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Supporting South Korea's Aging Population:

How AI and IoT Acceptance Connects the Young and Old

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Abstract

In 2024, South Korea surpassed every other nation by becoming the country with the lowest fertility rate (below 0.7%). Population decline will hinder future ability to care for their aging population and although the government and private corporations are investing millions of dollars on developing Artificial Intelligence-Internet of Things (AI-IoT) devices to support the aging, the acceptance levels and the amount of family support required is undervalued. By examining AI-IoT's current use and role in South Korea's public health system this paper shows how intergenerational support helps optimize existing procedures and equipment, increases the level of acceptance and use, and re-connects families. AI can be used in a myriad of ways to improve quality of life, but it isn't a standalone remedy – that will require a multi-faceted approach that integrates multiple support circles, but most importantly, the family. Peering into the interactions between three dyads of families and the importance of intergenerational support, narrative analysis was performed on the conversations, emotions and thoughts during and after the technical support interaction. Each participant was then asked to recommend ways for improving usage of technology. The end resulted with indications for the acceptance and continued usage of technology but also with whom that technology will be shared with.

1. Introduction

The Apple Watch, augmented by an Artificial Intelligence (AI) interface named "Siri," senses bodily changes with the ability to learn and track trends. Last Christmas, I gave an Apple smart watch to an aging relative who suffers from multiple health and physical issues. He was initially apprehensive about wearing this "new-fangled technology," but upon explaining the multiple safety features, he agreed to try it. The major selling point was that the watch could sense a fall, check his heart rate, and detect arrhythmias (irregularities in the heartbeat). But most importantly, it could contact emergency services or a family member by voice command or with the push of a "panic" button. I thought he would wear it only for a few days, but over two months later, he continues to wear it daily.

This continued acceptance would not have been possible without his wife, who assisted with his daily physical needs, including training and technical support for all the various electronics they own. In addition to his wife's support, his tech-savvy children visited regularly; often seeing to any and all of his issues. Without the support of his family, the continual use of any type of Artificial Intelligence-Internet of Things (AI-IoT) devices (smart phones, smart watches, active home monitoring, interactive robots) would be very low for several reasons. For example, he doesn't like interacting with strangers, has trust issues outside of his personal circles, and lacks the patience and knowledge to troubleshoot newer technical problems. This positive interaction with my relative here in America shifted my thoughts to my aging mother in South Korea. She lives in one of the most technologically advanced nations, the birthplace for tech giants like Samsung, LG, and Hyundai – responsible for many major industrial advancements that occurred from 1988 until today. Those who were middle-aged during that growth period, like my mother, are now senior citizens who didn't keep up with major technological changes of the last fifteen to

twenty years.[1] They are able to use certain smart devices such as cellular phones, smart televisions, and some wearable tech devices with support from family and friends. But how are all the senior citizens, who live alone and without any familial support system, coping to this new and constantly upgrading technology? In the rapid race to expand and upgrade technology at such a rapid pace, South Korea is now faced with a dilemma of what to do for those who are left behind.

According to South Korean government statistics, the fertility rate in 2022 was 0.78 (per female) and is expected to drop to 0.65 in 2025,[2] causing the population of the next generation to decline from over 51 million down to 36 million.[3] It's only the first quarter of 2024 and South Korea has already dropped below 0.70 – becoming the nation with the world's lowest birth rate. Korea's diminishing population is predicted to have devastating effects, especially for the care of the elderly. In addition, "some 1.9 million people 65 or over were living alone last year [2022], accounting for more than 20 percent of the elderly population in the country, according to the Health Ministry."[4] With the increasing numbers of senior citizens[5] living alone in South Korea, the government is investing millions of dollars on AI-IoT devices to support this demographic.

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[1] Eunjin Yang, Min Jung Kim, and Kyung Hee Lee. "Internet Use and Difficulties in Acquiring Health Resources among Older Adults with Disabilities during the COVID-19 Pandemic: A Population-Based Cross-Sectional Study." *BMC Public Health* 24, No. 1: 534. February 20, 2024. https://doi.org/10.1186/s12889-024-17922-2.

[2] Brad Lendon and Gawon Bae. "South Korea to see population plummet to 1970's levels, government says." *CNN online*, December 15, 2023. https://www.cnn.com/2023/12/15/asia/south-korea-to-see-population-plummet-intl-hnk/index.html.

[3] "South Korea to see population plummet to 1970s levels, government says," CNN World, Asia, updated December 15, 2023. https://www.cnn.com/2023/12/15/asia/south-korea-to-see-population-plummet-intl-hnk/index.html.

[4] Esther Chung, Jung-Woo Cho, and Min-Ji Jin. "Can AI rescue Korea's aging society from the abyss?" *Korea JoongAng Daily*, Updated November 16, 2023.

[5] Similar to being classified as a senior citizen at the age of 65 in the United States, South Korea identifies those who are over 65 years old as a senior citizen.

But how can emerging technology be best implemented so that the technology will be accepted by the aging population, and can the decreasing number of children effectively support this initiative? Is the old Korea ready to accept the new digital convergence?

AI can be used in myriad ways to improve quality of life. Darrel West discusses AI-IoT benefits in his book where he states, "Clinical wearables and remote sensors, along with mobile devices that electronically transmit such data as vital signs, amount of physical activity, and medication adherence, will provide never before seen telemedicine diagnosis and treatment services…for patients."[6] But it isn't a standalone remedy to assist the aging population: that will require a multi-pronged approach that integrates friends, public health and the government, but most importantly, the family. The Korean government, regional public health agencies, and even private entities are already researching and fielding ways for AI-IoT devices with some degree of success, but also with much needed improvements.[7] Besides the obvious needs such as technical training, product support, welfare checks and visits, this paper investigates the intergenerational role and how technology acts as a familial bridge versus a divider. My research lens examines AI-IoT's current use and role in South Korea and how the integration of family optimizes existing procedures and equipment, increases the level of acceptance and use, and as a bonus, re-connects families. Continual population decline will eventually evaporate the human resource well – crippling families, Korea, and the Asia Pacific more broadly. With similar occurrences in

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[6] Darrel M. West. *The Future of Work: Robots, AI, and Automation*. Washington, D.C.: Brookings Institution Press, 2018: 47.

[7] Dong-Jin Kim et al. "Present and Future of AI-IoT-Based Healthcare Services for Senior Citizens in Local Communities: A Review of a South Korean Government Digital Healthcare Initiatives." *Healthcare (2227-9032)* 12, no. 2 (January 15, 2024): 281. doi:10.3390/healthcare12020281.

Japan,[8] Taiwan, and China, much needs to be researched to prevent widespread occurrences beyond the Asia Pacific.

2. Literature Review

Korean Culture and Family

When researching Korean culture, it is essential to identify and establish a baseline or background of social norms and customs. Based on Confucian virtues and ethics, Koreans practiced filial piety for thousands of years. Caring of our elders is not a new concept, but the methods in which we do so change and adapt with time. In a research paper on modern filial piety in Korea, Dr. Kyu-Taik Sung identified categories of actions that Koreans traditionally cherished: respect, family, affection, and care of the parent – both physically and emotionally.[9] Dr. Sung's categories generally hold true; however, it is becoming more difficult to maintain these traditions. There is evidence today that show modernity's role in shaping society and culture – economics being a major factor. More women are in the workforce, couples are having fewer children and at a later age. These combined displacements to the traditional family have created ripple effects that expect to tidal wave in the next 10-20 years. Modernization may have improved Korean society in many ways, but it has also made it challenging to maintain the traditional family. This is where AI-IoT devices can help to fill that gap.

In America, many have seen the Life Alert television commercial where an elderly person is laying on the floor and yells, "Help, I've fallen, and I can't get up."[10] The advertisement was

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[8] Maciej Bazela. "Technology as a Response to the Challenges of Aging Society and Shrinking Labor Markets: What Can We Learn From the Case of Japan?" *Business and Professional Ethics Journal* 41, no. 3 (September 1, 2022): 525-546–546. doi:10.5840/bpej202313132.

[9] Kyu-Taik Sung. "Filial Piety in Modern Times: Timely Adaptation and Practice Patterns." *Australasian Journal on Ageing*, 17, (1998): 88-92. doi:10.1111/j.1741-6612.1998.tb00872.x.

successful because it tugged on the audience's pathos – thinking that help would physically arrive at the push of a button. AI driven devices can be used to assess the physical status of people at home and to call emergency services. But what happens after the emergency when the patient is in the hospital or back home alone? Can AI bring flowers to the bedside, can it hold your hand before and after surgery, and can it cry with you when you are afraid? It cannot fully replace the significant connections of family, human interaction and the cultural aspects of familial bonding. Smart devices are merely communication tools that facilitate efficiency; however, the human capital component cannot be ignored.

Esther Chung mentions AI-IoT device rejection in her article about "Smart Cities": an initiative by the Korean government to assist the staggering number of elderly who live alone. "There is still some taboo in Korean society, once known for its filial duty and culture, about turning to emerging technology to take care of elderly relatives living alone…When the reporter asked the official for an opportunity to interview a resident of a home where an IoT-programmed electricity plug was installed, the official said none would comply with the request."[11] This reluctance may be attributed to mistrust or the shame it could bring to the family, but this reluctance could potentially be reversed with the help and encouragement of family. Further in her article, Chung states the positive benefits of family and the community in conjunction with AI. "I think some smart cities in Korea like Songdo made enormous progress, but the challenge is to take advantage of the extraordinary technological progress in a way that does not lose sight

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[10] Life Alert is a medical alert company that creates wearable and remote devices allowing subscribers to request help in an emergency by voice or by pressing and holding a panic button.

[11] Esther Chung. "Smart cities are teaching senior citizens new tricks." *Korea JoongAng Daily*, October 28, 2019. https://koreajoongangdaily.joins.com/2019/10/28/socialAffairs/Smart-cities-are-teaching-senior-citizens-new-tricks/3069514.html?detailWord=.

of the human factor."[12] As extraordinary as this technological progress is, it merely serves as a

medium that help to connect humans. More importantly, technology strengthens the connections

between family members – those who we trust and care for the most.

South Korea is not the only nation dealing with a birth rate crisis and population decline. The

population decline trend is spreading across the entire Asia Pacific with no apparent definitive

solution. What is apparent is that the eventual workforce shortage will mandate alternative

options to replace the existing workforce, and also support the aging. Nicola Smith discusses

some potential solutions in her article about South Korea utilizing robots to replace people. She

mentions, "Korea may be a step ahead of Western nations in applying AI to elderly care, but it

offers a glimpse of what likely awaits many nations in future."[13] Although Korea appears to have

a jumpstart, this is technological foreign territory that is being explored with the help of the

government, public, and private agencies. This research examines this territory from the family's

perspective.

Post COVID-19 and the Expanding Role of AI

Besides the incredible technological advancements During the Covid 19 pandemic, South

Korea reacted swiftly to isolation protocols and underwent an immense overhaul of the way

healthcare was administered. The restrictions and limitations of in-person visits, including family

members, forced the nation and its public health system into "an alternative lifestyle, known as

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[12] Esther Chung. "Smart cities are teaching senior citizens new tricks." October 28, 2019. Located in Incheon, South Korea, Songdo is an international business district of technologically advanced developments and infrastructure to support sustainability.

[13] Nicola Smith. "How South Korea Is Harnessing AI to Ease Its 'Super-Ageing Society' Crisis; More than a Fifth of the Population Is Set to Be 65 and Older by 2025. To Meet Rising Demand among the Old, South Korea Is Turning to Robots." *The Telegraph Online*, December 23, 2023.

the "untact" era."[14] to rethink how patient interaction was conducted. To mitigate the spread of

the virus, patient care was performed at home with AI-IoT devices to maintain isolation

policies.[15] Initially successful, these devices lacked the humanistic component for acceptance

and prolonged use. But due to the pervasive pandemic and mandatory isolation protocols, the

only remedy was to modify the devices by embedding the technology into tactile items with

humanistic qualities such as dolls. Smart robots, some with facial recognition and interactive

capability, were produced by private companies and distributed to many isolated senior citizens.

One such company, Wonderful Robot, attempted to tackle the lack of human presence and the

need for continuous monitoring and care. The company accomplished this by making the

machine personable and interactive as stated below:

> Wonderful Robot is one of the many companies that has developed a "caring robot" for
> the elderly. Its robot, Dasom, can communicate and notify people when to take medicine.
> It also plays different sorts of music and videos for entertainment upon request. The
> robot's emergency response function allows people to verbally request help, immediately
> connecting them to their guardians or related facilities.[16]

As great as caring robots may sound theoretically, the user must accept the robot. To increase

acceptance, robots should also be user friendly and easy to use. This acceptance can be gained by

making the robots interactive physically and mentally. In a research study on robot companion

dolls, it was found that the more patients actively engaged with the robot through active (patting

and stroking) and passive (brain training and quizzes) methods, the more compliant patients were

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[14] Chi Meng Benjamin Ho, J. Hana, and Sejin Park. "IoT Based Health Monitoring System - Recent Trends and Directions." Paper presented at the International Society for Gerontechnology 13th World Conference, October 24-26, 2022, Daegu, South Korea." *Gerontechnology* 21 (October 2022): 1. https://doi.org/10.4017/gt.2022.21.s.524.pp1.

[15] Sunjoo Boo and Hyunjin Oh. "Perceptions of Registered Nurses on Facilitators and Barriers of Implementing the AI-IoT-Based Healthcare Pilot Project for Older Adults during the COVID-19 Pandemic in South Korea." *Frontiers in Public Health* 11, (October 10, 2023). doi:10.3389/fpubh.2023.1234626.

[16] Esther Chung. "Can AI rescue Korea's aging society from the abyss?" November 16, 2023.

with taking their medications.[17] But making a robot more human-like still doesn't make it human. What is important to recognize is that there are strides being made for these devices to be better accepted and used by the aging population which will help to offset the demand for more people.

The need for making things more personable was the natural progression for the expansion and acceptance of AI-IoT devices to much of the country. What wasn't factored was the digital divide between the young and old. Technology outpaced the learning capacity of the elderly, increasing the potential for many to be left behind, posing a serious health risk to elderly single-person households. To put this into perspective, Smith's article about AI usage in South Korea states, "The number of people at risk is estimated to be about 1.525 million, following a spike in single-person households from 28.6 to 33.4 percent between 2017 and 2021, in part aggravated by the pandemic."[18] While Korea is strategically advantaged with its existing technological advances to address this risk, the country underestimated the lack of human interaction and social infrastructure to support and sustain this rollout. The important question still remains: Will South Korea's future population be enough to support this effort? Further analysis of related articles will expound upon the initial and continuous software and hardware support required.

Acceptance of New Technology

Existing research regarding the use of AI-IoT or advanced interactive technology already confronts the issue of acceptance by the aging population and public healthcare. Jang and Lee

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[17] Ji-Chan Yun, S.-H. Yu, E. Yi, and Do-Hyung Park. "Companion Robot Can Be a Health Keeper for the Elderly: The Effects of Daily Use of Companion Robot on Medication Compliance." Paper presented at the International Society for Gerontechnology 13th World Conference, October 22-26, 2022, Daegu, South Korea." *Gerontechnology* 21 (October 2022): 1. https://doi.org/10.4017/gt.2022.21.s.559.opp3.

[18] Nicola Smith. "How South Korea Is Harnessing AI." December 23, 2023.

conducted a study on the willingness to use technology by the elderly. Through interviews of those who participated in the trial, their research results leaned toward positive levels of acceptance.[19] But their study didn't involve intergenerational inclusion to support AI-IoT acceptance. In another similar study that targeted the acceptance of healthcare technology amongst the elderly, the researchers also incorporated "Social Impact and Facilitating Condition" to expand upon the limitations of Technology Acceptance Model (TAM) which only focused on "Perceived Usefulness and Perceived Ease of Use."[20] Though their findings were comparable to similar studies, their third finding suggested, "Social influence is not that important for Korean elderly people to form a positive attitude towards use of digital wearables. Their friends, family, and acquaintances will not influence greatly whether the Korean elderly will intend to use these wearables unless they themselves are willing to use those technologies."[21] The researchers concluded that facilitating conditions were positively related while social influence was insignificant toward elderly usage of digital healthcare devices. What's more interesting is that these results were comparable to five other studies that were used as references. It's not to say that the researchers felt that family wasn't important, it's because they were more fixated on the acceptance of new technology. An area of concern that wasn't prevalent in the study was the level of trust that is apportioned between family and those outside the family. In addition, there is

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[19] Eun-Gyo Jang and Jin-Myong Lee. "The Effects of Willingness to Use Technology, Digital Alienation and Assistant Experiences on the Life Satisfaction of Elderly Consumers." Journal of Digital Convergence 19, no. 10 (October 28, 2021): 133–141. doi:10.14400/JDC.2021.19.10.133.

[20] Khin Shoon Lei Thant Zin et al. "A Study on Technology Acceptance of Digital Healthcare among Older Korean Adults Using Extended TAM (Extended Technology Acceptance Model)." Administrative Sciences (2076-3387) 13, no. 2 (February 2023): 7.

[21] Khin Shoon Lei Thant Zin. "A Study on Technology." (February 2023): 13.

a level of familial encouragement to try new things that may not be obtainable by non-family members.

Other studies continue to find the family as an integral ingredient in the acceptance and usage of technology. A similar study on technology acceptance using extended TAM (Technology Acceptance Model) was performed by researchers in China. This study concluded that "older adults who received more emotional and economic support from their children reported higher life satisfaction and were therefore more inclined to use smart home services."[22] Another study performed in Hong Kong utilized an expanded version of TAM called Senior Technology Acceptance Model (STAM) where it concluded, "Seniors with better social relationships expressed the belief that technologies are useful, and they were more inclined to use them than seniors with not such good social relationships. This might be attributed to the greater support that these seniors received from their family and peers, and the increased opportunities they had for sharing their usage experiences with others."[23] Both of the above studies appear to support the inclusion of the family as integral for overall acceptance. Considering that Korea and China, which now includes Hong Kong, share many commonalities, it is presumptive to say that they share similar values and morals regarding family and filial piety. In an article regarding the modern practice of filial piety, author Kyu-Taik Sung states, "The majority of Korean adult children still value and practice filial piety in their day-to-day living. However, the way they express this cultural value has changed in the process of adapting to rapid and massive social

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[22] Wenjing Wei et al. "A study on community older people's willingness to use smart home." *Frontiers in Public Health* vol. 11 1139667. June 6, 2023. doi:10.3389/fpubh.2023.1139667

[23] Ke Chen, and Alan Hoi Shou Chan. "Gerontechnology Acceptance by Elderly Hong Kong Chinese: A Senior Technology Acceptance Model (STAM)." Ergonomics 57, no. 5 (January 1, 2014): 647. https://www.tandfonline.com/doi/pdf/10.1080/00140139.2014.895855

changes."[24] The root culture hasn't changed, just the methods of delivery. Even though industrialization has changed the ways in which filial piety is practiced, much like the study in China, we can expect similar outcomes for South Korea – that intergenerational support still exists and supports the aging population.

It is important to note that AI isn't sentient (yet) and cannot replicate human processes, thoughts, and actions. Rather, it efficiently processes data, utilizes algorithms, and makes adaptive predictions based on input. AI has the power to augment applications and be integrated into hardware and robotic functions such as assisting with neuro sensory pathways for aging and disabled people. It can speak and type for disabled people and it can even translate or interpret shows or music. It is merely a tool for us to use to assist, but with any type of tool, there are limitations and preferences. "Nearly seven in ten (elderly persons living alone) said they would use an AI tool to alert family or friends in an emergency, but two thirds said they would still prefer exclusively human-based care."[25] Humans feed AI in the hopes that it will provide for us, but AI cannot reciprocate this and thus the human connection cannot be replaced by just an AI-IoT device. This research paper broadens existing studies by examining the cultural aspects of Korean gerontology and the relevance of intergenerational bonds to bridge the ever-changing technological divide. I argue that the elderly in Korea, which is deep rooted with culture, traditions, and social practices, will continue to require these social elements and intergenerational support to improve the acceptance and usage of technology.

3. Methodology

Data Collection

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[24] Kyu-Taik Sung. "Filial Piety in Modern Times." 1998.

[25] Nicola Smith. "How South Korea Is Harnessing AI." December 23, 2023.

To investigate this research question, I conducted qualitative interviews with three Korean dyads (1 elderly person and 1 family member). Participants were in Korea and were chosen through convenience sampling within my social network using the following inclusion criteria: senior citizens over the age of 65, has children or family who live nearby, and has one or more AI-IoT smart devices in use.

Verbal informed consent was obtained from all partners of the dyads. However, initial attempts at interviewing dyads through Zoom proved to be challenging as only one family member would agree to such a meeting. Due to logistical and time constraints, the remaining interviews were performed in person by the author's family member and at their home in Korea. Consent for recording the video interview wasn't given so translation and transcription occurred simultaneously. A pre-determined list of questions was given to the elder and child and they were tasked with asking and responding to the questions openly and freely – as if they were having a normal conversation. Interviews lasted between 8 and 20 minutes with an average of 13 minutes. Because none of the children in Group 0.5 agreed to be interviewed, their interview time was not included in the calculation. Based on the quality and content of their answers, follow up questions were asked. Questions also included demographic information for both parties and focused on various details of smart device use. Interviews were collected as audio recordings and shared securely.

Data Analysis

The audio was played and transcribed to Korean text using the dictation function on Microsoft Word. The text was then reviewed for errors in spelling and grammar before it was then machine translated into English text using the translate function on Microsoft Word. Secondary translation of the Korean text was scanned using the translate function on Papago (a

Korean-based app). The final translation checking and editing were performed by me, an advanced Korean and fluent English speaker, ensuring that both the spoken Korean and the English translations were accurate. During the translation process, answers that were unclear or incomplete were sent back to the respondents for follow-up over messaging. As with the audio files, these typed responses were translated using the translate function on Microsoft Word with the final translation and interpretation performed by the author.

While listening to the audio recordings, open coding was conducted and I created memos of various points in the conversation to denote tonal variations, voice inflections, pauses, laughter, and rhetorical comments. Based off initial responses, follow-up questionnaires were sent via email to the three dyads in order to clarify certain comments and to obtain specifics.[26] Written responses from each group were machine translated and proofread by me. Specifically, the follow-up questionnaires were developed to pinpoint similarities regarding the usage of CCTVs as that seemed to be a common theme amongst the groups. The responses regarding privacy were also an important finding as it serves to clarify the boundaries of what is and what isn't allowed within South Korean society.

4. Findings

Group 0.5: Mother only

This interview occurred on 21 March 2024 at 2:30 pm Pacific Standard time and concluded at 3:30pm. Consent for recording the interview wasn't given so notes were taken instead. Because her children declined to be interviewed, this was labeled Group 0.5. She is 82 years old and lives with her eldest son – her other two sons live far away and have families of their own.

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[26] Group 0.5 declined to participate any further than the initial interview.

The familial relationship was strained with her oldest son and although they lived together, she stated that "they don't communicate or interact much." Instead, she frequently and preferably spoke with her second oldest son and daughter-in-law. Her second oldest son provided her a smartphone and tablet that she used primarily for communication, entertainment, and emergencies. She denied having any other smart devices in her home and when asked what she does in case of emergencies when her eldest isn't home, she calls her second son or 119.[27] Although she suffers from minor episodes of dementia and memory loss, she was very adept at using her phone. Her responses to questions were outgoing, coherent, and confident.

When asked about tech support for her devices, her first step was to troubleshoot it on her own which mainly consisted of rebooting the device. She would then reach out to neighbors if necessary but would mostly rely on her second oldest son, who visited weekly. Her reasons for using the smart phone were mostly practical but admitted to wanting it in case something happened. I soon realized what that meant when during the interview, she stopped to check on her older sister who lived alone. She displayed a live audio/video feed from the closed-circuit television (CCTV) app on her smartphone showing her sister lying in bed. Through the app, she stated, "I check in on my sister three to four times a day and have the ability of a two-way speaker in case she is not visible through the CCTV." She also ensured that her sister ate her meals and reminded her to take her medications. At no point in time did her sister appear fazed or bothered that a CCTV was pointed at her bedroom and living room.

Upon completing the interview, the findings were that even with her current medical conditions, she was very capable of living an independent life. Her confidant actions and demeanor were that of someone who didn't want to bother others but would do so out of

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[27] Similar to the United States that use the numbers 9-1-1 to dial in case of an emergency, South Korea uses 1-1-9 as the number to call for police, fire, or medical emergencies.

necessity. She appreciated the consistent contact with her children and family and didn't want that to change. The unintended finding pertained to the CCTV that was setup in her sister's home. The convenience of being able to check in on a loved one through a cell phone app and the comfort of knowing that her sister is watching out for her safety must be reassuring for both. She obviously cared for her sister immensely as it was noticed in her facial expressions and softening of her voice when she spoke of her. Though she couldn't be physically with her sister, the CCTV allowed her to be with her sister virtually. The effortless way she handled her smartphone and how quickly she navigated the apps on her screen, was surprising for her age. Combined with her weekly visits from her second son (providing tech support as needed), this family dynamic provided a positive glimpse of how the aging population could be supported.

Group 1: Mother and Son

This questionnaire occurred on 14 April 2024 at 10:30 pm Korea time. The 52-year-old mother lives with her husband and has a daughter and a son. She doesn't use any specific health devices, nor does she feel a need for them but believes that they are a good idea. This group also didn't fit into the interviewee parameters but was included because of the strong family dynamics and their practicality in decision making. This group also provided a good exchange of ideas including conversations about the topic of AI-IoT health devices, the practicality and suggestions for future use. When speaking, the mother sometimes rephrased a question back to her son in a way that would evoke a predetermined response from him, but it came across as quid pro quo. For example, she said, "You'll help me if I need it and I'll do something for you in return, and then you can help me with something else. Right?" To which the son replied, "Of course" without hesitation. The mother-son interview began slowly but it progressed to where both participants expanded freely upon their answers. It soon morphed into a casual conversation

between the two that involved quirky comments, poking fun, and snickering. When the mother was asked about her relationship was with her children, she jokingly answered, "What do you think?" To which the son said, "I think it is good." She then states, "Ah, thank you. I don't think our relationship is bad, however it is good because if I ask for a favor, you'll listen and won't get angry with me." By listening to the audio, one could feel the deep connection between the two from their rhetoric, tone, and laughter.

Because there weren't any health concerns within this group, there wasn't a need for any health monitoring devices. The mother expanded by talking about her own father for whom she provided a smart watch for health monitoring. He stopped wearing it because he couldn't remember how to operate it or if something went wrong, he'd have to wait days for someone to look at it and for someone to explain how to operate it. Because of this, the mother stated, "Smart devices shouldn't be difficult, they should be simple as much as possible, easy to use and comfortable." Group 2 also expressed similar thoughts about simplicity and comfort which pointed towards the need to configure these devices to be user friendly. Although she was answering about her father's experience with smart devices, you could sense that she was also speaking for herself. A positive outcome of the questionnaires was that it brought about future health planning discourses between family members and ways to manage technology.

Korea already uses an extensive number of public CCTV cameras throughout the country. From anywhere in the world, one can access some of these cameras by simply using an app.[28] Rather than being invasive or a form of surveillance, it provides a passive form of safety and security and from this, we can deduce that the utilitarian effect trumps the requirement for

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[28] Naver Maps is South Korea's equivalent to Google Maps used in America. Within the settings of Naver Maps, you can select to access CCTVs and by clicking on a CCTV icon on Naver Maps, you can view the live video feed.

privacy, even in the home. When the mother was asked about the idea of having CCTVs in her home, she stated, "어 그런 것도 이렇게 나중에 엄마 혼자 살면 CCTV 하나 달아줘"[29] which means, "when the time comes and I am living alone, I'd like for you to install the CCTV cameras." Because it would be easy and passive, she felt that it would be useful and something she could use continuously.

When she talked about getting older, the idea of utility and logic came up again when she said she wanted to use AI-IoT health devices for everyone's sake. She said, "If I'm not healthy, it strains familial relationships, because if you're sick, the relationship with my children will suffer. My children would prefer a healthy mother because this would be mutually beneficial." Because the follow up questionnaire didn't involve audio recording, it was more difficult to get a same sense of feeling from her previous spoken dialogue. The underlying intention of utility and practicality existed but deciphering her emotions at the time was not possible. But the combination of the verbal conversations and the follow up questionnaire helped to weave the fabric of intergenerational bonding with technology promoting and simplifying the responsibility of caring for elders.

Group 2: Father and Son

This interview occurred on 12 April 2024 with no time specified. The father is 53 years old and lives with his wife and their two sons. Although this group didn't align completely with the methodology criteria, some of their responses seemed relevant and thus were incorporated into the paper. The father denies having any particular AI-IoT health devices, but he does use the health app on his smartphone because there isn't a current need for anything else. He explained

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[29] Group 1 interview transcript page 8.

that his wife and son help him whenever there are any technical issues and he seemed keen on maintaining his health. In a supplemental questionnaire, he was asked how long he would keep using a health device and the main reason why. His response was:

> They should be easy to use, comfortable, and low-maintenance. Health is the most important thing. There is a saying that if you lose your health, you lose everything. Health is not something you check on every single occasion, but you should check it daily. It should be simple and convenient to use, and the price should not be too high. Then it is likely that purchase and usage will be high due to the convenience.

I thought this was profound because he expanded upon his answer,[30] but he also enlarged the audience to include others. The father's salient response keyed in on convenience, which includes also a low price and the ability to use the technology on a daily basis without having any maintenance.

The majority of the son's responses didn't apply to the research, but his answers to the follow-up questionnaire seemed fitting. As a 22 year old college student living at home, he was appreciative of his parent's love and support, and he felt the need to support them once they were older. However, as the eldest son, he didn't feel that it was his sole duty, but it should be a combined effort with his younger brother and that everyone who can help should help. He mentioned that his generation is experiencing a more balanced playing field due to increased gender equality and that filial piety toward parents is not entirely reliant on the eldest son anymore.

This particular group couldn't speak for the elderly, but because they were essentially the next in line, their responses mattered. Especially so when asked about CCTV usage at home in the future. Should the father live alone, he said that CCTV in his home would be "necessary" because you never know "what kind of situation you might find yourself in." As for privacy,

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[30] During the initial recorded audio interview, the 53 year old father succinctly answered the interview questions and often omitted key details that were asked.

there was no hesitation in his answer, "It doesn't matter because it will be my family watching." Further examination should look into the issue of what if it isn't a family member watching and how else could CCTV and other augmented technologies be used to provide elderly support.

Group 3: Father and Daughter

This questionnaire occurred on 14 April 2024 without any time specified. The father is 73 years old and lives with his 68-year-old wife. They have two daughters who live within a ten-to-fifteen-minute drive away and who visit and call frequently during the week. Currently he does not use any type of health monitoring device but felt that he could have used one a decade ago to allow him to automatically check his body – preferably a small device that could be worn. He stated, "서로 이제 사랑하기 때문에 그런 면에서. 그 자녀 관계와 그 잘 관계가 이루어지고 있는 것 같아요."[31] Which translates as, "Because we love each other, in that sense, we share a good relationship." I found this to be an interesting comment because in my experience growing up with older generations born during the Korean War (1950-1953), the word "love" was not commonly expressed verbally. Instead, love was mostly displayed through actions. Through supplemental questions after the initial interview, the father stated that he had no privacy concerns about CCTV use in his home and would welcome it for the mutual benefit of his wife and daughters. But because his health is relatively good and the hospital is close by, the financial costs of these health devices isn't warranted.

During the initial interview conversation, the father mentioned the word "love" four separate times. The daughter never mentioned the word, not even during the supplemental questions after the interview. She simply stated that she is close with them and that they have a

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[31] Group 3 interview transcript page 2.

good relationship. Initially, this was inferred as a silently strained family relationship, but after reading into the responses, her actions seemed to reflect her love. Even with her current hardships, she made the time to visit her parents and to call them frequently and check on their health.

The daughter is 42 years old, married and with two daughters. She and her family rent an apartment ten minutes away from her parents. Currently she has a stable job as an office worker and but feels that she could be in a better financial position. She describes her life as being crazy because she is a woman. There are no sons in the family, so she feels that she and her older sister have to play the caregiver role for their parents. In addition, the responsibilities of being a wife, a mother, and provider are often overwhelming. Although she tries to maintain healthy habits, she often overlooks her own health for the benefit of her family. Further into the conversation, she liked the idea of a health monitoring device and would be willing to pay for that if needed. But since no devices are currently being used, there wasn't much data regarding the level of technical support she provides. She's not technically inclined but is capable of providing support to her father by using apps to learn. She likes the idea of having these devices to help her and her sister to help monitor their parents as they age.

During the supplemental questions, her answer summed up their relationship where she states:

> I have never thought about CCTV in the home because my parents live together, but once they are older or if only one of them is left, I think it would be a good idea to install CCTV. It helps you to be mindful or to be prepared to take care of your parents because you never know what to expect. If I am going to install the device, it won't be my own decision, but I will do it after a final discussion with my sister and parents.

The need for a health device is not urgent but due to the interview, both parties are now considering it for their future.

The daughter uses a Samsung health app she uses to track her sleep, weight, hydration, caloric intake and output. Concerned that it doesn't provide an accurate real time picture of her actual health, she states "I am inconvenienced each time I have to stop what I'm doing to input the data, I wish that these types of functions could be automatically input so that it would be easier to use but more accurate." Granted some of these health functions such as real-time health monitoring can be alleviated using a smart watch or ring, her current financial status doesn't allow for that.

This echoed similar complaints from mostly the elders of other groups about the inconvenience and hassle of smart devices. The constant need to maintain or input data detracts from efficiency and ease of use which ultimately causes people to stop using the device completely. Many of the participants in this research seemed comfortable in sacrificing a bit of privacy in exchange for utility and convenience. Thus, passive usage outweighed privacy which would help facilitate acceptance and usage.

5. Conclusion

The purpose of this research was aimed at exploring the importance of intergenerational relationships and obtaining honest perspectives of families in South Korea about usage and acceptance of technology. Through interviews and questionnaires, this sample study produced findings that supported the importance and need of familial relationships for elderly Koreans. If required, the elderly can survive on their own, however, there were preferences expressing the desire for lifelong connection. Rather than focusing on technology being easy to use, useful, and supported, this study focused on the significance of family and determined that familial support is a convincing influence.

The overall trend of Korea's immense population decline is alarming and will continue to be a topic of concern for South Korea and the Asia Pacific for the next several decades. The aging population, especially those living alone, must adapt to new ways of reliance to survive. Although the country has begun implementing AI-IoT devices and smart-home technology as countermeasures to ensure the safety and welfare of its senior citizens, acceptance and adoption of these new ways will continue to be a challenge. The emphasis of familial trust and the actual desire for connection cannot be ignored. Further longitudinal studies and research will be required to determine the effectiveness of the implemented AI technologies coupled with the integration of family members.

Although effort was put into minimizing any limitations in this pilot study, there were some uncontrollable variables. Selection of participants was performed through family contacts in Korea resulting in three dyadic questionnaires and one single interview delivering a minimal amount of data. Only. Although it provided some insight into the topic, a much larger sampling pool would have provided more rounded and accurate results. Half of the groups didn't align with my original age demographic requirement (over 65 years old) for this study which didn't address the rapid exposure to modern technology. The seniors who grew up in the 1960's and 1970's was more likely exposed to and educated in technology while the pre-1950's seniors did not have the same opportunity. Gender of the elder did not seem to be a major factor for this study but should be for future studies to address existing patriarchal issues and familial expectations of daughters versus sons within Korean culture. Educational opportunities increased for women during the industrial and technological revolution in South Korea, but the high level of inequity continues to exist. More factors to consider are the financial status and geographical locations of those interviewed. As with many goods and services, geographical locations limit

the delivery and technical support. Lastly, comparison of household dynamics would provide a deeper understanding as to why technological support was or wasn't provided.

As more and more Koreans age, a common theme from this research was, "I don't want to be a burden to my children and family." Korean seniors will often dismiss their wants and needs to ensure that their children and their grandchildren have whatever they need to live and thrive – a viable reason for the large number of senior citizens living alone in Korea. On most phone calls with my mother in Korea, when asked if she is doing well or needs anything, she always tells me, "I'm old, don't worry about me. Take care of yourself, your health, and your family. That's all that matters." I hear what she tells me, and I absorb it with a grain of salt. Deep down, I know that she truly wants my attention, my care and love. As a Korean and in my decades of interacting with other Koreans, I've learned that our elders will often be indirect and tell us the opposite of what they truly mean. Because of that, I try to visit my mother annually but that may become financially unsustainable. Due in part to this research and when necessary, I intend on installing CCTV cameras in my mother's home and a health monitoring device to support her from afar – with her permission of course.

New technology and elderly-friendly devices will continue to be researched, developed, and employed, but many of these AI-IoT smart devices faced many user difficulties. What can affect change and acceptance? During Apple's Worldwide Developer's Conference in 1997, an audience member asked Steve Jobs why Apple doesn't apply more advanced technology like their competitors. Jobs brilliantly answers this question by stating, "You've got to start with the customer experience and work backwards to the technology. You can't start with the technology and try to figure out where you're going."[32] Steve Jobs knew that the answer to technology

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[32] Superapple4ever. "Apple's World Wide Developers Conference 1997 with Steve Jobs." Video. 1:11. YouTube, June 5, 2011. https://www.youtube.com/watch?v=GnO7D5UaDig

acceptance was by taking the complex and making it simple, usable, and welcoming. From this study, we found that the elderly want things to be easy and passive. But what exactly is the threshold? Although technology can never replace human touch, it can help support human interaction. With the diminishing population, assisting the elderly becomes more and more difficult so it is imperative that families intervene and fill the widening generational gap. More importantly, families should make the time, earlier than later, to come to a consensus about how and the way they agree to help each other without being burdensome. This research has brought the attention of caring for our elders into the spotlight. In performing these interviews and questionnaires, directly between parents and children, it created a face-to-face intergenerational agreement. It unearthed an unwritten promise and the unspoken hope that laid dormant among the elderly – that their children would be there for them, and they would not be alone. The children, although fewer in numbers, would continue to care for their elders through the aid of these AI-IoT smart devices. Once thought to distance families, tech is now the active adhesive that is helping to maintain the bond.

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