ART AND DESIGN
Journal homepage: https://art-design.com.ua/en
8(2), 2025

Received 29.01.2025 Revised 14.05.2025 Accepted 25.06.2025

UDC 745.4:008(510) DOI: 10.30857/2617-0272.2025.2.1

Research on the design of traditional small wooden tools in the Central Plains of China

Hu Sun

Postgraduate Student
Kyiv National University of Technologies and Design
01011, 2 Mala Shyianovska Str., Kyiv, Ukraine
Shanxi University of Science&Technology
710021, 6 Xuefu Rd., Xi'an, China
https://orcid.org/0009-0006-0093-7612

Alla Rubanka*

Associate Professor
Kyiv National University of Technologies and Design
01011, 2 Mala Shyianovska Str., Kyiv, Ukraine
https://orcid.org/0000-0003-0298-0850

Abstract. This research aimed to systematise traditional small wooden tools of the Central Plains of China in order to determine their cultural significance and to explore the interdependence between traditional creativity and modern design. The study was based on historical and cultural analysis and involved a systematic and interdisciplinary approach. The methods employed included literature review, art historical and cultural analysis, and archaeological classification techniques. From a design perspective, both qualitative and quantitative research methods were used to collect data and examine traditional small wooden tools in the Central Plains. Building on previous studies, the design principles and methods inherent in these tools were clarified, and the dialectical relationship between structure and function in form design was established. The study focused on the combination of materials used in traditional small wooden tools in light of advancements in science and technology. The factors influencing the development of the shape and size of these tools, as well as the ways in which they can be integrated into contemporary design, were identified. The design principles and methods refined from traditional small woodwork tools include: the dialectical relationship between structure and function; the prioritisation of functionality and the modular design concept; the emotional design approach; a design philosophy that highlights the expressive qualities of materials and the integration of new technologies; and a human-centred approach incorporating safety and customisation. Investigating the design heritage of small wooden tools not only contributes to the preservation of traditional culture but also facilitates the incorporation of its elements into modern practice by merging historical forms with contemporary technologies and materials

Keywords: Chinese traditional culture; creative concepts; design inspiration; innovative design; artefacts

INTRODUCTION

By the early 21st century, woodworking had become heavily industrialised, leading to a loss of the traditional warmth and personal connection once associated with handcrafted wood products. Traditional Chinese woodworking tools combined practical functions with significant cultural values, embodying aesthetic standards and cultural norms. This study focuses on traditional small wooden tools from the Central Plains region of China, examining their development and underlying design principles.

Recent research defines these small wooden tools as hand-powered woodworking implements used for crafting doors, windows, and furniture, distinct from larger structural carpentry tools (Hu *et al.*, 2024). Traditional Chinese carpentry historically categorised tools into "large woodwork" for structural projects and

Suggested Citation:
Sun, H., & Rubanka, A. (2025). Research on the design of traditional small wooden tools in the Central Plains of China. *Art and Design*, 8(2), 11-19. doi: 10.30857/2617-0272.2025.2.1.

*Corresponding author

"small woodwork" for furniture and detailed crafts. As early as the Song dynasty (960-1279 CE), texts recorded distinctions between large-scale tools and small woodworking tools (Xidong, 2023). During the Qing dynasty (1636-1912 CE), these smaller tools were classified under decorative carpentry, explicitly covering furniture and interior woodworking. Scholars have extensively analysed traditional woodworking principles as resources for contemporary design innovation. For example, W. Hu *et al*. (2024) enhanced traditional Chinese furniture joints through experimental and numerical methods, improving mechanical strength and production efficiency. They also summarised ecological concepts in the design of traditional wooden furniture, providing new references and ideas for the sustainable development of modern wooden furniture.

Some scholars, such as H. Ni (2024), have approached the subject from the perspective of materials and processes, exploring the reasons why ancient artefacts continued to flourish and proposing a framework for realising traditional artefact culture in the production of modern goods. Y. Chen (2024) explored the integration of traditional woodworking techniques with digital restoration technologies, demonstrating potential avenues for preserving cultural heritage while advancing technological innovation. Additionally, G. Xue *et al.* (2024) emphasised sustainable cultural development strategies in traditional Ming-style furniture, highlighting the importance of incorporating historical forms, structures, and aesthetics into contemporary design. Contemporary researchers such as L. Xia *et al*. (2024), Y. Lou (2024), and M. Zhang & L. Jia (2024) have further explored how classical design philosophies inspire regenerative design concepts through the study of ancient texts related to artefacts, production, and craftsmanship. These efforts help translate traditional craftsmanship methods into modern practices. Studies by Y. Sun *et al*. (2022) have demonstrated how features of ancient ritual objects can inform contemporary product design. Y. Shen (2021) examined the patterns and evolution of woodworking tools from a process-oriented perspective. Q. Wang (2024), by contrast, focused on the Neolithic period to explore the concept of artefacts in the early stages of human civilisation – work that contributes significantly to understanding the broader Chinese artefactual cultural system. Likewise, Q. Li (2022) applied traditional woodworking principles to sustainable lighting designs, emphasising ecological and aesthetic considerations in product development. In addition to research on the connection between traditional artefact culture and modern design, recent studies have also investigated how digital technologies can enrich the dissemination of traditional woodworking culture (Shen, 2024). For traditional small woodworking tools, there exist both abstract bodies of knowledge and tangible artefactual studies, but most research stops at this point. It merely presents the design concepts of traditional artefacts, while neglecting an understanding of the artefacts after their inheritance – a crucial aspect in preserving and extending their vitality and value. Therefore, exploring the modern value of traditional artefacts through their transformation into contemporary design holds essential significance.

This research aimed to bridge historical woodworking knowledge and contemporary design practice. Specific design principles and concepts inherent in traditional small wooden tools were identified and proposed as guidelines for modern design, ensuring the preservation and innovative adaptation of traditional craftsmanship.

MATERIALS AND METHODS

This study employed a multidisciplinary approach that integrated design, statistics, anthropology, archaeology, sociology, and the history of technology. A combination of qualitative and quantitative methods was adopted to comprehensively investigate the design principles of traditional small wooden tools. These methods were selected to uncover both the cultural significance and technical characteristics of the tools. The sequence of the study was designed to correlate logically with the results obtained.

A systematic literature review was conducted to collect and synthesise relevant historical documents and recent academic publications. This review established the theoretical foundation and provided contextual data. Field investigations were carried out in traditional woodworking workshops and through interviews with craftsmen. Observations of physical objects and production processes were recorded, and supplementary data were obtained from reliable online sources. The collected data were classified, synthesised, and analysed to identify inherent design principles and cultural significance (Jiang, 2020). The procedures followed standard qualitative research methods as documented in earlier studies.

Quantitative methods were employed to measure and statistically analyse key indicators such as tool dimensions, material properties, and operational efficiency. Representative cases of traditional small wooden tools were purposefully selected for detailed study (Shen, 2024). Measurement indicators included size, weight, material density, and other parameters relevant to tool performance. Statistical analyses were performed to establish correlations between design features and functional outcomes. This analytical approach was grounded in established frameworks from the literature (Hu & Li, 2024).

RESULTS AND DISCUSSION

Dialectical relationship between structure and function

The analysis revealed that the dialectical relationship between structure and function played a pivotal role

in the design of traditional small wooden tools. Classic production tools were created with a balance between structure and function, and this study confirmed that the same structural configuration could serve multiple functions, while certain functions required a specific structure (Xidong, 2023). Field investigations and analytical methods applied in this research showed that the design of these tools was not arbitrary but followed principles that ensured both practical efficiency and cultural expression. In comparison with previous research, M. Jiang (2020) emphasised that traditional wooden tools not only performed utilitarian tasks but also conveyed deeper cultural meanings. In contrast, the current study demonstrated that the interplay between structure and function was clearly visible in how material choices and modular design concepts contributed directly to both tool performance and aesthetic appeal.

The study further revealed that the concept of modular design was integral to achieving an optimal balance between durability and adaptability. Y. Shen (2021) argued that the careful combination of materials in traditional tools was critical for ensuring stability while allowing for aesthetic variation. In the present analysis, it was found that modular design not only enabled tools to adapt to various tasks but also functioned as a mechanism for the transmission of cultural heritage. These results indicated that traditional artisans had developed a systematic method for integrating multiple functions within a single structural framework – a finding that supported and extended the conclusions drawn by M. Jiang (2020).

In addition to the Chinese context, international research has also explored the material culture of hand tools. Research conducted by Japanese scholars, as referenced in related studies, focused on the tangible attributes of tools to understand their cultural significance. However, those studies often lacked a systematic analysis of the underlying design principles. The present study addressed this gap by providing empirical evidence that the same design principles governing structural-functional relationships in Chinese tools could also be observed in foreign examples. This comparison underscored the universality of certain design concepts while also highlighting the unique cultural factors that influenced traditional Chinese woodworking.

Classification of traditional small wooden tools

The study further classified traditional small wooden tools in the Central Plains into four functional categories. Cutting tools, including axes and saws, were identified by their robust designs suited to heavy-duty applications. Smoothing tools, such as various types of planes and shovels, exhibited refined craftsmanship, indicating their use in precision work. Carving and piercing tools, including chisels and drills, were noted for their versatility and delicate construction. Finally, measuring and alignment tools, encompassing instruments such as gauges, rulers, and related devices, were characterised by their accuracy and specialised design. B. Warcholinski & A. Gilewicz (2022) had previously established a functional classification of woodworking tools, and the present study confirmed this categorisation through both qualitative observation and quantitative measurement. The empirical data supported the view that these categories were not arbitrary but reflected the inherent logic of traditional tool design, which prioritised both functionality and cultural expression.

In summary, the discussion integrated the results of structural analysis, cultural evaluation, and functional classification. The findings corroborated earlier research while offering new insights into the dynamic evolution of traditional small wooden tools. By comparing the present results with those reported by M. Jiang (2020) and Y. Shen (2024), the study demonstrated that traditional design principles were robust and had significant implications for modern design practices. This comparative analysis provided a clear framework for understanding how cultural heritage and technical functionality could be reconciled, thereby laying the groundwork for future research on the contemporary transformation of traditional artefacts. The findings align with broader international research trends, such as those by V. Strilets *et al.* (2021), who identified key patterns in furniture design development at the turn of the 21st century. They emphasised the importance of form-making and the reinterpretation of traditional elements in contemporary material culture. Similarly, the concept of ecological design in traditional Chinese furniture proposed by J. Hu & B. Li (2024) highlights a combination of philosophy, craft heritage, and functionality as the foundation of a sustainable design approach.

Figure 1. Functional classification of small woodworking tools
Note: a – tools for woodworking, b – flat wood tools, c – carving and piercing tools, d – measuring and orienting tools
Source: authors' photos based on Z. Li (2015)

With regard to the relationship between the structure and function of tools, W. Houkes & A. Meijers (2006) proposed two criteria for the ontology of technological artefacts: underdeterminism (UD) and realisation constraints (RC) (Meron, 2024). These encompass two key phenomena. One is structure-to-function, where the same structure can realise multiple functions. For example, the leverage principle is widely applied in traditional small wooden tools. The frame saw, for instance, uses its beam as a fulcrum to maintain the saw blade and the biu tsi rope in a state of balanced tension, ensuring the effectiveness of the sawing operation. Each component is detachable and contributes to the functionality of the tool, as illustrated in Figure 2.

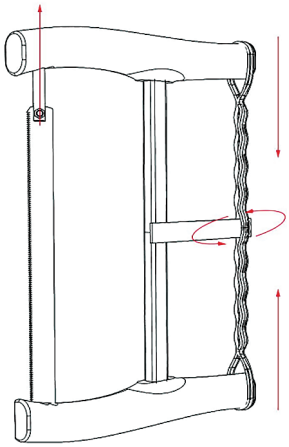

Figure 2. Force analysis diagram of rope and saw blade
Source: drawn by the authors

The fact that the "soft" twine at one end is tightened to keep the "hard" saw blade at the other end taut reflects the ingenuity and empirical understanding of mechanical balance and material properties possessed by ancient designers. The second phenomenon is function-to-structure, whereby a single function can be realised through various structural forms. An analysis of traditional small wooden tools reveals that the fulfilment of a function does not rely on a single structural solution. For example, tools such as jin, ji, zhen, chi, and various planers differ significantly in structure and mode of operation, yet all serve the purpose of levelling wood. In contrast to UD, the RC phenomenon represents the relative rigidity of the relationship between structure and function – that is, a structure cannot perform all possible functions. This constraint underlies the classification of processes and tools in woodworking. Both UD and RC have distinct advantages. UD enables the optimisation of resources through multifunctional design, reflecting an environmentally conscious design philosophy. Conversely, RC enhances the specialisation and hierarchical organisation of tools, improving their functional efficiency and clarity of use.

The essential embodiment of morphological design

First, the function determines form. In the traditional handicraft industry, woodworking itself is categorised into large-scale carpentry, small wooden tools, fine woodworking, round woodworking, and water woodworking, among others. These fields are wide-ranging, and the division of labour is a key characteristic. However, the tools used are largely similar, differing primarily in their dimensions and scale. In modern times, woodworking tools are numerous and diverse, with common types including saws, axes, planes, chisels, gauges, rulers, and inkwells. This rich and enduring system of tools has been passed down for thousands of years, owing to the craftsman's close interaction with the tools. Priority is given to usability and efficiency – tools are refined and optimised primarily with functionality in mind. For instance, although planers may vary in shape and operational style depending on specific tasks, functionality remains the central and consistent design focus. According to a study by L. Xia *et al.* (2024), the evolution of tools reflects a growing understanding of the natural world. This "use-oriented" approach is the essence and core of traditional Chinese artefacts.

Second, the concept of nested design is central. Different structural optimisation strategies influence aspects such as material consumption, assembly forms, and recycling methods throughout a product's life cycle. Historically, the Chinese were pioneers in employing modular systems on a large scale. A defining characteristic of small wooden tools used by carpenters is their combinatory structure – that is, they consist of multiple components related by material, function, or structural design. Regardless of these interrelations, such tools are always presented as part of a coherent and systematic whole. This modular logic is also evident in other traditional implements, including utensils, medical instruments, and farming tools. Traces of these production methods continue to influence modern product design, even in everyday objects found in 2025.

Finally, emotional design must be acknowledged. Ancient artisans created with the aspiration of a better life and this aspiration has been continuously expressed and developed through heritage. Y. Sun *et al*. (2022) observed that the form of artefacts not only embodies practical value but also reflects human consciousness and cultural values. Objects often serve as tangible expressions of the maker's or owner's identity and aesthetic preferences. Numerous sources document the enduring use of traditional woodworking tools. H. Ni's (2024) study found that although tools such as the Lu Ban ruler, ink pot, planer, and frame saw are small in scale, they have remained in use for centuries. Their continued relevance is due not only to their functionality but also to their cultural symbolism, which resonates with the values of Chinese society. This human-centred and emotionally responsive approach to design has always existed in Chinese architecture and

craftsmanship and aligns with the principles of emotional design advocated in contemporary psychology.

Material and technical rationality

The first principle is to emphasise the expression of the material itself. The role of materials in design can be summarised as practical function, aesthetic function, and emotional expression. Material selection is based on functional requirements, meaning that the materials used are chosen according to the specific purpose of the tool. Traditional small wooden tools are primarily made of wood, with working parts reinforced by metal. This approach effectively leverages the functional properties of each material, combining the "softness" of wood with the "rigidity" of metal to achieve a balance of flexibility and strength in the design, thus maintaining the tools' inherent stability and equilibrium.

The second principle is to explore the possibilities afforded by new technologies. According to T.J. Rivers (2022), the essence of technology lies in pushing the "limits of method", and it begins to explain the evolution of human culture through the development of tools as representations of technological advancement. In other words, the history of human civilisation mirrors the development of tools. Traditional small wooden tools are typical production implements that span the Palaeolithic, Neolithic, Bronze, and Iron Ages – each period introducing new technologies and materials that significantly influenced the performance and efficiency of such tools. During the Palaeolithic era, natural objects such as stones, wood, animal bones, shells, and mussels were intentionally shaped to produce sharp ends suitable for gripping (Kim & Seo, 2024). In the Neolithic period, tools remained predominantly stone-based (Shen, 2021), though materials such as wood, bone, mussels, pottery, shells, and metals were also introduced. Composite tools emerged, constructed from multiple materials and connected through bindings or mortise-and-tenon joints. The use of handles facilitated striking, grinding, and drilling, marking a major leap in technological and cultural development. By the late Western Han dynasty, society had entered the iron age – a clear watershed moment. As iron smelting advanced, tool components such as saw blades, planer blades, and drill bits became sharper and more refined. This transition brought about qualitative changes in the performance of small wooden tools, enhancing their function and enabling more precise categorisation and application. These innovations reduced material waste and refined the processing of objects. Technology and society, both centred on tools, together form an intricate and interdependent network – mutually reinforcing and co-evolving to support the creation of a stable and harmonious world.

A human-centred view of creation

The principle of people-oriented design was articulated as early as ancient China (Guanzi, 2015). Objects should serve people, not the other way around – that is, one should use things without being burdened by them. This concept has long stood as the core of the human relationship with material culture. Similarly, while all tools are hand-operated, the variation in grip styles and the direction of applied force significantly influence the curvature and design of tool handles. The userfriendliness of traditional small wooden tools is evident not only in their compatibility with human body proportions but also in their functional convenience. A single tool may be adapted for multiple purposes, with the most notable example being the modular design method previously discussed. In line with human tendencies to rely on familiar tools, such a model undoubtedly reduces the need for re-adaptation. Fewer tools also make transportation more efficient and less labour-intensive.

Within the concept of customised design, traditional small wooden tools – as artefacts shaped by human intent – are significantly influenced by human agency (Lou, 2024). These tools were almost always handcrafted by carpenters for their own use, which, in contemporary terms, aligns with the idea of customised or bespoke design. Addressing the relationship between personalised craftsmanship and large-scale industrial production, and determining how to preserve human-centred values in an era defined by speed and efficiency, remains a pressing challenge in both society and industry.

Continuation of structural functions

The types and functions of traditional small wooden tools continue to influence modern woodworking, which can broadly be divided into integrated and handmade processes. Many modern small tools retain traditional structural or functional characteristics, while also adapting to contemporary needs through improvements in power and technology. The snail tape measure – whose form resembles that of the traditional inkwell – uses a coiled spring mechanism around a central axle. The ruler still extends and retracts via a pulling motion, but now includes updated ruler surfaces incorporating various measurement systems such as the centimetre scale, Dinglan ruler, Luban ruler, and table ruler. This tool effectively integrates the features of the inkwell and Luban ruler into a single compact, lightweight, and portable device (Kroes, 1998; Jiang, 2020). It not only preserves the wisdom embedded in traditional tools but also accommodates multicultural measurement systems, thereby meeting the needs of a wider range of users. The continuation of traditional tools' functions and working principles is a vital path for future development (Zhang & Jia, 2024). For example, the modern reciprocating saw consists of a main body, handle, battery, switch, chuck and saw blade. Its working principle is essentially the same as that of the traditional frame saw: the object is cut via a reciprocating blade movement. In traditional designs, this motion was powered manually; modern versions use mechanical components driven by gears to operate a telescopic rod. With a stroke distance of 15 mm and powered by

electricity, the saw's cutting capacity is greatly enhanced, and the frequency of blade movement is significantly increased. Reciprocating saws are used not only by carpenters but also as versatile tools across various fields. By changing the saw blade via the collet mechanism, it is possible to cut through metal, wood, plastic, stone, and other materials, thereby significantly broadening their range of applications.

Power evolution and innovations in tool materials

From the perspective of technological development within society, the dominant power sources have evolved over time. In the primitive and agricultural periods, manpower and animal power were the primary means of operation. During the industrial era, steam power became prevalent. In information society – characterised by rapid scientific and technological advancement – numerous new technologies have emerged. These advancements primarily involve the widespread use of electric power, internal combustion engines, and innovations in transportation and communication technologies. Currently, electric and petroleum-powered tools dominate, with renewable energy sources serving as complementary options. As part of the transition towards ecological civilisation, the future focus will be on the development of environmentally friendly energy sources, in response to low-carbon and sustainable development goals. This evolution in power technologies underscores how science and technology are powerful drivers of social progress. Modern small wooden tools have evolved from manual operation to electric-powered devices, such as electric saws, power planers, electric drills, laser levels, and electronic precision measuring instruments.

Traditional small woodworking tools were made from a range of materials, including wood, stone (including jade), metals (such as bronze, copper, and iron), and composite materials. The material classification system is illustrated in Figure 3.

Figure 3. Material classification system for small wooden tools
Note: a – wood type, b – stone type, c – metal type, d – mixed material class
Source: authors' photos based on Z. Li (2015)

The technical level of tool design has improved continuously over time. Material use represents the optimal expression of technology. In selecting materials for tools, two core principles are generally followed: choosing the most appropriate material based on function, and keeping pace with the times through the adoption of innovative materials. This requires designers not only to be familiar with various materials but also to possess a forward-looking understanding of technological trends. The dual nature of the tools – being both functional and symbolic – increases the complexity and specificity of material selection. Fully understanding and utilising material properties is a challenging task, but it is a critical factor in a tool's ability to remain competitive in the market.

Extension of application scope

With the popularisation of technology, the application scope of traditional small wooden tools has continued to expand, particularly in terms of user demographics and contexts of use. Traditional small wooden tools were once exclusively used by carpenters, who were typically the only group to possess a full set. However, as of 2025, the revival of traditional culture has led to a gradual increase in individuals engaging in woodworking as a hobby or profession. Compared to earlier generations, the demographic profile of modern woodworking enthusiasts is increasingly youthful. Many founders of contemporary woodworking studios are young people. Some are university teachers guiding students in the creation of handcrafted wooden items; others are descendants of traditional carpenters, engaging in woodworking to preserve family craftsmanship. Additionally, there are experiential workshops aimed at nurturing children's creative thinking and practical skills. Preserving tradition requires adapting it to the pace of contemporary life. Traditional skills and tools must be transformed into a dynamic and youthful force. The continued vitality of tradition depends on the innovations brought by younger generations. As small wooden tools undergo changes in technology and materials, their use has expanded from exclusively processing wood to also accommodating metal, plastic,

stone, and other materials. For example, electric drills, thanks to their durable drill bits and sufficient power have become essential not only for woodworking but also for everyday tasks such as drilling and screw driving. In this way, tools have undergone a transformation from specialist to general-purpose use, shedding their exclusive identity and achieving greater functional versatility. The innovation path is illustrated in Figure 4.

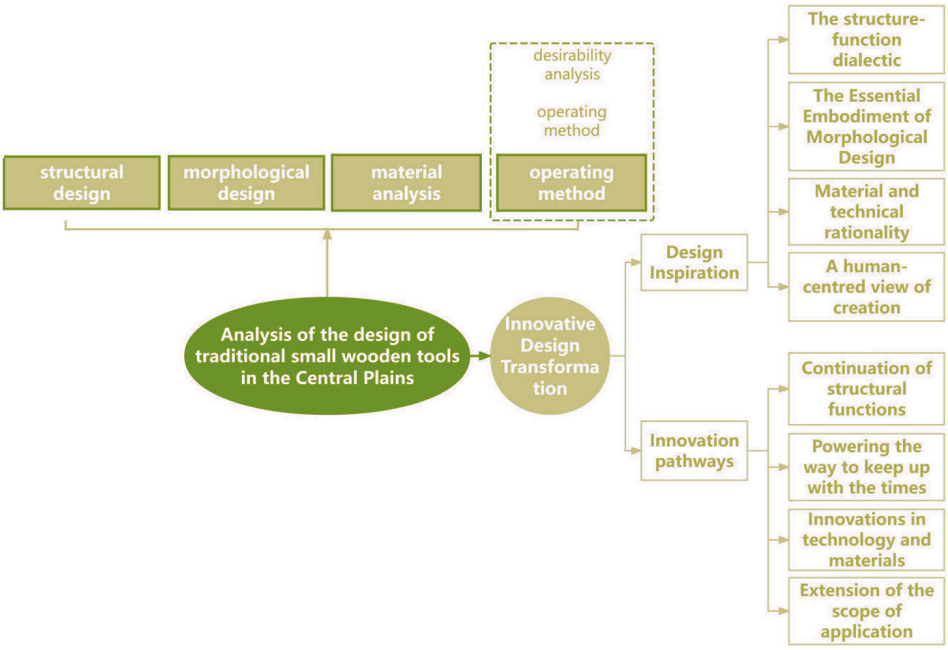

Figure 4. Analysis of the design of traditional small wooden tools
Source: compiled by the authors

Innovation in design involves modernising traditional forms by integrating them with contemporary needs and aesthetics while retaining culturally significant elements. This process requires selecting and adapting traditional features that continue to hold relevance today. In particular, features that embody the spirit of the current era deserve closer examination and careful preservation. Through an analysis of traditional small wooden tools from Central China, focusing on both their historical evolution and their relevance to modern design, this study demonstrates that many underlying principles remain valuable. By merging traditional concepts with modern design strategies, new possibilities emerge for the evolution of these tools. This research proposes practical methods and strategies for transforming traditional designs into innovative products that align with the demands of contemporary society.

CONCLUSIONS

This study found that traditional small wooden tools in the Central Plains exemplify a distinct balance between structure and function, developed through centuries of practice. The analysis demonstrated that the integration of modular design, material properties, and cultural symbolism enhanced both the tools' practical efficiency and their aesthetic value. Qualitative field investigations and quantitative measurements revealed that traditional artisans employed resource-sharing strategies to optimise functionality while preserving cultural heritage. Specifically, the research analysed how the dialectical relationship between structure and function was achieved through design elements that enabled a single structure to serve multiple functions, as well as how different structures could realise the same function. These findings support the view that key traditional design principles – such as modular configuration and the interrelation between material expression and mechanical performance – can serve as effective guides for contemporary design practice. Furthermore, the study demonstrated that experiential design strategies, which emphasise user interaction and cultural context, can be effectively applied to modern design challenges. By establishing a bridge-building approach between traditional methods and modern technology, the research provided a clear framework for integrating historical craftsmanship into current design processes. Future research should focus on developing and testing new design prototypes based on these traditional principles, as well as conducting comparative studies in different cultural contexts to further explore their applicability to modern innovation. This research thus not only enriches the understanding of traditional woodworking tools but also lays the groundwork for their revitalisation in contemporary society.

ACKNOWLEDGEMENTS

In the process of the completion of this paper, the authors received the full support and help of many experts, scholars and relatives, for which sincere thanks are expressed.

FUNDING

The study did not receive funding.

CONFLICT OF INTEREST

There is no conflict of interest in this study. All authors have read and approved this version of the article, and due care has been taken to ensure the integrity of the work. Neither the entire paper nor any part of its content has been published or has been accepted elsewhere. It is not being submitted to any other journal.

REFERENCES

[1] Chen, Y. (2024). Traditional woodworking techniques and digital restoration technology in the perspective of intangible cultural heritage. *Applied Mathematics and Nonlinear Sciences,* 9(1), 1-22. doi: 10.2478/amns-2024-3101.
[2] Guanzi. (2015). *Guanzi (essential Chinese wisdom).* San Francisco: China Books & Periodicals.
[3] Houkes, W., & Meijers, A. (2006). The ontology of artefacts: The hard problem. *Studies in History and Philosophy of Science Part A*, 37(1), 118-131. doi: 10.1016/j.shpsa.2005.12.013.
[4] Hu, J., & Li, B. (2024). Ecological view of thing-making design in traditional Chinese furniture. *Packagng Engineering,* 24.
[5] Hu, W., Li, D., & Zhang, J. (2024). Optimal design of the traditional Chinese wood furniture joint based on experimental and numerical methods. *Wood Research,* 69(1), 50-59. doi: 10.37763/wr.1336-4561/69.1.5059.
[6] Jiang, M. (2020). *Research on the extension and application of traditional Chinese small wood works in the modern context*. (Master's thesis, Nanjing University of the Arts, Nanjing, Cnina). doi: 10.27250/d.cnki.gnjyc.2020.000264.
[7] Kim, K., & Seo, I. (2024). Preliminary study on the utilized pebbles in the Paleolithic. *Baeksan Journal*, 128, 147-184. doi: 10.52557/tpsh.2024.128.147.
[8] Kroes, P. (1998). Technological explanations: The relation between structure and function of technological objects. *Society for Philosophy and Technology Quarterly Electronic Journal,* 3(3), 124-134. doi: 10.5840/techne19983325.
[9] Li, Q. (2022). Study on material selection of traditional design materials. *Furniture and Interior Decoration,* 12, 66-69. doi: 10.16771/j.cn43-1247/ts.2021.12.014.
[10] Li, Z. (2015). *Traditional Chinese architectural woodworking tools.* Shanghai: Tongji University Press.
[11] Lou, Y. (2024). *Research on Kaogongji from the perspective of design philosophy.* (Master's thesis, Henan University, Henan, China). doi: 10.27114/d.cnki.ghnau.2024.003262.
[12] Meron, Y. (2024). Looking at things strangely: Defamiliarisation as a design approach for media literacy education. *The Design Journal*, 27(6), 1122-1141. doi: 10.1080/14606925.2024.2397213.
[13] Ni, H. (2024). The archaeological value excavation and digital development of the Liangzhu site and its impact on the urban culture of the museum. *Mediterranean Archaeology & Archaeometry*, 24(3), 206-222. doi: 10.5281/zenodo.13626988.
[14] Rivers, T.J. (2022). An integrated approach to technology: Stone tools, method, and social behavior as factors for the technologization of society. *Journal of Research in Philosophy and History*, 5(1), 24-38. doi: 10.22158/jrph.v5n1p24.
[15] Shen, D. (2024). *Research on digital communication design of Chinese traditional small wood tools.* (Master's thesis, Nanjing University of the Arts, Nanjing, Cnina). doi: 10.27242/d.cnki.gnjlu.2024.000782.
[16] Shen, Y. (2021). *Research on the tools of traditional small wood technology*. doi: 10.27662/d.cnki.gznlc.2021.000953.
[17] Strilets, V., Lampeka, M., & Khizhinsky, V. (2021). Furniture design development trends late XX – beginning XXI century. *Culture and Contemporaneity*, 23(2), 123-129. doi: 10.32461/2226-0285.2.2021.249244.
[18] Sun, Y., Wu, I.W.W., & Lin, R.T. (2022). Transforming "Ritual cultural features" into "Modern product forms": A case study of ancient chinese ritual vessels. *Religion,* 13(6), article number 516. doi: 10.3390/rel13060517.
[19] Wang, Q. (2024). On the creation thought in Longshan culture and its inspiration to contemporary design. *Popular Literature and Art,* 24.
[20] Warcholinski, B., & Gilewicz, A. (2022). Surface engineering of woodworking tools, a review. *Applied Sciences,* 12(20), article number 10389. doi: 10.3390/app122010389.
[21] Xia, L., Huang, X., & Yuan, J. (2024). Research on the development of traditional small wood for threading and picking tools in the Stone Age. *Shanghai Packaging,* 9, 68-71. doi: 10.19446/j.cnki.1005-9423.2024.09.021.
[22] Xidong, J. (2023). The productivity level of the Song Dynasty. *Social Sciences in China*, 44(2), 74-93. doi: 10.1080/02529203.2023.2192084.

[23] Xue, G., Chen, J., & Lin, Z. (2024). Cultural sustainability strategies of Chinese traditional furniture: A case study on Ming-style furniture. *Sustainability,* 16(17), article number 7443. doi: 10.3390/su16177443.
[24] Zhang, M., & Jia, L. (2024). "Cultural design" from the perspective of "design culture": Analysis and exploration of modern translation of Chinese traditional ways of creation. *Decorate,* 10, 12-19. doi: 10.16272/j.cnki.cn11-1392/j.2023.10.023.

Дослідження дизайну традиційних малих дерев'яних інструментів на Центральних рівнинах Китаю

Ху Сунь
Аспірант
Київський національний університет технологій та дизайну
01011, вул. Мала Шияновська, 2, м. Київ, Україна
Шаньсійський університет науки і технологій
710021, вул. Сюефу, 6, м. Сіан, Китай
https://orcid.org/0009-0006-0093-7612

Алла Рубанка
Доцент
Київський національний університет технологій та дизайну
01011, вул. Мала Шияновська, 2, м. Київ, Україна
https://orcid.org/0000-0003-0298-0850

Анотація. Це дослідження мало на меті систематизувати традиційні малі дерев'яні інструменти Центральної рівнини Китаю, щоб визначити їхнє культурне значення та дослідити взаємозалежність між традиційною творчістю та сучасним дизайном. Дослідження ґрунтувалося на історико-культурному аналізі та включало системний і міждисциплінарний підхід. Використані методи включали огляд літератури, мистецтвознавчий та культурний аналіз, а також методи археологічної класифікації. З точки зору дизайну, для збору даних і вивчення традиційних малих дерев'яних інструментів на Центральних рівнинах були використані як якісні, так і кількісні методи дослідження. Спираючись на попередні дослідження, було з'ясовано принципи та методи дизайну, притаманні цим інструментам, а також встановлено діалектичний взаємозв'язок між структурою та функцією в дизайні форми. Основну увагу приділено поєднанню матеріалів, що використовувалися в традиційних малих дерев'яних знаряддях праці, у світлі досягнень науки і техніки. Визначено фактори, що впливають на розвиток форми та розмірів цих інструментів, а також шляхи їх інтеграції в сучасний дизайн. Принципи та методи дизайну, запозичені з традиційних малих дерев'яних інструментів, включають: діалектичний зв'язок між структурою та функцією; пріоритет функціональності та модульну концепцію дизайну; емоційний підхід до дизайну; філософію дизайну, яка підкреслює виразні якості матеріалів та інтеграцію нових технологій; а також підхід, орієнтований на людину, що включає безпеку та індивідуалізацію. Дослідження дизайнерської спадщини малих дерев'яних інструментів не лише сприяє збереженню традиційної культури, але й полегшує включення її елементів у сучасну практику шляхом поєднання історичних форм із сучасними технологіями та матеріалами

Ключові слова: китайська традиційна культура; творчі концепції; дизайнерське натхнення; інноваційний дизайн; артефакти