The Introducing voice -based public services for strengthening the accessibility of the social vulnerables and open public communication

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Public institutions and governments develop discussions on the premise that they can facilitate smooth public communication with the socially vulnerable by promoting citizens' welfare by providing voice-based service chatbots to citizens. The purpose of the study is to propose a plan for intelligent governments to provide quick and efficient administrative services by efficiently managing knowledge and information within and outside government organizations based on ICT and facilitating access and use of information for citizens, especially vulnerable groups. This paper confirms that citizens' attitudes, perceptions, and expectations for public institutions ahead of voice-based service provision are positive through small surveys and interviews with experts with knowledge of artificial intelligence, discuss the technical aspects of voice-based services, the significance and necessity of public institutions. In addition, the government and public institutions are considering the implications of using and providing voice-based services. As a result, chatbot's voice-based service is of great significance in providing an opportunity and platform for wider citizens to participate in intelligent government, to strengthen information accessibility, guarantee and strengthen human rights and basic rights of the socially vulnerable.

Key Words : Voice-based services, public communication, Artificial lnteligence government, social-vulnerables, Digital Embrace, information accessibility.

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1. Introduction

ICT society is continuing to innovate by combining technologies and networks developed from e-government to intelligent government in the form of government administrative services. Artificial intelligence(AI) technology is widely used in various industries to improve qualitative support for decision-making and problem-solving through exploration of various types of mechanical intelligence, including natural language understanding, robotics, expert systems, neural networks, and

279

machine learning(Song, 2021). COVID-19 has also become a catalyst for business innovation. 76% of companies are planning long-term IT changes, and they are still introducing and providing various AI tech services such as big data, cloud, blockchain, IoT(Internet of Things), and open API and so on. Due to recent AI advances and abundant data provision, chatbots have been adopted by government agencies and have begun to be applied to quite complex tasks in various fields such as laws, taxes, social welfare and civil complaints, and housing finance(Business Insider,2016). For example, among government tasks, AI applications are found to be suitable in six types: artificial intelligence resource allocation, large-scale data set sharing, lack of manpower, procedures and simple iterations, various data collection and summary, and future prediction(Mehr,2017). As a result of using AI apps in the public sector, benefits such as reduction of cost and work-burden, improving productivity, creation of new employment opportunities, resolution of resource allocation problems, provision of public services, and enhancing civic satisfaction(William, Schatsky & Viechnicki, 2017). AI chatbots[1] are a representative citizen-friendly model, and securing various channels for public communication progress between the government and citizens of which the introduction into administrative services as emotional secretaries, which are the totality of advanced technologies, has a lot of significance. It is possible to communicate with citizens 24 hours a day and provide personalized services, so the system is being quickly introduced and established in the government and public sectors. With the small survey on convenience such as interworking with existing smart devices and mixing voice services, citizens' attitudes are very open and expectations are high(see 3.2). In particular, the term "conversational commerce" is already being implemented in various ways in the business industry, especially in the financial sector, through applications. For example, users are not difficult to access in real life by recommending products to suit their needs or tastes through chatbots(Tuzovic,2018). Voice consultants such as Amazon's Alexa or Google Assistant can be used on designated devices or regular smartphones, making it available to numerous extended users. More than 28 million so-called "smart speakers" were reported worldwide in the third quarter of 2019 alone (Canalys,2019).

Conversational interfaces use natural language to interact with applications, which presuppose that they will have great potential for civil services and lower barriers to interaction with governments. The open government aims to focus on providing citizen-centered services in a form that easily accesses, utilizes, and shares information provided by the public sector, improves citizens' participation in public sector activities, and reflects their intentions. The main issues of the open government are transparency, participation, and cooperation to create participatory and cooperative dialogue (Wirtz,2015). Voice-based services using natural

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1) machine learning algorithms, process automation, image recognition software, and voice recognition interfaces, including chatbots.

languages is to strengthen and protectg human basic rights for the social vulnerables and can be the public communication channel for realizing open government. In May, the "Korean version of the New Deal" policy announced plans to innovate into an intelligent (AI) government that effectively responds to the post COVID-19 era and quickly processes personalized public services in areas close to civil life (policy briefing, 2020). However, the issue of the universality of digital technology, that is, citizens' access to digital technology, should be considered to maintain citizens' economic, geographic, and psychological equity in the digital government. In particular, inducing participation of the social vulnerable is a key task of the intelligent government that should be realized based on the most. This paper aims to find out is 1. Reasons for introducing Voice service chatbots for the socially disadvantaged 2. Considerations in preparing a voice-based service platform for public institutions and 3. Implications for voice-based services to public communication with the social disadvantaged and open government public services.

2. Global Government Voice Chatbot Usage and Definition of Digital Divided with Social Vulnerability

2.1. Global Government Status Using Chatbot's Voice-Based Services

For many years, many global government agencies have provided voice-based chatbots services, to provide rapid information and smooth communication from government to citizens(see table1). It has been stated that this is to improve service delivery effectiveness and efficiency of internal manpower management (VSOFTconsulting. 2018).

2.2. Concept of digital divide with vulnerable class

Generally speaking, the vulnerable group refers to an individual or class that is difficult to maintain its current economic status when faced with social risks (young people in the job search process after graduation, middle-aged people who are unable to get a job after early retirement), inevitable in the course of employment or economic activity or face unexpected accidents (disease, industrial accidents, unemployment, etc.)(Kim.2014). Social minorities refer to those who have relatively limited opportunities for social participation compared to other classes due to economic, physical, and other conditions, and are more likely to be excluded from opportunities to receive equal benefits as members of a society without state public intervention. It tends to be culturally alienated due to social, economic, and physical conditions, and further forms a social vulnerable class in our society(Kim.2006). The class is vulnerable to access, capabilities, and utilization of ICT compared to ordinary citizens due to physical, regional, economic, and social conditions, including illiterate, elderly, and farmers and fishermen who cannot read or write(Lee.

Table 1. Global Government Voice Chatbot Usage

Department of Homeland Security	EMMA	Guided and informed by U.S. Citizenship and Immigration Services (English Voice Service) theMississippiStateGovernment
the Mississippi State Government	MISSI	- Enter concerns through voice input via Amazon's voice assistant Alexa - Provide residents with information on places to visit and events such as public services and taxes, medical services, public transportation, family services, employment opportunities, etc
San Francisco	PAIGE government	San Francisco's procurement chatbot application for internal workers keeps employees out of all the busy processes of government procurement.
Kansas City	OpenDataKC	Kansas City's open data portal is developed to help people find details about the city in one location. Interacting with people and providing immediate information to prevent people from wasting their time passing through the portal.
Government of Los Angeles	LACity Alexa	Launched LA City, a voice-enabled application for Amazon Alexa devices. Through this, the user may request information on events/news occurring in the city. Generaladministration
general administration	Mrs. Landingham	Guides new employees through a complete in-house onboarding process, such as filling out forms, organizing deliberations, etc
Dubai Government	Rammas	- The first government chatbot application launched on the Google AI platform - Provides the ability to process people's requests (claims and payments) 24 hours a day, process data, and make more accurate decisions
Government of Singapore	Gov.sg	Information about government agencies, news, press releases, people, and policies can be easily found and complained about the negligence of all public services can be raised and tracked. Chatbots extract information from government-only portals already set up for public use
the London Government	TravelBot	Bus arrival, route status, service update (bus/railway), map information provided
Australian Government	Alex	Australian IRS chatbots support mainly taxation, property rights, income and deductions, filing declarations, and tax-related people and business issues Gostraighttothecontentyou'relookingfor,savetimeandcreateabetternavigationexperience
Government of Bonn City, Germany	Botty Bonn	To help people with all urban problems and other administrative informatio
India Maharashtra Government	PMC	- Provide registration, online services, tax returns, health issues, finance, and driver's license information - Chatbot applications provide up-to-date information on analytical data (e.g., health data) across all public services - More transparency between government agencies and people

Source: Author(2022) made https://blog.vsoftconsulting.com/blog/15-governments-agencies-that-use-chatbots content into Table 1

Table 2. Define the concept of digital divide by periods.

The stage of change.	Introduction period.	Taking a leap forward	The saturation period.
Types of digital divide	access divided	usage divided	divided steamming from the quality of use
Term	Initial information divided	First information divided	The 2ndinformationdivided
explanation	The difference between those who are accessible and are not.	The difference between a user and a non-user	The differences between users and users.

source: Min (2011), digital divide with Internet use, Media Information Research, p152.

2019). The technical difficulty in accessing economic, legal, social, and government support due to the inability to read or write about many means and media provided by ICT society is generally referred to as a phenomenon in which access to knowledge and information is disproportionate by economic class, gender, and age(Min. 2011). If the information divided has been an inconvenience caused by the inability to use ICT, failure to use information can spread to economic, social, and cultural gaps and lead to various inequalities(Joo. 2018). The lack of information capabilities does not lead to a digital virtuous cycle of information utilization, application, and beneficiary, which promotes deepening inequality (see table 2). Therefore, in order to realize the digital embrace and digital virtuous cycle of the intelligent information society, pan-government policy promotion, social consideration, and agreement are needed to bridge and alleviate the digital divided of the vulnerable.

2.3. Non-face-to-face service and digital

divided.

COVID-19 makes the dynamic society disappear. Then, personal hygiene becomes important and face-to-face private and official meetings decrease. Media, work, and education being suitable for the hyper-personalization era take place at home through high-speed, ultra-advanced devices and most of life styles gather into small apps on display screen of smartphones or computers. In the era of New Normal, untact is facing a turning point in a familiar form of life. It is time to think about efficient ways to increase non-face-to-face communication between humans and machines with AI. For example finance through data and networks is commercialized in non-face-to-face, which combines FinTech, and offline counseling services are rapidly decreasing. The acceleration of digital transformation is alienating the social vulnerable, such as the elderly, low-incomer, and disabled, and there is a serious digital divided between the level of informatization and digital capabilities(Bae, 2021).Therefore, more social responsibility is required in the transition to the era

of "untact" and measures needed to bridge the digital divided starting with the pandemic are compensated with generating social contribution activities like viewing large letters of their apps, training on the use of smartphones and mobile banking apps suitable for rapid changes in the financial environment, and free Wi-Fi installation are required everywhere. "Digital innovation in the financial sector is progressing rapidly," the National Assembly Research Service(NARS) said in a report on this year's parliamentary audit. "We need to prepare guidelines as soon as possible to protect the information vulnerable and regulate unfair discrimination." In this year's analysis by the Ministry of Science technology and the Korea Intelligence Information Society Promotion Agency, the Internet utilization rate averaged 54.1% for men and 44.1% for women, with 70% for those in their 20s, 63.4% for those in their 40s, 51.6% for those in their 50s and 40.9% for those in their 60s. However, 57.3% of people with physical disabilities use the Internet, accounting for more than half. It is 40.6% of the visually impaired, 37.8% of the hearing and speech impaired, and 37.2% of the brain lesions, which is lower than that of the general elderly in their 60s or older (eDaily, 2021). As a result, through policies and plans for promoting digital embrace, the government and public institutions should take the initiative and show their willingness to solve it. The difference in access and utilization capabilities to continuously advance digital technology is feared to intensify socio-economic inequality and discrimination. Therefore, policies and digital embrace policies are

needed to ensure that all citizens participate in the digital world without discrimination or exclusion and enjoy the benefits of digital technology evenly(Jeoung. 2021). 44.7% of the respondents said they were afraid of becoming a digital underprivileged someday in the future, it consisted of 46.0% of the elderly, and 54.0% of the low-income class. The most necessary policy efforts for digital embrace of government and local governments were "customized development of digital devices" (25.3%)(Bae. 2021). Therefore, voiced-chatbot services is a customized task necessary to access and obtain basic rights and human rights guarantees of information of the social vulnerable for this era by making the most of the advantages of platform-based procesures(see Table 3). In March 2017, the UK presented a digital embrace policy as one of the seven major tasks in "UK Digital Strategy" to support digital utilization education, digital skill learning for the vulnerable, and online health management, focusing on strengthening digital capabilities and providing digital welfare services for the entire nation(Jeong.2021). In March 2019, the "GOYONG-I" pilot service, an automatic counseling chatbot for employment information from the Ministry of Employment and Labor, was launched. Chatbots are AI-based technologies that provide appropriate answers or various related information to questions through text conversations with humans. It is very useful to vulnerable with low digital informatization capabilities and utilization levels by implementing simple text conversations to enable them to apply for desired counseling or simple services without

Table 3. Define the concept of digital divide by period.

The stage of change.	Introduction period.	Taking a leap forward	The saturation period.	The Oversaturation Period
Types of digital divide	access divide	usage divide	divide steamming from the quality of use	divide guranteeing of the fundamental human right
Term	Initial information divide	First information divide	The 2nd information divide	The 3rd information divide.
explanation	The difference between those who are accessible and those who are not.	The difference between a user and a non.	Differences between users and users.	The difference between the social vulnerable and the non-social vulnerable.

Source: Min(2011) recitation & Author(2022) rewritten.

going through complex searches. For many years around the world, governments and public institutions have repeatedly pondered for smooth communication services by quickly providing information to citizens. As solutions, some of them have said they are providing voice-based services, including chatbots, to improve service provision efficiency and internal manpower management (VSOFTconsulting.2018).

3. Research method and result

3.1. Research method

Five expert interviews conducted to learn about how to utilize the voice-based chatbot's civic service in accessibility to vulnerable groups and citizens, challenges and opportunities. Five experts in charge or developing AI-related tasks in realizing interactive interfaces and services were asked to answer by e-mail between August and December 2020, due to COVID-19. The online survey conducted on whether citizens were receptive to providing voice-based services. Interview participants were in Seoul, Gyeonggi, Busan, Daejeon, Ulsan. Opportunities to promote access to intelligent public administration services, such as requirements and challenges from the perspective of technology, law, or organization, were asked, and specific ideas for potential applications and voice-based civil services were also requested from the perspective of publicity. Technical matters included the technical characteristics of each business, indicating that there was a limit to information disclosure, and only general answers were valid, because limited opinions cant be representation. There were still many limitations in information sharing common topics(hierachical approval lines, lack of accumulated data and

285

Table 4. Interview participants and common questions

1. Classification of experts interviewed.

P1 Software Project Developer.
P2 Director of Software Design.
P3 Local Government Artificial Intelligence-based Policy Officer
P4 Technology Innovation Center researcher.
P5 AI magazine contributer

2. Common question.

What's a voice robot?
What technology is used for voice bots?
Why do you need voice service for chatbots?
Why should the government introduce voice service chatbots?
If the government introduces voice services, it will be necessary.

privacy problems etc) were classified based on the responses and statements of interviewees through research analysis methods and clustered technologies, requirements, and applications.

Q1> P1, The voice bot is a chatbot in which a virtual secretary has a voice (audio option, interactive interface). In other words, the interaction is much more dynamic and immediate because you can talk like a virtual assistant instead of writing. It should be considered that people are much calmer when speaking than when writing. P2, It is a natural language understanding (NLU)-based voice channel for communication that operates by converting voice into text format. P5, it is an interactive interface that uses apps, messaging platforms, social networks, or chat solutions for conversation.

Q2> P1, The technology used varies depending on the type of voice bot you have, and some include more steps than others depending on what you are trying to do, but the process performed for oral to written transition is relatively simple. When

the bot receives audio input and converts it into text, AI processes it. For example, after converting audio files into text in real time using Google's Speech-to-Text tool, natural language processing and deep learning techniques run to read, analyze stimuli, and then run them as knowledge-based processing. When everything is analyzed, find the answer and send it to the user. P2, identifying the key markers of the speech and concluding the best response to the conversation or query, the TTS (text voice conversion) engine completes the interaction by converting the response into audio or voice. It is trained to complete the entire speech understanding and response process, which is almost human-like, and a speech assistant is an intelligent communication method. P4, It can be easily integrated without additional channels in partnership with Google Cloud Contact Center. P5, the interactive secretary automatically tracks scheduled tasks, networking with other chatbots, and improves the ability to process client queries.

Voicebots are being developed to provide a wide range of simple answers to basic questions, smooth and beneficial support, and are trying to significantly minimize the time it takes to handle questions.

Q3> P1, P3, P4, and P5 ① In interaction with citizens, it can be provided at a high speed without having to write or click any more buttons. ② People are not as careful when they speak as when they write. As a result, this carelessness leads to a new request/question method, which can rapidly increase the amount of knowledge-based data, increasing diversity in command analysis, thereby improving deep learning technology. ③Increasing the efficiency of the bot allows public officials to focus on dealing with more complex problems and eventually improves the quality of services they provide to citizens. ④The use of voice makes it a means of social inclusion as it is easily accessible to people who are unable to write, are unfamiliar with using technology, have disabilities, the elderly, multiculturalism, and farmers and fishermen. ⑤Customer satisfaction can be increased by providing more options to promote interaction with citizens. P2. ① Voice is the most natural communication mode and is easy to use, making it the most preferred communication mode. ②In the latest smart devices, voice bots are a natural alternative to existing devices rather than conventional touch tone methods. ③A wide range of customer services can be provided through knowledge base and back to personalized services. It can also be integrated with numerous smart speakers such as Alexa and Google Home.

Q4> It provides P1, P2, and P3 citizens with more personalized, intelligent, and insightful interactions in the following major areas.①Provide a great personalized service experience that provides timely and appropriate information to citizens ② Use advanced machine learning models to enable smart matching to connect the best agents to each citizen's interaction ③ Use strong AI technology to create smart interactions. ④ Integrated, authorized agents are authorized through AI-based guidelines for content and proposed tasks to help expedite public service processes. ⑤It reduces complexity in simple business operations for both citizens and public institutions. P4. Public institutions can use chatbots to connect with citizens, engage various stakeholders to solve social problems, and use a powerful tool called sophisticated chatbots to provide citizens with personalized solutions, receive immediate feedback, and collect information in real time. Real-time citizen response measurements are possible, and the use of chatbots can automate work to enable labor movement and contribute to narrowing the digital information divided.

Q5> P3, Bots provide consistent results on a regular basis for the provision of general information by public institutions without sleeping or taking a break, communicating with customers and improving citizens' participation.

P2, Digital Twin will provide a single interface for recognition and operational control of jurisdiction in the future.②Blockchain has the potential to innovate government services by providing transparent records of government transactions and
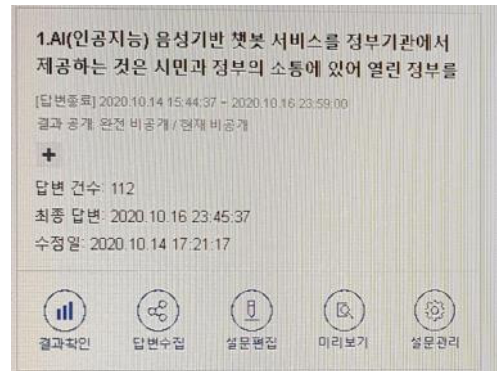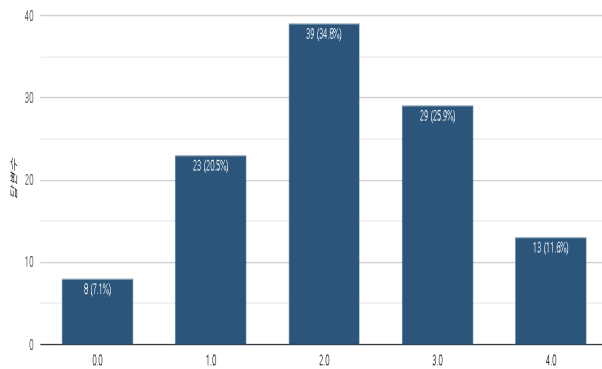
Table 5. Age groups participating in the survey(2020)

reducing friction between public and private sector ecosystems. It can change many government functions, including identity, voting, public records, regulatory supervision of procurement and supply chain risks. ③ Interactive platform functions are needed for data exchange. It creates valuable data streaming for public and individual users and allows data collaboration between governments, industries and citizens. ④It uses technologies including the Internet of Things (IoT) and AI to provide new ways of working, reserve resources, reserve and coordinate facility services, and provide improved experiences such as information sharing and collaboration.

3.2. Online Survey

112 ordinary citizens in their 20s and 60s were asked to an online survey agency to conduct a survey on the premise that "providing AI (Artificial Intelligence) voice-based chatbot services by government agencies is necessary for citizens to communicate with the government." With a total of 10 questions, only citizens' attitudes and intentions toward artificial intelligence voice-based chatbot services were checked with simple questions about personal and social factors. We expect that there will be enough sub-questions or variables for each question, but the deeper investigation methodology is not deeply related to the thesis that this paper intends to make, so we will proceed with further questions or variables for the experiment later. In terms of technology acceptance, only the age group was checked except for education or gender (0: 20s (2 people). Those in their 1:20s (8), those in their 2:40s (34), and those in their 3:50s (39). 4:60 (29 people), see Table 5. A Likert scale of five steps (0 to 4) of Very Not good , Not good, Normal, good, Very good was used.

1. In the matter of the Personal Usages: Q1. I am confident in understanding and using AI voice services in government agencies. Q2. AI speakers are suitable for use by government agencies. Q3. AI speakers are innovative for government agencies. Q4. Using AI voice-based chatbot service is very

interesting and fun. Q5. If I use AI speakers in government agencies, the use of government agencies will be more useful to me. Q6. If I use AI speakers in government agencies, it will be more convenient for me to use them.

Personal level survey results: 33.9% of Q1 said that they can make positive decisions about their capabilities and use them for their own purposes without any difficulty in using the technology. 28.6% said yes, 17% said yes, indicating that the technology's positive effects are much higher. The Q2 for value suitability is 41.1%, 28.6%, and 16.1%, indicating that the relationship between the recipient and the technology also has a very positive perception. Value innovation, 32.8% of Q3, 32.1% of Q3, and 20.5% of Q3 said yes, indicating that they have a very positive attitude toward interest in new products or services. In terms of interest in use, Q4, which measures the degree of satisfaction and interest in the behavior they use, was 34.8% yes, 30.4% normal, 25.9% very yes, and very little about 1% of the total was not. Therefore, it seems to most of the survey subjects that they are interested in voice AI services. In Q5 and Q6, the results of the acceptance response showed that the government had a positive perception and attitude toward the use of AI voice-based chatbot services at a comprehensive personal level, including 37.5% yes and 35.7% yes in terms of personal convenience and convenience.

2. In the matter of the Social Usages : Q7. The use of AI speakers in government agencies should be aligned as a social flow and phenomenon.Q8.

The use of AI speakers by government agencies reflects the social image of our society and should be used.Q9. If AI speakers are used by government agencies, the use of government agencies will be more socially useful for everyone.Q. If AI speakers are used by government agencies, the use of government agencies will be more socially convenient for everyone.

Social level survey results: social conformity, i.e., Q7 is 33.9% normal in subjective norms, 31.3% yes, 20.5% very much so. As a result, the influence of social sympathy on individuals is beneficial and positive, and the social image, Q8, is 36.6% normal. 25.9% Yes, 21.4% Very much so that they seem to have a positive perception of technology acceptance as a degree to which their social status or image within the social system is increased or strengthened, and the social usefulness response of Q9 is 36.6% Yes, 29.5% Normal, 17.9% Very. And in Q10, social convenience is 38.3% yes, 27.7% normal, and 18.1% very yes, indicating that citizens maintain a very positive perception and attitude as they see that the overall social level of usefulness and convenience is high.

3.3. Result

In a preliminary survey of ordinary citizens, voice-based chatbot services generally had positive expectations for personal usages and satisfaction of many people, and were considered excellent in terms of usefulness, utility, convenience, and validity of government use. In social conformity, that is, in subjective norms, Q7 is 33.9% normal,

31.3% yes, 20.5% very yes. As a result, individuals showed a beneficial and positive attitude to social sympathy, maintaining positive perceptions in technology acceptance as a degree of social image, social status, or reinforcement, and responding similarly to personal aspects in the rest.

In interviews with a group of experts, the P1, P2, P5 voice-based chatbot service is an interactive interface that combines text and speech based on natural language understanding to serve as a virtual assistant through speech recognition.

P5, the interactive assistant automatically tracks scheduled tasks and improves the ability to handle client queries by networking with other chatbots. Chatbots can move from being able to answer basic questions simply to providing seamless and beneficial support to all types of users, dramatically minimizing the time it takes to solve questions. Therefore, p1,p2 responded that they could quickly interact with the needs and needs of citizens, and that they were helpful to the elderly, the disabled, and the illiterate. As a result, P4. First, institutions are delegating ordinary and everyday tasks to chatbots to reduce employee workload and response time, and second, public institutions are using chatbots to connect with citizens and engage various stakeholders to solve social problems. Third, public institutions can use chatbots to receive immediate feedback, understand citizens' perspectives on problems, and gather information in real time to hear citizens' voices about the problems faced by local communities. Chatbots are also likely to experience similar

trends and will continue to learn how to adopt and use these new tools. p8 and p5 describe the field of use of voice service introduction by government agencies, and bots can communicate and interact with customers because they can provide consistent results 24 hours a day. ①The digital twin will provide a single interface for future jurisdiction awareness and operational control.②Blockchain provides transparent and authoritative records of government transactions, reduces friction between public and private sector ecosystems, and innovates government services such as regulatory oversight of identity, voting, public records, procurement and supply chain risks. ③An interactive platform function for data exchange for commercial and social benefits is possible. It creates valuable data streams for public and private users and allows data collaboration between governments, industries, and citizens. ④Technologies such as the Internet of Things (IoT) and AI can be used to provide new ways of working, reserve resources, schedule and coordinate facility services, share information, and collaborate.⑤Applications include industrial and process-specific situations, such as employees who use digital pens that interact directly with backend processing systems beyond productivity gains, or patients monitored remotely through wearable interfaces at home to improve treatment.

If the government develops the possibility of using voice-based services, it must quickly bridge the information gap for the socially vulnerable, protect them from crime, and quickly acquire and utilize information on various services in the

society, free from discrimination and rights and property.

4. Voice chatbot service and considerations of government agencies.

4.1. Cases of using voice-based chatbot services by the government and public institutions.

Voice recognition technology with AI, a key element of the 4th Industrial Revolution, is emerging as the best issue as it is expanded to new industries such as smartphone-based interactive personal assistants, home speaker-type hubs, connected cars, simultaneous interpretation, chatbots, and

robots. In particular, virtual assistant functions that recognize and operate human voice commands have been introduced in earnest in various products, driving market creation and growth (KIET, 2017)(see Figure 1). The voice recognition technology of AI chatbots in cloud computing is rapidly evolving by deep learning, which functions to strengthen access between citizen and government, thus promoting government transparency, preventing corruption, and those are recognized as an essential function for the role.

Since November 2021, the government has been expecting to create new values and improve efficiency based on public intelligent information systems by Corp. Sorizaba providing voice recognition AI services that apply voice synthesis technology to AI voice recognition solutions of integrated management systems(ITBiz, 2020). Among public
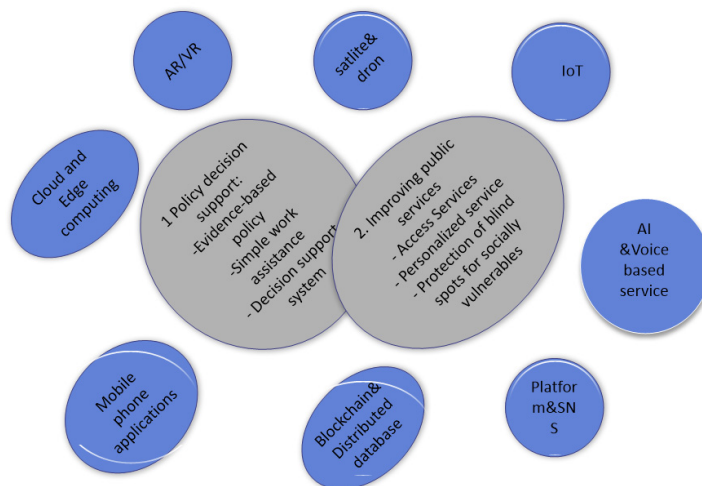
Source: Author(2022)

Figure 1. Development of Digital Eco System and Supporting Government system

service in advanced information technology, it is possible to issue civil documents and fill out desired them "in words" automatically to get the documents immediately. Identification is a biometric service framework such as fingerprint and voice recognition of biometric information(private key) (Choi, 2021). Jeju Island will provide these services by selecting about 30 types of documents with high frequency of issuances to the social vulnerable firstly like those who have difficulty issuing documents. Daejeon City and Gyeonggi Province will introduce "Smart Mirror", a safety inspection service using the combination of smart glasses and IoT technologies, and an AI that allows citizen with disabilities to receive various information quickly and accurately. By learning sign language movements, information is provided in sign language with the hearing impaired, and voice guidance for the visually impaired is also possible.

Bucheon-si and Seongdong-gu, Seoul, recognize AI's pre-entered motion and warn control personnel when a situation occurs (JoongAng Ilbo,2020). "Civil Complaint Government 365" service in Koea is an interactive civil complaint counseling service provided by six administrative agencies(National Police Agency, Korea Customs Service, Military Manpower Administration, Forest Service, Ministry of Unification, Ministry of Public Officials Pension Service) and The interactive civil service(National Secretary "Gubbi") provided by public institutions (Public Officials Pension Service) opened on May this year and provided chatbot and KT GiGA Genie Internet subscribers

as an AI speaker in 2021 through a cloud-based system(edaily, 2020). Collaboration between humans and AI is particularly emphasized in the decision-making area. In an environment where the pace of change is increasing and uncertainty is increasing, the frequency and complexity of decisions made by companies and individuals will increase, so the need for artificial intelligence in decision-making will increase(Lee et al., 2021).

4.2. Considerations of establishment of voice-based services.

In order to improve the quality and the convenience of administrative services, institutions are emerging that provide counseling services after working hours using voice-based chatbot services through real-time. Despite the remarkable development of AI technology, concerns remain over the possibility of service levels falling short of expectations or making wrong decisions due to misunderstandings in natural language and data processing in each sector. In terms of technology, not only difficulties in ontology generation, knowledge data construction, and big data, but also difficulties in non-technical perspectives that lack a venue or opportunity for discussion and academic knowledge exchange (Song, 2021). As a result, it was difficult to find information on the technical and functional aspects of voice-based services, such as academic literature on the integration of the public sector and AI, and research reports from government and related agencies.[2] is a procedure that consumers and suppliers must recognize as a

process of co-creating value, and it is possible only when a comprehensive legal framework and strategic cooperation of each platform operator are guaranteed. Fourth, the integration with voice support services(Amazon Alexa, Google Assistant, Microsoft Cortna, Apple Siri, etc.) used in users' daily lives can be needed to enable. The value chain of the voice AI market allows it to lead to base technology, voice AI platform, hardware with voice recognition functions, and services available to users (Samjeong Economic Research Institute, 2020). For example, during having breakfast, we often recognize the weather forecast for the day through voice support services. In order to increase the convenience of public NURIJIB that are frequently and irregularly visited, basic services such as mortgage loans, pensions, guarantee requirements, or inquiries will be installed so that they can be used without a separate custom extension. Fifth, strengthening accessibility of the social vulnerable, which is weaknesses revealed by the e-government, is an important requirement in implementing digital civic services. A public institution emphasizes the functional role of the corporation in social equal opportunities through effective and practical policies and financial support, especially in terms of social consideration and social distribution for the vulnerable. Therefore, it is predicted that it will provide an environment that naturally controls digital devices

with human senses, actions, and cognitive abilities so that people with severe disabilities and severely ill patients can be guaranteed the right to access data and protect personal information. With the development of artificial intelligence sensor technology, the interface that is attracting attention is NUI as users' actions can be directly input through communication methods. It is developing into AI, multi-touch, and largely augmented reality(AR)(Kim, 2020). Sixth, as a personal information processing problem, handling and protecting information related privacy is an important topic in the AI era. The need for user's authentication is natural for several advanced digital government services that include information that is important for privacy protection. The two-step authentication technique after voice recognition by combining a cryptographic method containing a personal pin and an individual's unique voice characteristics displays each prompt that verifies an authentication request with a user authentication app if authentication is required using the user's personal device. In addition, if "Biotech + Certificate (PKI)" is combined and used as speaker authentication technology, authentication procedures based on voice authenticity(Choi,2021) can be granted. In the case of public institution users, they can verify their identity using their personal taxpayer number. This is sufficient to be used in various governmental services because the

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2) Backoffice: It is generally referred to as an administrator page, and covers all contents related to service operation, such as product, content, marketing and accounting management, for operation management of the front page. User convenience is also important in the design stage, but logical data flow is important before that. Therefore, policy definition and flowchart design in the back office planning stage are important (https://yslab).kr/93

https://cloud.google.com/speech-to-text
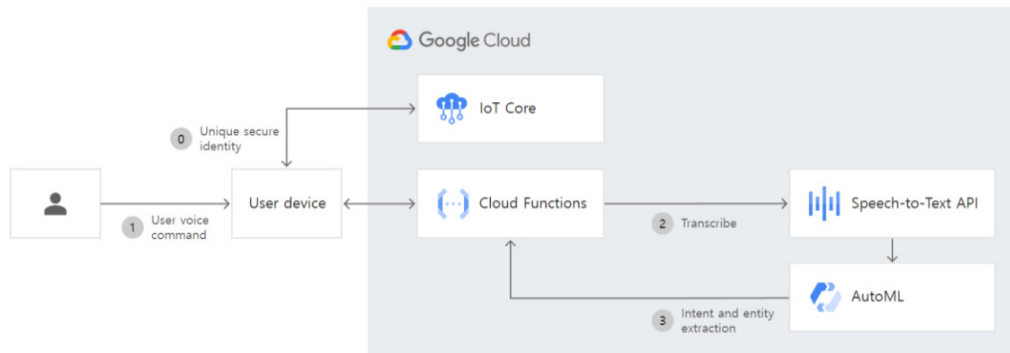
Figure 2. Voice recognition interface-based service configuration

possibility of abuse is very limited ((Joint Related Ministries, 2020). Seventh, it is about understanding the standard language of speech recognition. For example, when you want to receive directions provided by the app, you can say the starting point and destination in a local dialect. Since the vocabulary is limited, it raises concerns about whether even local dialects can be understood. The voice conversation interface <Figure 2> of the voice recognition-based service recognizes voice with a customized voice recognition engine. P1 (Refer to Appendix 1) believes that although understanding local dialects is an important requirement for accessibility and acceptance of various classes and local citizens, financial, private, and government services below will have little relevance in that they are expected to use standard language. In addition, considering that about 70% of local dialect speakers can accurately recognize standard language, and that financial and administrative languages are standard language, they may suffer from some special jargon, but they are not recognized as a problem. Eighth, there is a need for API[3] (now open API[4] is operating)to link and integrate data of government ministries and public institutions and to access information. It is imperative to realize more sophisticated interactive services and to resolve information distribution and lack of linkage in procedural access to information systems related to public data through third-party applications. In fact, various public data and related information systems have been established and operated by government ministries, individual departments, and

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3) API can be said to be the interface for Application Programming. It refers to an interface that allows applications to utilize the functions provided by any operating system or programming language. In other words, it is a stepping stone that connects operating systems and programming languages with applications. https://blog.hyundai-mnsoft.com/1638 [Hyundai Msoft's official blog]

4) https://www.data.go.kr/

public institutions, but it is often difficult to utilize these information. Standardization of information systems and data is necessary in terms of data linkage, such as not being able to use useful information in the past during business processing if information is disclosed and disappeared due to fragmentation of information systems.

5. How to utilize voice-based services.

Advanced digital civic services such as voice-based services serve as an opportunity to provide a significant paradigm shift for government and public institution processes. Notice that citizens can access digital services instead of visiting government offices, and look at the work areas that can be used through the combination of various AI technologies in government and public services.

5.1. Provide customized services by expanding non-face-to-face services.

First of all, by combining blockchain technology and voice-based services, official documents are requested using vast amounts of public data (deloitte, 2019). In terms of the structure and security of distributing and storing public data disclosed in the blockchain, all blockchain participants can share and own information. For example, citizens are asked for basic personal documents when they want to apply for a lease loan. Official

documents such as employment certificates, family certificates, lease agreements, and health insurance fact-finding certificates must be submitted to other institutions or companies from time to time. Currently, the digital government is strengthening user authentication and innovating public and private services with safe and convenient digital identification online and offline through mobile identification cards with a system that recognizes personal information through voice (Joint Relevant Ministries, 2020).

Second, it provides information search and counseling on related loan screening methods, laws or taxes, rates, bond transfer, and guarantee insurance (ICTSPOTISSUE, 2018). Robot Automation System and voice-based chatbot services provide information including daily laws or local housing finance corporations for citizens, such as related tax, specific problems or policies. If citizens have to access the data storage after voice recognition to determine whether or not they are eligible for certain services such as health insurance reduction, housing subscriptions, and the expected cost of related services can be provided to users through voice output. Most civil service services had different patterns of processes. It is expected that the pattern of complaint handling can be divided into several groups by using the classification technique of machine learning using various data generated in the complaint handling process. If this is systematized, civil petition processing can be automated according to the classification according to the characteristics(Lee, 2019).

Third, it uses big data and the Internet of

Things (IoT) to notify citizens' information collected through algorithms or provide personalized services for reminders (ICTSPOTISSUE,2018). In the future, the government plans to introduce a personalized "national secretary" system that supports applications to processing. For example, "○○○ is eligible for principal repayment this year." Your child ○○○ is eligible for a national scholarship application and can apply until x month x x month. "You can apply for a home loan". It will be serviced through a private messenger app or AI speaker by inserting basic functions into the "Government 24" and opening them with an open API.

Fourth, the government can use 'MyData'[5] to search, store, and distribute personal information held by public institutions if it wants to provide convenience and implementation of citizens' data sovereignty. For example, when applying for policy funds for small business owners, 20 types of required documents can be submitted as MyData services, used for credit management and asset management of citizens, or loaned to financial institutions as MyData (Join Related Ministries, 2020).

5.2. Protecting, monitoring, and controlling

personal privacy

The rapid development of ICT technology has led to the arrival of the era of big data by enabling information collection, processing, storage, and utilization, and is trying to secure regulations on "global data security" as the decoupling/coupling[6] phenomenon of customer value chain is accelerating in non-face-to-face society. That phenomenon requires regulations on the unauthorized use, occupancy, and utilization of stored domestic and foreign big data. In particular, there is considerable concern that it will be abused by exposure to phishing crimes (including smishing, voice phishing, farming, etc.). Therefore, through intelligent monitoring systems and location information systems using artificial intelligence technology, the preventive role can be increased by monitoring, recognizing, and analyzing the social vulnerable to protect from such crimes or risks. As all work processes are stored in the digital form and platform-based cloud, and then audit traces are left (Jung, 2021). Also there are Data Trusts[7], the trustee manages data and data rights for individuals and groups. In order to introduce the concept of data trust, the role of data trust agencies is important in order to set processable information by different stakeholders

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5) Through 'My Data', personal information held by public institutions is searched, stored, and provided to realize people's data sovereignty, and voice-based services are being fostered and developed from public, financial, and medical institutions to new data industries (Joint related ministries, 2020).

6) Decoupling is the opposite concept of coupling. Coupling, which means connecting and combining in advance, is a term referring to a phenomenon in which a country's economic situation is similar to that of a country or global economy related to that country(Territory Research Institute, 2020)

7) The data trust system consists of 1) collecting data, 2) providing data, and 3) retaining and utilizing data. In the proposed data trust scheme, the authority to determine who can collect, access, and use data is now more important than simply having collection, access, and permissions(Jang, 2022).

and to use data safely without excessively violating the rights of data subjects. trusted by the settlor. Authorization must be based on accurate processes, and the number of consignors and data through various incentives and performance sharing that can facilitate data consumers' engagement rather than simply 'protecting' data(Jang, 2022). In other words, social vulnerable groups are easily targeted for those crimes, where personal information is stolen and exposed to crimes and property losses and physical threats occur, and difficulties in financial transactions, public administration, and welfare services are increasing. Therefore, preventive measures can be taken by linking the police and financial authorities with intelligent monitoring systems by recognizing and analyzing voice instability in identification such as monitoring and voice biometric authentication based on the database of big data in financial transactions. In addition, it is particularly necessary to share and cooperate with financial institutions by strengthening security policies to compensate for weaknesses of vulnerable groups in the non-face-to-face era.

5.3. policy suggestions related to limitations

It is needed for citizens' use of artificial intelligence to acquire trust and social consensus by establishing a legal safety net in terms of data processing problems, exposure and utilization of personal information, and social resistance and conflicts due to the replacement of manpower by AI. So i hope to suggest some opinions.

First, it is necessary to reorganize and enact laws and systems. The Data Three Laws, including the Personal Information Protection Act, the Information and Communication Act, and the Credit Information Protection Act (enacted by 2020.8.5), the Framework Act on Intelligent Information Society and the Electronic Government Act (tentative name) (Korea Institute of Public Administration, 2019) for enhancing public communication from AI chatbot's functions are required to be enacted. In addition, the development of AI ethics and guidelines is more urgent than anything else.

Second, it is the establishment of a governance infrastructure based on a cloud platform. It is necessary to hurry to introduce a cloud system that can utilize artificial intelligence technology in all public institutions, including the government. This can increase productivity, efficiency, and accountability, and reduce costs.

Third, private companies should identify their needs and prepare tax benefits and funding and incentive systems to foster and promote big data businesses (Korea Information Society Agency, 2017).

Fourth, expand the scope of research as a basic academic and strengthen artificial intelligence education (Science and Policy Research Institute, 2018), democratic citizen digital literacy education, and data expert training are comprehensively needed. The power to respond to many side effects that will occur due to the introduction and expansion of artificial intelligence should be strengthened to make it artificial intelligence for all citizens. Critical thinking and cultivating social

responsibility can cultivate ethical judgment or communication skills that have undergone self-awareness and evaluation of text that promotes and incites dangerous information, biased or ideological thinking, and conflicts.

6. Implications of providing voice-based services by public institutions.

First of all, it is a change in the procesures of public institutions and the rigid bureaucratic culture. The problematic procedural complexity in the digitalization of the government stems from the rigid authority structure that has evolved over a long period of time (Lee, 2013). Therefore, it is necessary to change the organizational structure and improve procedures based on AI technology, and to pursue a common direction to transform into an intelligent and agile organization. Rather than a dichotomy approach in which limitations are set in policy and decision-making processes such as top down or bottom up, should be paid attention to the middle-out decision-making[8] process(Security News, 2009). Vertical command systems, business delivery systems, and business performance inevitably face difficulties in data composition and processing, so abundant data base is needed to provide voice-based services, and changes in government procedures and organizational culture will help the country develop and national competitiveness.

Second, concerns about information access rights and data protectio[9] data protection as one of the human rights such as "big data" and "open government data" in order to expand and guarantee basic rights. It should be considered that the Open Data Strategy(ODS), which is being promoted around the EU, started from expanding access to information as a basic right rather than revitalizing big data or markets. Korea also enforces the Act on [the Provision and Utilization of Public Data], which guarantees a wide range of public data rights, and the right to access information means "the basic human rights of individuals who are the basis of freedom of information or the right to know". The European Parliament's 'recommendations on access to administrative information and freedom of information' or defines the right to access the Internet as a basic right equal to freedom of expression (EU). Or it is being promoted for the purpose of disclosing information and bridging the information divide through efforts to legislate as the basic rights of the people(Finland).

Third, it is the development of a collaborative organizational management method of government

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8) Gartner, Inc., an information technology research and advisory firm, points out that enterprise architecture can no longer respond to this situation with traditional enterprise architecture (EA) as diversity and complexity increase in all areas, including markets, economies, countries, networks, and companies, and companies are known as middle-out EA or light EA.Gartner differentiates the seven characteristics of 'employee architecture' from the existing EA approach: non-deterministic, autonomous, rule-bound, goal-oriented, and resource-restricted environments (https://www.boannews.com/media/view.asp?idx=17538).

9) Data protection is the process of protecting data from loss, damage, and security threats.

organizations and the implementation and integration of citizen-centered ICT. As digital transformation accelerates, it is predicted that an organizational culture will be formed in which information from all departments is shared and collaborated without barriers. It is necessary to cross-design a platform-type collaborative organizational structure and function. However, there are many obstacles to bureaucratic collaboration as the rigidity of work sharing, budget management and budget utilization, performance evaluation problems, lack of horizontal coordination systems, and transition to digital governments require simplification of procedures to improvement. It is predicted that the provision of citizen-centered services that meet the higher expectations of citizens and personalized services through information sharing and collaboration by ministries suitable for the purpose of citizens will be more widely applied (Jeong et al.,2019).

Fourth, it is to ease the knowledge and information gap of the socially vulnerable and to guarantee the human rights of the disabled. The development of digital technology, which spurred the advent of an information society, has created a new communication environment that provides more information to many people and shares various cultural experiences. However, for the socially vulnerable with physical disabilities or economic difficulties, these environmental changes also have a negative aspect that they can act as barriers to normal social participation rather than an opportunity to improve their quality of life (Lee, 2008). For example, as the function of broadcasting media expands, concerns are raised that broadcasting media may intensify isolation and alienation for the disabled who are restricted from using the media (Song, 2003). Behind the progress of the information society, the gap between the rich and the poor has widened depending on the production, ownership, and accessibility of knowledge information, widening social polarization, resulting in mass production of the underprivileged (Lee, 2008). It is most commonly used as a meaning to refer to the distribution or utilization of information inequality in the information divided and the digital divide d[10] society. Early research on the knowledge gap, which is the theoretical basis of the information divided theory, focused on TV and other mass media, and the concept of the information divided began to spread in earnest related to the expansion of the computer information environment. Now, "digital divided" means the gap between opportunities to use information and communication in a digital environment and the ability to use it (Song. 2003). At the center of the problem is the disabled, especially among the social vulnerable. It is highly likely that the disabled will be excluded

10) It is most commonly used as a meaning to refer to the distribution or utilization of information inequality in the information society. Early research on the knowledge gap, which is the theoretical basis of the information gap theory, focused on TV and other mass media, and the concept of the information gap began to spread in earnest related to the expansion of the computer information environment. Now, "digital divide" means the gap between opportunities to use information and communication in a digital environment and the ability to use it (Song, 2003).

Table 6. Six principles of AI-related personal information protection

1. Legality: The basis for processing, such as the collection, use, and provision of personal information, must be legal and clear.
2. Humanity: Securely process and manage personal information.
3. Transparency: Personal information processing details are disclosed to make it easier for the data subject to understand.
4. Participation: It has a communication system for personal information processing and guarantees the rights of information subjects are guaranteed.
5. Responsibility: Clarify the management responsibility for processing personal information.
6. Fairness: Minimize the occurrence of social discrimination, bias, etc. by processing personal information according to the purpose of collection.

source: The Personal Information Commission(2021)

from various social participation as they are alienated from means of communication or information acquisition. Social alienation arising from the lack of means and methods such as channels provided by digital media or devices is a problem that society must overcome in the future.

Fifth, it is necessary to prepare measures for personal information and cybersecurity and strengthened digital privacy policies. The most vulnerable thing about the application of AI technologies is that they are exposed to hacking. There are various authentication methods such as passwords, PINs, smartphones, biometric authentication, text authentication, and QR authentication, but a "Digital Identity" service authentication method that requires user identification and designation as a consistent government policy is needed(Choi, 2021). The Public Key Infrastructure(PKI), a technology that encrypts and signs biometric information such as fingerprints to be safely used by registered users, is called the public key infrastructure, which was set as ITU's international standard in 1989 and is in use worldwide(p185). It is necessary to design

a combination of speaker authentication and PKI technology to be protected because the disabled are exposed to crimes that people who illegally use in their own profit committed, and multicultural families are expected to ease linguistic barriers, the biggest restriction on government use. In addition, autonomous efforts to make regular inspections mandatory are required. The Personal Information Commission(2021) announced six principles of AI-related personal information protection and stated that it is mandatory to prepare and implement response procedures for information subject notification, leakage report, and damage relief support in the process of AI service operation(see table 6).

Lastly, the establishment of digital governance is creating a new means for various stakeholder groups to participate at a low cost through the development of intelligent information technology and SNS(Jung, 2021). Therefore, with the progress of digital informatization, information human rights[11] are being viewed (Hwang & Lee. 2004). In particular, guaranteeing the right to access

11) The right to access information, self-determination of information (self-access to information, self-information,

information is essential as part of the digital inclusion policy of the socially underprivileged. Being alienated from information directly affects job choice and narrows the scope of economic opportunities, leading to economic poverty. Today, the use of information and information technology is the most important basic living factor and a medium for enjoying all legal interests and basic rights of individuals, meaning that bridging the information gap secures prerequisites for realizing basic rights (Hong, 2009). Various digital literacy education should also be conducted in various ways to promote the inclusive use of digital governance and digital technology for the social vulnerable, and it seems urgent to prepare corresponding laws and systems.

7. Conclusion.

This paper examined the following on the premise that public institutions, which aims to promote citizens' welfare and contribute to the sound development of the civic economy, provide voice-based services to citizens. First, it was confirmed that citizens' attitudes and expectations for public institutions ahead of voice-based services were maintained through a small random online survey, and interviews with experts with knowledge of AI were a challenge for public institutions and governments to strengthen information accessibility. Second, all matters to be considered

when establishing voice-based chatbots were investigated in connection with measures to be applied and utilized by public sectors, and third, the implications of voice-based services in terms of public communication and open government services were examined. This is significant in that it provides an opportunity and a foothold for wider citizens to realize their participation in intelligent governments and to practice social consideration and inclusion through strengthening and guaranteeing human rights, basic rights, and information accessibility for socially vulnerable groups. When writing this paper, I faced many limitations because it was the period when awareness of artificial intelligence was not high. The direct difficulty was the avoidance of disclosure of the technical part and the data itself, the overall difficulties are not easy to reach an agreement on the exchange of information between government organizations on data disclosure, and the bureaucratic structure was a closed structure for information provision. In addition, there was still a serious lack of manpower to manage and operate data, and public officials' perceptions and attitudes toward intelligent governments were lukewarm. It was even more difficult to obtain data due to insufficient data management and accumulation, and it is believed that more developmental studies will emerge only when active guidelines for disclosure and utilization of public data are presented.

In the future, I would like to continue to

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self-correction, information and communication), freedom of information and communication, information property, information security, and information sharing are essential rights that are threatened in many ways (Hwang, 2004).

publish many papers on social and humanistic influences such as cloud nationality and digital citizenship in line with the 4th industrial revolution, and how to deliver policies effectively and develop channels. The development of comprehensive public communication channel can lead to more transparent government organizations such as slowing decision-making, overcoming the harmful effects of bureaucratic organizations with risks of wrong decision-making, dismantling rigid organizational culture, and reducing the burden on civil servants. In addition, what should always be kept in mind in the information technology society using digital technology should never neglect the maintenance of laws and systems for personal privacy and cybersecurity, and should be built and designed around citizens who are not biased toward government and public institutions in data storage, utilization, and management. AI and untacted governmental system is getting very direct and close to our life that provides various standards in assessing the quality of life of citizens dreaming and aiming for bright and sound future design. Efforts by all of us to minimize the marginalized class in the process of implementing intelligent governments are very natural, and we hope that higher administrative services and a stepping stone for a positive paradigm shift can be provided.

참고문헌(References)

관계부처합동. '한국판 뉴딜 종합계획: 선도국가로 도약하는 대한민국의 대전환'. 2020 .

김경식, "불가능을 가능으로 연결해 주는 차세대 인터페이스 기술", 삼성디스플레이 뉴스룸, 4월28일, 2020.

김세훈, "다문화사회의 문화정책", 한국거버넌스학회, 한국거버넌스학회 학술대회자료집(2006), 461-470.

김현수, "사회적 취약계층의 신상보호를 위한 법제정비 방안 연구". 한국법제연구원, 2014.

민영, "인터넷 이용과 정보격차." 언론정보연구48(1), 158-187, 2011.

배영임, "비대면 시대의 그림자", 디지털 소외, 이슈&진단, 경기연구원, 2021.

송진순, "공공 소통 증진을 위한 인공지능 챗봇의 기능 강화 방안과 정책 제언", 입법과 정책 13(1), 339-366, 2021.

송종길, "장애인의 방송접근권 확대를 위한 정책 방안 연구", 방송연구57권, 47-178, 2003.

안석모, "정보인권 보고서 발간 배경 및 의의", 정보인권 보고서 발간 기념 공동학술 대회 자료집, 3~13, 2021.

이기호, "지능정보사회에서의 디지털정보격차와 과제", 보건복지포럼, 16-28, 2019.

이상호, "정보화사회 사회복지 패러다임의 변화와 실천과제", 남부대학교 논문집(8), 19-40, 2008.

이철주, "정부조직에서 정보기술의 사용과 공무원의 관료제적 특성변화에 대한 인식", 행정논총51(4), 31~71, 2013.

이소연 (2020. November 17th), Police dispatched when AI and sound met and bathroom scream were detected, Chosunbiz. Accessed January 15th, 2021 from https://biz.chosun.com/site/data/html_dir/2020/11/12/2020111202769.html

이정승, "프로세스 마이닝을 이용한 공공서비스

의 품질 측정:N시의 건축 인허가 민원 서비스를 중심으로", 지능정보연구25(4), 35-52, 2019.

이정선, 서보밀, 권영욱, "인공지능이 의사결정에 미치는 영향에 관한 연구: 인간과 인공지능의 협업 및 의사결정자의성격 특성을 중심으로", 지능정보연구27 (3), 231~252, 2021.

정소윤, 이재호, 강정석, "인공지능 기술의 행정분야 활용에 관한 탐색적 연구, KIPA 연구 보고서, 한국행정연구원, 85-100, 2019.

최준호, 김시완, 나경화, 이석호, 정윤현, "인공지능 시대의 HCI와 UX: Voice User Interface와 감정 기술", 융합연구리뷰, 융합연구정책센터, 2020.

정충식, "지능형정부의 사이버 보안", 지능형정부의 정책이슈(2021), 서울, 윤성사.

장근재, 이승용, "개인정보 자기결정권 확대를 위한 데이터 신탁제도 도입방안 연구", 지능정보연구28(1), 29-43, 2022.

주윤경, "지능정보사회와 정보불평등", KISO Journal, (33), 33-37, 2018.

최운호, " 지능형정부의 사이버 보안," 지능형정부의 정책이슈 (2021), 정춘식 외, 서울, 윤성사.

황주성·이민영, "차별 없는 정보접근보장을 위한 법제개편방향", KISDI 이슈리포트4(30), 2004.

Canalys. Amazon smart speaker ships crossed 10 million mark in Q3, 2019. Accessed 6 December, 2020, from https://www.canalys.com/newsroom/worldwide-smartspeaker-Q3-2019

David S, Craig M, and Kaushik L., *The Way to a Robotic Process Automation Cognitive Enterprise*, Deloitte University Press(2016).

DATANET(2021.April 29th), [Convenient self-certification] Distributed ID-based authentication, Accessed November 30, 2021, from www.datan et.co.kr/news/articleView.html?idxno=145334

Delloitte. "A medium for promoting the data economy, a public-led open data platform", Industry Focus, No.74, 2019.

eDaily(2020, July 29th), Saltlux, and the Ministry of the Interior and Safety won the Pan-Government Civil Complaint Consultation 365 Construction Project. from https://www.edaily.co.kr/news/read?newsId=03388246625839440&mediaCodeNo=257.

E-Daily(2021, August 15th), Hearing and speech impaired, only 38% use the Internet...Digital alienation is blocked, Accessed September 8, 2021, from https://www.edaily.co.kr/news/read?NewsId=01184086629147648&mediaCodeNo=257

Hyundai mcsoft. Everything about API from https://blog.hyundai-mnsoft.com/1638,2020.

Information and Communication Technology Promotion Center. "Status of AI use at home and abroad, public application", ICT SPOT ISSUE, 21-30, 2018.

IT Biz(2020. August 24). Establishment of an intelligent AI voice recognition solution for Sorizaba e-government cloud platform. Accessed December 30, 2020, from http://www.it-b.co.kr.

Joint Report of Related ministries, Korean Version of the New Deal Comprehensive Plan: A major transformation of Korea into a leading country. July 14, 2020.

JoongAng Ilbo(2020, February 12), now write it for me whenever I say it.AI fills out complex civil petition documents, Accessed December 10, 2020.

KIET, The rapid spread and limitations of voice recognition virtual assistant, issues(2017), 27-29.

Korea Creative Content Agency. Trends and prospects of speech recognition technology,

in-depth reports of cultural technology, 2011.

Personal Information Commission, Artificial Intelligence (AI) Personal Information Protection Self-Checklist, May 31, 2021.

Samjeong Economic Research Institute, Trends and business opportunities in the voice AI market, ISSUE MONITOR, No.126. 2020.

Security News(2009, August 21), Gartner presents a new approach to EA, Accessed September 8, 2021. from https://www.boannews.com/media/view.asp?idx=17538.

Tuzovic, S., Paluch, S, Conversational Commerce – A New Era for Service Business Development?, Springer Fachmedien Wiesbaden, Wiesbaden, 81−100, 2018.

Wirtz, B.W., Birkeyer, S. Open government: Origin, development & conceptual personal administration, 2015, 38(5), 381−396, Accessed January 15, 2021, from https://doi.org/10.1080/01900692.2014.942735.

VSOFTconsulting(2018. February 16th), 12 Global Government Agencies that use chatbot. Accessed January 15th, 2021, from https://blog.vsoftconsulting.com/blog/15-governments-agencies-that-use-chatbots.

국문초록

사회적 약자의 접근성 강화와 열린 공공소통을 위한 음성기반서비스 도입의 발전적 방안과 시사점

송 진 순*

공공기관과 정부는 시민에게 음성 기반 서비스 챗봇을 제공함으로써 시민 복지를증진하고 사회적 취약계층과 원활한 공공소통을 도모할 수 있다는 전제로 논의를 전개한다. 이 논문의 연구 목적은 지능형 정부가 ICT를 기반으로 조직 내외 지식 및 정보를 데이터화하고 체계화하여 능률적으로 관리하고 시민들, 특히 취약계층의 정보 접근과 활용을 용이하게 하여 신속하고 효율적인 행정서비스를 제공해 줄 방안을 제안하기 위함이다. 연구방법으로 소규모 설문조사를 통해 음성기반 서비스 제공을 앞둔 공공기관에 대한 시민들의 태도, 인식 및 기대가 긍정적임을 확인하고, 인공지능에 관한 지식을 갖춘 전문가들 인터뷰를 통해 음성기반 서비스에 필요한 기술적 측면과 공공기관 음성기반서비스 제공의 의의 및 필요성, 구축시 고려해야 할 제반사항들과 정책적 제언, 시사점을 살펴보고 한계 및 연구발전에 대해 고민해본다. 결과적으로, 챗봇의 음성기반서비스는 더 폭넓은 시민들이 지능형 정부에 참여를 실현하며, 정보 접근성을 강화하고 사회적 취약계층의 인권 및 기본권 보장·강화하는 사회적 배려와 디지털 포용을 실천하는 계기와 발판을 제공함에 큰 의의를 지닌다.

주제어 : 음성 기반 서비스 챗봇, 공공소통, 지능형 정부, 사회 취약계층, 디지털 포용, 정보 접근성.

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