

## Brief Paper:

# A Study on the Possibility of Introducing Korean Technologies into Vietnam for Monitoring and Prevention of Solitary Deaths of Elderly

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**Abstract:** The Socialist Republic of Vietnam has become one of the top ten nations with the highest aging rate. The proportion of their aging population increased from 7.2% to 10.95% from 1989 to 2017 and entered into the aging society six years earlier than what had been anticipated in 2011. The main issues in such a society are the problems associated with the elderly living by themselves and their solitary deaths. This study attempts to find a solution which would mitigate the burdens of aging or aged population who are living in a lonely and solitary living condition focusing on the system used for the purpose of managing or monitoring of their daily lives to prevent any undesirable outcomes including solitary deaths. The study also discusses the possibility of introducing the system into Vietnam.

**Key Words:** Deaths of elderly, IoT, Monitoring, Lonely death.

## I. INTRODUCTION

The age structure in the Socialist Republic of Vietnam (Vietnam) has changed much for the last three decades due to the increase in their life expectancy and the decrease in birthrate. According to the General Statistics Office (GSO) of Vietnam, their population increased from 64.41 to 96.01 million in the period 1989 to 2017 and during the same time, the elderly population also increased from 4.64 to 10.25 million, occupying 7.2% and 10.95% of the total population, respectively (Vietnam National Committee for Elderly 2017, p. 1; Phạm & Đỗ, 2009, p. 4) [1]-[3].

They entered the aging society in 2011 when their aging population reached 10% of the total population and it is expected that by 2038, they will become an aged society by having about 25% elderly people in the total population by 2049 (Health Partnership Group, Ministry of Health Ministry, 2018, p.66), reducing their workforce (age 15 to 59) to 57% (65%, as of 2015). Also, the aging index has

risen from 17 in 1979 to 47 in 2015 and it is forecasted that the index will rise up to 138% in 2049. In other words, there will be 138 elderly against every 100 teenagers under 15 (Health Partnership Group, Ministry of Health Ministry, 2018, p.68). Vietnam is a country who has the third-highest aging index in Southeast Asia next to Singapore and Thailand and included in the ten countries with the highest pace of aging (Health Partnership Group, Ministry of Health Ministry, 2018, p.68) [4-6].

The senior citizens living by themselves and their eventual solitary deaths are the two major problems in an aging society. Thus, this study discusses the necessity of an effective plan which will be able to deal with the aging population facing various types of chronic illnesses and the burden of healthcare expenses, along with the Korean technologies developed solely developed for managing and monitoring the senior citizens for the purpose of effectively preventing their solitary deaths.

## II. RELATED RESEARCH

Aging is a phenomenon emerging from extended life expectancy and reduced birthrate. Vietnam became a lower-middle-income nation by 2008 after implementing a reformative open-door policy referred to as Doi Moi since 1986 and accomplished much in the health medical field such as the expansion of primary medical care systems, reduction of child death rate, extension of average life expectancy, etc. following rapid economic growth. According to the General Office for Population and Family Planning (Ministry of Health), their life expectancy was extended from 68.6 in 1999 to 73.4 in 2016 and expected to rise up to 75 by 2025 (Bao Lao Dong, 2017; Phạm & Đỗ, 2009, p. 3) [7]-[8].

Meanwhile, following the implementation of the Family Planning Policy since 1960s, Vietnam's total fertility rate (TFR) decreased from 4.81 in 1999 to 2.03 in 2009 (2010, UN Population Fund). The proportion of children under 14

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consistently dropped to 39.2%, 24.5%, and 23.5% in 1989, 2009 and 2014, respectively (2014, UN Population Fund). On the other hand, the proportion of the working population (age 15 – 59) increased from 53.6% to 65.5% during the same period along with the rapid increase in aging population (7.2% to 9.5%). The UN Population Fund (2010) had expected that the proportion of children in 2050 would drop to 17% whereas the proportion of the aging population would rise up to 26.1% in the same year. As expected, the number of senior citizens living alone is on an upward tendency and in recent years and the problems involving the solitary deaths of elderly or young people are making headlines increasingly.

The period in which the proportion elderly population (over age 64) had increased from 7% to 14% (i.e., from an aging society to aged society) was just 20 years and this was a much faster rate than in France (115 years), USA (69 years), or Japan and China (26 years) (2011, UN Population Fund). At the end of 2017, the number of aging population was 10.25 million and among them, 5.20 (50.7%) million was female, 6.65 million (65.7%) lived in rural areas, and almost 10% of them was ethnic minorities (2017, Vietnam National Committee for Elderly). As of 2016, the proportion of the poor elderly households reached 25% and among them, the number of households of those senior citizens living by themselves exceeded that of ordinary households. The census taken in 2014 revealed that 32.4% of elderly living alone was in the lowest-income bracket whereas only 3.1% was the high incomers (2014, UN Population Fund). Also, a journal published in 2017 by the Communist Party of Vietnam reported that despite the fact that about 70% of the elderly population was experiencing economic hardship, those who were receiving pensions or public aid was only 30% (2016, Ministry of Labor, Invalids and Social Affairs). As such many senior citizens are maintaining their household by labor without any assistance from their children, society, or savings (2016a, Ministry of Labor, Invalids and Social Affairs) [9]-[10].

Especially, the number of single-living elderly increased following the increase of nuclear families. The UN Population Fund (2014) reported that, in Vietnam, the proportion of those who were living alone had increased as the age increased more. Specifically, the proportion of single-living elderly over 60 was only 3.2% but the same proportion for over 80 was 16.4%. Also, the proportion of those who were living alone in rural areas was higher than that of in urban areas (2014, UN Population Fund). This may have been the result of young people relocating to the cities. Meanwhile, the proportion of the female single-living elderly was higher than that of males and this can be explained by the global trend that the average life

expectancy is longer than that of males and/or they are less likely to marry again after divorce or bereavement. Even though the health span of the Vietnamese people has been increasing continuously, it is hard to say all of them are living healthily. A Vietnam Communist media reported in 2017 that although the average life span is reached a high level of 73.4 (2016), the average healthy life expectancy still remains at a low level of 64 and in particular, about 67.2% of the aging population is in a weak or a serious health condition (2017, Communist Journal). In average, the period of a senior citizen experiencing illnesses is 14 years and 95% of elderly has some kind of diseases (2016a, Ministry of Labor, Invalids and Social Affairs) [10].

### **III. POSSIBILITY OF INTRODUCING KOREAN TECHNOLOGIES INTO VIETNAM FOR MONITORING AND PREVENTION OF SOLITARY DEATHS OF ELDERLY**

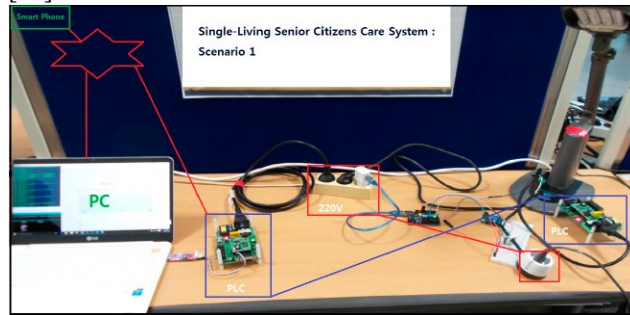
The solitary deaths of senior citizens are becoming a serious issue in the Republic of Korea (ROK) and the number of the elderly is increasing globally so that the studies concerning monitoring such deaths is being carried out actively in the countries such as USA, Japan, etc. [11]-[14].

The monitoring system proposed by the researchers working in Busan (ROK) was one that allowed the monitoring through the changes in electrical power generation and demand monitored through the system in which IoT system and Power Line Communication (PLC) network are combined together, completing a low-cost framework for the healthcare purpose. With this framework, they proposed a solution to solve the problem of the increased number of single-living elderly and their solitary deaths. The solution included an AI-based indoor/outdoor monitoring system which could be used to manage and improve the lives of them [15]-[19].

One of the current social issues in the Republic of Korea (ROK) is a problem of 'solitary deaths' of those who live alone. This problem applies to all other nations where the population of single-living senior citizens are on the rise. Each nation is struggling to find the solution and actively trying to grasp the situation by monitoring such phenomena [20]-[23].

The AI-based management system utilizes a camera(s) to grasp the movements in both in and out of one's home and detects his/her life pattern or special situations. If the elderly falls within his/her home, the system recognizes the situation and notify guardians or life managers, forming a safety network for immediate rescue. The

system can be used out of doors to prevent accidents [24]-[30].



(a) Single-Living Senior Citizens Care System.



(b) Efficient Solitary Senior Citizens Care Application.

Fig. 1. Monitoring System Proposed by the Researchers Working in Busan.

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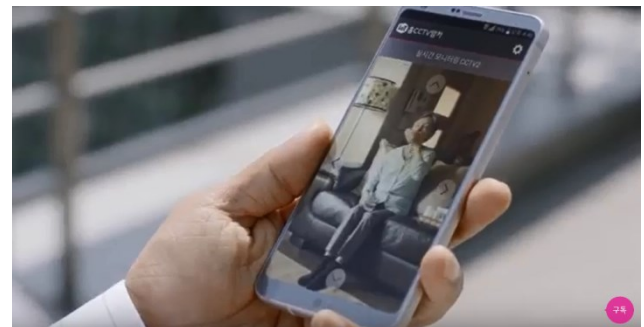
Meanwhile, Gimhae-city (ROK) has introduced a relief care system for the single-living elderly by adopting the ICT technologies developed by KT in 2019. The system recognizes emergency situations on a real-time basis to prevent their solitary deaths and this was the first attempt within their city. In addition, the city is cooperating with the KT's Busan Customer HQ Gimhae branch for the project of installing the IoT sensor-mounted LED lights in the homes of selected 100 single-living elderly belonging to a high-risk group with a budget of 70 million won. [Fig. 2] shows relief care system for the single-living elderly.

The movement detection sensor makes notifications to the families or the social workers in charge of the elderly in real time when it senses that there are no movements over a certain period of time to prevent death. These LEDs have a similar appearance with other existing LEDs but have higher efficiency so that the power rates can be reduced. The city has been preparing this service since last year with KT to prevent solitary deaths. Meanwhile, they were selected as the final choice last year to carry out

the new regional energy activation support project implemented by the Ministry of Trade, Industry and Energy. The business agreement contract has been signed with KT and with an investment amount of 5.3 billion won including private capital, they are conducting a power generation-based profitable new & renewable energy provision project at three water purifying plants including Sangye Purification Plant.



Fig. 2. Relief Care System for the Single-Living Elderly (Developed by KT).



(a) Home CCTV.



(b) Open-door notification.

Fig. 3. LG U-plus's Parent-relief IoT package.

Meanwhile, in a nationwide advertisement of a product prototype developed by the U-plus company, a mother who is suffering the aftereffect of a stroke occurred three years ago is appearing with his son, an office worker. Contrary to his heart, the son used to get angry as he was so concerned when he was not able to contact his mother but after installing the 'Parent-relief IoT package' his situation has changed as he does not have to worry any

longer: he can now take care of his mother with the functions such as ‘Open-door notification’, ‘Gas closing’, ‘Plugging’, Home CCTV’, etc. [Fig. 3]. He can check whether mother is eating well or taking medicines regularly as if he is just next to her. This prototype can be a useful product for the monitoring of single-living elderly as well. LG U-plus has released some basic or optional packages having these basic functions for the market targeting the elderly aged between 70 and 80 or the 40s or 50s customers who are taking care of their aged parents. As a launching promotion, they are exempting the basic fees (Basic Type: 5,500 won/month, Option Type: 12,000 won/month) if the customers subscribe to their IoT packages in May.

Among them, the system which can utilize the existing power line-based grids or lights may be more effective for the introduction into Vietnam rather than the other extensible systems being offered by LG U-plus.

#### IV. CONCLUSION

Despite the rapidly aging population, the health medical service and the social policy in Vietnam are yet to be established sufficiently. Although there are a variety of facilities taking care of orphans, disabled, or helpless single-living elderly under their welfare policies, some of them are providing their services to the homeless low-income single-living elderly only without adequate healthcare management. Even though some of the private nursing centers actually offer a variety of quality healthcare services similar to the ones provided in foreign countries, their expensive fees allow only a few with financial abilities to use them.

It was reported that about 30% of Vietnam’s elderly is not a medical insurance subscriber and 70% of them live in rural areas. It is evident that those without any pensions or savings will be able to use private nursing homes. The Vietnam government has been putting much effort into improving the quality of life of these elderly while implementing various welfare and social security policies but not all the senior citizens are being supported due to some limitations. It has been reported that the minimum income is not being guaranteed to the elderly and the health medical system and the local community services do not satisfy the needs of them yet (2016, Nguyen p. 43) [10]. It is important for the local governments to realize the importance of the policies associated with the welfare of senior citizens rather than just considering the welfare-related projects as the businesses of some societies or institutions only. It is also essential to promote social security policies, nationwide, especially for the regions with limited socio-economic benefits.

Thus, this study described the technologies involved with a Korean-model elderly life management/monitoring system for the purpose of preventing their solitary deaths and finding the possibility of introducing the model into Vietnam.

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