

УДК 7.012

DOI:10.30857/2617-0272.2023.3.7.

<sup>1,2</sup>YU Z., <sup>1</sup>PASHKEVYCH K. L.<sup>1</sup>Kyiv National University of Technologies and Design, Kyiv, Ukraine<sup>2</sup>College of Design and Art, Shaanxi University of Science and Technology, Xian, China

## INNOVATIVE APPLICATION OF TRADITIONAL BAMBOO WEAVING IN MODERN FURNITURE DESIGN

**The purpose** of the study is to explore the approaches and strategies of integrating traditional bamboo weaving elements into modern furniture design.

**Methodology.** The methodology of this paper is based on a literature review and a case study analysis. The literature review provides a theoretical framework and a historical background of bamboo weaving as a traditional craft and a cultural expression. The case study analysis examines examples of modern furniture designs that use bamboo weaving as a main or complementary element, and evaluates their functionality, aesthetics and sustainability. The paper uses qualitative and descriptive methods to analyze the data and draw conclusion.

**Results.** This paper summarized the two visual expression forms of traditional bamboo weaving in furniture design and put forward three application principles and innovative methods of bamboo weaving in modern furniture design.

**Scientific novelty.** Based on the attributes of bamboo weaving culture and technology, this article summarized the expression form, application principles and innovative methods of traditional bamboo weaving applied to modern furniture design.

**Practical significance.** This article provides some methods of combining traditional craft and modern design for designers, which can enhance the cultural value and aesthetic appeal of furniture products. It also contributes to the preservation and inheritance of bamboo weaving as a traditional skill and a cultural heritage, which can enrich the diversity and vitality of contemporary design culture.

**Keywords:** bamboo weaving craft; furniture design; innovative application methods; product design.

**Introduction.** Bamboo is a versatile material that has been used in various domains of literature, art, technology and tools since ancient times. As a commonly used material in fishing and agriculture, bamboo has an important influence on people's daily lives. With the development of industry and agriculture, bamboo weaving utensils have been widely applied in various areas of life and work, becoming the primary production method for various household tools [1]. The craft of bamboo weaving has continuously improved, resulting in exquisite and durable bamboo weaving products that exist in various forms in people's daily lives.

Furniture is an essential tool for human beings to maintain a normal life, engage in production practices, and carry out social activities [2]. Bamboo furniture manufacture can include the bamboo weaving process, which is rich in variety and has both practical

function and aesthetic value [3]. On one hand, bamboo furniture has strong load-bearing capacity and is resistant to deformation. It has good breathability and is less prone to bacterial growth. It is also environmentally friendly due to its natural properties. On the other hand, bamboo furniture offers a variety of shapes and beautiful patterns, and it is easy to process. Nowadays, the demand for bamboo furniture in the market is increasing, which leads to continuous progress and innovation in bamboo weaving techniques to create bamboo furniture that meets people's aesthetic preferences and market requirements. By combining traditional bamboo weaving techniques with modern furniture design, we can promote traditional craftsmanship on a larger scale and maximize the display of the excellent characteristics of bamboo materials [4].

**Analysis of previous researches.** In all times bamboo weaving attracts researchers'

attention. The research mainly focuses on modernizing bamboo weaving through aspects such as form design, cultural connotations, and modern scientific technology. Many scholars (Yu *et al.*) [5] have studied representative cultural heritage patterns, such as extracting plant decorative patterns and integrating them with bamboo weaving for innovative product design. These patterns are then showcased through bamboo weaving techniques, which is a commonly used approach in contemporary bamboo weaving research.

Bamboo culture, as a symbol of Chinese literati and scholars, has a long-standing tradition in China. Researchers Chen M. Y. and Zhang Z. F. [6] explored the innovative application of emotional factors in bamboo furniture design, based on the three levels of emotional design proposed by Norman (2003) [41]: visceral, behavioral, and reflective. They analyzed the shape, material, and color of bamboo furniture from an emotional perspective and proposed some design guidelines.

From the perspective of design aesthetics, the authors Yang W. Y. and Zhang F. C. [7], Xue Y. J. [8] and others proposed an innovative design principle guided by modern life aesthetics and centered on functionality, advocating to design bamboo-made household products that suit modern lifestyle and popular taste from three aspects: functional innovation, formal innovation, and craft innovation.

Bamboo is a natural, environmentally friendly, and highly renewable material. A number of scholars Liu Z. M. and Yu G. W. [9], Wu S. H. and Fan K. K. [10], Wen *et al.* [11] investigated its environmental properties and evaluated the sustainability of bamboo furniture from social, economic, and environmental perspectives throughout its life cycle. They proposed several strategies, methods and principles for the sustainable design of bamboo furniture.

Bamboo weaving craft, a traditional handicraft of ethnic minorities with regional characteristics, can enhance the aesthetic and

spiritual value of modern furniture design, as well as preserve and disseminate ethnic minority culture. Researchers Wang G. [12], Lin L. P. and Huang S.Y. [13], Xu *et al.* [14] analyzed the relationship between folk culture and bamboo furniture, and suggested innovative ways and techniques to incorporate bamboo weaving craft into modern furniture design, but there was no single-dimensional in-depth study. Their study offers insights for integrating traditional craft into contemporary design.

Author Chen Z. J. and He X. Q. [15–17] published a series of researches on bamboo decorative furniture in 2016. The works according to the characteristics of China traditional bamboo culture and bamboo weaving, this article studies the design ways of bamboo weaving decorative furniture and recommends design approaches based on three aspects such as requirements, morphology, culture etc. Hope to impress the traditional bamboo craft with innovative way of thinking and combine with modern furniture production technology to design the bamboo weaving furniture with new design approaches.

Based on the user's demand for bamboo furniture products, the weight values of various factors affecting the user's purchase of bamboo furniture are quantified, and the design basis is provided for the designer according to the weight values. A number of scholars Liu A. and Chang L. [18], Luo *et al.* [19], Dong *et al.* [20] summarized the innovative strategies of product design methods for bamboo furniture in modern living fields, such as analytic hierarchy process, TRIZ theory subsystem synergistic evolution law, lightweight design, modular design, etc., which provide reference and inspiration for the application of traditional crafts to modern furniture design.

To explore the design direction of bamboo furniture, Authors Xu B. [21], Wu S. H. and Ho M. C. [22], Wang *et al.* [23] conducted the application in furniture design from different classifications and characteristics of bamboo material. They showed the situation and effect in the modern life when they combine with

different materials, such as stainless steel, wood, and so on. They determined the path of integrating bamboo and diverse materials into furniture design, satisfying the different needs of modern furniture in terms of practicality and emotional appeal.

Researchers Zhao *et al.* [24], Liu *et al.* [25] took reconstituted bamboo and round bamboo as the research objects, analyzed the mechanical and structural characteristics of bamboo, and summarized the structural forms and functional features of furniture. Specifically, they proposed innovative design methods of bamboo furniture with lightweight, portable, flat and functional diversification from the aspects of module design etc., composite material design innovation and joint structure component optimization.

Acknowledging the conducted research, it is worth noting that there is a lack of unified principles and methods for applying traditional bamboo weaving to modern furniture design of various styles. Further research is needed to explore and prospect the development of the mentioned field of design.

**Statement of the problem.** The aim of the work is to identify the visual expression forms of traditional bamboo weaving in furniture design include various patterns, textures, and structures created through weaving techniques.

**Results of the research and its discussion.** Bamboo is a natural green material with good mechanical strength and bending strength, and it is currently being promoted by many designers as a green material in furniture design (Sharma *et al.*) [26]. The weaving techniques used in flat and three-dimensional bamboo weaving are different. Commonly used flat weaving techniques include the pick and press method and the through and through method. The different thicknesses of the bamboo strips used to weave the flat patterns and the differences in the gaps between the warp and weft lead to different results. The size of the bamboo strips used for weaving is determined by the needs of the product being

woven. For example, fine pieces are often used for weaving handicrafts, while relatively wider pieces are used for weaving furniture panels. Sometimes bamboo strips of different thickness are used in combination to give a richer visual effect.

Bamboo weaving furniture can be divided into two categories, which include those prepared as a whole and those prepared by the board. Bamboo furniture prepared as a whole is a three-dimensional piece of furniture made entirely of bamboo, which includes the skeleton and the panels. Panel preparation refers to the weaving of parts of the furniture from bamboo materials, such as sitting surfaces and cabinet doors, among others.

The visual expression of bamboo weaving into modern furniture design is usually realized in the form of plane and curved surface (Fig. 1, a). Planes have geometric and non-geometric forms. In the direction, the plane has vertical plane, horizontal plane and oblique plane. The flat bamboo braid is made of warp and weft bamboo silk or bamboo proverbs, which has the characteristics of tranquility, stability and order. In furniture design, it is commonly used as the countertop of table furniture, the seat surface of chair furniture, the door panel of backrest and cabinet furniture (Fig. 1, b), the shelf board, bed screen and screen of frame furniture. The surface is represented in space as rotating surface, non-rotating surface and free surface, and the shape has geometric surface and free surface. The curved surface is mild, soft, friendly and dynamic and so on. It is commonly used as the backrest of chair furniture, the base of table furniture (Fig. 1, c), the door panel of screen and cabinet furniture etc.

On the basis of retaining traditional bamboo weaving handicraft, introducing modern design language and modeling method can make bamboo weaving furniture more contemporary, conform to modern aesthetic, and realize the innovation of bamboo weaving furniture. We summarize four principles and methods of integrating bamboo weaving into modern furniture design.

1. The approach of bamboo weaving graphic integrated into furniture design.

Bamboo weaving is patterned by the change of thickness, interleaving and weaving of warp and weft. Each pattern is based on the basic knitting technique of "picking one and pressing one". The pattern elements of bamboo knitting are mostly animals and plants, geometry and auspicious characters. The geometric pattern is composed of the regular arrangement and distribution of geometric shapes, which is the most used pattern in bamboo weaving. Bamboo knitting patterns, whether abstract or figurative patterns, are relatively simple to deal with, easy to produce monotonous, dull feeling. Therefore, on the basis of summarizing the structure form and techniques of bamboo weaving, combining with modern graphic language, the elements, colors and composition of bamboo weaving patterns should be innovated.

There are two kinds of colors of bamboo weaving: primary color and processing color. Primary color refers to bamboo that does not do a green preservation process, bamboo due to oxidation, and natural transformation into yellow-brown. The primary color of bamboo weaving is fresh and elegant, harmonious and natural, and is the most common color matching of bamboo weaving. Processing color refers to the form of industrial infection of bamboo to make it colored. In bamboo weaving color matching, is the use of color composition, similar color, adjacent color, similar color, contrast color, and complementary color collocation. As shown in Fig. 2, a–b, the straw inlay furniture made by "A+A" design combines color and pattern ingeniously, giving the works a strong vitality and subtle fantasy texture.

Bamboo weaving patterns exhibit an aesthetically pleasing symmetry and rhythmic structure. Through innovative techniques, these patterns can be reconstructed using scattered composition forms and free weaving methods, thereby surpassing the constraints of traditional, regular bamboo weaving. This approach to

bamboo weaving has been explored in several scholarly works, demonstrating its potential for artistic expression and creative design (Fig. 2, c).

2. The way of bamboo weaving combined with new technology into modern furniture design.

Traditional bamboo weaving techniques often fail to meet the aesthetic demands of modern household goods that require visually appealing designs. Therefore, new technologies and techniques for manufacturing bamboo furniture need to be explored. To align bamboo weaving products with modern aesthetics, traditional bamboo weaving technology should be improved and innovated, focusing on enhancing the diversity of forms for bamboo weaving works. As follow in Figure 3, a, the Cocoon Plan by Rock W. and Kao M. C. [32], that is not only stylish and eco-friendly, but also illustrates the modernization of bamboo weaving techniques by showcasing the innovation of traditional close weaving and hollow weaving techniques for bamboo weaving works. They used traditional bamboo material and modern technology to create a sofa and a stool that are light, comfortable, and eco-friendly etc. The intertwining bamboo strips completes the over-sized seat and backrest that will surely provide comfort to every user.

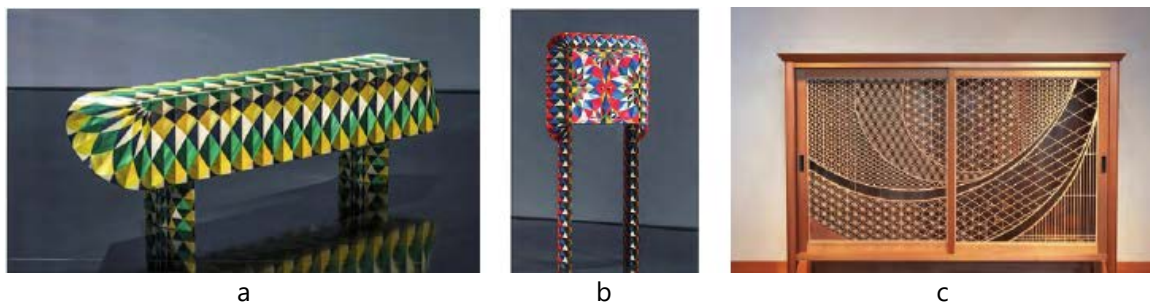
For example, designer Zhou Y. R. and Su R. R. jointly designed the "BAMBOOL STOOL" (Fig. 3, b), which combines original bamboo and bamboo weaving techniques to produce a suitable and beautiful seat. They used an irregular knitting method to weave the stool surface with different geometric patterns. On the other hand, traditional bamboo weaving techniques are mostly handmade and have many limitations. Therefore, integrating modern mechanical processing methods in bamboo weaving can make the bamboo slices evenly distributed, the surface polished smooth, the finished product more beautiful, and reduce the scrap rate of bamboo. As Fig. 3, c shows another work by Zhou and Su [33], called "PAOPAO SOFA", which is a representative furniture design that uses a modular

combination and semi-mechanized production. The sofa is composed of a single bamboo woven ball repeatedly arranged, integrating the traditional bamboo weaving technology in Taiwan. Because of its simple form, it can be mass-produced by modern industrial technology combination production, greatly reducing the production cost. The product has both the natural sense of traditional bamboo weaving process and the modern simple form of beauty, suitable for most contemporary home furnishings. The design idea of this sofa provides a new direction for the design of

modern bamboo woven products. The optimization and deconstruction of bamboo weaving offer novel opportunities for furniture design. A range of weaving methods are utilized in furniture, with the resulting components being reassembled in unique combinations. Alternatively, fine bamboo weaving techniques can be modularly spliced and interwoven to create a dynamic and integrated curved space, as seen in Fig. 4, c–d [35]. These design strategies inspire creative approaches to expanding the traditional bamboo weaving process.



**Fig. 1.** The visual expression of bamboo weaving in furniture design: a – “Shimmering of heated air”, Shono Shounsai, Tokyo, Japan, 1969 [27]; b – “Sorren Media Cabinet”, Shea & Syd McGee, Utah, USA, 2014 [28]; c – “Loop Cocktail Table”, Jamie Durie, Australia, 2019 [29]



**Fig. 2.** Bamboo woven pattern integrated into furniture design pattern design strategy: a, b – “Exquisite Corpse”, Adma Goodrum. (Australia) & Arthur Seigneur. (France), 2020 [30]; c – “Maison & Objet Exhibitor”, Kenichi Inomata, Japan, 2019 [31]

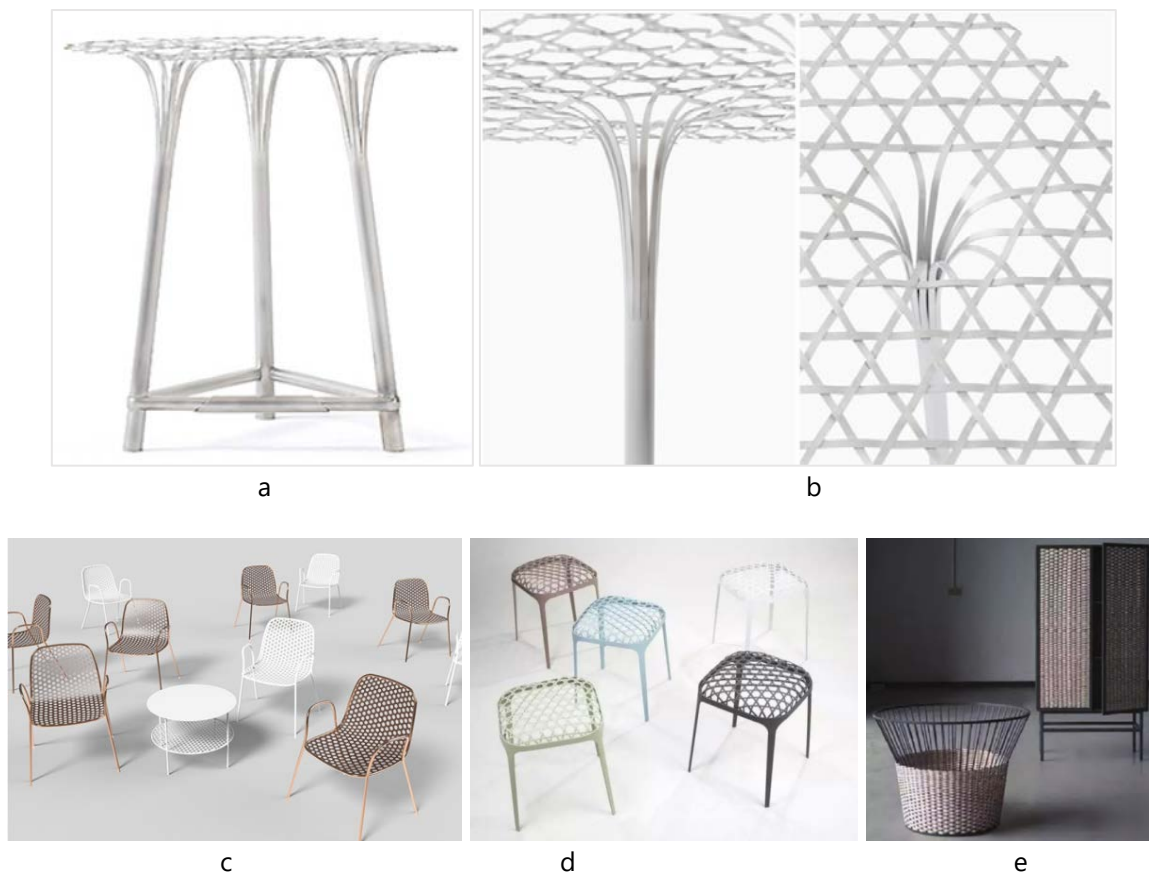


**Fig. 3.** The approach of bamboo weaving technologies into furniture design: a – “Cocoon plan furniture sofa”, Rock W. & Kao M. C., Taiwan, China, 2010 [32]; b – “BAMBOO STOOL”, Zhou Y. R. & Su R. R., Taiwan, China, 2011 [33]; c – “PAOPAO SOFA”, Zhou Y. R. & Su R. R., Taiwan, China, 2011 [33]

Japanese design group "Nendo" has adapted Taiwanese craft techniques, translating them into a contemporary furniture piece entitled "Bamboo Steel Table" (Fig. 4, a-b) [34], developed for Han Gallery. The properties of the thin steel strips of metal from which it is made allows the weaving method, typically used to form baskets and containers, to be explored at a larger scale. The traditional hexagon pattern, usually executed in natural fiber, improves the strength of the product through the overlapping triangular forms it creates. Instead of cutting notches into the wood and then bending the material which is often seen in bamboo furniture, this table uses another technique where vertically sliced pieces are woven upwards and outwards to form the table legs and top, creating a seamless connection. First, this was tried on bamboo before the same method was applied with steel strips. By

changing the material, Nendo brings the design into an urban context while offering more structural stability.

Bamboo upholstery panel furniture represents a novel form of bamboo upholstery and modern furniture, achieved through innovative processes that combine bamboo upholstery technology with modern panel furniture production techniques (Fig. 4, e) [36]. This type of furniture is designed to make full use of wood and its scraps, thereby improving wood utilization rates and mitigating issues such as board expansion and deformation, while simultaneously enhancing board quality. The development and design of bamboo decorative panel furniture not only reduces wood resource loss, but also leverages the unique characteristics of bamboo furniture to create a new, environmentally-friendly furniture form that warrants further exploration.



**Fig. 4.** The way of bamboo weaving combined with new technology into modern furniture design: a-b – "Bamboo Steel Table", Masayuki Hayashi, Japan, 2012 [34]; c-d – "Sunyata chair", Zhang J. J, Taiwan, China, 2015 [35]; e – "Meet the wicker basket", Nils Chudy & Jasmina Grase, Germany, 2017 [36]

3. The strategy of bamboo weaving and multi-material integration into furniture design.

Bamboo furniture has a great potential in the modern furniture market, but it also requires more design expressions to adapt to the modern home life. Weaving technique is a core aspect of bamboo furniture, but it can be enhanced by combining bamboo with other materials. Different materials can exhibit their unique textures, structures, colors, and glosses, which can create different visual and tactile effects. Bamboo weaving has a high plasticity, which facilitates its integration with other materials, such as plastic (Fig. 5, c) [38], metal, cloth, and even cement etc., The combination of bamboo weaving and other new materials can express the texture and characteristics of different materials through design, and convey a richer design aesthetic.

Bamboo and concrete both share a low-key and restrained style, but they also contrast each other in texture and appearance. Bamboo weaving adds some flexibility and warmth to the rigid and cold concrete, while concrete provides a solid and stable base for the delicate and intricate bamboo weaving (Fig. 5, a) [37]. Taiwanese designers Lin Ta-Chih and Hsieh Yi-Fan designed a chair work called "Ching" (Fig. 5, b) [37], which combines green bamboo and cement, and connects two completely different materials together. In the production process, the designers drilled holes on the parts, bent the parts under heating, and then cast the hourglass-shaped mortise holes on the parts with cement, connecting the bamboo parts together with cement connectors. This work uses design to redefine the meaning and relationship between the two materials, thus expressing the craftsmanship of the original materials and giving them a pure feeling.

In recent years, some designers and researchers have applied bamboo weaving techniques to tubular steel pipes, and created various furniture pieces, such as chairs, tables, lamps and so on, aimed to create a new style that integrates the natural and modern elements. There are mainly two forms of furniture design

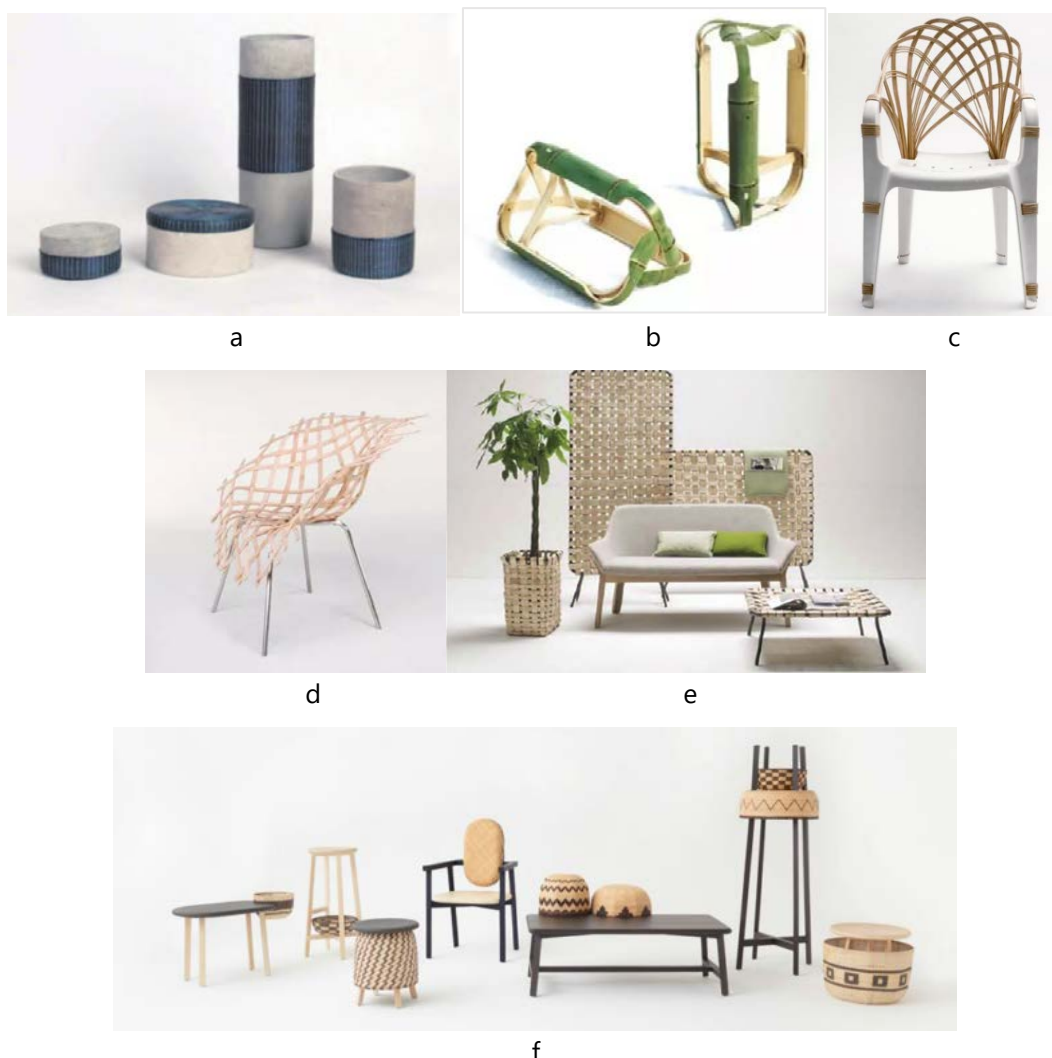
that combine bamboo weaving and metal. One is to use metal as the frame and bamboo weaving as the furniture surface material, forming a light and textured effect (Fig. 5, d) [37]. This form can use different weaving patterns and textures to express the regional and ethnic characteristics of the furniture, as well as save wood resources, in line with the concept of ecological protection and sustainable development. Another is to use bamboo weaving as the main structure of the furniture, and connect it with metal parts, forming a three-dimensional and variable effect. This form can use the elasticity, toughness and flexibility of bamboo to create various interesting shapes, and also show the mechanical beauty and craftsmanship of bamboo. For example, the "Air Chair" (Fig. 5, e) [39] designed by Pinwu Design Studio is made of several bent bamboo strips, forming a seat that fits the human posture. The structural support of the chair is made of stainless steel pipes. The shape of the whole chair is like a petal, giving a sense of lightness and agility. As the designer described his work, this chair is a special interpretation of the traditional Chinese bamboo weaving, which reveals the limit of bamboo weight and strength, and the result shows its lightness and durability. It is proved that these techniques can give the hard metal a sense of pliancy and warmth, and can also create a visual and design harmony that enhances both materials, and also a cultural transmission of traditional handicraft skills. These techniques can prove to give metallic material flexibility and warmth, creating visual and design harmony that enhances both materials, as well as a cultural transmission of traditional handicraft skills.

Moreover, bamboo weaving can be integrated with various materials in furniture design, using different weaving techniques in different positions to achieve different functions. "Tokyo Tribe" (Fig. 5, f) [40] is a series of innovative furniture designed by Nendo, a Japanese design studio, combining bamboo weaving with three kinds of materials: metal, concrete, and wood. The products use metal

pipes as the main structure of the furniture, and uses the elasticity and plasticity of bamboo weaving to wrap bamboo strips or other plant fiber materials around the metal pipes, forming different weaving modes and patterns. Concrete is used as the top or base of the furniture, and bamboo weaving technique is used to decorate on the concrete, breaking the monotony and coldness of concrete, and reflecting the contrast between tradition and modernity. The method of combining bamboo weaving and wood in this work is to cut solid wood into blocks or boards of different shapes and sizes, and then open holes of different shapes and sizes on the surface or inside, and use bamboo weaving technique to

insert bamboo strips or other plant fiber materials into the holes, forming different spaces and functions. The furniture products are round in shape, and combine the characteristics of bamboo and other materials to reflect the naturalness and affinity of the furniture, while maintaining the solidity and modernity of the furniture.

The combination of bamboo weaving and various materials is an innovative way of furniture design, which not only preserves the traditional charm of bamboo weaving craft, but also enhances the functionality and aesthetics of furniture, bringing fresh blood and vitality to furniture design.



**Fig. 5.** The strategy of bamboo weaving and multi-material integration into furniture design: a – “Furniture of bamboo with concrete”, China, 2015 [37]; b – “Ching” Bamboo chair, Lin Ta-Chih & Hsieh Yi-Fan, Taiwan, China, 2013 [37]; c – “same same but different chair”, Laura Jungmann, Germany, 2014[38]; d – “Air Chair”, Zhang L. & Wang L. L., China, 2015 [37]; e – “Zumitz” –Jean Louis Irtzoki & Ander Lizaso, Spain, 2015 [39]; f – “Tokyo Tribe”, Nendo Design, Japan, 2015 [40]



**Conclusions.** By employing case analysis and comparative research methods, combined with a substantial amount of literature, the aim is to provide references for the application of bamboo weaving in furniture design. Based on the composition and utilization forms such as lines, surfaces, and volumes, the article explores the principles, forms, methods, and scope of bamboo weaving in furniture design. Furthermore, the article validates the technical feasibility and artistic value of bamboo weaving in modern furniture design.

While exploring the application principles of utilizing bamboo weaving in modern furniture design involve considering the functional requirements of the furniture, such as load-bearing capacity and ergonomics, and incorporating bamboo weaving elements accordingly. Innovative methods can include integrating bamboo weaving with other materials, combining different weaving techniques, and utilizing modern technology to enhance the efficiency and precision of the weaving process. In this paper, we also have conducted three methods of integrating bamboo weaving into modern furniture design, and discussed their advantages and challenges.

One method is to apply bamboo weaving surface to the furniture surface material, which is based on other furniture main materials such as solid wood, board, iron art, etc. By using modern production and processing technology,

the bamboo weaving surface is attached to the main material of the furniture by gluing, pressing, nailing and other methods. Different weaving patterns and textures express the regional and national characteristics of the furniture, and also save wood resources and improve the quality of the furniture surface.

Another method is to design three-dimensional bamboo weaving furniture, which is a way of weaving bamboo strips with rectangular cross-section into three-dimensional shapes. This method not only has lively patterns and rich shapes, but also can create novel and modern living products with traditional bamboo weaving techniques. Three-dimensional bamboo weaving furniture can also combine modular and systematic design methods to show the combination of traditional culture and fashion aesthetics.

The third method is to apply bamboo weaving techniques to new material design, which means not only using bamboo as the weaving material, but also exploring more possibilities of weaving other materials such as cloth, leather, metal, etc. Weaving techniques can create different aesthetic and artistic effects with different materials, and also provide comfortable and practical experience for users. For example, some designers use latex, rubber bands, ropes and other materials to weave chairs with bright colors and soft textures.

#### Література:

1. Zhang J. Y., Zhang J. M., Jiang L. Entrepreneurship and Application Analysis of Bamboo in the Field of Product Design [C]. Art Design and Digital Technology. Proceedings of the International Conference on Art Design and Digital Technology. 2022-09-16. DOI: 10.4108/eai.16-9-2022.2324899.
2. Sharma B., Gatoo A., Bock M., Ramage M. Engineered bamboo for structural applications. *Construction and Building Materials*. 2015. 81. P. 66–73. DOI: 10.1016/i.conbuildmat.2015.01.077.
3. Zheng Y., Zhu J. The application of bamboo weaving in modern furniture. *BioResources*. 2021. 16(3). P. 5024–5035. DOI: 10.15376/biores.16.3.5024-5035.
4. Gao W. X. Study on Creative Design of Bamboo Furniture from the Perspective of Ecological Design [C]. Series: Advances in Social Science, Education and Humanities Research. *The 2nd International Conference on Culture, Education and Economic Development of Modern Society (ICCESE)*. 2018. DOI: 10.2991/iccese-18.2018.165.
5. 于娜, 张聪, 王华. (2018). 基于数量化理论的家具造型意象设计. *包装工程*. 39(22): 183–188. DOI: 10.19554/j.cnki.1001-3563.2018.22.030.
6. 陈梦瑶, 张仲凤. (2016). 竹家具的情感化设计研究. *包装工程*. 37(14): 122–125. DOI: 10.19554/j.cnki.1001-3563.2016.14.028.

7. 杨宛莹, 张福昌. (2015). 现代竹编生活器具的创新设计探究. *包装工程*. 36(24): 137–140. DOI: 10.19554/i.cnki.1001-3563.2015.24.032.
8. 薛拥军. (2017). 形式与功能——设计美学视野下的竹家具设计探析. *竹子学报*. 36(4): 55–60. DOI: 10.19560/j.cnki.issn1000-6567.2017.04.009.
9. 刘宗明, 余国伟. (2021). 基于全生命周期理念的竹家具减量化设计研究. *家具与室内装饰*. DOI: 10.16771/j.cn43-1247/ts.2021.03.001.
10. Wu S. H., Fan K. K. Sustainable development of traditional bamboo furniture in taiwan: a study on design style. *Journal of the Science of Design*. 2021. 5(2). P. 51–60. DOI: 10.11247/jds.5.2\_2\_51.
11. Wen X. D., Hong L., Mu J. Research on Bamboo Furniture Design Based on D4S (Design for Sustainability). *Sustainability*. 2023. 15(11). 8832. DOI: 10.3390/su15118832.
12. 王刚. (2021). 川渝民间竹制家具的创新设计. *包装工程*. 42(2): 286–290. DOI: 10.19554/j.cnki.1001-3563.2021.02.048.
13. 林立平, 黄圣游. (2017). 滇西南少数民族的竹家具文化. *竹子学报*. 36(1): 83–88. DOI: 10.19560/j.cnki.issn1000-6567.2017.01.017.
14. 徐俊华, 郭联欢, 何蕊, 任海青. (2019). 傣族竹编及其在现代家具设计中的应. *林产工业*. 46(2): 46–48. DOI: 10.19531/i.issn1001-5299.201902014.
15. 陈祖建, 何晓琴. (2016). 竹编饰面家具的材料设计与分析. *家具与室内装饰*. (06): 13–15. DOI: 10.16771/j.cnki.cn43-1247/ts.2016.06.003.
16. 陈祖建, 何晓琴. (2016). 竹编饰面家具设计案例研究. *家具与室内装饰*. (03): 16–19. DOI: 10.16771/j.cnki.cn43-1247/ts.2016.03.005.
17. 陈祖建, 何晓琴. (2016). 竹编饰面家具设计的实现途径. *家具与室内装饰*. (01): 63–65. DOI: 10.16771/j.cnki.cn43-1247/ts.2016.01.016.
18. 刘岸, 常霖. (2016). 重组竹家具产品轻量化设计分析与方法. *林产工业*. 43(12): 46–51. DOI: 10.19531/j.issn1001-5299.2016.12.012.
19. 罗坤明, 肖代柏, 郭青媛. (2023). 基于层次分析法的竹编家具创新设计研究. *家具与室内装饰*. 30(06): 43–49. DOI: 10.16771/j.cn43-1247/ts.2023.06.009.
20. Dong W. Y., Dai X. D., Yao J. J., Xiong Y. Preliminary Study on the Innovative Design of Original Bamboo Furniture Based on the Coordination Evolution Rules of Subsystems of TRIZ Theory [C]. *IOP Conference Series: Materials Science and Engineering. International Conference on Optoelectronic Science and Materials*. 2019-09-20. DOI: 10.1088/1757-899X/711/1/012070.
21. 徐冰. (2019). 传统竹编工艺与现代家具设计融合的应用研究. *包装工程*. 40(04): 186–191. DOI: 10.19554/j.cnki.1001-3563.2019.04.030.
22. Wu S. H., Ho M. C. A Study of the Technique Combining Traditional Bamboo Furniture and Carpentry. *International Journal of Social Science and Humanity*. 2015. 5(11). P. 985–989. DOI: 10.7763/IJSSH.2015.V5.592.
23. Wang M. R., Zhang J. J., Zhang Z. F. The Application of Bamboo Materials in Furniture Design. *International Journal of Trend in Research and Development*. 2017. 4(5). P. 139–143. URL: <http://www.ijtrd.com/papers/IJTRD10956.pdf>.
24. 赵东杰, 张帆, 宋莎莎, 李叶. (2021). 传统圆竹家具创新设计研究. *林产工业*. 58(06): 41–45+60. DOI: 10.19531/i.issn1001-5299.202106007.
25. 刘雨璐, 姜夏旺, 孙德林, 邹伟华, 王张恒. (2020). 基于重组竹的折叠家具设计. *林产工业*. 57(11): 56–59. DOI: 10.19531/i.issn1001-5299.202011012.
26. Anket Sharma, Vinod Kumar, Babar Shahzad, M. Ramakrishnan, Gagan Preet Singh Sidhu. Photosynthetic Response of Plants Under Different Abiotic Stresses: A Review. *Journal of Plant Growth Regulation*. 2019. 39. P. 509–531. DOI: 10.1007/s00344-019-10018-x.
27. Kogei – Japanese art crafts. (2015). URL: <https://www.veniceclayartists.com/kogei-japanese-art-crafts/> (Last accessed: 07.24.2023).
28. Get Inspired. From design to lifestyle, everything you need to make life beautiful. (2020). URL: <https://studio-mcgee.com> (Last accessed: 06.28.2023).
29. The Jamie Durie Collection. (2018). URL: <https://www.bakerfurniture.com/design-story/designers-and-collections/jamie-durie/> (Last accessed: 06.28.2023).
30. The straw men: Reviving a craft the world almost forgot. 2020. URL: <https://www.afr.com/life-and-luxury/design/the-straw-men-reviving-a-craft-the-world-almost-forgot-20200113-p53qya> (Last accessed: 06.28.2023).
31. Maison&Objet Exhibitor. 2019. URL: <https://k-ino.jp/en/> (Last accessed: 06.28.2023).
32. Cocoon Plan: A Furniture Made Of Bamboo. 2010. URL: <https://www.igreenspot.com/cocoon->

[plan-a-furniture-made-of-bamboo/](#) (Last accessed: 07.24.2023).

33. Research on inheritance and innovation of traditional bamboo weaving technology in China. 2022. URL: <https://www.fx361.com/page/2022/0415/10253139.shtml> (Last accessed: 07.24.2023).

34. Nendo: bamboo steel table for han. 2021. <https://www.designboom.com/design/nendo-bamboo-steel-table-for-han-gallery/> (Last accessed: 07.24.2023).

35. SOZEN-the creative spirit of Jiangnan in China. 2015. URL: [http://gs.cnr.cn/gsfz/fczx/20150508/t20150508\\_518497140.html](http://gs.cnr.cn/gsfz/fczx/20150508/t20150508_518497140.html) (Last accessed: 06.28.2023).

36. Meet the wicker by Nils Chudy and Jasmina Grase. 2017. URL: <https://www.blogdecodesign.fr/decoration/meet-wicker-par-nils-chudy-et-jasmina-grase> (Last accessed: 07.24.2023).

37. How are the soft and beautiful bamboo bending furniture made? 2013. URL: <https://zhuanlan.zhihu.com/p/67344477> (Last accessed: 07.24.2023).

38. Traditionally Upcycled Objects By Laura Jungmann. 2014. URL: <https://www.museumderdinge.org/exhibitions/transformations-concepts-re-using-things> (Last accessed: 06.28.2023).

39. Zumitz series produces creative furniture designs. 2015. URL: [https://www.sohu.com/a/60714753\\_121315](https://www.sohu.com/a/60714753_121315) (Last accessed: 06.28.2023).

40. "Tokyo Tribe" a playful furniture design. 2015. URL: [http://www.d2ziran.com/default/article-act-detail\\_id\\_1169.htm](http://www.d2ziran.com/default/article-act-detail_id_1169.htm) (Last accessed: 06.28.2023).

41. Norman Donald A. 设计心理学. 北京: 中信出版社, 2003.

### References:

1. Zhang, J. Y., Zhang J. M., Jiang, L. (2022). Entrepreneurship and Application Analysis of Bamboo in the Field of Product Design. *Art Design and Digital Technology*. proceedings of the International Conference on Art Design and Digital Technology. 2022-09-16. DOI: 10.4108/eai.16-9-2022.2324899 [in English].

2. Sharma, B., Gatoo, A., Bock, M., Ramage, M. (2015). Engineered bamboo for structural applications. *Construction and Building Materials*, 81: 66–73. DOI: 10.1016/i.conbuildmat.2015.01.077 [in English].

3. Zheng, Y., Zhu, J. (2021). The application of bamboo weaving in modern furniture. *BioResources*, 16(3): 5024–5035. DOI: 10.15376/biores.16.3.5024-5035 [in English].

4. Gao, W. X. (2018). Study on Creative Design of Bamboo Furniture from the Perspective of Ecological Design[C]. Series: Advances in Social Science, Education and Humanities Research. *The 2nd International Conference on Culture, Education and Economic Development of Modern Society (ICCESE)*. DOI: 10.2991/iccese-18.2018.165 [in English].

5. Yu, N., Zhang, C., Du, Y., Wang, H. (2018). Furniture modeling image design based on Quantitative Theory. *Packaging Engineering*, 39(22): 183–188. DOI: 10.19554/j.cnki.1001-3563.2018.22.030 [in Chinese].

6. Chen, M. Y., Zhang, Z. F. (2016). Emotional Design Research of Bamboo Furniture. *Packaging Engineering*, 37(14): 122–125. DOI: 10.19554/j.cnki.1001-3563.2016.14.028 [in Chinese].

7. Yang, W. Y., Zhang, F. C. (2015). Innovation Design of Modern Bamboo-Weaving Daily Utensil. *Packaging Engineering*, 36(24): 137–140. DOI: 10.19554/i.cnki.1001-3563.2015.24.032 [in Chinese].

8. Xue, Y. J. (2017). Form and Function – Bamboo Furniture Design from the Perspective of Design Aesthetics. *Journal of Bamboo Research*, 36(4): 55–60. DOI: 10.19560/j.cnki.issn1000-6567.2017.04.009 [in Chinese].

9. Liu, Z. M., Yu, G. W. (2021). Research on the Reduction Design of Bamboo Furniture Based on the Concept of Whole Life Cycle. *Furniture and Interior Decoration*. DOI: 10.16771/j.cn43-1247/ts.2021.03.001 [in Chinese].

10. Wu, S. H., Fan, K. K. (2021). Sustainable development of traditional bamboo furniture in taiwan: a study on design style. *Journal of the Science of Design*, 5(2): 51–60. DOI: 10.11247/jsd.5.2\_2\_51 [in English].

11. Wen, X. D., Hong, L., Mu, J. (2023). Research on Bamboo Furniture Design Based on D4S (Design for Sustainability). *Sustainability*, 15(11), 8832. DOI: 10.3390/su15118832 [in English].

12. Wang, G. (2021). Innovative Application of Sichuan & Chongqing Traditional Bamboo Furniture in Interior Design. *Packaging Engineering*, 42(2): 286–290. DOI: 10.19554/j.cnki.1001-3563.2021.02.048 [in Chinese].

13. Lin, L. P., Huang, S. Y. (2017). Bamboo Furniture Culture of Minorities in Southwest Yunnan. *Journal of Bamboo Research*, 36(1): 83–88. DOI: 10.19560/j.cnki.issn1000-6567.2017.01.017 [in Chinese].

14. Xu, J. H., Guo, L. H., He, R., Reng, H. Q. (2019). The Application of Bamboo Weaving Craft of Dai

- Nationality in Modern Furniture Design. *China Forest Products Industry*, 46(2): 46–48. DOI: 10.19531/i.issn1001-5299.201902014 [in Chinese].
15. Chen, Z. J., He, X. Q. (2016). Material design and analysis of bamboo decorative furniture. *Furniture and Interior Decoration*, (06): 13–15. DOI: 10.16771/j.cnki.cn43-1247/ts.2016.06.003 [in Chinese].
16. Chen, Z. J., He, X. Q. (2016). Case study of bamboo decorative furniture design. *Furniture and Interior Decoration*, (03): 16–19. DOI: 10.16771/j.cnki.cn43-1247/ts.2016.03.005 [in Chinese].
17. Chen, Z. J., He, X. Q. (2016). The realization of bamboo decorative furniture design. *Furniture and Interior Decoration*, (01): 63–65. DOI: 10.16771/j.cnki.cn43-1247/ts.2016.01.016 [in Chinese].
18. Liu, A., Chang, L. (2016). Design Analysis and Method of Light-weight Reconstituted Bamboo Furniture. *China Forest Products Industry*, 43(12): 46–51. DOI: 10.19531/j.issn1001-5299.2016.12.012 [in Chinese].
19. Luo, K. M., Xiao, D. B., Guo, Q. Y. (2023). Research on the Innovative Design of Bamboo Woven Furniture Based on Hierarchical Analysis. *Furniture and Interior Decoration*, 30(06): 43–49. DOI: 10.16771/j.cnki.cn43-1247/ts.2023.06.009 [in Chinese].
20. Dong, W. Y., Dai, X. D., Yao, J. J., Xiong, Y. (2019). Preliminary Study on the Innovative Design of Original Bamboo Furniture Based on the Coordination Evolution Rules of Subsystems of TRIZ Theory. *IOP Conference Series: Materials Science and Engineering. International Conference on Optoelectronic Science and Materials*. DOI: 10.1088/1757-899X/711/1/012070 [in English].
21. Xu, B. (2019). Research on the integration of traditional bamboo weaving technology and modern furniture design. *Packaging Engineering*, 40(04): 186–191. DOI: 10.19554/j.cnki.1001-3563.2019.04.030 [in Chinese].
22. Wu, S. H., Ho, M. C. (2015). A Study of the Technique Combining Traditional Bamboo Furniture and Carpentry. *International Journal of Social Science and Humanity*, 5(11): 985–989. DOI: 10.7763/IJSSH.2015.V5.592 [in English].
23. Wang, M. R., Zhang, J. J., Zhang, Z. F. (2017). The Application of Bamboo Materials in Furniture Design. *International Journal of Trend in Research and Development*. 4(5): 139–143. URL: <http://www.ijtrd.com/papers/IJTRD10956.pdf> [in English].
24. Zhao, D. J., Zhang, F., Song, S. S., Li, Y. (2021). Research on Innovative Design of Traditional Round Bamboo Furniture. *China Forest Products Industry*, 58(06): 41–45+60. DOI: 10.19531/i.issn1001-5299.202106007 [in Chinese].
25. Liu, Y. L., Jiang, X. W., Sun, D. L., Zou, W, H., Wang, Z. H. (2020). Folding Furniture Design Based on Recombinant Bamboo. *China Forest Products Industry*, 57(11): 56–59. DOI: 10.19531/i.issn1001-5299.202011012 [in Chinese].
26. Anket Sharma, Vinod Kumar, Babar Shahzad, M. Ramakrishnan, Gagan Preet Singh Sidhu (2019). Photosynthetic Response of Plants Under Different Abiotic Stresses: A Review. *Journal of Plant Growth Regulation*, 39: 509–531. DOI: 10.1007/s00344-019-10018-x [in English].
27. Kogei – Japanese Art Crafts. (2015). URL: <https://www.veniceclayartists.com/kogei-japanese-art-crafts/> (Last accessed: 07.24.2023) [in English].
28. Get Inspired. From design to lifestyle, everything you need to make life beautiful (2020). URL: <https://studio-mcgee.com> (Last accessed: 06.28.2023). [in English].
29. The Jamie Durie Collection (2018). URL: <https://www.bakerfurniture.com/design-story/designers-and-collections/jamie-durie/> (Last accessed: 06.28.2023). [in English]
30. The straw men: Reviving a craft the world almost forgot (2020). URL: <https://www.afr.com/life-and-luxury/design/the-straw-men-reviving-a-craft-the-world-almost-forgot-20200113-p53qya> (Last accessed: 06.28.2023) [in English].
31. Maison&Objet Exhibitor (2019). URL: <https://k-ino.jp/en/> (Last accessed: 06.28.2023) [in English].
32. Cocoon Plan: Furniture Made Of Bamboo (2010). URL: <https://www.igreenspot.com/cocoon-plan-a-furniture-made-of-bamboo> (Last accessed: 07.24.2023) [in English].
33. Research on inheritance and innovation of traditional bamboo weaving technology in China (2022). URL: <https://www.fx361.com/page/2022/0415/10253139.shtml> (Last accessed: 07.24.2023) [in Chinese].
34. Nendo: bamboo steel table for han (2021). <https://www.designboom.com/design/nendo-bamboo-steel-table-for-han-gallery> (Last accessed: 07.24.2023) [in English].
35. SOZEN-the creative spirit of Jiangnan in China (2015). URL: [http://gs.cnr.cn/gsfrc/fzx/20150508/t20150508\\_518497140.html](http://gs.cnr.cn/gsfrc/fzx/20150508/t20150508_518497140.html) (Last accessed: 06.28.2023) [in English].
36. Meet the wicker by Nils Chudy and Jasmina Grase (2017). URL: <https://www.blogdecodesign.fr/>

[decoration/meet-wicker-par-nils-chudy-et-jasmina-grase](#) (Last accessed: 07.24.2023) [in English].

37. How are the soft and beautiful bamboo bending furniture made? (2013). URL: <https://zhuanlan.zhihu.com/p/67344477> (Last accessed: 07.24.2023). [in Chinese].

38. Traditionally Upcycled Objects By Laura Jungmann (2014). URL: <https://www.museumderdinge.org/exhibitions/transformations-concepts-re-using-things> (Last accessed: 06.28.2023) [in English].

39. Zumitz series produces creative furniture designs (2015). URL: [https://www.sohu.com/a/60714753\\_121315](https://www.sohu.com/a/60714753_121315) (Last accessed: 06.28.2023) [in Chinese].

40. "Tokyo Tribe" a playful furniture design (2015). URL: [http://www.d2ziran.com/default/article-act\\_detail\\_id\\_1169.htm](http://www.d2ziran.com/default/article-act_detail_id_1169.htm) (Last accessed: 06.28.2023) [in Chinese].

41. Norman, Donald A. (2003). The Design of Everyday Things. Beijing: Citic Publishing House [in Chinese].

<sup>1,2</sup>Юй Ц., <sup>1</sup>ПАШКЕВИЧ К. Л.

<sup>1</sup>Київський національний університет технологій та дизайну, Київ, Україна

<sup>2</sup> Коледж дизайну та мистецтв, Шеньсїський університет науки і технологій, Сіань, Китай

## ІННОВАЦІЙНЕ ЗАСТОСУВАННЯ ТРАДИЦІЙНОГО БАМБУКОВОГО ПЛЕТІННЯ В СУЧАСНОМУ ДИЗАЙНІ МЕБЛІВ

**Метою** дослідження є вивчення підходів і стратегій інтеграції традиційних елементів плетіння з бамбука в сучасний дизайн меблів.

**Методологія** базується на огляді літератури та аналізі прикладів. Огляд літератури містить теоретичну базу та історичну основу процесу бамбукового плетіння як традиційного ремесла та культурного вираження. У роботі використано якісні та описові методи для аналізу даних і формування висновків.

**Результати.** Узагальнено дві форми візуального вираження традиційного бамбукового плетіння в дизайні меблів і запропоновано принципи застосування та інноваційні методи плетіння бамбука в сучасному дизайні меблів. Розглянуто приклади дизайну сучасних меблів, в яких як основний або додатковий елемент використовується плетіння з бамбука, що покращує функціональність, естетику та довговічність виробів.

**Наукова новизна.** Базуючись на атрибутах культури та технології бамбукового плетіння узагальнено форму вираження, принципи застосування та інноваційні методи традиційного бамбукового плетіння, застосовані до сучасного дизайну меблів.

**Практичне значення.** Наведено методи поєднання традиційного ремесла та сучасного дизайну, які можуть підвищити культурну цінність та естетичну привабливість меблевих виробів. Це також сприяє збереженню та успадкуванню бамбукового ремесла як традиційної майстерності та культурної спадщини, яка може збагатити різноманітність сучасної культури дизайну.

**Ключові слова:** бамбукове плетіння; дизайн меблів; інноваційні методи застосування; дизайн продукції, культура, мистецтво.

ІНФОРМАЦІЯ  
ПРО АВТОРІВ:

**Юй Цзівей**, аспірантка, факультет дизайну, Київський національний університет технологій та дизайну, ORCID 0000-0002-1218-0817, **e-mail:** 51076213@qq.com

**Пашкевич Калина Лівіанівна**, д-р техн. наук, професорка, завідувачка кафедри мистецтва та дизайну костюма, Київський національний університет технологій та дизайну, ORCID 0000-0001-6760-3728, Scopus 57191851112, **e-mail:** pashkevich.kl@knutd.com.ua

**Цитування за ДСТУ:** Yu Z., Pashkevych K. L. Innovative Application of Traditional Bamboo Weaving in Modern Furniture Design. *Art and design*. 2023. №3(23). С. 79–91.

**Citation APA:** Yu, Z., Pashkevych, K. L. (2023) Innovative Application of Traditional Bamboo Weaving in Modern Furniture Design. *Art and design*. 3(23). 79–91.

<https://doi.org/10.30857/2617-0272.2023.3.7>