Original Article
J. Korean Wood Sci. Technol. 2023, 51(6): 555-568
https://doi.org/10.5658/WOOD.2023.51.6.555

Journal of the Korean Wood Science and Technology
pISSN: 1017-0715 eISSN: 2233-7180
http://www.woodj.org

A Study on the Diffusion Strategies of Wood Culture Using Analytic Hierarchy Process (AHP)

Jiyoon YANG[1] · Myungsun YANG[1] · Yeonjung HAN[1] · Myungkil KIM[1] · Won Joung HWANG[1,†]

ABSTRACT

The diffusion strategies of wood culture were established using the analytic hierarchy process, to prepare a diffusion plan of wood culture and wood utilization in response to climate change due to global warming. 'Standardization of wood culture', 'Valuation of wood culture', and 'Habituation of wood culture' were set as three major implementation strategies and priorities were evaluated. As a result, it was analyzed in the following order: 'Development of systematic education programs for each age group for rational and efficient use of eco-friendly wood materials and development of wood education standard guidelines linked to the curriculum', 'Preparation of scientific basis data on human compatibility and eco-friendliness of wood to ensure the reliability of wood and wood products', and 'Establishment of monitoring and improvement plan through the designation as a model school'. Through this, it was determined that an educational environment, changes in public attitudes through publicity, and expanding opportunities to use wood and wood products were necessary for wood culture diffusion. The results of this study can be used as basic data to derive the diffusion strategies of wood culture and establish a roadmap and policy implementation strategy to revitalize wood culture.

Keywords: wood, wood culture, diffusion strategies of wood culture, analytic hierarchy process (AHP)

1. INTRODUCTION

Recent government policies related to climate change have increased the importance of wood as a carbon storage material (Ghani and Lee, 2021; Ju *et al*., 2023; Lee *et al*., 2022; Yoo *et al*., 2021). Wood is a renewable resource, requiring very little energy to manufacture, and is easy to reuse for used products (Setiawan, 2023). Because of these characteristics, major industrialized countries have made increasing the use of wood a key task in building a low-carbon, circular society (Kim *et al*., 2019; Min *et al*., 2011).

Wood is a resource-recycling material inseparable from the industrial field and daily life, so it has an important meaning from a cultural point of view. Various wooden household products such as wooden construction, wooden furniture, wooden shelves, and dog houses are used daily, and plastic-centered household products are replaced by wood (Park *et al*., 2022). In this way, human civilization naturally uses wood daily, and 'wood

Date Received October 10, 2023, Date Revised November 5, 2023, Date Accepted November 11, 2023
[1] Division of Wood Industry, Departments of Forest Products and Industry, National Institute of Forest Science, Seoul 02455, Korea
[†] Corresponding author: Won Joung HWANG (e-mail: wonjoung@korea.kr, https://orcid.org/0000-0001-6848-5778)

culture' has been formed as a living culture (Yang *et al*., 2023). However, although people's interest in wood and wood culture is increasing, there are few opportunities to enjoy wood culture, and there is a lack of awareness and infrastructure for this (Im and Han, 2023). According to the Wood Culture Awareness Index of the Wood Culture Index, which shows the level of wood use and the degree of awareness of residents, the national average score was 43.9 points as of 2022 (Korea Association of Wood Culture, 2022). Despite the differences in living conditions by region, the provinces and metropolitan cities are similar, and there is not much variation from year to year, so it is necessary to prepare highly effective policies to improve the awareness of wood culture among the public.

As a result of a survey on the perception and preference of wood culture to enhance the value of wood among the general public, the use of wood was perceived as an eco-friendly material, positively affecting the body and reducing carbon dioxide. However, there was also a high level of negative perception that logging destroys forests (Han and Lee, 2021a). Therefore, it is necessary to change the perception by promoting the virtuous cycle of using wood, an eco-friendly material.

As basic data for establishing a diffusion strategy to enjoy wood culture in daily life, the resources applicable to wood culture were investigated and classified into seven types: cultural facilities, wooden architecture, cultural heritage, cultural events, wood education, cultural contents, and wood products (Han *et al*., 2021). However, as a result of a survey on the level of awareness of wood culture among the public, 40.2% of the respondents answered that they did not have an image of wood culture resources, so although the types of resources that make up wood culture were categorized, there was a lack of overall conceptualization and specific research and development on wood culture (Han and Lee, 2021b). As a result of the big data analysis conducted with wood as a keyword, the demand for wooden houses and education is continuously increasing, so it is necessary to develop and promote support policies for this (Han *et al*., 2022). Therefore, it is necessary to change the perception of wood use and develop strategic measures to expand the use of wood further.

It is unreasonable to simply sum up and apply the evaluation criteria values to determine the priority of various measures to solve problems (Kim and Bae, 2023). There are various evaluation criteria. There are various techniques for systematically evaluating mutually exclusive alternatives to determine priorities, such as the scoring method, Delphi, fuzzy, data environment analysis, and analytic hierarchy process (AHP; Kim *et al*., 2015b). Among them, the AHP technique can easily extract decision-makers' value systems by aggregating the objective and subjective factors through a 1:1 pairwise comparison between elements that make up the decision-making hierarchy for complex and unclear problems (Song and Lee, 2013). In addition, due to the advantage of being able to objectively and consistently determine the value of a given alternative and calculate its importance or weight, it is used for project performance measurement evaluation, priority determination of evaluation items, and rational selection of alternatives (Cho, 2021; Lee and Shim, 2002; Shin and Kim, 2023).

To make wood culture a part of our daily lives, it is necessary to set policy directions for the promotion of wood culture from the people's experience of wood, wood use, and wood environment in their daily lives (Hwang and Oh, 2022; Jang, 2022; Yang *et al*., 2021). The public's interest in the human friendliness and emotional stability of wood, a traditional eco-friendly material, is increasing. Carbon neutrality can be realized by expanding the use of wood, a carbon store, due to the increase in the amount of wood resources that can be harvested, making it possible to link it with global issues. Therefore, this study aimed to suggest ways to spread wood culture and expand the use of wood. In addition, to increase the efficiency of the promotion strategy for

the 'spread of wood culture,' the AHP technique was used to investigate the urgency, importance, and feasibility of each detailed strategic task to establish standards for the implementation of the promotion strategy more efficiently and systematically in the future.

2. MATERIALS and METHODS

2.1. Evaluation items and methods of survey

Through the results of the previous studies on the classification of wood culture, the current status, and the environmental assessment, it was analyzed that there is insufficient technical support and institutional improvement in the field of wood culture for the development of the wood culture industry and that it was analyzed that there is a lack of diversification of wood-friendly talent training programs and promotional content and participation programs to improve public awareness (Han and Lee, 2021a, 2021b; Han *et al*., 2021, 2022; Hwang *et al*., 2023). Based on this, 'standardizing wood culture' with the goal of developing technology and policies to build wood culture infrastructure, 'Valuing wood culture' with the goal of developing educational content to establish a wood culture, and 'habituating wood culture' with the goal of developing and disseminating promotional content to spread wood culture was set as the three major implementation strategies. The survey evaluated the urgency, importance, and feasibility of each sub-task of the 'Wood Culture Diffusion Promotion Strategy (Draft)' (Appendixes 1-3).

A total of 56 participants, including 17 wood culture experts, 16 university professors, and 23 Korea Forest Service officials, were included in the survey and evaluation. A total of 35 responses (62.5%) were received after the survey. In general, surveys are conducted with a certain sample size to ensure the reliability and significance of the results, but AHP does not require a certain sample size if assuming the respondents' expertise and logical consistency (Kim *et al*., 2015a).

2.2. Weighting method

The evaluators prepared and evaluated a survey to determine the weighting of each indicator of urgency, importance, and feasibility for all detailed items of the implementation strategy for the spread of wood culture (draft; Table 1).

Based on the results of each detailed implementation item received from the evaluators, AHP was used to calculate the importance of the implementation strategy for the spread of wood culture (Table 2).

※ Comparison matrix: Importance of the comparison items compared to the reference items
※ Baseline items: The scores marked in the reference items were reflected
※ Comparison items: 1/n if marked in the comparison item compared to the reference item (n; indicative score)
※ Geometric mean: $Xi = \sqrt[n]{Ai \times Bi \times Ci}$ (n; the

Table 1. Scorecard for determining weights

Indicator	Meaning of scale									Indicator
	Extremely important	Very important	Important	Slightly important	Similar	Slightly important	Important	Very important	Extremely important	
Urgency	5	4	3	2	1	2	3	4	5	Importance
Urgency	5	4	3	2	1	2	3	4	5	Feasibility
Importance	5	4	3	2	1	2	3	4	5	Feasibility

Table 2. Example weighting calculations

Indicator	Urgency	Importance	Feasibility	Calculating weight	
				Geometric mean	Weight
Urgency	1.00	0.50	0.33	$\sqrt[3]{1.00\times0.50\times0.33}=0.55$	0.16
Importance	2.00	1.00	0.50	$\sqrt[3]{2.00\times1.00\times0.50}=1.00$	0.30
Feasibility	3.00	2.00	1.00	$\sqrt[3]{3.00\times2.00\times1.00}=1.82$	0.54
Sum				3.37	1.00

number of reference items, A, B, C: Comparison matrix points for each reference item)

※ Weight: $Wi = Xi/\sum_{i=1}^{n} Xi$ (average of variation and rate of change in geometric mean calculation method)

The AHP is a method that can systematically evaluate exclusionary factors in complex cases where there are many goals or evaluation criteria for decision-making, but it is difficult to be consistent in the results of each pair-to-pair comparison because it is a subjective judgment based on the knowledge and experience of the evaluator. Therefore, the validity of the pairwise comparison results is verified through the consistency rate (CR) (Jeong *et al*., 2014; Kim *et al*., 2015c). The consistency ratio for verifying the consistency is calculated using Equations (1) and (2). In general, the smaller the CR, the greater the consistency of the judgment, and if the CR is less than 0.1, the pairwise comparison is judged to have reasonable consistency. A CR of less than 0.2 is considered to have an acceptable level of consistency, while a CR of 0.2 or higher suggests a lack of consistency, and a re-examination is required.

$$Consistency\ Index\ (CI)=\frac{\lambda_{max}-n}{n-1} \quad (1)$$

$$Consistency\ Ratio\ (CR)=\frac{CI}{RI} \quad (2)$$

※ Max-eigenvector (Eigenvector, λ_{max}): Maximum eigenvalue of matrix A

※ Random index (RI): An index that indicates the tolerance of consistency

3. RESULTS and DISCUSSION

3.1. Detailed promotion strategies for the spread of wood culture

The key to expanding and revitalizing the use of wood is to prepare policies and institutional foundations so that the use of wood can become a daily life through wood culture. Based on this, for sustainability, it was determined that a strategy to revitalize wood culture centered on educational content for future generations and a promotion strategy to improve public awareness were needed. So, an implementation strategy (draft) for the spread of wood culture was established, focusing on three main strategies: establishing a foundation, activating wood education, and activating public relations.

To implement the strategy of ‘standardizing wood culture’, we have improved wood information services and utilization technologies for the establishment of wood culture infrastructure and established a plan to develop region-specific policies to induce private businesses to expand wood culture infrastructure. Through this strategy, we sought to lay the foundation for the development of the wood industry by securing wood consumers by providing technical support and improving the system of

wood culture.

To promote the ‘valuing wood culture strategy,’ a detailed plan was established to develop a systematic and multifaceted wood culture education program and a specialized wood education program to nurture wood culture experts. Through this, we fostered wood-friendly talent by improving wood education and improved affinity and friendliness for wood culture.

The strategy of ‘habituating wood culture’ was derived through the development of promotional content to induce wood-friendly interest and a wood cultural experience event program to make wood experience a part of everyday life. Through these strategies, we aimed to contribute to the spread of wood culture and the achievement of carbon neutrality by improving public awareness of the expansion of wood use.

In a recent analysis of people’s perception of wood, a culture that can voluntarily participate in wood use and wood experience will be formed only when positive perceptions toward wood based on concrete facts are secured and access strategies are established for each stage, space, and field (Kim *et al*., 2020). Suppose the foundation of related policies and systems is established after establishing the direction through securing such awareness and strategies. In that case, it will be possible to naturally achieve the spread of wood culture in daily life.

3.2. Priority analysis results for the spread of wood culture

Based on the results of the evaluation of the urgency, importance, and feasibility of each of the detailed tasks of ‘Standardizing Wood Culture’, ‘Valuing Wood Culture’, and ‘Habituating Wood Culture’ of the 「Wood Culture Diffusion Promotion Strategy (Draft)」, the rankings and overall priorities for each implementation strategy were analyzed (Tables 3–5).

First, in terms of the overall implementation strategy, ‘Development of systematic education programs for the rational and efficient use of eco-friendly wood materials and development of standard guidelines for wood education linked to the curriculum’ was analyzed as the priority (Table 4), 'Preparation of scientific evidence on the human friendliness and eco-friendliness of wood to ensure the reliability of wood and wood products’ as the second priority (Table 3), and ‘Preparation of monitoring and improvement plans through designation of pilot schools’ as the third priority (Table 4).

In ‘standardizing wood culture’, ‘preparation of scientific evidence on the human-friendliness and eco-friendliness of wood’, ‘establishment of databases’, and ‘development of standard guidelines’ were ranked top priorities (Table 3). In the strategy of ‘valuing wood culture’, ‘Development of standard guidelines for wood education’, ‘Preparation of monitoring and improvement plans’, and ‘Analysis of the effectiveness of current wood culture experience centers and woodworking workshops and derivation of improvement plans’ were ranked as the top priority (Table 4). In the strategy of ‘habituating wood culture’, ‘Development and operation of contents linked to play, attractions, and experiential activities’, ‘Development and dissemination of visual online contents using infographics and YouTube’, and ‘preparation of plans to expand the events of the Wood Culture Festival, including the establishment of a wood use campaign (I Love Wood) and a week to promote the use of wood (Wood Week)’ were analyzed to be implemented as top priorities (Table 5). The CR of the weighting results for each indicator of urgency, importance, and feasibility for the detailed implementation items for the spread of wood culture was 0.075, which was a significant level.

In other countries, various programs and initiatives are being operated to spread the culture of wood use. In North America, campaigns are being carried out to promote the use of wood. In Germany, a wood-related education system based on practical education and field

Table 3. Results of a survey on the 'Standardization of wood culture' promotion strategy

Promotional strategy 1	Standardization of wood culture					
Goal	Technology and policy development to build wood culture infrastructure					
1-1. Improving wood information services and usage technology to build wood culture infrastructure						
□ Arrangement of a plan to link demand and suppliers by establishment a wood information service system					Priority	
○ (System construction) Providing wood information by high-visibility demand source		Urgency	Importance	Feasibility	Strategy	Assignment
- Establishment of the DB for consumer-oriented wood culture by wood species, standards, and purpose		2.37	2.71	2.62	2	4
- Improving and utilizing wood culture information provision platforms such as Dadream and Wood Information Call Center		2.08	2.43	2.58	9	23
○ (System utilization) Presentation of a plan to establish a stable distribution network and provide incentives		Urgency	Importance	Feasibility	Strategy	Assignment
- Presenting a consumer-friendly online marketing plan linked to the wood information system		2.18	2.53	2.26	10	25
- A plan to provide incentives to encourage input of necessary information into the system		1.99	2.21	2.16	13	43
○ (Demand outlook) Prediction of future consumption of wood cultural resources using social psychological concepts		Urgency	Importance	Feasibility	Strategy	Assignment
- Analysis of relevant variable and effects affecting future demand for wood culture		1.76	2.15	2.02	18	53
- Forecasting future consumption of wood culture using quantitative and qualitative forecasting methods		1.79	2.13	1.97	19	54
□ Establishment of measures to increase preference for wood products through the discovery of new technologies, development and distribution of new products					Priority	
○ (Discovery of new technologies) Development of use and processing methods using harvested domestic wood		Urgency	Importance	Feasibility	Strategy	Assignment
- Discovering demand for harvested wood products through the development of new technologies suited to the characteristics of domestic wood		2.36	2.64	2.29	7	17
- Development of various product modules and semi-finished products to ensure tractability		2.23	2.58	2.48	8	18
○ (Development and distribution of new products) Establishment of a plan to preferential purchase and provide incentives for new and innovative technology-certified products using domestically produced woods		Urgency	Importance	Feasibility	Strategy	Assignment
- Life cycle evaluation of new and innovative technology-certified products linking LCI data of wood products (LCA)		2.10	2.49	2.16	11	32
- Development of carbon storage evaluation index for wood products using domestic materials		2.33	2.72	2.54	4	6
1-2. Inducing private business and developing regional specialized policies to expand wood culture infrastructure						
□ Improving public and private projects and developing policies through appropriate use cases of wood					Priority	
○ (Public commercialization) Presenting a success model through the expansion of wooden public building and facilities		Urgency	Importance	Feasibility	Strategy	Assignment
- Technical support services, monitoring, and development for wooden public buildings		2.40	2.72	2.54	3	5
- Development of a successful model for living environment public wooden construction and facilities		2.35	2.64	2.57	5	8
○ (Expansion of private business) Inducing private business expansion through a public business success model		Urgency	Importance	Feasibility	Strategy	Assignment
- Preparation of scientific basis data on human compatibility and eco-friendliness of wood to ensure the reliability of wood and wood products		2.53	2.87	2.54	1	2
- Establishment of quality standardization and deregulation measures to promote private business use of wood and wood products		2.35	2.68	2.45	6	10
□ Developing a wood culture hub policy through the expansion of specialized regional infrastructure					Priority	
○ (Regional specialization) Expanding the use of local wood in connection with the wood industry		Urgency	Importance	Feasibility	Strategy	Assignment
- Development of a model with a great regional ripple effect linked to local specialized wood industrial complexes and wood industry clusters		1.99	2.31	2.14	12	41
- Prepare plans to strengthen support for local wood products development to reduce carbon footprint and revitalize the local economy		1.93	2.23	2.02	14	46
○ (Hubs) Promoting wood culture hubs using regional specialized model networks		Urgency	Importance	Feasibility	Strategy	Assignment
- Analyzing the current situation and preparing measures to strengthen roles through monitoring by regional specialized model		1.89	2.21	1.99	15	47
- Development of a wood cultural region model to expand synergy of regional specialized networks		1.92	2.16	1.92	17	51
○ (Establishment of governance) Network connection and governance establishment for each wood culture element		Urgency	Importance	Feasibility	Strategy	Assignment
- Survey the types of stakeholder conflicts by network type and prepare conflict management and efficient operation plans		1.90	2.16	2.00	16	48
- Development and distribution of educational content to establish wood culture		1.71	2.01	1.80	20	56

Table 4. Results of a survey on the 'Valuation of wood culture' promotion strategy

Promotional strategy 2	Valuation of wood culture				
Goal	Development and distribution of educational content to establish wood culture				
2-1. Developing the program to promote systematic and multifaceted wood culture education					
□ Development and utilization of wood education program by life cycle				Priority	
○ (Infancy·adolescence) Development of standard guidelines for wood education programs to understand wood culture	Urgency	Importance	Feasibility	Strategy	Assignment
- Development of systematic education programs for each age group for rational and efficient use of eco-friendly wood materials and development of wood education standard guidelines linked to the curriculum	2.55	2.87	2.73	1	1
- Establishment of monitoring and improvement plan through the designation as a model school	2.39	2.75	2.61	2	3
○ (Young adults) Development and utilization of wood culture content linked to wood culture experience	Urgency	Importance	Feasibility	Strategy	Assignment
- Analyzing the effectiveness of the current wood culture experience and carpenter's shop and deriving improvement plans	2.30	2.67	2.59	3	7
- Development of standard textbooks and programs for wood culture experience, including various contents such as forest culture	2.30	2.59	2.60	4	9
○ (Old age) Development of health, healing, dementia prevention, and re-employment programs through wood culture	Urgency	Importance	Feasibility	Strategy	Assignment
- Development of programs for health, healing, and dementia prevention	2.23	2.60	2.49	5	15
- Development of programs for stable retirement life and re-employment	2.14	2.46	2.35	10	26
□ Development of a multifaceted wood culture education program to expand wood enthusiasts				Priority	
○ (Content diversification) Development of diversified content such as digital media, wood culture communication programs, etc.	Urgency	Importance	Feasibility	Strategy	Assignment
- Discovering wood culture education content that reflects the needs of each type of wood lover	2.02	2.30	2.26	15	36
- Development of a forest composite wood culture program that breaks away from the woodwork-oriented wood culture experience	2.08	2.44	2.32	12	29
- Development and distribution of digital-based content such as wood culture plotting using metaverse	1.77	2.02	1.93	20	55
○ (Expand experiential education) Presenting plans to expand multifaceted experiential education content tailored to consumers	Urgency	Importance	Feasibility	Strategy	Assignment
- Standardization of open platform space and hands-on training facilities	2.13	2.41	2.39	11	27
- Develop and operate an online consulting program to meet user accessibility and needs	2.02	2.32	2.35	14	34
2-2. Development of a professional wood education program to foster wood culture experts					
□ Development of a wood culture expert training program for university and elementary and secondary school education				Priority	
○ (Establishment of new curriculum) Establishment and operation of wood culture knowledge and production curriculum in regular university curricula such as architecture, art, and design	Urgency	Importance	Feasibility	Strategy	Assignment
- Development of curriculum and content for wood culture education through analysis of overseas cases	2.26	2.55	2.49	6	16
- Prepare a plan to introduce a wood culture curriculum within the domestic university curriculum	2.09	2.39	1.96	17	40
○ (Training of educational personnel) Establishment of the training course for wood culture experts, including planning and design	Urgency	Importance	Feasibility	Strategy	Assignment
- Strengthening the curriculum for wood education experts and preparing a plan for operating specialized training courses	2.16	2.55	2.53	7	20
- Establishment of the training course for wood culture interpreters and wood specialist planners and preparation of operation plan	1.98	2.28	2.27	16	37
□ Establishment of a support plan for wood education experts for lifelong education besides formal education				Priority	
○ (Infrastructure construction) Establishment and operation of a support center for the efficient operation of the wood education expert system	Urgency	Importance	Feasibility	Strategy	Assignment
- Establishment of a system to link wood education-related lectures by region and target education experts	2.18	2.44	2.39	9	24
- Establishment of a free rental and collection system for wooden education sets	1.89	2.12	1.98	19	52
- Develop and operate regular continuing education programs on the latest cultural trends and policies	1.96	2.24	2.21	18	42
○ (Activation plan) Establishment of a revitalization support plan by supplementing the current wood education expert system	Urgency	Importance	Feasibility	Strategy	Assignment
- Expanding the deployment of wood education experts and establishing new systems	2.28	2.55	2.33	8	22
- Establishing a venue for discovering and sharing best practices by establishing a wood education expert competition, etc.	2.07	2.38	2.35	13	31

Table 5. Results of a survey on the 'Habituation of wood culture' promotion strategy

Promotional strategy 3	Habituation of wood culture				
Goal	Develop and distribute promotional content to diffuse the wood culture				
3-1. Develop and utilize various promotional contents to induce wood-friendly interest					
□ Development of promotional content for 7 types of wood culture for public sympathy				Priority	
○ (Information content) Establishment of DB by type of wood culture, production and utilization of digital map	Urgency	Importance	Feasibility	Strategy	Assignment
- Establishment of 7 types of wood cultural resource portals, provision of information, and analysis of user preferences	2.12	2.32	2.26	9	33
- Production and use of digital maps by wood culture type for web maps and services using big data	1.92	2.14	2.15	14	45
○ (Experiential content) Development of content to induce various experiential activities	Urgency	Importance	Feasibility	Strategy	Assignment
- Develop content and prepare operation plans related to things to do, see, and experience activities	2.28	2.60	2.54	1	11
- Designating space for wooden facilities and operating leisure programs to promote understanding of wood culture	2.11	2.40	2.40	7	28
□ Development and distribution of online and offline programs for public communication				Priority	
○ (Online content) Analysis of tends by media and development of accessible content to effectively deliver information	Urgency	Importance	Feasibility	Strategy	Assignment
- Development and distribution of visual online content using infographics, YouTube, etc.	2.24	2.49	2.68	2	12
- Development and distribution of virtual experience-type online content such as AR, VR, and Metaverse	1.83	2.15	2.24	13	44
○ (Offline content) Development of on-site wood education and wood culture exhibition content to support the local wood culture community	Urgency	Importance	Feasibility	Strategy	Assignment
- Develop and distribute offline content through the organize and support of the 「National Participation Wood Culture Promotion Group」	1.92	2.30	2.29	12	39
- Development and distribution of offline content through the organization and support of a 「Wood culture diffusion support group」 for local specialization	1.83	2.15	2.05	16	60
3-2. Development of a wood cultural experience event program to encourage wood-friendly participation					
□ Development of citizen participation program in everyday life to make wood experience part of daily life				Priority	
○ (Contest event) Discovering contests through materials and contents of wood culture in everyday life	Urgency	Importance	Feasibility	Strategy	Assignment
- Develop ways to utilize materials such as wood and quality of life, wood and health, wood and community revitalization, etc.	2.26	2.52	2.47	5	19
- Establish a plan to utilize the contest results in connection with program development and related projects	2.05	2.35	2.24	10	35
○ (Cultural event) Promotion of events where people can directly checked and select wood and wood products	Urgency	Importance	Feasibility	Strategy	Assignment
- Preparing plans to expand wood culture festival events, including the 'I Love Wood' campaign and 'Wood Week'	2.19	2.55	2.66	3	13
- Establishment of measures to connect wood industry clusters, collection points, and distribution centers, such as opening a wood material market and wood product exhibition hall	2.33	2.63	2.38	4	14
□ Development of an expert participation program for the industrialization of wood experience				Priority	
○ (Expert participation) Discover wood culture events that include all fields of wood use, including architecture, are, and design	Urgency	Importance	Feasibility	Strategy	Assignment
- Developing plans to promote contests, exhibitions, and cultural events such as the 「Wood Culture Fair」 to encourage the participation of wood culture experts	1.97	2.28	2.26	11	38
- Establishment of a plan to share the activities of wood culture companies and wood professional planners to promote the 「Wood culture interpretation contest」	1.79	2.16	2.10	15	49
○ (Industrialization support) Finding support cultural events to expand the wood culture and craft industry	Urgency	Importance	Feasibility	Strategy	Assignment
- Proposal of a plan to promote industrialization support events through design and idea contests for the use of wood in everyday life and the development of regional revitalization products	2.19	2.56	2.45	6	21
- Prepare a plan to promote start-up support events for each type of wood culture that can be industrialized, such as wooden construction, wood products, and wood experience	2.11	2.43	2.27	8	30

training is well established, and professional human resources development is occurring naturally (Lee *et al*., 2013). Additionally, various wood use promotion systems are being operated to contribute to carbon neutrality. The British Columbia (BC) state in Canada has enacted the Wood First Act, which requires the preferential use of wood in public buildings (Myoungh and Kim, 2021). France has established legal standards related to the use of wood. Since 2022, it has announced the 'Sustainability Legislation' law, which requires the use of 50% wood as a material to construct all public buildings (Jeon and Kim, 2022).

To revitalize the use of wood in Korea, revitalization measures such as improving wood products in consideration of consumer preferences, developing systems and programs for wood education, and fostering experts in wood education have been proposed (Kim, 2012; Kim *et al*., 2022). Wood culture information services are provided through various platforms such as Dadream, Wood Information Call Center, Wood Information Portal, and Wood Resource Information System. Still, technical support and system improvement are insufficient. In addition, 59 wood culture experience centers (as of August 2023) have been created or operated across the country to revitalize local wood culture. Still, there is a lack of policy development or research for successfully establishing local wood culture bases. The key to promoting the use of wood is to prepare policies and systematic foundations so that the use of wood can become a daily life through wood culture. Based on this, systematic planning should be established for sustainability, such as a strategy to revitalize wood culture centered on educational content for future generations and a public relations strategy to improve public awareness.

4. CONCLUSIONS

Although the spread of wood culture in daily life is included as one of the five strategic tasks in the 2nd Comprehensive Plan for Wood Utilization, there is a lack of technical support and institutional improvements for wood culture to develop the wood culture industry. In this study, three implementation strategies were established for the spread of wood culture in daily life. Based on the detailed implementation plan, AHP was used to determine priorities and identify tasks to be performed first. Through this, it was found that proactive support is needed to spread wood culture, such as creating an environment for the use of wood through formal education in schools, to induce a change in public perception through continuous promotion of wood use, and to expand opportunities to come into contact with wood and wood products. If a wood culture cluster is created at the regional level that links facilities, human resources, programs and contents, and local wood supply chains related to wood culture, and if it is established as a national integrated network and supported by the central and local governments, the various implementation strategies of this study will be systematically and effectively implemented. In addition, evaluating the progress of the annual promotion strategy in connection with the Wood Culture Index to achieve strategic goals will also be a way to promote the spread of sustainable wood culture. Through these efforts, wood culture should naturally permeate our lives.

CONFLICT of INTEREST

No potential conflict of interest relevant to this article was reported.

ACKNOWLEDGMENT

This research was supported by the Research Project (FP0000-2023-01-2023) through the National Institute of Forest Science (NIFoS), Korea.

REFERENCES

Cho, I.G. 2021. Applying analytic hierarchy process (AHP) to government project evaluation. The Journal of Korean Policy Studies 21(4): 1-20.

Ghani, R.S.M., Lee, M.D. 2021. Challenges of wood modification process for plantation *Eucalyptus*: A review of australian setting. Journal of the Korean Wood Science and Technology 49(2): 191-209.

Han, Y., Lee, S.M. 2021a. Investigation on the awareness and preference for wood culture to promote the value of wood: Ⅰ. Awareness of wood and cultural experience. Journal of the Korean Wood Science and Technology 49(6): 616-642.

Han, Y., Lee, S.M. 2021b. Investigation on the awareness and preference for wood to promote the value of wood: Ⅱ. Awareness of wood cultural resources. Journal of the Korean Wood Science and Technology 49(6): 643-657.

Han, Y., Lee, S.M., Choi, J., Park, C.Y. 2021. A study on classification of wood cultural resources in South Korea. Journal of the Korean Wood Science and Technology 49(5): 430-452.

Han, Y., Yang, M.S., Lee, S.M. 2022. Investigation on the awareness and preference for wood culture to promote the value of wood: Ⅲ. Living environment and trend of wood utilization. Journal of the Korean Wood Science and Technology 50(6): 375-391.

Hwang, J.W., Oh, S.W. 2022. Formaldehyde deodorization effect and far-infrared emission characteristics of ceramics prepared with sawdust, risk husk, and charcoal: Effect of material mixing ratio. Journal of the Korean Wood Science and Technology 50(2): 104-112.

Hwang, W.J., Eom, C., Han, Y., Chun, S., Kim, M., Lee, S., Lee, H., Chang, Y., Ha, S., Kim, M., Son, D.W. 2023. A Study on the Establishment of the Wood Culture Diffusion Strategy. National Institute of Forest Science, Seoul, Korea.

Im, I.G., Han, G.S. 2023. Environmental suitability for conservation and the risk period for fungal damage of wooden cultural heritages in Korea. Journal of the Korean Wood Science and Technology 51(4): 295-308.

Jang, E.S. 2022. Experimental investigation of the sound absorption capability of wood pellets as an eco-friendly material. Journal of the Korean Wood Science and Technology 50(2): 126-133.

Jeon, Y.J., Kim, Y.H. 2022. Consideration of wood application plan by living SOC through analysis of overseas wooden buildings. Korea Institute of Ecological Architecture and Environment 22(4): 79-86.

Jeong, H.S., Cho, J.Y., Ko, H.J. 2014. Analytic hierarchy process-based prioritization in expanding health insurance benefit package: In case of four major serious diseases. Health Policy and Management 24(2): 181-190.

Ju, J.D., Shin, C.S., Seo, J.W. 2023. Tree-ring analysis for understanding growth of *Larix kaempferi*. Journal of the Korean Wood Science and Technology 51(5): 345-357.

Kim, B.C., Choi, M.I., Kim, Y.M. 2015a. AHP analysis on relative importance of ad creativity evaluation factors. The Korean Journal of Advertising 26(3): 61-80.

Kim, D., Bae, K. 2023. Analysis of future defense policy priorities with AHP. Journal of Advances in Military Studies 6(1): 99-118.

Kim, D.B., Jeong, J.Y., Park, J.S., Park, Y.S. 2015b. Development of the speed limit model for harbour and waterway (Ⅰ): Considerations discrimination for speed limit decision. Journal of the Korean Society of Marine Environment & Safety 21(2): 171-178.

Kim, J.H, Park, C.Y., Kang, S.H., Choi, S.J. 2015c. An overview of the analytic hierarchy process. Evidence and Values in Healthcare 1(1): 35-40.

Kim, M.J., Chang, Y.S., Kim, M.J., Shim, K.B., Eom,

C.D. 2019. Assessment of carbon storage capacity by substitution of wood in public facility. Journal of the Korea Furniture Society 30(4): 312-318.

Kim, M.J., Park, C.Y., Kim, J.S., Eom, C.D. 2020. A study on the analysis of the perception survey on the utilization of wood for wood urbanism. Journal of the Korea Furniture Society 31(4): 310-325.

Kim, M.J., Yang, M.S., Park, C.Y., Eom, C.D. 2022. Analysis of Korean carpentry studio to promote the use of domestic wood. Journal of the Korea Furniture Society 33(4): 523-535.

Kim, Y.J. 2012. A study on the revitalization of operating analysis D.I.Y carpentry shop. Journal of the Korea Furniture Society 23(4): 415-424.

Korea Association of Wood Culture. 2022. The wood culture index. https://kawc.or.kr/page/foundation/system/woodculture_result.php

Lee, H., Shim, M. 2002. Decision making for priority of water allocation during drought by analytic hierarchy process. Journal of Korea Water Resources Association 35(6): 703-714.

Lee, K.H., Jo, S.Y., Kim, S.C. 2022. The relationship between tree-ring growth in *Pinus densiflora* S. et Z. and the corresponding climatic factors in Korea. Journal of the Korean Wood Science and Technology 50(2): 81-92.

Lee, Y.J., Park, J.H., Shin, H.H., Ko, S.K. 2013. Reference pricing: Case study and implication. Korean Social Security Studies 29(4): 201-219.

Min, K., Chang, C., Hur, G. 2011. Policy Issues on Wood Demand and Supply to Tackle Climate Change. Korea Rural Economic Institute, Naju, Korea.

Myoungh, S., Kim, Y. 2021. An analysis of laws and cases related to domestic and foreign wood use. In: Yeosu, Korea, Proceedings of Autumn Annual Conference of AIK, pp. 114-115.

Park, C., Yang, M., Kim, M., Kim, J., Choi, J., Eom, C. 2022. A study on the development of wood electronic calculator. Journal of the Korea Furniture Society 33(1): 56-68.

Setiawan, D., Hidayat, A., Supriyadi, S., Lestari, W. 2023. Environmental ethics policy in Jepara: Optimization of handicraft designs from wood waste in the furniture industry. Journal of the Korean Wood Science and Technology 51(5): 392-409.

Shin, H., Kim, Y. 2023. A study on the importance of demand estimation evaluation factors in the integrated public rental house using analytic hierarchy process. Journal of Real Estate Analysis 9(1): 101-119.

Song, K., Lee, Y. 2013. Re-scaling for improving the consistency of the AHP method. Social Science Research Review 29(2): 271-288.

Yang, M.S., Han, Y., Kim, M., Hwang, W. 2023. Vitalization strategy research of wood culture: Focusing on the importance and urgency assessment. In: Jeonju, Korea, Proceeding of the Korean Society of Wood Science and Technology Annual Meeting, p. 106.

Yang, S.M., Lee, H.H., Kang, S.G. 2021. Research trends in hybrid cross-laminated timber (CLT) to enhance the rolling shear strength of CLT. Journal of the Korean Wood Science and Technology 49(4): 336-359.

Yoo, H.J., Ju, J.D., Park, J.H., Shin, C.S., Eom, C.D., Seo, J.W. 2021. Estimation of the optimal periods for planting and felling *Larix kaempferi* based on the period of the its cambial activity. Journal of the Korean Wood Science and Technology 49(5): 399-415.

APPENDIX

Appendix 1. Standardization of wood culture questionnaire

Promotional strategy 1	Standardization of wood culture		
Goal	Technology and policy development to build wood culture infrastructure		
1-1. Improving wood information services and usage technology to build wood culture infrastructure			
□ Arrangement of a plan to link demand and suppliers by establishment a wood information service system			
○ (System construction) Providing wood information by high-visibility demand source	Urgency	Importance	Feasibility
- Establishment of the DB for consumer-oriented wood culture by wood species, standards, and purpose			
- Improving and utilizing wood culture information provision platforms such as Dadream and Wood Information Call Center			
○ (System utilization) Presentation of a plan to establish a stable distribution network and provide incentives	Urgency	Importance	Feasibility
- Presenting a consumer-friendly online marketing plan linked to the wood information system			
- A plan to provide incentives to encourage input of necessary information into the system			
○ (Demand outlook) Prediction of future consumption of wood cultural resources using social psychological concepts	Urgency	Importance	Feasibility
- Analysis of relevant variable and effects affecting future demand for wood culture			
- Forecasting future consumption of wood culture using quantitative and qualitative forecasting methods			
□ Establishment of measures to increase preference for wood products through the discovery of new technologies, development and distribution of new products			
○ (Discovery of new technologies) Development of use and processing methods using harvested domestic wood	Urgency	Importance	Feasibility
- Discovering demand for harvested wood products through the development of new technologies suited to the characteristics of domestic wood			
- Development of various product modules and semi-finished products to ensure tractability			
○ (Development and distribution of new products) Establishment of a plan to preferential purchase and provide incentives for new and innovative technology-certified products using domestically produced woods	Urgency	Importance	Feasibility
- Life cycle evaluation of new and innovative technology-certified products linking LCI data of wood products (LCA)			
- Development of carbon storage evaluation index for wood products using domestic materials			
1-2. Inducing private business and developing regional specialized policies to expand wood culture infrastructure			
□ Improving public and private projects and developing policies through appropriate use cases of wood			
○ (Public commercialization) Presenting a success model through the expansion of wooden public building and facilities	Urgency	Importance	Feasibility
- Technical support services, monitoring, and development for wooden public buildings			
- Development of a successful model for living environment public wooden construction and facilities			
○ (Expansion of private business) Inducing private business expansion through a public business success model	Urgency	Importance	Feasibility
- Preparation of scientific basis data on human compatibility and eco-friendliness of wood to ensure the reliability of wood and wood products			
- Establishment of quality standardization and deregulation measures to promote private business use of wood and wood products			
□ Developing a wood culture hub policy through the expansion of specialized regional infrastructure			
○ (Regional specialization) Expanding the use of local wood in connection with the wood industry	Urgency	Importance	Feasibility
- Development of a model with a great regional ripple effect linked to local specialized wood industrial complexes and wood industry clusters			
- Prepare plans to strengthen support for local wood products development to reduce carbon footprint and revitalize the local economy			
○ (Hubs) Promoting wood culture hubs using regional specialized model networks	Urgency	Importance	Feasibility
- Analyzing the current situation and preparing measures to strengthen roles through monitoring by regional specialized model			
- Development of a wood cultural region model to expand synergy of regional specialized networks			
○ (Establishment of governance) Network connection and governance establishment for each wood culture element	Urgency	Importance	Feasibility
- Survey the types of stakeholder conflicts by network type and prepare conflict management and efficient operation plans			
- Development and distribution of educational content to establish wood culture			

Appendix 2. Valuation of wood culture questionnaire

Promotional strategy 2	Valuation of wood culture			
Goal	Development and distribution of educational content to establish wood culture			
2-1. Developing the program to promote systematic and multifaceted wood culture education				
□ Development and utilization of wood education program by life cycle				
○ (Infancy·adolescence) Development of standard guidelines for wood education programs to understand wood culture		Urgency	Importance	Feasibility
- Development of systematic education programs for each age group for rational and efficient use of eco-friendly wood materials and development of wood education standard guidelines linked to the curriculum				
- Establishment of monitoring and improvement plan through the designation as a model school				
○ (Young adults) Development and utilization of wood culture content linked to wood culture experience		Urgency	Importance	Feasibility
- Analyzing the effectiveness of the current wood culture experience and carpenter's shop and deriving improvement plans				
- Development of standard textbooks and programs for wood culture experience, including various contents such as forest culture				
○ (Old age) Development of health, healing, dementia prevention, and re-employment programs through wood culture		Urgency	Importance	Feasibility
- Development of programs for health, healing, and dementia prevention				
- Development of programs for stable retirement life and re-employment				
□ Development of a multifaceted wood culture education program to expand wood enthusiasts				
○ (Content diversification) Development of diversified content such as digital media, wood culture communication programs, etc.		Urgency	Importance	Feasibility
- Discovering wood culture education content that reflects the needs of each type of wood lover				
- Development of a forest composite wood culture program that breaks away from the woodwork-oriented wood culture experience				
- Development and distribution of digital-based content such as wood culture plotting using metaverse				
○ (Expand experiential education) Presenting plans to expand multifaceted experiential education content tailored to consumers		Urgency	Importance	Feasibility
- Standardization of open platform space and hands-on training facilities				
- Develop and operate an online consulting program to meet user accessibility and needs				
2-2. Development of a professional wood education program to foster wood culture experts				
□ Development of a wood culture expert training program for university and elementary and secondary school education				
○ (Establishment of new curriculum) Establishment and operation of wood culture knowledge and production curriculum in regular university curricula such as architecture, art, and design		Urgency	Importance	Feasibility
- Development of curriculum and content for wood culture education through analysis of overseas cases				
- Prepare a plan to introduce a wood culture curriculum within the domestic university curriculum				
○ (Training of educational personnel) Establishment of the training course for wood culture experts, including planning and design		Urgency	Importance	Feasibility
- Strengthening the curriculum for wood education experts and preparing a plan for operating specialized training courses				
- Establishment of the training course for wood culture interpreters and wood specialist planners and preparation of operation plan				
□ Establishment of a support plan for wood education experts for lifelong education besides formal education				
○ (Infrastructure construction) Establishment and operation of a support center for the efficient operation of the wood education expert system		Urgency	Importance	Feasibility
- Establishment of a system to link wood education-related lectures by region and target education experts				
- Establishment of a free rental and collection system for wooden education sets				
- Develop and operate regular continuing education programs on the latest cultural trends and policies				
○ (Activation plan) Establishment of a revitalization support plan by supplementing the current wood education expert system		Urgency	Importance	Feasibility
- Expanding the deployment of wood education experts and establishing new systems				
- Establishing a venue for discovering and sharing best practices by establishing a wood education expert competition, etc.				

Appendix 3. Habituation of wood culture questionnaire

Promotional strategy 3	Habituation of wood culture		
Goal	Develop and distribute promotional content to diffuse the wood culture		
3-1. Develop and utilize various promotional contents to induce wood-friendly interest			
□ Development of promotional content for 7 types of wood culture for public sympathy			
○ (Information content) Establishment of DB by type of wood culture, production and utilization of digital map	Urgency	Importance	Feasibility
- Establishment of 7 types of wood cultural resource portals, provision of information, and analysis of user preferences			
- Production and use of digital maps by wood culture type for web maps and services using big data			
○ (Experiential content) Development of content to induce various experiential activities	Urgency	Importance	Feasibility
- Develop content and prepare operation plans related to things to do, see, and experience activities			
- Designating space for wooden facilities and operating leisure programs to promote understanding of wood culture			
□ Development and distribution of online and offline programs for public communication			
○ (Online content) Analysis of tends by media and development of accessible content to effectively deliver information	Urgency	Importance	Feasibility
- Development and distribution of visual online content using infographics, YouTube, etc.			
- Development and distribution of virtual experience-type online content such as AR, VR, and Metaverse			
○ (Offline content) Development of on-site wood education and wood culture exhibition content to support the local wood culture community	Urgency	Importance	Feasibility
- Develop and distribute offline content through the organize and support of the 「National Participation Wood Culture Promotion Group」			
- Development and distribution of offline content through the organization and support of a 「Wood culture diffusion support group」 for local specialization			
3-2. Development of a wood cultural experience event program to encourage wood-friendly participation			
□ Development of citizen participation program in everyday life to make wood experience part of daily life			
○ (Contest event) Discovering contests through materials and contents of wood culture in everyday life	Urgency	Importance	Feasibility
- Develop ways to utilize materials such as wood and quality of life, wood and health, wood and community revitalization, etc.			
- Establish a plan to utilize the contest results in connection with program development and related projects			
○ (Cultural event) Promotion of events where people can directly checked and select wood and wood products	Urgency	Importance	Feasibility
- Preparing plans to expand wood culture festival events, including the 'I Love Wood' campaign and 'Wood Week'			
- Establishment of measures to connect wood industry clusters, collection points, and distribution centers, such as opening a wood material market and wood product exhibition hall			
□ Development of an expert participation program for the industrialization of wood experience			
○ (Expert participation) Discover wood culture events that include all fields of wood use, including architecture, are, and design	Urgency	Importance	Feasibility
- Developing plans to promote contests, exhibitions, and cultural events such as the 「Wood Culture Fair」 to encourage the participation of wood culture experts			
- Establishment of a plan to share the activities of wood culture companies and wood professional planners to promote the 「Wood culture interpretation contest」			
○ (Industrialization support) Finding support cultural events to expand the wood culture and craft industry	Urgency	Importance	Feasibility
- Proposal of a plan to promote industrialization support events through design and idea contests for the use of wood in everyday life and the development of regional revitalization products			
- Prepare a plan to promote start-up support events for each type of wood culture that can be industrialized, such as wooden construction, wood products, and wood experience			