Certificate	184	49.73%
	Secondary School Certificate	17	4.59%
	No recognized academic degree	5	1.35%
	Other degrees	4	1.08%
Marital Type	Married	36	9.73%
	Single	334	90.27%
Profession	Freelancing	4	1.08%
	Business	19	5.14%
	Student	322	87.03%
	Private job	7	1.89%
	Public job	5	1.35%
	Don't work	10	2.70%
	Other jobs	3	0.81%
Computer Skill	Very good	74	20.00%
	Good	168	45.41%
	Moderate	99	26.76%
	Poor	27	7.30%
	Very poor	2	0.54%
Internet Skill	Very good	100	27.03%
	Good	186	50.27%
	Moderate	73	19.73%
	Poor	10	2.70%
	Very poor	1	0.27%

<Table 4> Demographic Characteristics of the Respondents (Cont.)

Category	Group	Frequency	Percentage
Internet Usage Experience	4 years and more	270	72.97%
	3 to 4 years	67	18.11%
	1 to 2 years	26	7.03%
	Fewer than 1 year	6	1.62%
	No experience with the internet	1	0.27%
Internet Use/Day	4 hours and more	276	74.59%
	3-4 hours	64	17.30%
	1-2 hours	18	4.86%
	Fewer than 1 hour	6	1.62%
	No use/day	6	1.62%

strength of the relationship between two or more items (Yong and Pearce, 2013). In contrast, internal consistency and convergent validity were assessed using the average variance extracted (AVE) and composite reliability (CR) methods. All components must have a factor loading, CR, and AVE value of more than 0.5, 0.7, and 0.5 to be permitted (Hair et al., 2014). As is noticed in <Table 5>, all the requirements were met.

Multicollinearity has an impact on dependability, which is measured using the variance inflation factor (VIF). Furthermore, VIF values greater than 5 are not allowed (Daoud, 2018). <Table 6> shows that the elements were distinct and that their inter-correlation strengths were within the acceptable bounds.

The square root of each variable's AVE must be greater than the highest squared correlation of any other variable, according to Fornell and Larcker's (1981) criteria. According to this criterion, the diagonal values must be greater than the corresponding row and column values. As demonstrated in <Table 7>, the measures were sufficient and passed the discriminant validity test.

<Table 5> Factor Loadings, Outer VIF, CR, and AVE

Variables	Items	Factor Loadings	Outer VIF Values	Composite Reliability	AVE
Adoption Intention	AI1	0.918	3.561	0.954	0.838
	AI2	0.921	3.941		
	AI3	0.898	3.082		
	AI4	0.926	4.065		
Attitude	ATT1	0.901	3.035	0.944	0.809
	ATT2	0.873	2.570		
	ATT3	0.902	3.179		
	ATT4	0.922	3.723		
Personal Innovative-Ness	PI1	0.811	2.243	0.915	0.683
	PI2	0.855	2.665		
	PI3	0.880	2.826		
	PI4	0.789	2.121		
	PI5	0.792	2.123		
Perceived Self-Efficacy	PSE1	0.817	2.107	0.938	0.753
	PSE2	0.852	2.578		
	PSE3	0.884	2.956		
	PSE4	0.889	3.286		
	PSE5	0.893	3.354		
Perceived Trust	PT1	0.919	3.738	0.953	0.835
	PT2	0.892	2.918		
	PT3	0.926	4.076		
	PT4	0.918	3.596		
Social Influence	SI1	0.835	2.311	0.947	0.749
	SI2	0.844	2.771		
	SI3	0.888	3.429		
	SI4	0.878	3.138		
	SI5	0.848	2.601		
	SI6	0.898	3.851		

The coefficient of determination (R^2) can be used to evaluate a structural model's explanatory ability (Hair et al., 2014). In this study, the R^2 values for AI, ATT, PSE, and SI were 0.736, 0.730, 0.584, and 0.489, respectively (see <Table 8>).

<Table 6> Multicollinearity

Relationships	Inner VIF Values
ATT → AI	1.975
PI → ATT	2.216
PI → PSE	2.216
PI → SI	2.216
PSE → AI	1.809
PT → ATT	2.216
PT → PSE	2.216
PT → SI	2.216
SI → AI	1.879

<Table 7> Discriminant Validity

Variables	AI	ATT	PI	PSE	PT	SI
AI	0.916					
ATT	0.826	0.899				
PI	0.811	0.786	0.826			
PSE	0.679	0.617	0.659	0.868		
PT	0.775	0.807	0.741	0.748	0.914	
SI	0.640	0.636	0.682	0.591	0.609	0.865

<Table 8> Coefficient of Determination

Dependent Variables	R^2 values	Adjusted R^2 values
AI	0.736	0.734
ATT	0.730	0.729
PSE	0.584	0.581
SI	0.489	0.486

With the hypothesized association directions, all nine of our hypotheses (H1 - H9) were significant (see <Table 9>). Six hypotheses were highly supported ($P < 0.001$), two were moderately supported ($P < 0.01$), and the remaining one was weakly supported ($P < 0.05$). However, the impact of attitude and social influence on adoption intention was

<Table 9> Results of Hypotheses

Hypothesis No	Relation-Ships	B Values	T Values	P Values	Remarks
H1	ATT → AI	0.608	10.428	0.000	Supported
H2	SI → AI	0.114	2.967	0.003	Supported
H3	PSE → AI	0.236	3.700	0.000	Supported
H4	PT → ATT	0.498	4.356	0.000	Supported
H5	PT → SI	0.230	2.978	0.003	Supported
H6	PT → PSE	0.576	5.150	0.000	Supported
H7	PI → ATT	0.417	3.683	0.000	Supported
H8	PI → SI	0.512	7.227	0.000	Supported
H9	PI → PSE	0.232	2.169	0.031	Supported

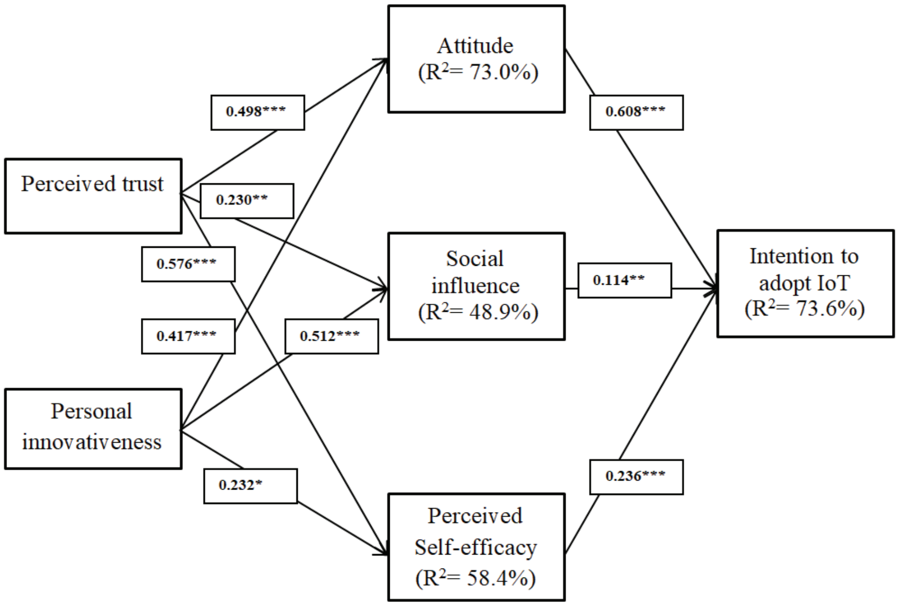
<Table 10> Predictive Relevance

Dependent Variable	Q^2 values
AI	0.611
ATT	0.581
PSE	0.432
SI	0.358

shown to be the biggest and lowest among the relationships. However, both PT and PI were found to be almost equally strong key determinants of ASE (see <Figure 3>).

Moreover, the predictive relevance of the model was examined with the blindfolding procedure (see <Table 10>). The Q^2 value of AI, ATT, PSE, and SI was 61.1%, 58.1%, 43.2%, and 35.8% respectively which is greater than 0 and suggests that the model is adequately predictive (Hair et al., 2014).

The effect size can be split into three categories: weak, moderate, and substantial, with values more than or equal to 0.02, 0.15, and 0.35 (Hair et al., 2014). <Table 11> reveals that we found three substantial, two moderate, and four minor effect sizes.



Note: ns = non-significant, *p < 0.05, **p < 0.01, ***p < 0.001

<Figure 3> Structural Model

<Table 11> Effect Size

Relationships	f^2 Values	Remarks
ATT → AI	0.709	Substantial effect
SI → AI	0.026	Weak effect
PSE → AI	0.117	Weak effect
PT → ATT	0.415	Substantial effect
PT → SI	0.047	Weak effect
PT → PSE	0.360	Substantial effect
PI → ATT	0.291	Moderate effect
PI → SI	0.232	Moderate effect
PI → PSE	0.058	Weak effect

Ⅵ. Discussion and implications

6.1. Discussion of Findings

As these criminal activities commonly occur in the vicinity of our houses (Chon, 2017), we have focused our research on burglary and home theft. Developed countries, on the other hand, have been able to reduce criminal activity through the employment of advanced security systems (Hodgkinson and Andresen, 2019). When compared to other types of security systems, an IoT-enabled security system is one of the most modern and efficient (Surantha and Wicaksono, 2018). As a result, the introduction of an IoT-enabled security system is expected to benefit Dhaka residents in terms of home security. To achieve our goal, we improved the ASE model to better understand the factors that inspire young people to adopt IoT owing to security concerns. Following the model, a set of hypotheses was offered to study the model's variable interactions. Besides, the results were compared with existing literature too.

Hypothesis H1 states that a higher ATT level leads to a higher AI level. H1 is highly supported by the data, with AI (β = 0.608, $p < 0.001$) being favorably impacted by the ATT. The findings also show that ATT has a substantial effect (f^2 = 0.709) on AI. Furthermore, this finding is found to be consistent with past research (Karahoca et al., 2018). Because of the huge benefits of IoT-based security systems, this strong and significant influence of attitude on intention shows that young users are strongly planning to use them.

Hypothesis H2 states that a higher SI value will result in a higher AI value. The SI (β = 0.114, $p < 0.01$) has a substantial beneficial impact on AI, according to the findings. In this context, Lee and Shin (2019) have obtained comparable results. The SI has a weak effect (f^2 = 0.026) on AI, according to the results. Therefore, it may be stated that before making any technology-related decisions, young consumers rely on the advice of friends, well-wishers, and family members.

The PSE and AI have a positive connection, according to hypothesis H3. This finding is backed up by Al-Emran et al. (2020), who have come to the same conclusion. Furthermore, the path coefficient and effect size are determined to be β = 0.236, $p < 0.001$, f^2 = 0.117, implying that PSE has a weak and favorable effect on AI. As a result, it is reasonable to conclude that young customers feel confident in their abilities to manage IoT systems in their homes.

According to Wang and Tseng (2011), PT and ATT have a strong connection. The current research's findings, on the other hand, have matched those of the previous study. The path coefficient and effect size are determined to be β = 0.498, $p < 0.001$, and f^2 = 0.415, respectively, suggesting that PT has a positive and high effect on ATT, thus supporting H4. As a result, it may be concluded that an individual has sufficient knowledge and comprehension of the system, resulting in trustworthiness and a favorable attitude subsequently.

The hypothesis H5 shows that PT has a beneficial effect on SI. Anyway, the PT (β = 0.230, $p < 0.01$) has a substantial impact on SI, according to the findings. As a result, hypothesis H5 can be considered valid. In addition, the data show that the PT has a weak effect (f^2 = 0.047) on SI. The obtained results are in line with prior research (Chin et al., 2009). So, it is clear that the system's trustworthiness has a substantial impact on all aspects of social influence, such as friends, family members, and well-wishers.

Hypothesis H6 has comparable outcomes to Hypothesis H5 and is likewise supported. The H6 hypothesis states that PT has a favorable effect on PSE. Likewise, the findings of this study show that the PT (β = 0.576, $p < 0.001$) has a substantial impact on PSE. Furthermore, the effect size, f^2 = 0.360, shows that the PT highly affects PSE. The results are somewhat consistent with those of the previous study (Craig et al., 2010). As a result, where such sentiments have formed an individual's technology-oriented efficiency, the system is trusted to be useful, helpful, and predictable.

Hypothesis H7 states that a higher PI level leads to a higher ATT level. H7 is highly supported by the data, with ATT (β = 0.417, $p < 0.001$) being favorably impacted by the PI. The findings also show that the PI has a moderate influence (f^2 = 0.291) on ATT. Furthermore, this finding is noticed to be consistent with past research (Kasilingam, 2020). As a result, it might be claimed that young customers are sufficiently innovative to adopt a positive and risk-taking attitude toward adopting such a system.

Hypothesis H8 states that a higher PI value will result in a higher SI value. PI (β = 0.512, $p < 0.001$) has a substantial beneficial impact on SI, according to the findings. In this context, Akar (2019) has obtained comparable results. The finding also shows that the PI (f^2 = 0.232) has a moderate impact on SI. Therefore, customers receive benefits from social influence because it gives more proof of the innovation's authenticity, appropriateness, and confidence in adopting it.

The PI and PSE have a positive connection, according to hypothesis H9. This finding is backed up by Kim and Park (2018), who has come to the same conclusion. Furthermore, the path coefficient and effect size are determined to be β = 0.232, $p < 0.05$, and f^2 = 0.058, implying that PI has a weak and favorable influence on PSE. This implies that young people with a high level of innovativeness are likely to display more efficacies while using new technology like IoT.

6.2. Limitations and Future Research Directions

There are a few limitations of this study that can be addressed in future research. Firstly, adult participation has been excluded from the study, which is only for the younger generation. Since, young individuals are seldom decision-makers in their families, the adoption of such a system may not be entirely dependent on their decisions. According to Mbaga-Semgalawe et al. (2000), the head of the household is the ultimate decision-maker in matters of adoption, and his or her choice is based on the consent of other family members (Brown and Venkatesh, 2005). Twine et al. (2019) also believe that the household head should be an adult of at least 24 years of age. Therefore, it is highly important to measure the acceptance of household heads to enhance the adoption of IoT-enabled security devices. As a result, any future research must include a sample of this adult population. Furthermore, we may compare the data obtained from these two generations, which will contribute to the present study. Secondly, the comparison between male and females were not considered. Thereafter, the moderating impact of age and gender can be an interesting topic since there might be a variation in IoT acceptance between male-female and young-adult consumers. Notably, Albert et al. (2019) have confirmed a variation between gender and generation in IoT adoption. Thirdly, it would be a nice idea to compare the performance of teenagers and young adults in this study context. In such a case, the outcomes of the study would be more simplified and specific for a particular group. Fourthly, this study is conducted primarily from the perspective of developing countries. However, cultural differences in industrialized nations may have an impact. Additionally, demographic information including computer, internet proficiency, and internet usage may be employed as control factors in future studies to help generalize the findings. Including the control variables can lead to larger impact sizes and meaningfully negative or positive regression coefficients, as Li (2021) notes. Finally, the research is conducted from the perspective of an individual. However, the organizational environment might also be worthwhile to explore as it might lead to different factors for IoT adoption for security studies.

6.3. Implications for Theory and Practice

This work has addressed several previously unknown topics from the theoretical viewpoint. Primarily this research has addressed all the research gaps as identified in Section 2.5. To begin with, this is one of the first studies to look at the factors that influence people's intentions to utilize IoT in their homes for security reasons. Notably, consumer adoption of IoT devices and services has been studied by researchers (Hsu and Lin, 2018; Pal et al., 2019; Sung and Jo, 2018). In any event, home security problems have not been expressly addressed in these situations. Second, the study's target sample is Dhaka city's youthful customers who have hitherto been underserved from theoretical repercussions. Third, we have inherited the ASE model from the health domain to our IoT security domain. Notably, TPB has been utilized in the past to solve IoT-related challenges (Fu and Wu, 2018; Viot et al., 2017; Yang et al., 2017), however, the ASE model has not been extensively employed in this context, although these two models are competent. Finally, in this study, perceived trust and innovativeness are employed as predictors of the ASE model, which has not yet been comprehensively validated. Furthermore, according to our findings, these two variables can successfully expand the ASE model. Therefore this study stands out as one of the first to incorporate these factors into a single research model in an effort to better understand the elements that affect consumers' intentions to utilize IoT for security concerns. As a result, by examining user adoption behavior using this distinctive model, this study may strengthen the theoretical understanding of IoT adoption for security reasons. It also lays a solid foundation for information system literature, contributes to the body of information on IoT management, and might mark the beginning of a theory regarding the adoption of IoT-enabled security devices.

From a practical viewpoint, this study adds young customers' behavioral intentions to protect themselves from home hazards, enabling the improvement of preventative programs. First, in terms of policy implications, the current research justifies the use of trust and innovativeness to encourage young people to adapt to IoT-based security solutions. Besides, IoT companies should put more effort into developing trust with their consumers. Moreover, users may opt to stay with the IoT platform for a longer amount of time if they have a high degree of trust. Furthermore, clients have a high level of innovativeness and are willing to accept any new technological innovation, such as IoT, as it is anticipated to be advantageous. Second, this study is projected to raise public knowledge of household security, which will help to improve Dhaka's general law and order situation. Besides, this security awareness can assist the Bangladesh Government's Digital Vision 2021 in terms of citizen safety where household safety has also been taken into account in terms of health and social security ("Making vision 2021 a reality," 2012). However, these regulations did not include any provisions for family security utilizing IoT devices. As a result, our research is capable to supplement existing policies and frameworks with new ideas and information.

Ⅶ. Conclusion

A secure and safe dwelling is a fundamental requirement for everyone, and home security is a big worry for everybody who owns or rents a home (Baqutayan et al., 2015). Dinisman and Moroz (2017) found that 81% and 78% of burglary and home theft victims were emotionally impacted, with 21% and 13% reporting substantial emotional distress. On the other side, IoT is one of the most advanced security systems available, and it has helped to drastically reduce crime in developed countries. As a consequence, if Dhaka citizens choose to deploy IoT in their homes, burglary will reduce for sure. On the other hand, we've taken the ASE model from the health domain and applied it to the information security domain. Furthermore, we have expanded and empirically validated the ASE model by including perceived trust and personal innovativeness as predictors of young people's propensity to use IoT for home security. According to our findings, both the predictors' PT and PI are found to be efficient predictors for the ASE model in our study. In addition, ATT, SI, and PSE are found to have a direct impact on AI, whereas PT and PI have an indirect impact. Further, the variance is found as 73.6% which is almost substantial. Therefore, we can claim that the obtained data has been well fitted within the model. Moreover, these two variables (perceived trust and personal innovativeness) can play an important role in the development of the ASE model too. Besides, the obtained results are found to be consistent with prior literature. Importantly, the findings of ASE factors relating to perceived trust and personal innovativeness are nearly unprecedented in this context, and they have opened a new arena of research in the information system.

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<Appendix>

<Table> Summary of IoT Adoption Studies

No	Authors	Cite	Journals, Year	Theory/ Model	Method	Variables	Findings	Implications
1	Philip Menard, and Gregory J. Bott	(Menard and Bott, 2020)	Computers and Security, 2020	APCO	Quantitative	TRU, RIS, PRI, SOS, VIS, INT	Internet was rated differently from the privacy of IoT devices viewpoint. Furthermore, it improved respondents' comprehension of data sharing mechanisms, which influenced their attitudes and future IoT plans.	This study contributed by revealing unexpected and significant variations in internet privacy from the context of the IoT.
2	Brijesh Sivathanu	(Sivathanu, 2018)	Journal of enabling technologies, 2018	BRT	Quantitative	ATT, RSNF, RSNA, CONV, UBIQ, ADV, COMP, UBAR, TBAR, OPEN, RIS, INT	UBIQ, ADV, COMP, and CONV were found to be grounds for adoption, whereas UBAR, TBAR, and RIS were found to be reasons against adoption.	The BRT model was used to study the uptake of IoT-based wearables for healthcare among elderly people by combining the RSNF and RSNA into a unified model.
3	Se Hun Lim, Dan J. Kim, Yeon Hur and Kunsu Park	(Lim et al., 2018)	International Journal of Human-Computer Interaction, 2018	EPAM	Quantitative	SKNO, PSEC, SSEC, PSEC, NSEC, DSEC, CONFM, PU, SATF	In mobile Fintech services, SKNO and PSEC had a substantial impact on consumers' confirmation and perceived usefulness.	The 2nd order PSEC as an extended portion of PAM was developed and empirically tested.
4	Shahrokh Nikou	(Nikou, 2019)	Telematics and Informatics, 2019	TAM and IDT	Quantitative	COST, INNOV, PU, PEOU, COMP, TRIAL, OBSRV, INT	The findings demonstrated that COMP, PU, and PEOU were significant drivers of smart home adoption.	This was among the first empirical studies to include consumer innovativeness into the framework.
5	Mostafa Al-Emran, Andrina Granic, Mohammed A. Al-Sharafi, Nisreen Ameen, and Mohamed Sarrab	(Al-Emran et al., 2020)	Journal of Enterprise Information management, 2020	TAM and PMT	Quantitative	PS, PV, SE, RE, COST, PU, PEOU, INT	Students' intention for using smartwatches as teaching content was significantly influenced by PV, SE, RE, COST, PEOU, and PU.	This was a groundbreaking study that combined the PMT and the TAM to create a new comprehensive theoretical model for studying the uptake of smartwatches for academic reasons.

<Table> Summary of IoT Adoption Studies (Cont.)

No	Authors	Cite	Journals, Year	Theory/ Model	Method	Variables	Findings	Implications
6	Kwonsang Sohn, and Ohbyung Kwon	(Sohn and Kwon, 2020)	Telematics and Informatics, 2020	TAM, TPB, UTAUT, and VAM	Quantitative	PEOU, PU, ATT, SN, PFEE, PVAL, PTECH, ENJOY, INT	Decomposition analysis was used to compare the effect of each element on purchase intention. Besides, the VAM was determined to be the most effective at simulating user acceptability.	The TAM may not be the appropriate paradigm to describe new technologies like AI-based intelligent technologies.
7	Adai Mohammad Al-Momani, Moamin A Mahmoud and Mohd Sharifuddin Ahmad	(Al-Momani et al., 2018)	Journal of Organizational and End User Computing, 2018	TAM and UTAUT	Quantitative	PU, PEOU, SI, COST, KNO, TRU, PRINSEC, INT, BV	Intention impacted behavior, which was predicted by all of the proposed factors except SI.	The goal of this research was to fill a vacuum in the literature by including elements like KNO and TRU.
8	Ahmed Shuhaiber, and Ibrahim Mashal	(Shuhaiber and Mashal, 2019)	Technology in Society, 2019	TAM	Quantitative	ATT, PEOU, PU, ENJOY, AWARE, TRU, RIS	TRU, AWARE, ENJOY, RIS, PU, and PEOU had a strong impact on attitudes, which in turn had a large impact on intent to use smart homes.	One of the first studies in the smart home literature looked at the link between AWARE and ATT.
9	Heetae Yang, Hwansoo Lee and Hangjung Zo	(Yang et al., 2017)	Industrial Management and Data Systems, 2017	TPB	Quantitative	ATT, SN, PBC, AUTOM, MOB, PRINSEC, RIS, TRU, IOPR, INT	Smart home adoption was influenced by elements such as MOB, PRINSEC, and TRU.	By including both service usability and negative considerations, this study suggested and verified a novel theoretical model
10	Jane E. Klobas, Tanya McGill, and Xuequn Wang	(Klobas et al., 2019)	Computers and Security, 2019	TRA	Quantitative	ATT, PBC, RIS, INT	The impact of education level on smart home technology acceptance was explored, and it was shown that persons who were elder and more knowledgeable were more inclined to make their safety risk evaluation.	Young people not only showed more positive attitudes about smart home devices, but they also had reasonable security risk assessments as older people.
11	Jungyeon Sung, and Jaewook Jo	(Sung and Jo, 2018)	Journal of Theoretical and Applied Information Technology, 2018	UTAUT	Quantitative	PE, EE, SI, FC, RIS, INT	All of the hypothesized variables influenced intention but not attitude. Furthermore, consumer innovativeness had a moderating effect on attitudes regarding IoT services and intentions to adopt them.	This study concentrated on the consumer's response and attempted to explore customers' thoughts.

<Table> Summary of IoT Adoption Studies (Cont.)

No	Authors	Cite	Journals, Year	Theory/ Model	Method	Variables	Findings	Implications
12	Rajphriyadharshini Rajmohan, and Md Gapar Md Johar	(Rajmohan and Johar, 2020)	International Journal of Recent Technology and Engineering, 2020	UTAUT 2	Quantitative	PE, EE, SI, FC, CREDI, INT	PE, EE, SI, CREDI, and FC were shown to be the most important predictors of consumers' behavioral intentions toward IoT adoption.	This study found that technology is highly linked to uncertainty, thus physicians should consider their mindset before deciding to implement IoT.
13	Jungwoo Shin, Yuri Park, and Daeho Lee	(Shin et al., 2018)	Technological Forecasting and Social Change, 2018	TAM	Quantitative	COMP, PRI, PU, PEOU, ATT, INT	COMP, PEOU, and PU had a considerable favorable impact on purchasing intention	Unlike other sophisticated ICT goods and services, older customers were more inclined to buy the smart home sooner than young customers.
14	Phaik Khee Beh, Yuvaraj Ganesan, Mohammad Iranmanesh and Behzad Foroughi	(Beh et al., 2019)	Behaviour and Information Technology, 2019	UTAUT 2	Quantitative	PE, EE, SI, FC, PRVAL, HEDM, INT	PE, EE, FC, and HEDM had a beneficial effect on behavioral intentions to use the smartwatch for fitness and health tracking.	The findings can help smartwatch developers, and advertisers create more successful gadgets and tactics and thereby promote smart watches for health applications.
15	Pankaj Vishwakarma ,Srabanti Mukherjee, and Biplab Datta	(Vishwakarma et al., 2020)	Journal of Destination Marketing and Management, 2020	VAM	Quantitative	PVAL, ENJOY, PU, COST, RIS, PIMM, PCOMX, SSEEK, INT	The relevance of PIMM and RIS as the two most important markers of benefits and sacrifice, respectively. Besides, PVAL was also discovered to be among the most significant antecedents of VR acceptance.	This was the first research to look at customer perceptions of the benefits and drawbacks of VR.
16	Prasittichai Narakorn, and Tummatinna Seesupan	(Narakorn and Seesupan , 2019)	International Journal of Social Sciences, 2019	TAM	Quantitative	PU, PEOU, ATT, CINT	PEOU, PU, and ATT of IoT had a substantial favorable impact on the desire to adopt IoT in the future.	These ideas may be used by company owners to develop new technologies and gain a competitive edge.

Theory/Model:
APCO: Antecedents-Privacy Concerns-Outcomes; BRT: Behavioral reasoning theory; EPAM: Extended post-acceptance model; TAM: Technology acceptance model; IDT: Innovation Diffusion Theory; PMT: Protection motivation theory; TPB: Theory of Planned Behavior; UTAUT: Unified Theory of Acceptance and Use of Technology; VAM: Value-based adoption model; TRA: Theory of Reasoned Action.

Variables:
Trust: TRU; Risk: RIS; Privacy: PRI; Scope of sharing: SOS; Visualization: VIS; Attitude: ATT; Reason for: RSNF; Reason against: RSNA; Convenience: CONV; Ubiquitous: UBIQ; Advantage: ADV; Compatibility: COMP; Usage barrier: UBAR; Traditional barrier: TBAR; Openness: OPEN; Knowledge: KNO; Perceived Security: PSEC; Service Security: SSEC; Network Security: NSEC; Device Security: DSEC; Confirmation: CONFM; Perceived usefulness: PU; Satisfaction: SATF; Social influence: SI; Awareness: AWARE; Cost (response): COST; perceived value: PVAL; Innovativeness: INNOV; Perceived ease of use: PEOU; Perceived severity: PS; Perceived vulnerability: PV; Self-efficacy: SE; Trialability: TRIAL; Observability: OBSRV; SUBJECTIVE NORM (social norm): SN; Perceived Fee: PFEE; Perceived Technicality: PTECH; Enjoyment: ENJOY; Perceived Behavioral Control: PBC; Privacy and security: PRINSEC; Facilitating condition: FC; Mobility: MOB; Credibility: CREDI; Automation: AUTOM; Interoperability: IOPR; Performance expectancy: PE; Effort expectancy: EE; Price value: PRVAL; Hedonic motivation: HEDM; Perceived immersion: PIMM; Perceived complexity: PCOMX; Sensation-seeking: SSEEK; Intention: INT; Continuous intention: CINT; Behavior: BV; Privacy and security: PRINSEC; Service knowledge: SKNO

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