

Jiun-Chuan, C. (2026). Citizen Participation at National Science and Technology Conference: A Case of Geriatric Welfare. *Applied Research in Administrative Sciences*, 7(1), 71-83. DOI: <https://doi.org/10.24818/ARAS/2026/7/1.05>

## Citizen Participation at National Science and Technology Conference: A Case of Geriatric Welfare

**Chao, JIUN-CHUAN**

**PhD, Science & Technology Policy Research and Information Center (STPI);  
 National Institutes of Applied Research (NIAR), Republic of China (Taiwan)  
[chaoeric2012@gmail.com](mailto:chaoeric2012@gmail.com)**

**Abstract:**

According to the National Development Council's estimates, Taiwan will become a super-aged society in 2025, and geriatric welfare will become an essential issue. In December 2024, the Executive Yuan held the 12th National Science and Technology Conference (12th NSTC), and widely discussed geriatric welfare. The conference's conclusions were compiled into the National Science and Technology Development Plan (2025-2028). According to the Fundamental Science and Technology Act, the NSTC is held every four years to discuss science and technology development over the next four years and to provide guidance for government ministries' science and technology policies. However, previous conferences lacked research methods for setting topics, and it was impossible to understand the context of their formation. This paper aims to explore how to set topics at the NSTC. The case study of geriatric welfare will be used to understand the research methods for setting topics. Since geriatric welfare is closely tied to citizens' lives, this article employs the theory of citizen participation as a research framework to explore the following research questions. Question 1: What research methods are used in setting topics related to geriatric welfare? Question 2: How do the research methods and the theory of citizen participation impact the output of older people's welfare policies? This paper will use the theory of citizen participation and research methods to explore people's activities at all stages. These research findings can answer two questions. From initial findings, literature analysis, expert interviews, and focus group discussions (FGDs), we can identify the topics at NSTC. For example, we can use government documents such as the White Paper on Science and Technology (2023-2026) and the Ministry of Health and Welfare's Policy Address, along with other related papers, to draft a framework and consult experts on elderly welfare. Secondly, we can use citizen participation to revise the topics or contents, as many social welfare non-governmental organizations (NGOs) were involved in setting the topics rather than others. This paper sought to combine theories of citizen participation, literature analysis, expert interviews, and FGD to develop a new analytical framework. This paper's contribution could play a critical role in a new analytical framework to study the policy of geriatric welfare at NSTC. It could improve research on science and technology policy.

**Keywords:** Geriatric Welfare, Super Aged Society, National Science and Technology, Conference, Citizen Participation

**JEL:** H110, I380, O380

**DOI:** <https://doi.org/10.24818/ARAS/2026/7/1.05>

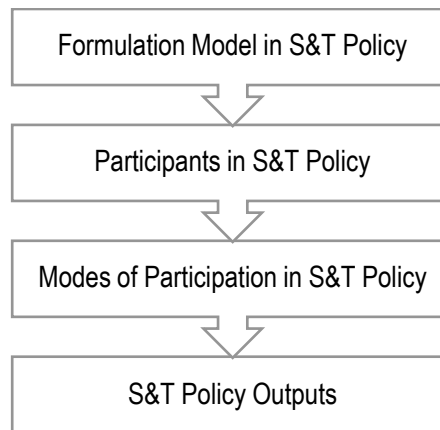
### INTRODUCTION

According to estimates by the National Development Council, Taiwan will become a super-aged society in 2025, and geriatric welfare is a critical issue. In December 2024, the Executive Yuan convened the 12th National Science and Technology Conference (12th NSTC) to discuss geriatric welfare issues. The conference's conclusions will be incorporated into the *National Science and Technology Development Plan (2025-2028)* [NSTDP 2025-2028]. Pursuant to the *Fundamental Science and Technology Act*, the NSTC is held every four years to deliberate on the direction of national science and technology development for the upcoming four-year period and to provide strategic guidance for ministries in formulating their respective science and technology policies. There is a lack of systemic studies in understanding research methodologies for determining discussion topics to create science and technology policies. This article required understanding the science and

technology policymaking from the NSTC. We identified the need for geriatric welfare at the 12th NSTC, but we needed a creative way to research it.

### Analytical Framework

The study hypothesizes that science and technology policies in geriatric welfare should be supported by at least one corresponding research method and theory to facilitate policy formulation. Given the close connection between geriatric welfare and citizens' everyday lives, this study adopts the theory of citizen participation as its analytical framework. Figure 1 shows the analytical framework.



**Figure 1. Analytical Framework**

Source: Author, 2026

### Formulation Model in S&T Policy

The government generally categorizes the formulation of science and technology policy into several distinct models. First, under the government-led model, government agencies assume full responsibility for policy planning and implementation, while civil society groups play only a limited role. Second, the expert-led model assigns a dominant role to academic experts and research institutions, which provide authoritative input and lead the policy design process. Third, the hybrid model involves collaborative planning between governmental actors and academic experts, with civil society organizations providing supplementary support. This article analyzes current practices in national science and technology conferences and in science and technology policy planning to identify and assess potential models for policy formulation.

### Participants in S&T Policy

Participants involved in the formulation of science and technology policy include government officials, academic scholars, industry experts, researchers, and civil society organizations. This article analyzes the types of actors participating in the 12th NSTC and in the formulation of science and technology policy.

### Modes of Participation in S&T Policy

This article primarily examines whether science and technology policy are formulated by a single category of participants or multiple stakeholders. It further examines whether the policymaking process relies exclusively on in-person participation or adopts a hybrid model integrating digital technologies with face-to-face engagement.

### S&T Policy Outputs

The NSTC will produce either concrete policy documents or declaratory policy statements as its outcomes.

Drawing on the analytical framework, this article seeks to address the following research questions.

Question 1: What research methods are used in setting topics related to geriatric welfare?

Question 2: How do the research methods and the theory of citizen participation impact the output of geriatric welfare policies?

This article is important because the results can provide new insights into addressing the lack of methodological support for science and technology policy, develop a theoretical model for science and technology policy, and create a model for the cross-disciplinary integration of policy research, sociological theory, and research methods. In doing so, this article aims to make a significant contribution to help inform the development of science and technology policies in the geriatric welfare sector by providing insights into data collection and analysis methods. This research can also help further understand the theoretical foundations and research methods required for the formulation of science and technology policy.

This article is divided into four sections. Section 1 provides background information on the NSTC. Section 2 outlines the research methodology. Section 3 presents results and discussion. Section 4 provides answers to the research questions.

## Background of the 12th NSTC

### Fundamental Science and Technology Act

Why does the Executive Yuan have to convene this kind of national-level conference? According to this Fundamental Science and Technology Act, Article 1:

*This Act is enacted for the purpose of establishing fundamental guidelines and principles for the government in promoting scientific and technological development to raise the standards of science and technology, maintain economic development, strengthen ecological preservation, improve public well-being, boost national competitiveness, and promote the sustainable development of human society (NSTC, 2017a & 1999).*

According to Article 9:

*The government shall present a written statement every two years that describes the vision, strategies, and current status of scientific and technological development (NSTC, 2017b).*

According to Article 10:

*The government shall formulate a National Science and Technology Development Plan every four years, reflecting the nation's developmental trends, societal needs, and the goal of balanced regional development. This Plan shall serve as a basis for formulating scientific and technological policies and promoting scientific and technological research and development. The content of the National Science and Technology Development Plan shall take into consideration the opinions of the Academia Sinica, the scientific and technological research sector, the industrial sector, and relevant social organizations. It shall be reviewed and approved by the Executive Yuan following discussions at the National Science and Technology Conference. The National Science and Technology Conference mentioned in the preceding Paragraph shall be convened once every four years by the Executive Yuan (NSTC, 2017c).*

In conclusion, the holding of the 12th NSTC is based on Articles 1, 9, and 10 of the Fundamental Science and Technology Act, and its requirement to hold a national conference every four years is of great importance. This section has analyzed the Fundamental Science and Technology Act. The next part of this paper will focus on the execution framework for the 12th NSTC.

### Execution Framework for the 12th NSTC

As is customary, the 12th NSTC is convened by the Premier of the Executive Yuan, with the Chairman of the National Science and Technology Council serving as the deputy convener. The National Institutes of Applied Research (NIAR) serves as the supporting staff, responsible for conference

planning, developing key future technology strategies, and administrative tasks. Participating ministries propose preliminary implementation measures based on their responsibilities and policy plans: the NSTC is responsible for innovative technology, the Ministry of Economic Affairs for an innovative economy, the Ministry of Health and Welfare for a balanced society, and the Ministry of Environment for net-zero sustainability. Following this, we held a series of discussions, including inter-ministerial meetings, opinion gathering meetings, regional preparatory meetings, and the formal conference. Public suggestions on policies are collected through physical meetings and social media platforms such as YouTube, Facebook, and Threads. The conference conclusions will form the new "National Science and Technology Development Plan," working together to implement the President's policies through inter-ministerial strategic measures.

## 1. LITERATURE REVIEW

### 1.1. Citizen Participation

Citizen participation refers to unpaid individuals' involvement in organizational activities aimed at achieving common goals. These activities include government advisory committees, community service activities, mutual aid groups, and volunteer organizations. Marc A. Zimmerman and Julian Rappaport (1988) argue that voluntary citizen participation in community organizations is a crucial mechanism for developing psychological empowerment, and the two are highly correlated. For citizens, participating in community organizations provides three types of experience: experience in organizing personnel, identifying resources, and formulating strategies, thereby enhancing their sense of political efficacy, competence, control, and responsibility (Zimmerman & Rappaport, 1988).

In addition to political activities, Paul Florin and Abraham Wandersman (1990) believe that forms of citizen participation include becoming a member of the community management committee, participating in neighborhood decision-making, engaging in the activities of local political organizations, and participating in social movements (Florin & Wandersman, 1990).

Rosenbloom, Kravchuk and Clerkin (2015) have discussed that citizen participation is a form of advice and advocacy originating from outside the government. Citizen participation takes place through participation in advisory committees, citizen committees, or other similar arrangements, and can also involve involvement in the public policy decision-making process, demonstrating concern for public affairs. The core spirit of citizen participation is that participants need not be experts; they need only participate in public hearings and consultation meetings to offer suggestions to public officials and civil servants, or to express their opinions on public affairs. The value of citizen participation lies in the support it provides for the formulation of public policies, contributing to social stability. Advances in technology, such as e-government and e-citizen assemblies, further encourage citizen participation (Rosenbloom, Kravchuk & Clerkin, 2015).

Dean (2018) integrates participatory governance with urban governance to examine the dynamics of citizen participation in urban contexts, highlighting the Partnership between administrative agencies and citizens. However, the study focuses on urban governance as its empirical case and does not address national-level policymaking, particularly in the domain of science and technology policy (Dean, 2018). Androniceanu (2021) argues that, regardless of the type of governance model adopted, administrative transparency constitutes a critical mechanism for promoting democratic governance.

Before going any further, this article would like to define some key terms in public administration. We will be using this article. Citizen participation refers to the voluntary involvement of citizens in public affairs such as community matters and political activities. Citizen participation includes submitting suggestions through committees, public hearings, and briefings, or by personally participating in activities, contributing their opinions, or providing unpaid services. Citizen participation should focus

on public affairs, and the channels and levels of participation should not be restricted. For example, expressing opinions online and attending online public hearings should have the same effect as in-person activities.

Furthermore, citizen participation should not be limited to local public affairs but should extend to dialogue with national policy directions. Citizens can be concerned with and participate in any public matter. Therefore, in formulating technology policies, citizens can express their opinions and participate in the process through both physical and virtual channels.

This article uses citizen participation theory to explain how the National Science and Technology Conference collects public opinion, especially during the third phase of regional preparatory meetings, and how citizens express their opinions on science and technology development through in-person and online participation. Citizens engage in policy communication with government agencies based on their own experiences, industry needs, and personal expectations, enabling two-way communication between the public sector and citizens and supporting the formulation of science and technology policies.

## 1.2. Participatory Governance

Fiket, Draško and Allegretti (2026) argue that the emergence of participatory governance reflects a condition of democratic malaise. In response, the author conceptualizes participatory governance as an institutional innovation designed to address these systemic shortcomings. At its core, participatory governance emphasizes sustained citizen engagement in public affairs in order to enhance the legitimacy and inclusiveness of public policymaking. By fostering continuous civic involvement, it seeks to reconstruct the relationship between citizens and democratic institutions, thereby strengthening both the legitimacy and effectiveness of policy outcomes. The author further underscores that participatory governance should not be regarded as an end state, but rather as the starting point of institutional innovation. It must be transformed into stable, enduring institutional arrangements to realize its normative and practical objectives fully (Fiket, Drasko & Allegretti, 2026).

Winsvold and Vabo (2024) argue that participatory governance is closely associated with political leadership capacity. However, their analysis focuses primarily on the performance of political actors and lacks a systematic examination of policy formulation processes. The present study addresses this limitation by exploring the relationship between participatory governance and the formulation of science and technology policy (Winsvold & Vabo, 2024).

Țiclău and Hințea (2025) argue that adaptive governance, collaborative governance, and co-creation constitute closely related concepts, as they all aim to address societal challenges and deliver high-quality public services jointly. However, they provide limited discussion regarding higher-level policy formulation and do not specify concrete mechanisms for implementation. This gap serves as the analytical entry point for the present study (Țiclău & Hințea, 2025).

This paper contends that participatory governance constitutes an institutional innovation that promotes sustained citizen involvement in public policy deliberation and decision-making. Its primary purpose is to enhance the legitimacy of decision-making by incorporating diverse perspectives to ensure inclusiveness. In the domain of science and technology policy—particularly where such policies intersect with social welfare and directly affect citizens' daily lives and interests—scholars have rarely applied participatory governance frameworks. Consequently, the formulation of science and technology policy through participatory governance remains an underexplored area, representing a significant research gap.

### 1.3. Co-Production and Collaborative Governance

Bianchi, Nasi and Rivenbark (2021) argue that public policy decisions emerge from the collective engagement of diverse actors who jointly address complex public issues (Bianchi, Nasi & Rivenbark, 2021). Sabie, Purdescu and Niță (2025) first establish a foundational definition of co-production and emphasize that it is not an entirely novel concept. They argue that co-production aims to enhance the quality of public services by jointly engaging public administration and citizens. Using museum services as an empirical case, the authors illustrate how museums and visitors collaboratively work to improve service quality, thereby demonstrating a linkage between theoretical frameworks and practical application (Sabie, Purdescu & Niță, 2025).

However, their analysis primarily focuses on public service provision and does not address national-level policy formulation, particularly in the domain of science and technology policy. Therefore, the present study derives its research value from addressing this gap in the existing literature. Through cross-sectoral collaboration, governmental agencies, private enterprises, and civil society organizations actively participate in the policymaking process, thereby co-constituting public policy outcomes. Accordingly, these heterogeneous actors enhance the quality of public policy decisions by engaging in processes of co-design, co-production, and co-evaluation.

### 1.4. Digital Participation

Riitta Hänninen (2025) conceptualizes digital participation as a mode through which citizens engage in public policy deliberation by utilizing digital technologies, thereby contributing to the policymaking process. In other words, citizen participation in public policy discussions no longer relies solely on physical meetings; individuals can now actively engage through digital tools. This shift diversifies the forms and modalities of public deliberation, reshaping the conventional structure of policy discussion forums and expanding the scope of civic engagement (Hänninen, 2025).

Svirak, Kwarteng and Pilík (2023) argue that the use of digital tools facilitates policy communication and interaction between governments and citizens; however, their application to participatory policymaking requires further development. They emphasize that civil servants' familiarity with and acceptance of digital tools constitute critical factors in this process. The present study further contends that scholars should examine citizens' acceptance of digital technologies in greater depth, as such analysis would enhance understanding of citizens' digital participation in public policymaking (Svirak, Kwarteng & Pilík, 2023).

### 1.5 Aging Policy and Gerontechnology

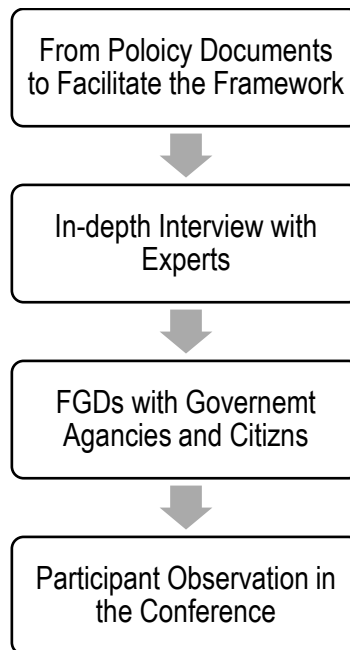
Sirikurattakorn, Sonsuphap and Pongpanich (2025) argue that aging policy and gerontechnology function as policy instruments designed to address population aging and the challenges of an aging society. Through cross-sectoral policy coordination, these approaches employ information and communication technologies (ICT) to meet the needs of older adults in areas such as quality of life, social participation, and healthcare. In doing so, they aim to mitigate the societal impacts associated with demographic aging (Sirikurattakorn, Sonsuphap & Pongpanich, 2025).

Piau, Campo, Rumeau, Vellas and Nourhashemi (2014) argue for the promotion of the concept of aging in place and emphasize that enterprises, governments, academic institutions, and civil society organizations should collaboratively develop tools to enhance the quality of life of older adults (Piau et al., 2014). However, the article does not address the policy dimension of science and technology, particularly in formulating concrete strategic measures. This omission constitutes a notable gap in the literature.

## 2. METHODOLOGY

### 2.1. Data Collection

The research utilizes a mixed-methods approach to gather data and support analyses. Primary resources are collected through focus group discussions (FGDs), in-depth interviews, and participant observation with various experts, including government and non-governmental organization actors involved in issues related to the welfare of elderly persons. We also engaged with experts, including a government official from the Ministry of Health and Welfare, the NSTC, and other relevant stakeholders, such as Show Chwan Memorial Hospital and the Digital Transformation Association (DTA). We collected 74 minutes of meeting notes from primary sources. Secondary sources include academic papers, think tank reports, and expert analyses of science and technology policies. This article also collected government documents from the websites of the Office of the President, Republic of China (Taiwan), the Executive Yuan, the NSTC, the Ministry of Health and Welfare, and the Laws and Regulations Retrieving System.



**Figure 2. Data Processing**

Source: Author, 2026

### 2.2. Data Used in the Analysis

This article applies a qualitative analysis method grounded in the theory of citizen participation in public administration and in research methods to assess people's activities. The research method employed in this paper uses participant observation as its core and combines various methods according to the different research stages.

As the number and activity of citizen participation increase, this article intends to use theories of citizen participation to analyze citizen behavior at the third stage. According to the *Ladder of Citizen Participation* (Arnstein, 1969), there are several levels of citizen participation in public affairs, ranging from "nonparticipation" to "tokenism" and ultimately to "citizen power." In today's civil society, citizen participation is often tokenistic, and this stage is subdivided into "informing", "consultation", and "placing". According to the degree of cooperation between the public and private sectors and the level of citizen concern, some issues are also shifting towards Citizen Power, the focus of this article.

### The First Stage

We developed keyword groups based on the concept of the welfare of elderly persons for science and technology policy documents through literature analysis. Firstly, we analyzed the various strategies in the *White Paper on Science and Technology (2023-2026)* [White Paper on S&T]. On the other hand, we analyze President William Lai's *National Project of Hope* (Cho, 2024). During this stage, previous results will be combined with current policy directions to establish a preliminary framework for the topic.

The *White Paper on S&T* provides insight into the current policy for elderly persons (NSTC, 2023).

*To promote gender equality in health and care work, we will introduce affordable and humane assistive technologies (care robots, innovative positioning systems, wearable and non-wearable smart mobility aids) to reduce occupational injuries among caregivers (approximately 90,000 workers), extend their service life, and improve the quality of care for disabled elderly. Furthermore, through the development of appropriate technologies, we will address societal needs by establishing technological tools that incorporate gender perspectives and align with societal development.*

Based on the policy content of the *National Hope Project*, explain the future direction of social welfare policies.

*Expand social investment and strengthen the social support system across childcare, education, care, housing, medical care, and labor. Through universal, high-quality, and affordable public services, reduce the burden on individuals and families, and create a better living environment. In response to Taiwan entering a super-aged society next year, the government will promote "Long-Term Care Ten-Year Plan 3.0," which will not only increase service coverage but also expand nighttime community home care services, encourage businesses to implement flexible work arrangements, and increase subsidies for residential service providers to a maximum of NTD\$180,000 per year. Ultimately, this will connect community, home, institutional, medical, and social welfare services to form an integrated care system.*

The *Long-Term Care Ten-Year Plan 2.0* details specific measures, including (Ministry of Health and Welfare, 2024):

*In addition to establishing home-based, community-based, and residential services, it promotes a new long-term care benefit and payment system, as well as a comprehensive community care service system. It also strives to guarantee caregivers' salaries and benefits, increase coverage of dementia services, continue to promote prevention and delay of disability care, strengthen dementia care capacity, and integrate home-based medical care.*

Based on the above literature and government data, this paper develops keywords at this stage to facilitate the construction of a preliminary issue framework, including: social welfare, elderly, long-term care, super-aged society, and aging technology.

### The Second Stage

In this stage, we used the in-depth interview method. Firstly, we prepared a list of experts and an interview outline. A total of 8 experts familiar with this issue were consulted on the output topic structure. The experts' fields of expertise include sociology, social welfare, social work, health care, and gerontology. The interview focused on two key questions and sought the experts' opinions. Question 1: Are the current framework and strategies reasonable? Question 2: Are there any other strategies not included in this issue? Due to varying consultation situations, we conducted in-depth interviews with four experts and received written responses from seven additional experts.

### The Third Stage

At this stage, we held topic group meetings and internal discussion meetings. At this stage, the central government departments were invited to evaluate the feasibility of promoting this issue. After reaching a consensus through internal meetings, we held four meetings to explain the policy to local civic groups, key opinion leaders, residents, industrial unions, and craft unions in Taipei, Taichung, Tainan,

and Hualien. A total of several opinions was collected. We also utilized the *Ladder of Citizen Participation* (Arnstein, 1969) to analyze the opinions of key opinion leaders and residents.

During this stage, government agencies participating in the preparatory meetings for the regional divisions included: the Ministry of Health and Welfare, the Ministry of Digital Affairs, the Ministry of Economic Affairs, the Ministry of the Interior, the Ministry of Education, the National Science and Technology Commission, the Ministry of Culture, the Ministry of Agriculture, the Ministry of Environment, and the Ministry of Transportation. Among the non-governmental organizations were Show Chwan Memorial Hospital, the Digital Transformation Association, Evergreen University, Taichung Chunhui Charity Association, CTBC Business School, and Taichung Street Performers Association.

### **The Fourth Stage**

In this stage, participant observation is adopted. The research team participated in the formal conference discussions, listening to the strategy and summary reports. There were 30 government agencies, 35 non-governmental organizations, 10 universities, and 15 industry groups including Chinese National Federation of Industries (CNFI), National Association of Small & Medium Enterprises, R.O.C. (NASME), General Chamber of Commerce of the Republic of China, Taiwan Electrical and Electronic Manufacturers' Association (TEEMA), Taiwan Automation Intelligence and Robotics Association (TAIROA), Taiwan Chief Information Security Officer Alliance (CISO), Taiwan Artificial Intelligence Association to sign up formal conference.

## **3. RESULTS AND DISCUSSION**

### **3.1. Participatory Governance Facilitates S&T Policy**

The 12th NSTC adopts a hybrid model in policymaking: governmental agencies first delineate policy directions for science and technology in accordance with the President's governing philosophy, action agendas, and implementation programs, and subsequently incorporate input from civil society organizations into the policy content. In particular, within the domain of social welfare-related technology policy, civil society organizations actively contribute their perspectives to enhance the comprehensiveness of policy design. These observations indicate that incorporating participatory governance provides a useful framework for understanding how citizen engagement in science and technology policymaking strengthens policy legitimacy.

Citizens and officials jointly participate in the formulation of science and technology policy.

The 12th NSTC brings together government officials, research institutions, and civil society organizations to deliberate and develop policy directions for science and technology. Rather than relying on a single category of participants, the process involves collective decision-making among multiple stakeholders.

### **3.2. Multiple Stakeholders Collaboratively Formulate S&T Policy**

At the 12th NSTC, participants engage not only through in-person meetings but also through digital technologies, enabling members of civil society organizations to express their views and participate in deliberations. Through such arrangements, stakeholders collectively contribute to the development of policy content. Accordingly, collaborative policymaking and digital participation offer useful analytical perspectives on the modes of participation in science and technology policy formulation.

### 3.3. Citizen Participation will Move to the Next Stage

According to the *Ladder of Citizen Participation*, the degree of citizen participation in public affairs has several gradients. Based on the degree of opinion expression, the four preparatory meetings, considering the number and type of participants and their speaking engagements, showed citizen participation ranging from Informing to Placing. Citizens could fully express their opinions at the meetings, and government departments would adjust future technology policies for elderly welfare accordingly. Whether future citizen participation will develop towards Partnership remains to be seen.

### 3.4. Citizen Participation and four Research Methods Formulate Policy

Through four phases of data collection and analysis, this study validates that four research methods—literature analysis, in-depth expert interviews, focus group interviews, and participant observation—help formulate science and technology policies in the field of social welfare for the elderly. On the other hand, the citizen street ladder theory demonstrates the level of citizen participation in science and technology policy and its future potential.

According to the *White Paper on S&T*, the promotion strategy for the welfare of the elderly focuses on leveraging technology to advance elderly care and childcare, opening a new era of medical intelligence, and enhancing the health and care of the entire population. This strategy encompasses the elderly, children, and teenagers, which is too broad and complex to focus on effectively. After FGD and in-depth interviews with experts, a separate technology introduction policy for the elderly was recommended. Combining the policy vision of the *National Project of Hope*, the opinions of civic groups, science and technology policies, and the needs of the science and technology industry, we will eventually form the promotion of “The Long-Term Care Ten-Year Plan 3.0”, develop the elderly technology industry, and improve the living security of those being cared for. Specific promotional measures include using artificial intelligence to promote elderly living and healthcare consulting services, as well as applying technology to digitally empower caregivers and the elderly, enhance the quality and energy of care, and create a friendly platform for elderly learning and socialization.

### 3.5. The Welfare of the Elderly and People’s Lives are Closely Related

The third stage involved regional preparatory meetings. Because the issue of the welfare of elderly persons is closely related to people’s lives, there was a significant increase in the participation of citizens and social welfare groups, approximately 15 civic organizations, such as the Taichung Chunhui Charity Association, the Taichung Lifestyle Aesthetics Association, and the Taiwan Digital Health Industry Development Association. The number of citizen opinions collected also increased accordingly. Given the increased number and activity of citizens, this paper analyzes civic behavior at this stage using relevant theories of citizen participation.

### 3.6. Citizen Participation from Consultation to Partnership

According to the citizen ladder theory, the level of public participation in technology policy at regional preparatory meetings varies across regions. In the eastern and southern regions, citizen participation is concentrated on informing and consulting, primarily through physical settings, with only a small portion expressing opinions. Conversely, in the central and northern regions, citizen participation progresses from informing to Partnership, with active expression of opinions and a willingness to participate in policy formulation. Therefore, the citizen ladder theory reveals varying levels of citizen participation in policy-making across different regions. The transition from informing to Partnership occurs from the southern to the northern regions.

## CONCLUSIONS

To conclude, the article hypothesizes that geriatric welfare issues would benefit from a research method and theory to facilitate science and technology policies. This study adopts the theory of citizen participation as its analytical framework to address the following research questions.

Question 1: What research methods are used in setting topics related to geriatric welfare?

There are four research methods: literature analysis, in-depth interviews, focus group discussions, participant observation, and the Ladder of Citizen Participation. How do the research methods and the theory of citizen participation impact the output of geriatric welfare policies? In particular, the geriatric welfare encompasses promoting “The Long-Term Care Ten-Year Plan 3.0”, developing the elderly technology industry, and improving the living security of those receiving care. Specific promotional measures include the use of artificial intelligence technology to promote elderly living and healthcare.

This study contributes to existing knowledge on the subject and develops a methodology for collecting data on science and technology policy, and will be of interest to NSTC, academia, and policymakers, providing strategic insights for industry practitioners and NGOs. Through literature review, expert interviews, focus groups, and participant observation, it gathers multifaceted, cross-disciplinary opinions from representatives of industry, government agencies, and civil society organizations. Second, it introduces citizen participation theory to provide a theoretical foundation for the formulation of science and technology policy. Using the citizen ladder participation theory, it explores the extent of citizen participation in science and technology policy formulation and the outcomes of policy communication, demonstrating the collaborative efforts of government and the private sector to shape science and technology policy.

Question 2: How do the research methods and the theory of citizen participation impact the output of older people’s welfare policies? It provides a case study of applying citizen ladder participation theory to the field of social welfare science and technology policy. The findings of this article can serve as a reference for formulating science and technology policies in the social welfare sector, rather than relying solely on experience or implementation results. Furthermore, the introduction of the Citizen Ladder theory can provide a theoretical foundation for science and technology policymaking and demonstrate how the government and citizen groups can jointly formulate science and technology policies through policy communication and citizen participation.

## THEORETICAL CONTRIBUTION

This article extends the scope of application of participatory governance, collaborative policymaking, digital participation, and the ladder of citizen participation, demonstrating that these theoretical frameworks are not only applicable to traditional public affairs but also to national-level policymaking. They retain explanatory power within the domain of science and technology policy. From the perspective of the social sciences, this study integrates theories of public administration with theories of technological development, thereby achieving interdisciplinary synthesis.

## POLICY RECOMMENDATION

The article concludes with policy recommendations presented in the next section.

Firstly, when formulating science and technology policies for geriatric welfare, integrate literature analysis, expert interviews, FGDs, participant observation, and other methods, and incorporate citizen participation theory to strengthen the theoretical foundation and research methodology for policy formulation.

Secondly, when conducting FGDs for opinion-gathering meetings, increase the proportion of representatives from elderly and disadvantaged groups, as well as from social welfare organizations. For example, ensure that at least 40% of the representatives are present to increase the number of opinions collected from the target group. Specifically, citizens aged 65 and above, those eligible for disability status, and economically disadvantaged groups should account for 40% of the representatives present.

Finally, establish a database of citizen opinions. After each opinion-gathering meeting, organize and categorize all opinions to establish a regularly updated, searchable opinion database. Specifically, each online, written, or oral opinion that receives 100 citizen endorsements can be included in the opinion database as a general opinion. If it receives 500 endorsements from citizens, it is considered a valuable opinion, and the proposer can be asked to provide further written explanations for subsequent evaluation. If a proposal receives the endorsement of 1,000 citizens, it will be listed as an important opinion. A discussion meeting must be held, and the proposer must attend and explain. After a feasibility assessment, it will be listed as a priority opinion for the year, and the follow-up processing status will be reported to the citizens.

### Abbreviations

S&T Policy	Science and Technology Policy
NSTC	National Science and Technology Conference
NSTC	National Science and Technology Council
NSTDP 2025-2028	National Science and Technology Development Plan (2025-2028)
FGDs	Focus Group Discussions
White Paper on S&T	White Paper on Science and Technology

### ACKNOWLEDGEMENT

The earlier draft of this paper was presented at the 2025 Conference on Gerontechnology and Service Management Practice & Innovation (Nan Kai University of Technology, Nantou, June 6, 2025). We are grateful to the participants for their comments. There are no grants or funding bodies to be acknowledged for preparing this paper.

### REFERENCES

- Androniceanu, A. (2021). Transparency in Public Administration as a Challenge for a Good Democratic Governance. *Administratie si Management Public*, (36), 149-164. <https://doi.org/10.24818/amp/2021.36-09>
- Arnstein, S. P. (1969). A Ladder of Citizen Participation. *Journal of the American Institute of Planners*, 35(4), 216-224. <https://doi.org/10.1080/01944366908977225>
- Cho, J. (2024, September 20). *Premier Cho Jung-tai's Oral Policy Report to the 2nd Session of the 11th Legislature*. Executive Yuan. Retrieved May 13, 2025, from <https://english.ey.gov.tw/Page/878D1F23A9E61177/6d05b287-1e65-41e6-bbc3-4bf6f6ee385a>
- Carmine, B., Nasi, G., & Rivenbark, W. C. (2021). Implementing Collaborative Governance: Models, Experiences, and Challenges. *Public Management Review*, 23(11), 1581-1589. <https://doi.org/10.1080/14719037.2021.1878777>
- Dean, R. J. (2018). Counter-Governance: Citizen Participation Beyond Collaboration. *Politics and Governance*, 6(1), 180-188. <https://doi.org/10.17645/pag.v6i1.1221>
- Fiket, I., Pudar D., G., & Allegretti, G. (2026). Towards an Innovative Democracy: Institutionalizing Participation in Challenging Times. *Politics and Governance*, 14, Article 11861,1-8. <https://doi.org/10.17645/pag.11861>
- Florin, P., & Wandersman, A. A. (1990). An Introduction to Citizen Participation, Voluntary Organizations, And Community Development: Insights for Empowerment Through Research. *American Journal of Community Psychology*, 18(1), 41-54. <https://doi.org/10.1007/BF00922688>

- Hänninen, R. (2025). Revisiting Digital Participation as a Prerequisite of Digital Inclusion. *The Information Society*, 41(4), 256-268. <https://doi.org/10.1080/01972243.2025.2500507>
- Ministry of Health and Welfare. (2024, December 23). *The Long-Term Care Ten-Year Plan 2.0*. Executive Yuan. Retrieved November 13, 2025, from <https://www.ey.gov.tw/Page/5A8A0CB5B41DA11E/25f0e507-d41a-4191-9cb1-dd03c691b918>
- National Science and Technology Commission. (1999). Fundamental Science and Technology Act. *Presidential Office Gazette*, (6255), 5-8.
- National Science and Technology Commission. (2017, June 14). *Fundamental Science and Technology Act*. Laws and Regulations Retrieving System. Retrieved December 12, 2025, from <https://law.nstc.gov.tw/EngLawContent.aspx?lan=E&id=35>
- National Science and Technology Commission. (2023). *White Paper on Science and Technology (2023-2026)*.
- Piau, A., Campo, E., Rumeau, P., Vellas, B., & Nourhashemi, F. (2014). Aging Society and Gerontechnology: A Solution for an Independent Living? *The Journal of Nutrition, Health & Aging*, 18(1), 97-112. <https://doi.org/10.1007/s12603-013-0356-5>
- Rosenbloom, D., Kravchuk, R., & Clerkin, R. (2015). *Public Administration: Understanding Management, Politics, and Law in the Public Sector* (8<sup>th</sup> ed.). McGraw-Hill Education.
- Sabie, O. M., Purdescu, F., & Niță, E. M. (2025). Exploring the Dynamics of Public Service Co-Production: Drivers, Opportunities, Challenges and Case Insights in Cultural Domain. *Applied Research in Administrative Sciences*, 6(1), 34-45. <https://doi.org/10.24818/ARAS/2025/6/1.03>
- Sirikurattakorn, N., Sonsuphap, R., & Pongpanich, K. (2025). Dynamics of an Aging Society in a Developing Country: Policy, Business Strategy Adaptation, and Financial Perspectives. *Corporate & Business Strategy Review*, 6(1), 33-42. <https://doi.org/10.22495/cbsrv6i1art3>
- Svirak, N., Kwarteng, M., & Pilík, M. (2023). Perceptions of Social Media Usage to Engage Citizens: A Qualitative Study of Czech Republic Municipalities. *Administratie si Management Public*, (41), 163-181. <https://doi.org/10.24818/amp/2023.41-09>
- Țiclău, T., & Hinteă, C. (2025). Overcoming Turbulence: A Theoretical Analysis of Adaptive Governance as a Viable Organizational Paradigm. *Applied Research in Administrative Sciences*, 6(3), 4-15. <https://doi.org/10.24818/ARAS/2025/6/3.01>
- Winsvold, M., & Vabo, S. I. (2024). How Well Do Participatory Governance Arrangements Serve Political Leadership? *Governance*, 37(4), 1061-1079. <https://doi.org/10.1111/gove.12825>
- Zimmerman, M. A., & Rappaport, J. (1988). Citizen Participation, Perceived Control, and Psychological Empowerment. *American Journal of Community Psychology*, 16(5), 725-750. <https://doi.org/10.1007/BF00930023>