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¹YIN J., ²KROTOVA T.¹Shaanxi University of Science and Technology, Xi'an City, China^{1,2}Kyiv National University of Technologies and Design, Kyiv, Ukraine**STUDY OF MODERN TRENDS IN INNOVATIVE DESIGN OF HOUSEHOLD APPLIANCES**

Purpose: to analyze the trends of modern home appliance design innovation through the exhibition scale and theme, industry hot topics, and keywords, based on the design samples of household appliances of the Appliance & electronics World Expo (AWE) exhibition from 2012 to 2021.

Methodology. Using the methods of observation, analysis, synthesis, and generalization, the information about the AWE exhibition has been analyzed, and the characteristics and elements of typical home appliance products in different periods have been studied.

Results: Analyzed the typical product design in China's home appliance industry, and studied the theme, key information and typical cases of the exhibition by tracking the AWE exhibition, integrated the current manufacturing development situation and consumer demand, output the current trend of home appliance product innovation, and provided referenceable suggestions for product innovation design of household appliances.

Scientific novelty: China National Appliance and Consumer Electronics Expo is the authoritative home appliance event in China, from which frontier information such as industry forums or conferences can be obtained. Systematic combing of previous exhibitions can express the stray key information intuitively, rise from practical significance to theoretical logic, clarify the main topics and core contents of the development of home appliances in different periods, and thus explore the innovation trend of home appliances in theoretical perspective.

Practical significance: The study of the development pulse of home appliance design innovation helps to understand the trend of home appliance development in the current social and industry context, providing manufacturing companies with the direction of innovation and transformation, as well as providing a viable reference value for the dynamic form and direction of development in the macro industry development.

Keywords: home appliances; product design; trend research; AWE; intelligence analysis.

Introduction. With the continuous development of social economy, the design of home appliances has undergone a long development and evolution of styles in different eras, marking the characteristics and preferences of different stages in the timeline of home appliance development. Looking back, home appliances were given the needs and values of the times, and looking forward, the path and trend of the follow-up of home appliances should be explored from the development process, so as to grasp the development direction of the industry and realize effective guidance and suggestions. Organized by China Household Electric Appliances Association, the China Household Electric Appliances and Consumer Electronics Expo covers large home appliances, consumer electronics, kitchen and small home appliances,

environmental and health appliances, smart home, as well as home appliance parts and accessories and their supporting services, and is a platform to promote cross-border integration between traditional home appliances and emerging fields, and to promote all-round multi-level communication between the industry chain and consumers, with timeliness, representativeness and authority. Analyzing the information behind it can grasp the industry dynamics, promote industrial innovation and upgrade, and achieve high-quality development.

Analysis of previous researches.

According to the design trends of home appliances, scholars have studied the design trends of home appliances in the context of macro industry, including the "soft power" of design, market segmentation and the

prevalence of green [1]; In the trend of Internet of Things, home appliances are designed with human-machine interface, natural interaction and friendly appearance [2]; the strategy of innovative design of home appliances for 5G technology is to enhance user experience and interaction [3]; in the context of new retail, the social interaction strategy of creating consumer-centered interactive experience and building word-of-mouth communication based on social relationship is emphasized [4]; Defining home appliances as "family", it is believed that the family trend of home appliances not only ensures the interconnection of products, but also inherits brand genes and forms differentiating features [5]; The significance and necessity of CMF design was discussed with Chinese brand air conditioners as the object of study, and it proposed the trend of "artistic" product design [6].

Reports on the AWE event are abundant in real time and are followed by authoritative media organizations in China. In the field of academic research, scholars discussed the trend-crowd-innovation continuum from "planning products" to "planning life" [7]; summarized the design trends of small home appliances in AWE 2021, from category segmentation, functional laziness, health normalization [8], and another scholar predicts three trends in home appliance development: the trend of diversified product line layout becoming the norm, the trend of continuous fission of brand attributes through celebrity marketing, and the trend that smart home appliances are no longer an empty talk [9].

Setting objectives. Prediction and analysis of design trends is a research activity with orientation to see the market dynamics while being able to find the direction of development and gain new development opportunities. AWE has always been a gathering place for new technologies, new products and new thinking, but the study of this exhibition as a research object and the systematic sorting of its information and the semantics behind it are not sufficient, therefore, this study will explore the modern

trends of innovative design of household appliances with regard to the development of AWE.

Problem statement. The following tasks have been set in the research: to systematize data on topics and trends in the design of household appliances in the period of 2012–2021; to characterize the main trends in the modern innovative design of household appliances.

The results of the research and their discussion. As one of the material carriers to measure the quality of life, home appliances play an important role in home life and become an important part of the home environment. In home interior design, the selection and design of home appliances are of great attention. The speed of innovation and iteration of home appliances surpasses the development of interior design concepts, resulting in design elements and trends such as home appliance styles, trend elements, color shapes and product sizes, which inevitably influence the home environment and reflect the aesthetic sense, lifestyle, space form and emotional support behind the family life of the user. Home appliances have gone beyond functional design to become multiple material carriers of brand, experience, emotion, aesthetics and culture, creating a multi-dimensional home environment in line with the modern technological context. Trend research is a summary of industry development, but also the starting point and direction for the industry to start again. Effective and trend prediction and research comes from the analysis of previous data and information, and combined with social and industry background for efficient, agile and accurate integration and analysis.

Consumer Electronic Show (CES), International Funkausstellung Berlin (IFA) and Appliance & Electronics World Expo (AWE) are the most authoritative home appliance exhibitions in the world. After 30 years of precipitation since 1992, AWE has become an important event platform for annual brand launches and industry summits, presenting the achievements

of the consumer electronics industry of the times. The object of this study is the exhibition situation of AWE since 2012–2021, which is sorted out from five aspects: time, theme, scale

and main content (Table 1), and its research value is important for the development trend of home appliance product design.

Table 1

AWE Summary Information (2012–2021)

Time	Theme	Scale	Main content
2012	Caring for the environment and enjoying life	About 45,000 visitors	Green, intelligent and customized products are in demand
2013	Caring for the environment and enjoying life	About 60,000 visitors	Show the results of the transformation and upgrading of home appliances
2014	Caring for the environment and enjoying life	4 exhibition halls About 82,000 visitors	Show the demand of consumer upgrade with cutting-edge technology products and intelligent life concept
2015	Intelligent	5 exhibition halls About 110,000 visitors	In the new normal, new model, new opportunities, the user experience as the core of the intelligent war
2016	Internet+ My Home	7 exhibition halls About 180,000 visitors	Intelligent, green, high-end has become the development trend of home appliances and consumer electronics
2017	Smart Life All in AWE	8 major exhibition halls About 220,000 visitors	New ecology of consumer upgrade through future perspective, disruptive technology and human care
2018	Smart Life Global Platform	10 exhibition halls About 292,000 visitors	Hardware products and the Internet of Things, big data, artificial intelligence and other technology integration results
2019	On AI Smart Living	10 exhibition halls About 338,900 visitors	AIOT accelerates the landing scene intelligent era security escort
2020	Future of Smart Competition	—	—
2021	AWE New Decade Leading the future with intelligence	6 exhibition halls About 350,000 visitors	Set system, intelligent, full-scene layout, Breaking New Ground; the beginning of the 14th Five-Year Plan, the starting point of the new decade of AWE

(Note: Due to the New Crown epidemic, the 2020 show has been postponed and the 2022–2023 show will be combined and held in Shanghai, China from April 27–30, 2023).

The continuous development of technology brings agile product iteration, home appliances have become the fastest-growing category of consumer electronics products, and their development direction and target orientation should keep pace with the times and be guided by science. A breakdown of the development and changes in the home appliance industry during the decade, there are three significant features.

First, the trend of intelligence is irreversible, when technology brings

convenience, intelligence has become a necessity, the concept of "home" has expanded from the physical entity to the network ecology, in the artificial intelligence, the intelligent design of home appliances has become the current focus of attention.

Second, the environment and health. Green appliances have been the key words in the field, "green" label has become a means to promote consumption, but its research and development is difficult, balancing

consumption and environmental issues need more confidence.

Third, user-centered. The meaning of the existence and design of home appliances is to provide life needs, and the main body of life is the "user", therefore, the user's needs and preferences is the basis, to provide users with intelligent life is the goal.

By summarizing the information from AWE exhibition hotspots, news reports and summit forums, it presents the current situation and form of the development of the home appliance industry in the past ten years, and in the current environment, it is necessary to predict and analyze the modern trends of innovative design of home appliances on the basis of development vision and keen insight, and accurately grasp the opportunities and innovative directions of design. In view of the results of the above study, 5 dimensions of development trends are proposed.

1. Focus on the needs and interests of a consumer group. Users' labels are constantly changing with the times and consumer behavior, and the new youth group has become the main force in the current consumer market [10]. Among the constantly segmented user groups, hobbies have become one of the criteria for segmentation, such as sports enthusiasts who are concerned about healthy lifestyles in the post-epidemic era, new parents in the post-90s, and food tasters who discover the beauty of food, etc. "Interest" has become an intrinsic motivation to link group activities, with the invisible power to bring users together to establish a similar standard of living and share a common state of life, which will influence the market layout of home appliances.

Take the mother and baby group as an example, this group is mostly young women, the times give them distinctive personality, fashion, beauty and self-confidence, but also give the "mother" identity under the unique tender, loving, brave and sensitive. Therefore, the segmentation market for mother and baby groups has become a hot spot, and the core strategy is to establish a product line for

mother and baby groups through humanized design, from the shape, color and tone of the accurate expression of user needs, from the product semantics, brand story and value image to convey the user group identity. BEAR is a Chinese mother and baby home appliance brand, its products air fryer (Figure 1), from the volume, the use of space for professional design, with light color, simple, lovely and soft, and from the health perspective to interpret the structure and working principle of the product, conveying a sense of happiness and exquisite product semantics, in line with the interests of the current mother and baby groups preferences.

The "interest" group circle is a strategy to position products and markets from user needs, and the core idea is still user-centered, establishing a subtle emotional bridge between users and home appliances, exploring the consumer preferences and individual needs of mainstream groups, stimulating product iteration ideas and users' desire to buy and share, reaching the deep-seated needs of "interest" group users, and creating a user-centered product explosion.

2. Energy of appearance, artistic expression of home appliances. The aesthetic value of home appliances is the key point for users to choose. In a complex home environment, home appliances exist around users as "decorations" and "artworks" based on their functions, and users want to show their personal taste and character through home decoration and home appliances selection, explore the aesthetics of art to give the home a sense of atmosphere and high quality, in line with the needs of modern life and fashion aesthetics, Coway launched the art co-branded air purifier (Figure 2), with the theme of "create air, decorate space", with nine decorative panels to switch at will, creating an exclusive art space aesthetics.

In the times of appearance first, visual expressiveness and attractiveness is the inner value of the product to convey, through the suitable modeling, color, pattern and other artistic means to attract the user's visual

attention. Giving the concept and emotion of art works to the products, forming the linkage between art and life, promoting the integration of each other, so that the products have both value and connotation, forming a very characteristic difference and personality in the homogeneous competition. The beauty of the product is the sense of value, the appearance of the product is the competitiveness, the value of the product is enough to influence the user's emotional judgment.

3. "Deep" interaction experience between technology and user. After the test of aesthetics of appearance, the use experience becomes the key to dialogue and communication between products and users. With the continuous development of artificial intelligence, technology integration and innovation for home appliances integration and innovation to overcome the technical barriers, the impact of virtual reality and augmented reality technology to provide more possibilities. Home appliance products have formed a family-centered interaction system, with interaction methods ranging from manual operation to motion sensing, voice interaction, and EEG interaction [11]. On the one hand, the aim is to provide convenient, accurate and efficient operation through technological enrichment, and on the other hand, to be able to provide users with real and immersive enjoyment through services and experiences.

The "depth" of interaction is a tangible bridge between the product and the user, linking the two sides in different dimensions to achieve two-way communication and understanding of information. "Simple" interaction focuses on the realization of functions, while "deep" interaction is more concerned with the feelings and experiences in the interaction process. Deep interaction creates a more realistic and interactive user experience, cultivates a sense of belonging and use of the product, and enjoys the sense of accomplishment brought by technology. Haier virtual trial mirror (Figure 3) based on the Internet of Things to establish the full life

cycle of clothing platform, 3D virtual fitting, intelligent recommendations to wear, the use of technology to empower users to provide an immersive trial experience.

Innovative design of home appliances has a long way to go in the research of deep interaction. Serving reality with technology without increasing its acceptable cost is an important topic and also has the prospect of development.

4. Integration of appliances into the environment. When a household appliance has a use environment, it is no longer an independent unit. It exists in different forms in each space of the home environment, and becomes a member of the family with rich functions, sizes and styles, and organically "integrates" into the home appliance ecosystem in the home space. Its integration can be considered in three ways.

First, with the development of artificial intelligence technology and the Internet of Things, smart home products have gradually spread from single products to systems, such as, the subsystems in Haier's smart home system, whole house food, whole house wash, whole house water, whole house air and whole house intelligence, realizing the non-integrated integration of home appliances in function.

Secondly, in the home environment, considering the space utilization and scene coordination, the design of home appliances is matched and integrated with the interior space layout at the beginning, effectively and fully utilizing the space, and achieving reasonable adaptability in terms of style, size and other aspects. For example, Ronshen WILL3.0 series refrigerator (Figure 4) with "no boundary" ultimate aesthetics let the refrigerator "disappear" in the overall kitchen space [12].

Finally, in the concept of home appliance product design, product design translates corporate brand, regional culture, traditional culture and other elements through design, and then returns to life with home appliances as a carrier, and continues to innovate in the process of inheritance and development,

injecting fresh power into the iteration of home appliance design.



Fig. 1. Air Fryer, company BEAR. China [13]



Fig. 4. Ronshen WILL3.0 built-in refrigerator. Company Ronshen, China [16]



Fig. 2. Air Purifier. Company Coway, China [14]



Fig. 3. Virtual Trial Mirror. Company Haier, China [15]

As a result, break through the boundaries in the innovation of home appliances, reasonable transformation, precise links, to achieve the scene integration, functional integration, cultural integration of borderless compatibility in different dimensions, integration mode.

5. Sustainable. In the context of the community of human destiny, home appliances have not deviated from the concept of green and healthy design. However, "sustainable" can not only be used as a green label to label products, in the era of rapid technological development, it is necessary to think calmly about green solutions for home appliances, and not to abandon natural systems at the cost of high-speed development.

At the level of environmentally sustainable design, the design of home appliances should consider the design and use of products from the whole life cycle system, combining the concepts of green design, modular design, durability design and recycling design. Intervene in the product design concept from the source, control the consumption and utilization of resources from the process, and consider the renewal of the life cycle from the result, and intervene in the whole life process of the product. In 2022, China National Grid launched the "Embrace Green Intelligence, enjoy a Better Life" campaign, in which it proposed the "Copper Good Logo to help replace old appliances with new ones" to improve the recycling value of copper materials.

At the level of social sustainability, focus on environmental and energy issues from the perspective of service design and social innovation, design and create a new way of life, consider new expressions and forms of existence for home appliances, and maintain the sustainability and balance of the earth's resources. At the same time, establishing and changing users' consumption psychology and cultivating a green and friendly consumption concept can form a sustainable consumption concept, which complements the design of

sustainable home appliances and builds a common ecological civilization.

Conclusions. Based on the analysis of the exhibition Appliance & electronics World Expo, as well as consumer preferences, we highlight the five main themes of home appliance trend design: Focus on the needs and interests of a consumer group, artistic expression of the appearance of home appliances, "deep" interaction experience between technology and user, integration of appliances into the environment, Sustainable. Explore the emotional bridge between brands and consumers from the "interest" group circle, and build an interest circle in line with the minds of young consumers, so as to inspire the new generation of consumers to buy and share; Energy of appearance, artistic expression of home appliances, symbolic visual definition, reflecting the connotation and value dimension of the brand through the visual expressiveness and attractiveness of the product, forming product differentiation and personalized development; "Deep" interactive experience, through the scene innovation function reconstruction, from product intelligence, functional integration, experience scenario to create a value experience beyond user expectations; Integration of appliances into the environment, activating value innovation through functional integration, scene integration and cultural integration innovation, fusing technology and culture to capture the power of the user's mind. Sustainable, low-carbon environmental protection in the context of the whole life cycle of the product from the continuous deepening of sustainable design awareness, in order to obtain super-sensory performance and value, that is, the value and content of the home appliance product design accumulation in the home environment.

Література:

1. 刘世平,黄运勇.宏观行业背景下的家电设计趋势分析.工业设计. 2016. No. 10. P. 123-125.
2. 冯甘泉.物联网趋势下的智能家电设计研究.技术与市场. 2020. No. 27 (11). P. 36-37.

3. Lu H.L., Cao X., Hsu Y. Product Innovation and Design Strategies for 5G Technology in China's Home Appliance Companies. *Sustainability*. 2022. No. 14 (22).
4. 刘越,张凌浩.新零售背景下家电品牌社会化互动设计.包装工程. 2020. No. 41 (08). P. 269-274.

5. 王征,郑刚强,王朝伟,刘览宇.基于“家族化”特征的智能家电产品设计策略. *包装工程*. 2023. No. 44 (02). P. 207–216.

6. Fei W. Y., Hee S. S. A Study on CMF Characteristics of Chinese Brand Air Conditioning Design. *Journal of Basic Design & Art*. 2019. No. 20(06). P. 323–336.

7. 张铭,段凯风,高紫薇.从“规划产品”到“规划生活”——AWE产品创新策略解析. *设计*. 2019. No. 32 (08). P. 150–155.

8. 杨征.聚焦AWE看小家电2021大趋势. *家用电器*. 2021. No. 04. P. 47.

9. 张丽.从AWE看家电发展趋势. *家用电器*. 2017. No. 04. P. 24–25.

10. 克劳锐.2022新青年消费图鉴.北京:克劳锐指数研究院, 2022.

11. 爱魔镜科技有限公司.2022全球小家电趋势洞察白皮书.北京:魔镜市场情报, 2022.

12. 新浪家居家电事业部.2022-2023家电设计趋势报告.新浪家居, 2023.

13. BEAR Air Fryer. URL: <https://www.bears.com.cn/products/kitcheninfo.html?id=228>.

14. Coway Air Purifier. URL: <http://www.coway-china.com/aircare/>

15. Haier Virtual Trial Mirror. URL: <https://cloud.tencent.com/developer/news/448187>.

16. Ronshen WILL3.0 built-in refrigerator. URL: <http://www.ronshen.com.cn/ecology.html>.

References:

1. Liu, S. P., Huang, Y. Y. (2016). Analysis of home appliance design trends in the context of macro industry. *Industrial Design*, 10, 123–125 [in Chinese].

2. Feng, G. Q. (2020). Research on the design of smart home appliances under the trend of Internet of Things. *Technology and Market*, 27(11), 36–37 [in Chinese].

3. Lu, H. L., Cao, X., Hsu, Y. (2022). Product Innovation and Design Strategies for 5G

Technology in China's Home Appliance Companies. *Sustainability*, 14 (22).

4. Liu, Y., Zhang, L. H. (2020). Social Interaction Design of Appliance Brand under New Retail Background. *Packaging Engineering*, 41(08), 269–274 [in Chinese].

5. Wang, Z., Zheng, G. Q., Wang, Z. W., Liu, L. Y. (2023). Design Strategies of Intelligent Household Appliances Based on "Family" Characteristics. *Packaging Engineering*, 44 (02), 207–216 [in Chinese].

6. Fei, W. Y., Hee, S. S. (2019). A Study on CMF Characteristics of Chinese Brand Air Conditioning Design. *Journal of Basic Design & Art*, 20 (06), 323–336.

7. Zhang, M., Duan, K. F., Gao, Z. W. (2019). From "planning products" to "planning life" – analysis of AWE product innovation strategy. *Design*, 32 (08), 150–155 [in Chinese].

8. Yang, Z. (2021). Focus on AWE to see small appliances 2021 trends. *Household appliances*, 04, 47 [in Chinese].

9. Zhang, L. (2017). The development trend of home appliances from AWE. *Household appliances*, 04, 24–25 [in Chinese].

10. Beijing: TopKlout Index Research Institute. (2022). 2022 New Youth Consumption Guide [in Chinese].

11. Beijing: Magic Mirror Market Intelligence. (2022). 2022 Global Small Appliances Trend Insight White Paper [in Chinese].

12. Sina Home Appliance Division (2023). 2022–2023 Appliance Design Trends Report. Sina Home [in Chinese].

13. BEAR Air Fryer. URL: <https://www.bears.com.cn/products/kitcheninfo.html?id=228>.

14. Coway Air Purifier. URL: <http://www.coway-china.com/aircare/>

15. Haier Virtual Trial Mirror. URL: <https://cloud.tencent.com/developer/news/448187>.

16. Ronshen WILL3.0 built-in refrigerator. URL: <http://www.ronshen.com.cn/ecology.html>.

ДОСЛІДЖЕННЯ СУЧАСНИХ ТЕНДЕНЦІЙ ІННОВАЦІЙНОГО ДИЗАЙНУ ПОБУТОВОЇ ТЕХНІКИ

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Мета: проаналізувати тенденції сучасного інноваційного дизайну побутової техніки на основі зразків дизайну побутової техніки виставки Appliance & electronics World Expo (AWE, Китай) з 2012 по 2021 роки.

Методологія. За допомогою методів спостереження, аналізу, синтезу та узагальнення проаналізовано інформацію про виставку AWE, досліджено характеристики та елементи типових виробів побутової техніки в різні періоди.

Результати: Проаналізовано дизайн побутової техніки в китайській промисловості, вивчено тенденції, ключову інформацію та тематичні групи товарів шляхом відстеження виставки AWE, інтегровано поточну ситуацію розвитку виробництва та споживчий попит, виведено поточні тенденції інновацій у виробництві побутової техніки та наведено характеристики щодо інноваційного дизайну побутової техніки.

Наукова новизна: Китайська національна виставка побутової техніки та побутової електроніки є авторитетною подією у сфері побутової техніки в Китаї, завдяки якій можна отримати інформацію про передові технології, інші галузеві форуми або конференції. Систематичне вивчення тенденцій попередніх виставок дозволяє систематизувати розсіяну ключову інформацію, провести паралелі від практичної значущості до теоретичної логіки, прояснити основні теми та особливості розвитку побутової техніки в різні періоди, і, таким чином, дослідити інноваційні тенденції побутової техніки.

Практична значущість. Вивчення змін у розвитку інновацій побутової техніки допомагає зрозуміти тенденції в дизайні побутової техніки в сучасному соціальному та галузевому контексті, а також позначені компаніями-виробниками напрями інновацій та трансформацій, які дозволяють забезпечити життєздатне еталонне значення для динамічних форм розвитку в макрогалузевому функціонуванні.

Ключові слова: побутова техніка; дизайн продукту; дослідження тенденцій; AWE; системний аналіз.

ІНФОРМАЦІЯ
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