Smart home for YOLD in Thailand

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Abstract

From the statistics of the number of elderly people in 2021, it was found that Thailand has a total population of 66,666,666 people, 12,462,010 people aged 60 years and over, 1,396,343 people aged 80 years and over. From a situation, the Thai government has continued the action plan for the elderly (2002-2022) and prepare Thai society to become an aging society completely in the year 2021. There are still some operations that need to be improved

For Thailand Smart home market trends, social middle-class people with income and having purchasing power will be the purchaser of the product. In Thailand, the Siam Cement Company Limited focuses on the convenience of living energy saving and health-enhancing devices for residents that can be controlled by using a smartphone. The advantages of smart homes are that they can be controlled through an application and operate the home devices via smartphone or tablet is a decentralized system, if one of the devices is broken but other devices will still be able to operate normally, highly flexible in use and can add additional devices to the system There is no need to modify the whole system. Operate only by installing additional equipment to the control point to enable interoperability. This makes the system maintenance costs relatively low because if there is damage, it can fix only the point, no need to modify the whole system.

Keywords: Guidelines, Smart home, YOLD, Thailand

1. Introduction

Due to the declining fertility rate of the world population Plus, the population is living longer because of more effective medical care and the population born in the Baby Boomers era has entered the old age. It is a factor that has caused many countries in the world to undergo a significant social change in the structure of the society: the rapid increase in the aging population, especially in developed countries such as France, Sweden, Japan. According to the World Health Organization (WHO), the number of people aged 60 and over is projected to increase by at least 3% per year and approximately 1.4 billion people and will increase to 2 billion by 2050. The proportion of people aged 60 and over in Asia is expected to increase rapidly. (Department of Mental health, 2021).

For Thailand, the National Statistical Office predicts that Thailand will enter a fully aging society in 2022 and by 2030 the proportion of the elderly population will increase to 26.9% of the country's population.

From the statistics of the number of elderly people in 2021, it was found that Thailand has a total population of 66,666,666 people, 12,462,010 people aged 60 years and over, 1,396,343 people aged 80 years and over, with details as follows:

Table1: Number of elderly people in Thailand, 2021.

Elderly 60+	
Current population aged 60+	12,469,010
population aged 60 this year	372,061
Deaths of population aged 60+ this year	180,909
Net aged 60+ increased this year	191,152
Elderly 65+	
Current population aged 65+	8,250,193
population aged 65 this year	299,234
Deaths of population aged 65+ this year	160,512
Net aged 65+ increased this year	138,722
Elderly 80+	
Current population aged 65+	1,396,343
population aged 65 this year	81,509
Deaths of population aged 65+ this year	68,632
Net aged 65+ increased this year	12,877

Source: National Statistical Office, 2021

From a situation, the Thai government has continued the action plan for the elderly (2002-2022) and prepare Thai society to become an aging society completely in the year 2021. From the evaluation of the action plan. There are still some operations that need to be improved, such as preparing the population for quality aging promotion and development of the elderly and social protection for the elderly. In addition, the National Board of Elders have adjusted the action plan (2020-2022), which is a collaboration of many agencies. Focusing on the main issues, namely, campaigning to raise awareness of the society on the necessity of preparing for the elderly Working people understand how to prepare for things such as income, health, and housing.

Elderly housing is important, as the elderly are prone to physical changes in many areas, proper housing adjustments are essential. so that the elderly can do various daily activities easily and safely Reduce the risk of slipping and prevent accidents. that may occur. In the latter we are seeing more innovations in home, these are meant to support the aging society that is spreading in many countries around the world. Whether it's familiar things like GPS, Bluetooth or Wi-fi, it has been developed to have a variety of uses become the main connection channel which extends to other types of facilities such as heat sensor type appliances cleaning robots, etc.

For Thailand Smart home market trends, social middle class people with income and having purchasing power will be the purchaser of the product. The market value of smart home products in 2020 will be as high as 2,500 million baht, an increase from 2016 at 645 million baht or an average growth of 40 percent per year (Kultida Denwittayanan T, 2017) In Thailand, the Siam Cement Company Limited (SCG) focuses on the convenience of living. energy saving and health-enhancing devices for residents that can be controlled by using a smartphone (Estopolis, 2017). The advantages of smart homes are that they can be controlled through an application and operate the home devices via smartphone or tablet is a decentralized system (decentralize), if one of the devices is broken but other devices will still be able to operate normally, highly flexible in use and can add additional devices to the system. To modify or install additional systems There is no need to modify the whole system. Operate only by installing additional equipment to the control point to enable interoperability. This makes the system maintenance costs relatively low. Because if there is damage, it can fix only the point, no need to modify the whole system. (Atkitchenmag, 2017).

Most of the problems with smart homes in Thailand that are causing its use are not widespread due to consumer misunderstandings. About the importance of automation

security systems are costly to install and expensive equipment. Which many people still do not understand and do not see the importance of the system that is useful in any aspect Therefore, smart home systems in Thailand are not very popular (Guru, 2017). In the past, there have been a number of studies that have addressed smart homes, such as one of the (Kim, Park, & Choi, 2017) studies based on the value-based adoption model (VAM) and the technical acceptance model (TAM) is the main research study on the acceptance of smart home services by using Internet of Things devices, which does not cover studies in development and design. Smart home for the elderly. In the article of Guidelines for developing Smart home for YOLD in Thailand, the researcher has studied preliminary concepts and theories as follows:

2. Smart Home Concept

Smart Home is the use of computer technology, control, visualization and communication through a network of various home facilities to meet the needs of users. To control the automation of the whole system and more convenient management (Fang, Misra, Xue, & Yang, 2012). In addition, it will increase user-device interaction. For smart home environments (Du, Wang, & Mi, 2013; Gao, Hu, Yao, & Ren, 2014; Wu & Fu, 2012). Today's smart home systems are connected to wireless sensor network technology. It can reduce the installation cost in the cable segment. It also gives the system the flexibility to expand the connection of additional devices in the future (Chan, Campo, Estève, & Fourniols, 2009). Device status can be checked at any time (Lara & Labrador, 2013).

Nowadays, smart homes allow us to control our homes remotely. There are smart home hubs connected via cloud or smartphone applications with artificial intelligence (AI) that play an important role in the smart home. Artificial intelligence in the home can make everyday tasks easier. For example, in a home with a smart home hub such as Amazon Echo Alexa to control various devices in the house, smart lights, temperature control systems. (thermostats) locks and applications Instead of using a smartphone as a controller, a smart home hub can be used as a virtual assistant. In a smart home hub implementation, consumers will say. and give commands through the device It is connected to the cloud (Tang, 2017).

The home electrical control system supports a platform for analytics. and control the electricity consumption of residents and is a way to organize the electrical system in order and energy efficiency in a smart home system consists of the following four main components (Li et al., 2018).

1. The main system consists of a database server, application server, Security equipment and more cloud-based.

2. Communication channels are divided into long-distance communication networks and local communication networks, such as broadband communications and wireless communication.

3. command section and connected to a device called a smart home hub is the core of a smart home system. It is the main device to control the user's interface to intelligent electrical devices.

4. Smart electrical devices consist of sensors, intelligent electrical, equipment security equipment.

Smart homes are useful in facilitating residents in four aspects: 1) convenience. It can command various devices inside the house via a smartphone, operate remotely. 2) Control. Able to order various appliances adjust and set the time to turn on and off automatically as well as to alert the various operating systems via smartphone. 3) Safety System connected to CCTV motion sensor burglar alarm or sending a notification to the police station Security guards 4) Health care and the elderly heart rate sensor system or a system for contacting for emergency help to the hospital (Prapaporn Kullimratchai, 2016)
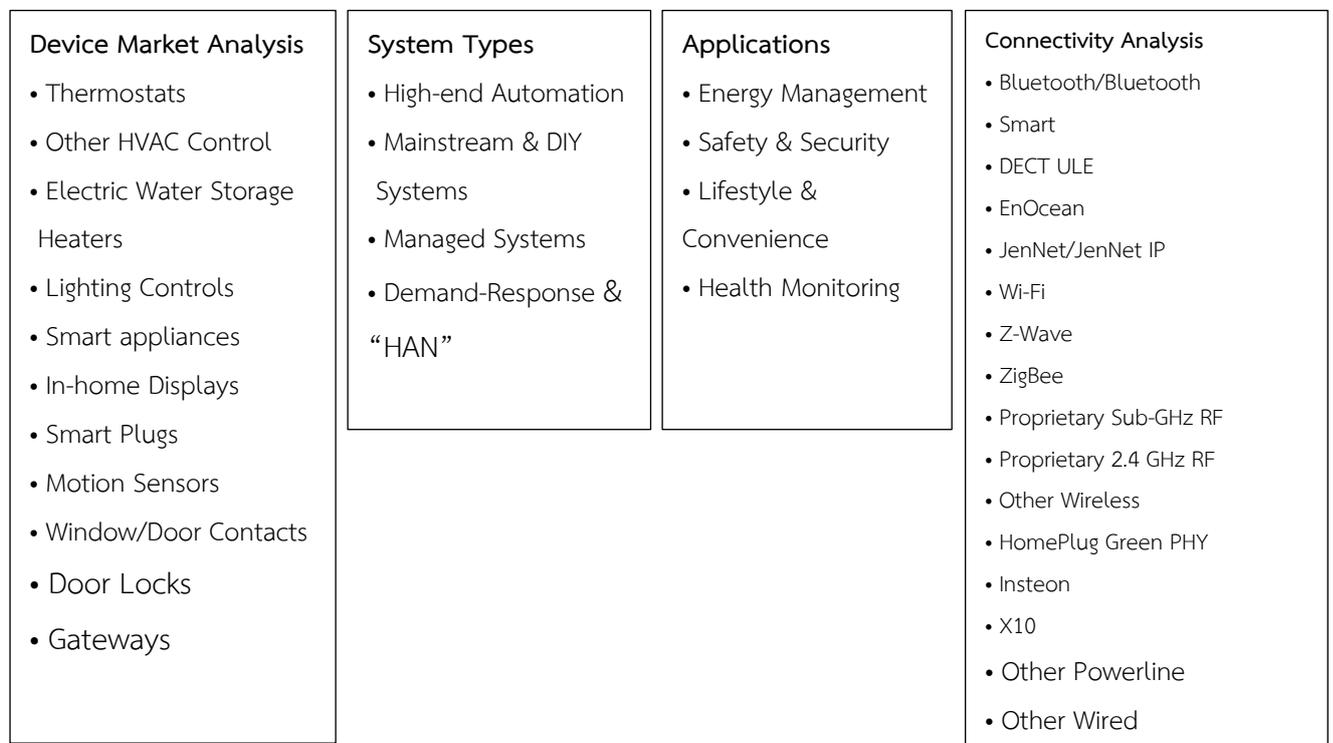
Home Automation

Device Market Analysis	System Types	Applications	Connectivity Analysis
• Thermostats	• High-end Automation	• Energy Management	• Bluetooth/Bluetooth
• Other HVAC Control	• Mainstream & DIY Systems	• Safety & Security	• Smart
• Electric Water Storage Heaters	• Managed Systems	• Lifestyle & Convenience	• DECT ULE
• Lighting Controls	• Demand-Response & "HAN"	• Health Monitoring	• EnOcean
• Smart appliances			• JenNet/JenNet IP
• In-home Displays			• Wi-Fi
• Smart Plugs			• Z-Wave
• Motion Sensors			• ZigBee
• Window/Door Contacts			• Proprietary Sub-GHz RF
• Door Locks			• Proprietary 2.4 GHz RF
• Gateways			• Other Wireless
			• HomePlug Green PHY
			• Insteon
			• X10
			• Other Powerline
			• Other Wired

Figure 1: Home Automation

Source: http://www.imsresearch.com

3. The concept of the elderly

Elderly refers to a person aged 60 years and over, both male and female. The elderly was divided into two groups, the early elderly and the late elderly where the early elderly is aged 60-69 years and the late elderly Refers to a person aged 70 years and over (Tamonwan Suwanhome, 2012: 4). while the Office of the Promotion and Protection of the Elderly (2010:1) gives the meaning of the elderly that a person of Thai nationality and age from 60 years of age or more, as well as Wilaiwan Thongcharoen (2011: 2) has given the meaning that Aging is a process Universal starting from birth. Height, age determined by the number of years. (Chronological age) is commonly used to determine retirement or leave work. In Thailand, the age of 60 is used. In most developed countries, the age of 65 years and over is used as the criterion for calling "elderly people" (Thai Elderly Research and Development Institute Foundation). and the Institute for Population and Social Research. Mahidol University, 2016).

The age range of the elderly can be divided into 4 periods, namely (Sriruen Kaewkangwan, 2006).

1) The less old period. It is about 60-69 years old, which is the time when the elderly face retirement, loss of job position, loss of income, loss of people around them. This is the time when the elderly should join the group or socializing to do a lot of activities to compensate for the activities that have been done.

2) Moderate old age, about 70-79 years old, is the time when people start getting sick. More family members of the same age began to die. Elderly people in this period are less social with others. rarely interferes with family and social activities Need peace

3) Real old age, about 80-90 years old, is the age that needs help from people around you more than other ages. Start thinking more about the past need privacy but also need an environment that stimulates various competencies.

4) Very old age, about 90-99 years old. There are few elderly people who will reach 90 years old. It is a period with many health problems. They have to do activities that they are satisfied with and want to do. This group of elderly people has been through a lot of good and bad things. It is a period of need for happiness, peace and self-satisfaction.

4. SOC Theory

SOC Theory is a psychological theory about adaptation in each age range. As appropriate for the physical, mental, and social conditions, successful individuals can adapt to situations based on gains and losses. The composition of the SOC consists of three steps. (Selection)

Practices to achieve equilibrium (Optimization) and Substitution (Compensation) (Baltes & Baltes, 1990; Freund & Baltes, 2002).

Selection (Selection) is to set goals in life that are specific to each individual. It's a potential goal. When there is a clear goal, it will lead to practice to achieve a state of balance. (Optimization) leading to goals such as health care to be ready to work, training and learning skills until proficiency (Charness, Czaja, & Sharit, 2007). and when following the method, did not achieve the goal. will lead to a change in method like asking for help from others Following Successful People (Nipawan Boonthaptom, 2008).

A study by Ng & Law (2014: 1-14) used the SOC theory to explain why older adults continue to work after age 55 and over, starting from choice. Older people have many needs and need to make choices and set priorities. Practice to achieve a state of equilibrium The elderly is highly skilled and experienced and can create an advantage in continuous development and look for future opportunities and substitutions. The elderly has a variety of approaches to dealing with health constraints, social support helps seniors to have good physical health, such as providing the elderly with the right tools, creating housing that is suitable for the age of the elderly.

5. The concept of depreciation

Asset depreciation is the amount that an asset's value depreciates as a result of the use of that fixed asset by that asset has a lifespan of more than 1 year, but when it is used Fixed assets are not exhausted. The value of that asset is no longer the same. The depreciation of an asset each year until the end of its useful life is the fixed asset depreciation each year. All fixed assets are subject to depreciation, except land. There are many methods of depreciation, but no matter which method you use, you will need to know the following information: (อรุณี อย่างธารา และคณะ)

1. Cost of Assets is the total cost that an entity pays to acquire a fixed asset in its ready-to-use state, therefore cost comprises the purchase price. and other expenses that will make the asset in a ready-to-use condition, such as transportation costs, installation costs, etc.

2. Estimated life is the period of time that the entity estimates that Fixed assets will be available.

3. Salvage Value is the expected amount. will be received from the sale of that asset. when the expiration date

The method for calculating depreciation is as follows.

1. Straight-line Method

2. Double-declining Balance Method

3. Sum-of-the year-digit Method

4. Units of Output Method

6. Guidelines for developing Smart home for YOLD in Thailand

1. Development of housing for the elderly

In the real estate business in the past, there have been some housing projects for the elderly or a project with facilities that meet the lifestyle of the elderly gradually. But most of them live in the form of vacation homes in the provinces. Specifically targeting Thai elderly people who are retired or another form of housing that should be developed for the elderly is a residence near the hospital near parks or residences that are easy to travel to find children Near the family of the children would be another form of housing for the aging society to not have to live alone in the home. But at present, it has not been designed for the elderly to be clear in terms of functions as they should be but from the trend of development for the elderly more in this era It is expected to see more real estate operators bring design ideas for the elderly to integrate with their residences. by the basic design principles for the elderly Should consider preventing accidents that may occur. Can be used in daily life easier and more convenient with, for example, the needs of the living room designed to have an emergency button. or alarm bells in the room, handrails to support yourself when you get up or when walking in the bathroom, non-slip floor mats, lever door knobs to facilitate opening and closing, high-low level furniture in the room, the width of the room door. and the spaces of the items placed in the room can provide wheelchairs or wide enough to move, etc. In addition, if it is a common area, there should be an activity room for the elderly. Add handrails and cover it with non-slip material. and reduce the level change or increase the thoroughfare with ramps to travel to different areas continuously can move by itself.

2. Problems, obstacles and success factors in housing development

On the economic side after retirement, most of them have no income. Except for some people who have pensions to spend, it's still enough. Show that most of the elderly after retirement without pension or pension or wealth will have no income to support, We have not much income from the state per month. But having to struggle with children, not taking care of the state should provide more welfare

Physical health Most of the elderly have physical disease in the story. Blood pressure, diabetes, pain in the waist, hips, legs, knees, ankles show that most of the elderly do not have time to exercise. Must use those times to make a living some of them received state aid, but it wasn't enough. The bones began to swell. The strength began to decline.

Mental health that most of the elderly still have to work continuously some people will be happy with their children. Some people are alone and will go to associations or clubs for the elderly. Some people earn their living by doing small trades and still be happy to walk around. Show that the elderly when doing what they like will be happy. Even without facilities financial status is not good if the mind is happy, then it is satisfied.

Social aspect, most of the elderly have their own society. Which is in a community near the residence did activities together Service to the community and society, showing that the elderly, even after retirement Even with increasing age, it will not stop working. I don't want to be a burden on my grandchildren. Want to show that you are still useful Still able to do a lot of other things, even if the strength declined. The body is not as strong as it used to be.

Environmental Most of the elderly even have their own homes. But the land belongs to the royal property and can live without having to pay rent there is still enough space to plant some trees, flowers, vegetables, and some kitchen gardens. Although some places have trash nearby. There will be a foul smell when it is upwind. Show that most of the elderly love nature. Likes to plant trees, flowers, vegetables, kitchen garden, has a house, a residence without renting.

7. Summary

From the statistics of the number of elderly people in 2021, it was found that Thailand has a total population of 66,666,666 people, 12,462,010 people aged 60 years and over, 1,396,343 people aged 80 years and over. (National Statistical Office, 2021) From a situation, the Thai government has continued the action plan for the elderly (2002-2022) and prepare Thai society to become an aging society completely in the year 2021. There are still some operations that need to be improved, such as preparing the population for quality aging promotion and development of the elderly and social protection for the elderly. In addition, the National Board of Elders have adjusted the action plan (2020-2022), which is a collaboration of many agencies. Focusing on the main issues, namely, campaigning to raise awareness of the society on the necessity of preparing for the elderly. Elderly housing is important, as the elderly are prone to physical changes in many areas, proper housing adjustments are essential.

So that the elderly can do various daily activities easily and safely reduce the risk of slipping and prevent accidents. That may occur. In the latter we are seeing more innovations in home, these are meant to support the aging society that is spreading in many countries around the world. Whether it's familiar things like GPS, Bluetooth or Wi-fi, it has been developed to have a variety of uses become the main connection channel which extends to other types of facilities such as heat sensor type appliances cleaning robots, etc.

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8. Recommendations

1. Earning income for the elderly to have daily expenses. Allocate budget for the elderly to be sufficient for their expenses. If the elderly has a good income, then the elderly who are just able to take themselves will be much more motivated to find a good home for themselves in their old age. Which may promote occupations that are maintained during retirement, work and find a residential location suitable for occupation

2. Organizing a medical facility in a community or village let a doctor and nurse come to take care of you every week. It is not necessary for the elderly to go to the hospital to see the doctor, but to have the doctor or the hospital come to the elderly instead. or develop a complete housing complex by establishing a medical center in that community with both Thai traditional and modern medicine

3. Providing housing for the elderly and campaigning for the children to see the importance of the elderly Paying attention to the elderly's day there was a meeting between the elderly and their children. By looking for a place to live not too far from the city or to develop a fully integrated housing by having a sports club or activity area for the elderly to relax and to have activities related to their children

4. If there is convenient transportation and not too close from the city, it will make the elderly feel good and make them not far from their children. Which will have a positive effect on mental health if transportation is convenient and there are activities for children to do, they will definitely come visit the elderly.

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