International Journal on Advanced Science Engineering Information Technology

Vol.15 (2025) No. 3
ISSN: 2088-5334

The Influence of Artificial Intelligence on Furniture Design Creativity: A Systematic Literature Review

Teddy Siswanto [a,*], Syandra Sari [a], Hartini [b], Shabrina Teruri [a]

[a] *Information System, Trisakti University, Kyai Tapa 1, Jakarta, Indonesia*
[b] *Management, Trisakti University, Kyai Tapa 1, Jakarta, Indonesia*
Corresponding author: [*]teddysiswanto@trisakti.ac.id

***Abstract*—In the past five years, studies have identified that sustainable practices and eco-friendly materials may reduce material strength, while technology use in furniture manufacturing can impact aesthetics. Technological advances have shifted furniture design from conventional to digital, focusing on user needs and creative innovation. An initial survey revealed challenges like limited design skills among craftsmen and the need for technology adoption. Artificial Intelligence (AI) has transformed design by enabling creativity and addressing complex market demands. The purpose of this study is to explore the application of AI in the furniture industry and examine AI technologies that are suitable for current and future needs, by utilizing the Systematic Literature Review (SLR) of Scopus.com database material accessed on 11 September 2024. This study's methodology covers research questions, search strategy, data extraction, and analysis. The main research question investigates the impact of AI on creativity in furniture design. Qualitative and quantitative analyses highlight key terms like SVM, case studies, indoor and outdoor environments, input, accuracy, and experimental results. Most methods focus on developing AI models for room classification, as well as hybrid approaches. Analysis through Network Visualization, Overlay Visualization, and Occurrence and Relevance metrics reveals that AI has a significant impact on furniture design creativity by driving innovation, personalization, optimization, efficiency, and technology integration. Further research on the application of AI to furniture is recommended to enhance production quality and design creativity, based on consumer personalization, by designing a layered architecture for AI integration to foster design creativity.**

***Keywords*—Artificial intelligence; furniture; systematic literature review.**

Manuscript received 28 Nov. 2024; revised 20 Jan. 2025; accepted 9 Apr. 2025. Date of publication 30 Jun. 2025.

I. INTRODUCTION

The state-of-the-art development of furniture design creativity in the last 5 (five) years has undergone significant evolution, influenced by changes in consumer preferences, technological advances, and environmental awareness. Some of the prominent trends that have dominated the furniture industry during this period are (a). Environmentally Friendly [1], [2], the use of environmentally friendly materials, such as bamboo, recycled wood, and used metal, has become the leading choice for environmentally conscious consumers. This approach not only emphasizes simple aesthetics but also emphasizes sustainability and social responsibility. (b). Antique Touch [3], [4], characterized by antique furniture or a vintage touch, is back in demand, offering a unique character and historical value in interior design. (c). Multipurpose and Flexible Furniture [5], [6] has become increasingly popular as lifestyle changes have led to a demand for furniture that offers flexibility and multifunctionality. For example, chairs that can be converted into tables or sofas that can be adjusted in shape, allowing users to adapt the space according to changing needs. (d). Sustainability and Environmentally Friendly Materials [7], [8] encourage awareness of environmental impacts, promoting the use of sustainable materials in furniture manufacturing.

Manufacturers are turning to materials such as bamboo, reclaimed wood, and recycled metals, while also implementing production processes that reduce their carbon footprints and minimize waste. (e). Technology Integration [9], [10] is influencing furniture design through the integration of innovative features. For example, tables with wireless charging and chairs that can be adjusted via mobile apps are becoming increasingly common, creating more organized and functional spaces, as well as enhancing manufacturing processes with technology. These trends reflect the furniture industry's adaptation to the needs of modern consumers who desire aesthetics, functionality, and

environmental responsibility in the products they choose. From the aspect of using recycled materials, it can result in weaknesses in the durability of furniture. Another weakness in the use of technology is that it can diminish the aesthetic factor, which is a key desire of consumers. Based on the identified deficiencies, it is necessary to explore how technology can mitigate these weaknesses and enhance strengths.

In recent years, the influence of technology, especially artificial intelligence (AI), has changed the way designers approach furniture making. AI technology provides a range of tools and methods that can enhance creativity, efficiency, and the quality of furniture design. The purpose of this study is to understand how AI technology can transform furniture design and its potential impact, as well as to understand the implications of AI in helping the industry adapt to technological changes and remain globally competitive.

There are several aspects of AI in furniture design; the first is the Design Optimization and Customization aspect, where AI enables designers to optimize furniture based on user data and preferences. Machine learning algorithms analyze market trends to create designs that meet consumer needs, while facilitating mass customization based on individual customer input [11]. The second aspect is AI-powered Generative Design, which enables designers to quickly explore a variety of design possibilities. By inputting specific parameters, such as materials, costs, and production constraints, AI can generate a variety of design options that would never have occurred to humans [12], [13]. The third aspect is Simulation and Analysis: AI helps in the simulation and analysis of designs to ensure that the final product meets quality and safety standards. This technology enables more efficient simulation of loads and material usage, thereby reducing waste and production costs [14]. The fourth aspect is Prototyping and Manufacturing: AI accelerates and improves the prototyping process. Combined with 3D printing, AI enables rapid and consistent prototyping based on AI-suggested design changes [15]. The fifth aspect is Sustainable Design: AI also plays a vital role in supporting sustainable design.

With the ability to analyze and optimize material usage, AI can help designers create more environmentally friendly and energy-efficient products [16]. Considering the five aspects outlined in the background, a literature review is needed to identify the development of AI in the furniture sector. Meanwhile, the academic contribution of a systematic literature review related to AI integration in ERP applications is to gain information on mapping the latest research and identifying relevant AI technologies and algorithms.

II. Materials and Method

All scientific journal materials accessed were sourced from scopus.com, while the research methodology was carried out through a Systematic Literature Review with the stages of Research Question Formulation, Searching Strategy, Data Extraction, Data Mapping, and Data Analysis as shown in Figure 1 as follows:

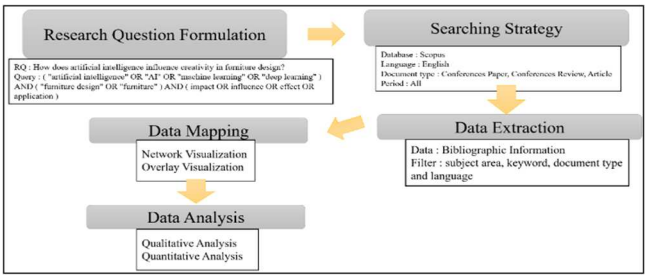

Fig. 1 Steps of Research Methodology

A. Formulation of Research Question

The reason for using this Research Question (RQ) is that, based on an initial survey, furniture craftsmen felt monotonous with the existing conventional creativity. Hence, they needed a new design model that utilizes the latest AI technology to increase innovative design creativity. RQ is created to focus the study, define its scope, and enhance the relevance of the papers searched. Based on the identified background and objectives, the main research question is: How does Artificial Intelligence affect furniture design creativity? This question aims to explore the role of AI in enhancing creativity in furniture design and fostering innovation. The search query is: ("artificial intelligence" OR "AI" OR "machine learning" OR "deep learning") AND ("furniture design" OR "furniture") AND (impact OR influence OR effect OR application).

The search query combines "artificial intelligence" with "machine learning" and "deep learning," which are integral to AI, and incorporates "furniture design" or "furniture" with terms such as "impact," "influence," or "application." The results, accessed on 11 September 2024, are shown in Figure 2.

Fig. 2 Search Query

B. Search Strategy

The search uses only the Scopus database for its credibility and reputation in academia. The SLR process includes studies on AI applied to furniture and excludes those unrelated to AI or furniture. Papers are not restricted by publication year, but are limited to English, and document types are conference papers, reviews, and articles.

C. Data Extraction

The collected data is in the form of bibliographic information: title, author, year of publication, source, insight, abstract, method, and result, to display the data in graphical form. The area is then limited to the language, as shown in Figure 3.

Fig. 3 Area Restriction Results

Based on access to the scopus.com database on September 11, 2024, the development of document data by year, by country, by type, by subject area and by citation. The analysis of research publication trends reveals significant growth and notable patterns over the past five years. As depicted in Figure 4, the number of papers meeting the specified search criteria has increased fivefold since 2019, reflecting a rapid expansion in relevant research. However, a slight decrease in 2024 is attributed to the data collection, which occurred in September, before the end of the year. This trend indicates an upward trajectory in academic output, reflecting a growing interest and activity in the field over time.

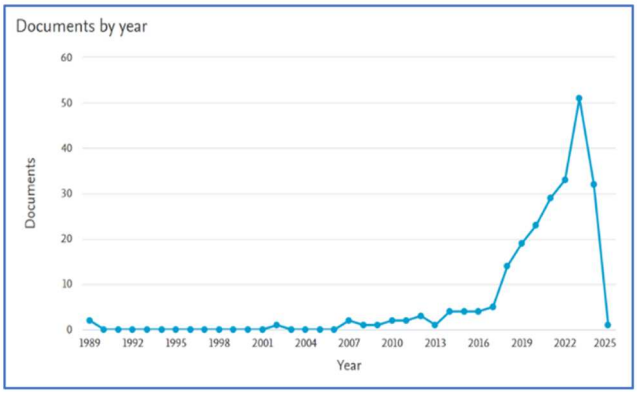

Fig. 4 Number of Papers Per Year

Figure 5 highlights the global positioning of Indonesian researchers, who rank 9th among contributors, following peers from China, the United States, India, Germany, Japan, South Korea, Poland, and the United Kingdom. This positioning underscores Indonesia's growing prominence in the research landscape, driven by increased participation and collaboration.

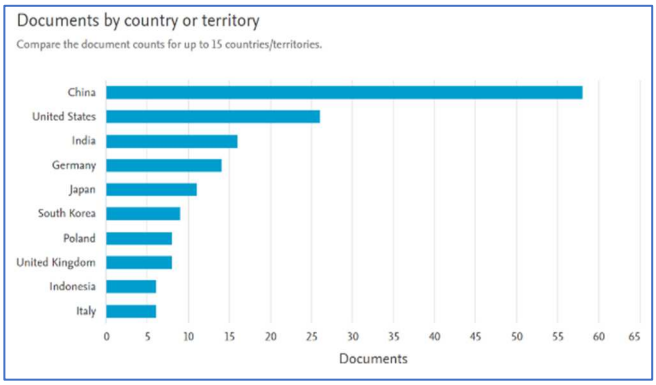

Fig. 5 Number of Papers by Country

Figure 6 shows that conference papers (42.7%), journal articles (41.5%), and conference reviews (9%) dominate the publication formats. This highlights the vital role of academic forums, particularly conferences and peer-reviewed journals, in disseminating research and promoting scholarly exchange. The prevalence of conference papers reflects a need for rapid dissemination of emerging ideas, while journal articles emphasize the value of rigorous, in-depth studies. Conference reviews highlight efforts to synthesize key trends. Overall, the distribution suggests a research culture that strikes a balance between speed and depth, utilizing structured academic platforms to advance knowledge and foster innovation.

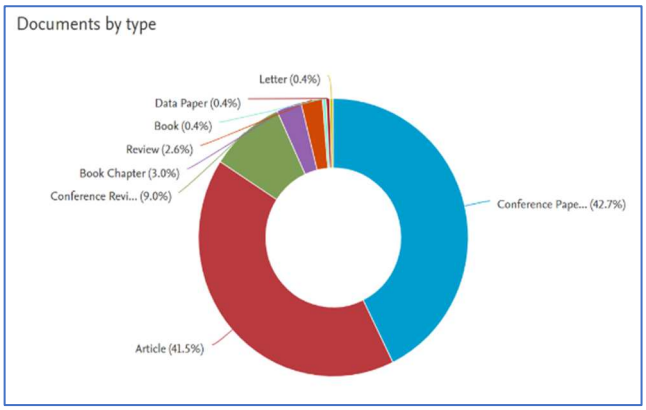

Fig. 6 Based on Document Type

Figure 7 shows computer science, engineering, and mathematics as dominant fields, highlighting a focus on technology-driven disciplines

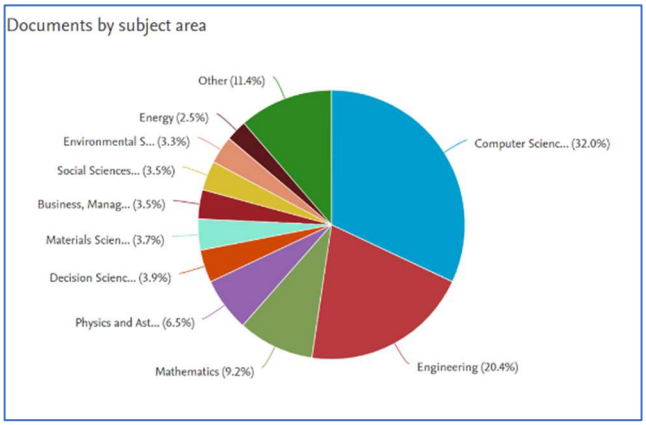

Fig. 7 Based on Subject Area

Figure 8 shows a sharp rise in citations, from 330 in 2023 to 400 in 2024, indicating growing recognition and impact. This trend underscores the studies' relevance and contribution to advancing knowledge and innovation.

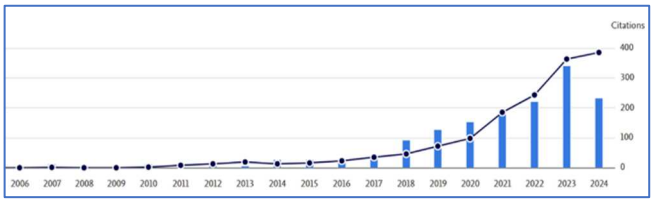

Fig. 8 Development of the Number of Citations from References

D. Data Mapping

1) Network Visualization: The collected data is mapped, and ERP aspects are integrated using Network Visualization. Out of 7601 items, 115 terms met the threshold of at least 10 outputs. Based on relevance scores, 69 terms with at least 60% relevance were selected. The Network Visualization forms 4 clusters, as shown in Figure 9. In the Network Visualization in Figure 9, it is divided into 4 (four) clusters, namely the first cluster is depicted in red: environment, object, work, area, architecture, space, person, room, indoor environment, and condition. The second cluster is depicted in blue: accuracy, deep learning, feature, experiment result, and challenge. The third cluster is shown in yellow: industry, furniture industry,

thing, internet, implementation, and cost. The fourth cluster is depicted in green: technology, artificial intelligence, development, impact, method, art, and concept.

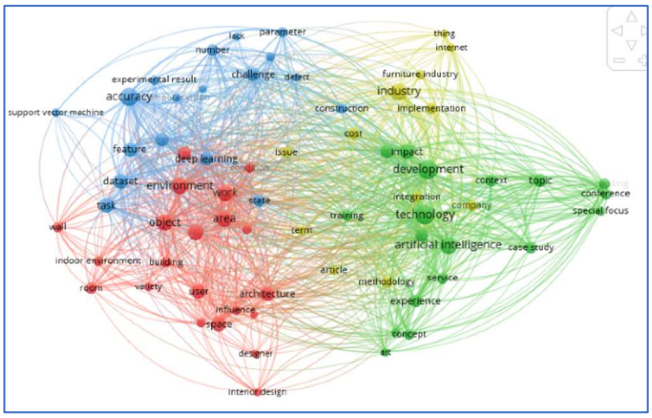

Fig. 9 Network Visualization

2) Overlay Visualization: Based on Overlay Visualization, light colors indicate the latest research, specifically covering research fields with keywords such as "thing," "internet," "furniture industry," "cost," "issue," and "implementation," as shown in Figure 10, with a focus on technology connectivity at the center.

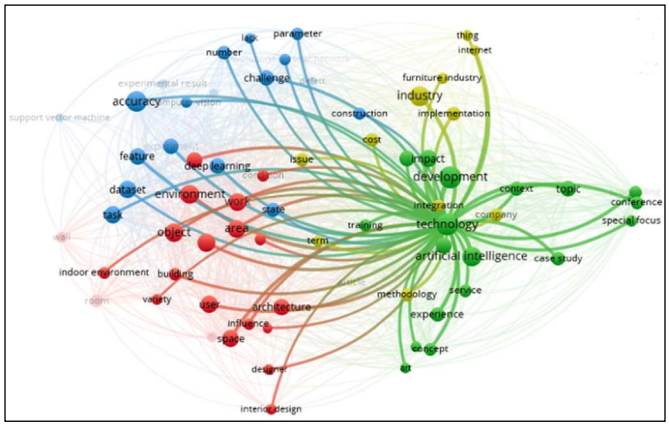

Fig. 10 Overlay Visualization

E. Data Analysis

1) Qualitative Analysis:

Obtained 43 papers that can be downloaded in full, which describe the research algorithm, namely the first is the use of the algorithm, and the second is the mathematical optimization of the algorithm, all of which are reviewed based on the research method used.

Based on the use of the algorithm, the method are: analysis and use of AI machine learning models [17], spatial parameters on personal thermal comfort in air-conditioned rooms at work using machine learning algorithms [18], exploration of research methodology on art and design using recycled or waste materials in landscape garden architecture [19], descriptive and inferential statistics and PLS SEM structural equation models [20], classifying rooms based on their use in more detail [21], survey questionnaires to collect data and analyze supporting factors and obstacles in the implementation of Industry 4.0 [22], data collection, data analysis, system analysis, system design, system implementation, and system evaluation [23], questionnaire design with machine learning techniques and the CART algorithm [24], 3D printing technology to insert fiber optic sensors into furniture parts [25], natural experiments in three corporate offices [26], sample data analysis to create a multidimensional practical teaching system on Ming and Qing dynasty furniture design [27], static Morris I technique, which helps identify accident hotspots by detecting spatial clustering and evaluating the significance of hotspots [28], machine learning with SHAP analysis to identify factors that most influence model predictions [29], Decision Support System with a dynamic system model to manage raw material inventory [30], Wood Species Identification based on Artificial Intelligence using macro images of wood pieces with different magnification levels [31], machine-learning-based method to estimate the reverberation time of a virtual room for auralization purposes [32], development of a two-dimensional plotter using a programmable logic controller (PLC) and human machine interface [33], a language-embedded Neural Radiance Fields regression approach to remove non-architectural elements, such as building interiors containing furniture [34], data collection, data preparation, and data analysis for work from home measurements [35], multiple cameras from two different angles to capture images of sheet metal drawer box defect detection [36], labeling software WARHOL objects that combine augmented reality technology with the use of virtual reality headsets [37], electrocardiogram data collection, development of an AI system utilizing deep learning algorithms and support vector machine [38], an experiment where participants were asked to build an IKEA bedside table in 1 to 5 people [39] and eye tracking and think aloud protocols to examine the cognitive processes underlying decision making, problem solving, and strategy selection in various contexts [40].

While based on the mathematical optimization of the algorithm, the method is: image processing to develop an efficient drill hole segmentation solution on furniture panels [41], detection of wood-damaging insects based on acoustic signals [42], creation of variations of various loss functions, such as Weighted SoftMax Loss Functions, Edge Penalty, and Adaptive Weighted SoftMax Loss Function, and testing model performance to determine the effect of the loss functions that have been developed [43], a hybrid approach that combines conventional methods and machine learning technology to predict purchasing behavior consumers [44]), hybrid approach with effective use of multi-sensors [45], inter frame difference filter to eliminate noise and interference [46], constructive preference elicitation, which is an interaction protocol between the system and the designer that mutually improves each other's proposals in selecting the designer's preferences [47], optimal planning that combines domain knowledge about the exhibition, spatial planning, and machine learning to build a recommendation scheme [48], for indoor scene co-segmentation using RGB D images. to separate foreground and background [49], lighting design for residential interior spaces with a data driven approach [50], entropy, and building a holistic evaluation model based on inverse neural networks and genetic algorithms [51], deep reinforcement learning to produce a system that can optimize the interior of a building by considering human activities in it [52], data collection was carried out using a CNC Jet 130 machining center, by

measuring the level of tool wear using the Vbmax parameter [53], machine learning to estimate the concentration of organic compound emissions from humans in classrooms [54], descriptive with qualitative data analysis to answer the objectives through furniture applications intelligent internet of things (IoT) based [55], interactive color design for furniture using the CycleGAN algorithm and AR Virtual Implantation Technology [56], deep learning and conventional machine learning for tool condition recognition in the milling process, with the aim of automating furniture production [57], classification of rosewood micro-images based on feature fusion and ELM [58], a customized Deep Neural Network approach to process large-scale LiDAR point data and a new paradigm for training and data validation [59].

A limitation of this study is access to only 43 of 210 research papers. Beyond AI's role in design creativity, it is also applied in marketing strategies. One example is a Machine Learning-based tagging system for call centers, designed to address client outreach challenges. Using predictive analysis, it prioritizes contacts, improving call success rates and optimizing resource allocation. This offers practical insights into integrating machine learning in customer service operations [60].

2) Quantitative Data in Occurrence and Relevance

Based on the aspects of occurrence and relevance, the 10 terms with the highest relevance are special focus (5.41), topic (3.03), support vector machine (2.66), wall (2.62), case study (2.46), room (2.22), indoor environment (2.07), input (1.44), accuracy (1.37), experimental result (1.34). Meanwhile, the terminology that often appears is development (63x), technology (62x), accuracy (52x), artificial intelligence (47x), industry (47x), object (46x), environment (44x), information (42x), work (42x), and area (42x).

III. Results and Discussion

Figure 4 shows an increase in papers on AI's impact on furniture design creativity, though 2024 shows a decline, likely due to pending publications. The top research countries are China, the U.S., and India (Figure 5). Most works are conference papers (42.7%), articles (41.5%), and reviews (9%) (Figure 6). The leading subjects are computer science (32%), engineering (20.4%), and mathematics (9.2%) (Figure 7). Citations on this theme have risen since 2010 (Figure 8).

A. Network Visualization Analysis

There are 4 (four) clusters in Figure 9 with the following analysis: The red cluster highlights three key areas: (1) architectural and spatial design, (2) human-workspace relationships, and (3) the impact of environmental conditions on indoor spaces. There is a strong link between design and environment, with research focusing on efficient, ergonomic, and eco-friendly space design.

The blue cluster highlights deep learning research focusing on accuracy optimization, feature selection, and robust experimentation. Researchers aim to overcome challenges to improve model performance. The link between accuracy and experimental results shows the emphasis on enhancing accuracy through feature-based experiments, reflecting a focus on optimizing model performance.

The yellow cluster focuses on three themes: IoT applications in the furniture industry, cost management in adopting new technologies, and the industry's shift towards automation and efficiency. The Internet of Things (IoT) drives innovation in both production and design, enhancing value and efficiency. However, cost remains a key challenge, with research emphasizing the need for sustainable and efficient implementation strategies.

The green cluster indicates that research shows artificial intelligence is a key component in the development of technology, with a strong focus on how AI helps create new technologies and drives innovation across various sectors. The impact of technology and AI development is often measured using specific methodologies, which are crucial for understanding its effects on society, industry, and the arts. The impact of technology and AI on the arts is substantial, with numerous studies examining how AI generates new concepts in art, facilitating the creation of more innovative and transformative artworks.

B. Overlay Visualization Analysis

Overlay Visualization Analysis in Figure 10 highlights the rising trend of IoT and AI adoption in the furniture industry. The terms "thing" and "internet" refer to IoT applications that enhance connectivity and efficiency in production, distribution, and product use. AI makes furniture "intelligent" by enabling connectivity for usage monitoring, automation, and integration with smart home systems. This research also emphasizes innovative products that use sensors and smart devices to enhance user experience and usability.

C. Occurrence Analysis

Occurrence Analysis reveals a strong focus on technology development, analysis accuracy, and AI implementation across industries. Factors such as environment, objects, and information highlight the growing interaction between technology and both physical and virtual environments. There is also an emphasis on applying technological innovation to enhance work efficiency through improved information management and the use of smart technology.

D. Relevance Analysis

Relevance analysis suggests that current research focuses on in-depth topics, employing accurate analysis methods and case study approaches. Technologies such as support vector machines, along with a focus on indoor environments, highlight a trend toward machine learning in space design and comfort. Additionally, issues of accuracy, relevance of input, and experimental results underscore the importance of data quality and testable outcomes in contemporary research.

E. Further Research

Based on the SLR that was made, the proposed further research on the design of layer architecture for AI integration for the development of design creativity for furniture craftsmen is shown in Fig. 11. Overview of the Generative Adversarial Networks (GANs) system layer architecture in ERP, as shown in Figure 11.

1) *Data Layer*: Provides data from the ERP to be trained by the GAN model.

2) *AI Model Layer (GAN)*: The Generator generates new designs/solutions; the Discriminator evaluates the results.
3) *Middleware Layer:* APIs and services for integration between GAN and ERP.
4) *Presentation Layer:* Displays GAN results on the ERP UI.

By designing this architecture, ERP applications can harness the power of GANs to enhance innovation, optimization, and efficiency in various areas, including product design, market prediction, and inventory management.

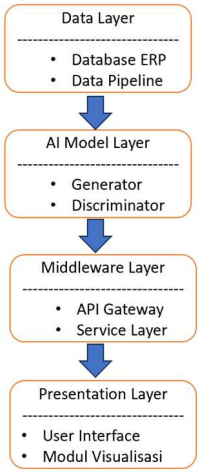

Fig. 11 Layer Architecture Diagram

IV. Conclusion

Based on the research question (RQ) created, it can be concluded that the use of AI to increase creativity in furniture design encompasses the following areas: Generative Design, Simulation and Optimization, and Ideation and Inspiration. Based on the analysis of the cluster aspect in Network Visualization, the brightness aspect of the Overlay Visualization domain, the quantitative aspect of Occurrence and Relevance, the qualitative aspect of the difference in research methods, it can be concluded that AI has a significant impact on furniture design creativity in the following ways: Innovation and New Design Exploration, Design Personalization, Optimization and Efficiency, and Smart Technology Integration.

Further research on AI in the furniture industry is crucial to enhance production quality and efficiency through innovative design. Key gaps include the lack of a comprehensive framework for AI integration in the design and production stages, as well as limited exploration of AI's role in enhancing human creativity. Addressing these gaps can advance academic insights, practical applications, and effective AI adoption in the industry. Research on integrating ChatGPT into ERP systems involves using the OpenAI API to enable real-time AI interactions. Middleware facilitates communication by translating queries, ensuring data relevance, and managing security through authentication and encryption. A chatbot interface integrated into the ERP dashboard provides interactive and personalized user experiences. API testing and optimization ensure smooth operations, enhancing efficiency and user engagement with AI-driven solutions.

Challenges in integrating AI into furniture design include a Limited Understanding of AI Technology, a Lack of Relevant Data, a Loss of Artistic Touch, and Complex Integration Requirements. These issues highlight the need for balanced, accessible, and secure AI integration in the creative process.

Acknowledgment

Thanks are due to the Ministry of Education, Culture, Research and Technology of the Republic of Indonesia and LLDIKTI3 Jakarta for support this research with the main contract number 105/E5/PG.02.00.PL/2024 dated 11 June 2024 and the derivative contract 832/LL3/AL.04/2024 dated 26 June 2024.

References

[1] M. Wan, Y. Zhang, and W. Ye, "Consumer willingness-to-pay a price premium for eco-friendly children's furniture in Shanghai and Shenzhen, China," *Forest Prod. J.*, vol. 68, no. 3, pp. 317–327, 2018, doi: 10.13073/fpj-d-17-00050.

[2] J. Shi *et al.*, "Facile fabrication of curved furniture by bamboo restructuring plasticizing for green furniture manufacturing," *Constr. Build. Mater.*, vol. 456, 2024, doi: 10.1016/j.conbuildmat.2024.139312.

[3] Z. E. Niemczewska, "How to assess the impact of commercially reused immovable cultural heritage on local, sustainable development in a holistic way?," *J. Cult. Heritage Manage. Sustain. Dev.*, 2021, doi: 10.1108/jchmsd-07-2019-0089.

[4] A. J. Muminović *et al.*, "Enhancing furniture manufacturing with 3D scanning," *Appl. Sci.*, vol. 14, no. 10, 2024, doi: 10.3390/app14104112.

[5] J. Peyrton and L. Avérous, "Structure-properties relationships of cellular materials from biobased polyurethane foams," *Mater. Sci. Eng., R, Rep.*, vol. 145, 2021, doi: 10.1016/j.mser.2021.100608.

[6] S. J. L. Chua, N. E. Myeda, and Y. X. Teo, "Facilities management: Towards flexible work arrangement (FWA) implementation during COVID-19," *J. Facil. Manage.*, vol. 21, no. 5, pp. 697–716, 2023, doi: 10.1108/jfm-09-2021-0101.

[7] K. Z. M. A. Motaleb *et al.*, "Enhancing mechanical properties of natural waste-based composites for automobile and plastic industry," *Polym. Compos.*, 2024, doi: 10.1002/pc.28690.

[8] A. Wiśniewska-Sałek, "Managing a sustainable supply chain - Statistical analysis of natural resources in the furniture industry," *Manage. Syst. Prod. Eng.*, vol. 29, 2021, doi: 10.2478/mspe-2021-0028.

[9] X. Xiong, X. Yue, M. Zhang, and G. Wang, "Intelligent manufacturing enabling technologies system construction for high-quality development of furniture," *Scientia Silvae Sinicae*, vol. 60, no. 11, pp. 177–189, 2024.

[10] X. Q. Xiong, Q. R. Ma, Y. Y. Yuan, Y. T. Pan, and Y. T. Niu, "Digital design and manufacturing of furniture enterprises oriented to intelligent manufacturing," *J. For. Eng.*, vol. 5, pp. 174-180, 2020.

[11] A. V. Calvo *et al.*, "The role of artificial intelligence in improving the omnichannel customer experience," *Int. J. Retail Distrib. Manage.*, 2023, doi: 10.1108/ijrdm-12-2022-0493.

[12] F. Jiang *et al.*, "Generative urban design: A systematic review on problem formulation, design generation, and decision-making," *Prog. Plann.*, 2023, doi: 10.1016/j.progress.2023.100795.

[13] J. Lee and S. Suh, "AI technology integrated education model for empowering fashion design ideation," *Sustainability*, vol. 16, no. 17, 2024, doi: 10.3390/su16177262.

[14] H. B, V. G, Vaibhav, K. S. Anantharaju, and R. K. Pai, "Machine learning in the era of smart automation for renewable energy materials," *e-Prime, Adv. Electr. Eng., Electron. Energy*, vol. 7, Mar. 2024, doi: 10.1016/j.prime.2024.100458.

[15] X. Sun, "Research on interior decoration display design system based on computer artificial intelligence technology," in *Proc. IEEE Int. Conf. Sensors, Electron. Comput. Eng. (ICSECE)*, 2023, pp. 1069–1073, doi: 10.1109/icsece58870.2023.10263300.

[16] J. K. Nayak and A. Chandwadkar, "Green patterns of user interface design: A guideline for sustainable design practices," *Interacción*, 2021, doi: 10.1007/978-3-030-90176-9_8.

[17] Y. K. Abdallah and A. T. Estévez, "Biomaterials research-driven design visualized by AI text-prompt-generated images," *Designs*, vol. 7, no. 2, 2023, doi: 10.3390/designs7020048.

[18] S. A. Ahmad *et al.*, "Performance of machine learning algorithms considering spatial effects assessment for indoor personal thermal comfort in air-conditioned workplace," *E3S Web Conf.*, vol. 396, 2023, doi: 10.1051/e3sconf/202339601064.

[19] H. T. Ahmed and A. M. Aly, "Recycled waste materials in landscape design for sustainable development (Al-Ahsa as a model)," *Sustainability*, vol. 15, no. 15, 2023, doi: 10.3390/su151511705.

[20] A. Bazrkar *et al.*, "The use of artificial intelligence in employee recruitment in the furniture industry of Iran according to the role of contextual factors," *Stud. Univ. "Vasile Goldis" Arad, Econ. Ser.*, vol. 34, pp. 86–109, 2024, doi: 10.2478/sues-2024-0009.

[21] G. Cai and Y. Pan, "Automated generation of room usage semantics from point cloud data," *ISPRS Int. J. Geo-Inf.*, vol. 12, no. 10, 2023, doi: 10.3390/ijgi12100427.

[22] L. Cervený *et al.*, "Industry 4.0 as an opportunity and challenge for the furniture industry - A case study," *Sustainability*, vol. 14, no. 20, 2022, doi: 10.3390/su142013325.

[23] Firdaus *et al.*, "J. Phys.: Conf. Ser.," *J. Phys., Conf. Ser.*, vol. 1339, doi: 10.1088/1742-6596/1339/1/012039.

[24] K. Gajowniczek *et al.*, "Assessment of the possibility of imitating experts' aesthetic judgments about the impact of knots on the beauty of furniture fronts made of pine wood," *Mach. Graph. Vis.*, vol. 32, no. 2, pp. 67–88, 2023, doi: 10.22630/mgv.2023.32.2.4.

[25] W. Jiang, D. Lu, and N. Zhao, "A new design approach: Applying optical fiber sensing to 3D-printed structures to make furniture intelligent," *Sustainability*, vol. 15, no. 24, 2023, doi: 10.3390/su152416715.

[26] T. Jindo *et al.*, "Impact of activity-based working and height-adjustable desks on physical activity, sedentary behavior, and space utilization among office workers: A natural experiment," *Int. J. Environ. Res. Public Health*, vol. 17, no. 1, 2019, doi: 10.3390/ijerph17010236.

[27] J. Liu, "Research on multi-dimensional practical teaching system of art design major in Ming and Qing dynasty furniture design based on sample data analysis," *J. Phys. Conf. Ser.*, vol. 1852, no. 4, Apr. 2021, doi: 10.1088/1742-6596/1852/4/042099.

[28] A. A. Khan and J. Hussain, "Utilizing GIS and machine learning for traffic accident prediction in urban environment," *Civ. Eng. J.*, 2024, doi: 10.28991/cej-2024-010-06-013.

[29] J. Lee *et al.*, "A machine learning and computer vision study of the environmental characteristics of streetscapes that affect pedestrian satisfaction," *Sustainability*, vol. 14, no. 9, 2022, doi:10.3390/su14095730.

[30] A. Manbas *et al.*, "Decision support system (DSS) analysis in raw material warehouse using system dynamics model (Case study: PT. Modera Furintraco Industri)," *IOP Conf. Ser., Mater. Sci. Eng.*, vol. 508, 2019, doi: 10.1088/1757-899X/508/1/012084.

[31] K. Nguyen-Trong, "Evaluation of wood species identification using CNN-based networks at different magnification levels," *Int. J. Adv. Comput. Sci. Appl.*, vol. 14, no. 4, 2023, doi:10.14569/ijacsa.2023.0140487.

[32] R. F. Perez, G. Götz, and V. Pulkki, "Machine-learning-based estimation of reverberation time using room geometry for room effect rendering," in *Proc. Int. Congr. Acoust., Integr. 4th EAA Euroregio*, vol. 9, p. 13, 2019.

[33] P. Khanduja, H. Bhargave, A. Babbar, P. Pundir, and A. Sharma, "Development of two-dimensional plotter using programmable logic controller and human machine interface," *J. Phys. Conf. Ser.*, vol. 1950, no. 1, Aug. 2021, doi: 10.1088/1742-6596/1950/1/012012.

[34] A. Rusnak *et al.*, "Automatic removal of non-architectural elements in 3D models of historic buildings with language embedded radiance fields," *Heritage*, vol. 7, pp. 3332-3349, 2024, doi:10.3390/heritage7060157.

[35] F. Salamone *et al.*, "Working from home in Italy during COVID-19 lockdown: A survey to assess the indoor environmental quality and productivity," *Buildings*, vol. 11, no. 12, 2021, doi:10.3390/buildings11120660.

[36] R.-K. Sheu *et al.*, "AI landing for sheet metal-based drawer box defect detection using deep learning (ALDB-DL)," *Processes*, vol. 9, no. 5, 2021, doi: 10.3390/pr9050768.

[37] M. Shreve *et al.*, WARHOL: Wearable Holographic Object Labeler. Palo Alto, CA, USA: Palo Alto Research Center, 2019.

[38] F. Shu and J. Shu, "An eight-camera fall detection system using human fall pattern recognition via machine learning by a low-cost Android box," *Sci. Rep.*, vol. 11, 2021, doi: 10.1038/s41598-021-81115-9.

[39] N. Suzuki, M. Imashiro, H. Shoda, N. Ito, M. Sakata, and M. Yamamoto, "Effects of group size on performance and member satisfaction," in *Human Interface and the Management of Information. Information in Applications and Services*, vol. 10905, pp. 191-199, 2018, doi: 10.1007/978-3-319-92046-7_17.

[40] H. Tong, Q. Wan, A. Kaszowska, K. Panetta, H. A. Taylor, and S. Agaian, "ARFurniture: Augmented reality interior decoration style colorization," *Electron. Imag.*, vol. 2019, no. 2, pp. 175-1–175-9, Jan. 2019.

[41] R. Augustauskas *et al.*, "Segmentation of drilled holes in texture wooden furniture panels using deep neural network," *Sensors*, vol. 21, no. 11, 2021, doi: 10.3390/s21113633.

[42] P. Bilski *et al.*, "Detection of wood boring insects' larvae based on the acoustic signal analysis and the artificial intelligence algorithm," *Arch. Acoust.*, vol. 42, no. 1, pp. 61-70, 2017, doi: 10.1515/aoa-2017-0007.

[43] M. Bukowski *et al.*, "Custom loss functions in XGBoost algorithm for enhanced critical error mitigation in drill-wear analysis of melamine-faced chipboard," *Sensors*, vol. 24, no. 4, 2024, doi10.3390/s24041092.

[44] C.-W. Chen, "Utilizing a hybrid approach to identify the importance of factors that influence consumer decision-making behavior in purchasing sustainable products," *Sustainability*, vol. 16, no. 11, 2024, doi: 10.3390/su16114432.

[45] L.-C. Chen *et al.*, "Edge-glued wooden panel defect detection using deep learning," *Wood Sci. Technol.*, vol. 56, no. 3, pp. 477-507, 2022, doi: 10.1007/s00226-021-01316-3.

[46] X. Dang *et al.*, "Multi-person action recognition based on millimeter-wave radar point cloud," *Appl. Sci.*, vol. 14, no. 16, 2024, doi:10.3390/app14167253.

[47] L. Erculiani *et al.*, Automating Layout Synthesis with Constructive Preference Elicitation. Trento, Italy: University of Trento, 2020, doi:10.1007/978-3-030-10997-4_16.

[48] L. P. Fan and T.-H. Chu, "Optimal planning method for large-scale historical exhibits in the Taiwan Railway Museum," *Appl. Sci.*, vol. 11, no. 5, p. 2424, 2021, doi: 10.3390/app11052424.

[49] L. Hang *et al.*, "RGB-D co-segmentation on indoor scene with geometric prior and hypothesis filtering," in *Proc. Chin. Conf. Pattern Recognit. Comput. Vis.*, 2018, doi: 10.1007/978-3-030-03398-9_15.

[50] H. Ren *et al.*, "Data-driven digital lighting design for residential indoor spaces," *ACM Trans. Graph.*, vol. 42, no. 3, 2023, doi:10.1145/3582001.

[51] J. Huang, "An evaluation model for green manufacturing quality of children's furniture based on artificial intelligence," *Int. J. Des. Nat. Ecodyn.*, vol. 15, pp. 921-930, 2020.

[52] J.-M. Sun, J. Yang, K. Mo, Y.-K. Lai, L. Guibas, and L. Gao, "Haisor: Human-aware indoor scene optimization via deep reinforcement learning," *ACM Trans. Graph.*, vol. 43, no. 2, pp. 1-17, 2024.

[53] J. Kurek *et al.*, "Advancing chipboard milling process monitoring through spectrogram-based time series analysis with convolutional neural network using pretrained networks," *Mach. Graph. Vis.*, vol. 32, no. 2, pp. 89-108, 2023, doi: 10.22630/MGV.2023.32.2.5.

[54] J. Liu, R. Zhang, and J. Xiong, "Machine learning approach for estimating the human-related VOC emissions in a university classroom," *Build. Simul.*, vol. 16, pp. 915-925, 2023, doi:10.1007/s12273-022-0976-y.

[55] D. Luo, "Intelligent furniture design for elderly care at home in the context of the Internet of Things," *Int. J. Inf. Technol. Syst. Approach,* vol. 16, no. 2, pp. 1-12, 2023, doi: 10.4018/ijitsa.320764.

[56] J. Ma and Y. Chen, "Interactive color design based on AR virtual implantation technology between users and artificial intelligence*," Int. J. Adv. Comput. Sci. Appl.*, vol. 15, no. 8, pp. 1003-1010, 2024, doi:10.14569/ijacsa.2024.0150899.

[57] A. Przybyś-Małaczek *et al.*, "Comparative study of conventional machine learning versus deep learning-based approaches for tool condition assessments in milling processes," *Appl. Sci.*, vol. 14, no. 13, 2024, doi: 10.3390/app14135913.

[58] X. Yang *et al.*, "Research on rosewood micro image classification method based on feature fusion and ELM," *J. Renew. Mater.*, vol. 10, no. 6, pp. 1275-1285, 2022, doi: 10.32604/jrm.2022.022300.

[59] Y. Zou *et al.*, "Towards urban scene semantic segmentation with deep learning from LiDAR point clouds: A case study in Baden-Württemberg, Germany," *Remote Sens.*, vol. 13, no. 16, 2021, doi:10.3390/rs13163220.

[60] H. A. M. Jebril *et al.*, "Exploring the application of ISSM and TTF theories: A literature review," *Int. J. Adv. Sci., Eng. Inf. Technol.*, vol. 14, no. 5, pp. 1589-1595, Oct. 2024, doi: 10.18517/ijaseit.14.5.10955.