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Recent trends in packaging design based on Industrial Design registrations in Indonesia

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Abstract

Indonesia is experiencing a significant transformation in its industrial sector, with packaging emerging as a crucial element of industrial growth. This study investigates recent trends in packaging based on industrial design applications in Indonesia from 2001 to 2023. The methodology involves analyzing data from specific databases of industrial design applications, focusing on the number of applications, their origin, and their classification according to the Locarno system. The analysis includes quantitative data on the frequency and distribution of design applications and qualitative insights from case studies. The results reveal a robust domestic industry with many applications from local entities such as research institutions and companies. The dominant categories include flexible packaging (bags, sachets, tubes) and rigid packaging (bottles, large containers), catering to various sectors like food, cosmetics, pharmaceuticals, and chemicals. International interest is also notable, with significant contributions from global corporations, highlighting Indonesia's strategic importance in the global packaging market. From 2001 to 2023, the number of domestic design applications related to packaging in Indonesia increased from 197 to 780, while foreign applications grew from 37 to 221. Although domestic filings remained higher overall, the foreign share peaked at 40.2% in 2020, reflecting a growing international interest in Indonesia's packaging design sector.

Key words: *packaging, packaging design, industrial design, locarno, recent trends*

1. Introduction

Indonesia, the world's fourth most populous country, is undergoing a significant industrial transformation. Packaging, a key driver of this transformation, not only reflects the product's functionality and appeal but also embodies the nation's cultural and environmental ethos (Shukla et al., 2022). The integration of industrial design in packaging is not just a trend but a crucial factor influencing consumer preferences, market dynamics, and sustainable practices in Indonesia. In recent years, the Indonesian packaging industry has embraced innovative design approaches to meet the evolving demands of both local and global markets (Purwanto et al., 2020). Technological advancements, changes in consumer behavior, and a growing awareness of environmental sustainability primarily drive this transformation. Applying industrial design principles in packaging has resulted in creating aesthetically pleasing, functionally superior, and eco-friendly packaging solutions (Silva & Pålsson, 2022).

According to the report, industrial design filings decreased by 2.1% in 2022, totaling approximately 1.5 million designs. Offices in Asia accounted for 70.3% of this activity, highlighting a strong regional concentration of design innovation (WIPO, 2023). Meanwhile, Indonesia's rising Global Innovation Index (GII) rank reflects a growing focus on industrial design, with local companies increasingly registering unique designs to enhance product differentiation and appeal. This trend emphasizes Indonesia's commitment to innovation, where supportive IP policies foster growth in creative packaging solutions that align with global market demands (WIPO, 2024). Registering industrial design applications related to packaging is essential: a) provides legal protection and grants the design owner exclusive rights to use and exploit the design. b) a registered design helps establish and maintain a strong brand identity (Manavis et al., 2023). Packaging often serves as the first point of interaction between a product and its consumers. c) design registration can add considerable economic value to a product. d)

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registration encourages further innovation and creativity within the industry. e) registered designs provide a basis for legal action against infringers (Gershman et al., 2020). Research has described the development trend of graphical user interfaces through industrial design applications in Indonesia (Prihastomo & Winanti, 2024). Another study highlights the future development trends of Taiwan's cultural and creative products through the lens of industrial design (Hsieh et al., 2024). Nevertheless, research has yet to focus on the latest packaging trends based on industrial design applications in Indonesia.

This research seeks to fill that gap by investigating the following research question: How have recent trends in industrial design registrations influenced the development of packaging in Indonesia, and what are the implications for innovation? It explores the recent packaging trends based on industrial design applications in Indonesia. By examining the latest innovations and practices, we seek to understand how industrial design shapes the packaging industry, enhances product value, and contributes to sustainable development. It also delves into Indonesian designers and manufacturers' challenges and opportunities in this rapidly evolving landscape.

This study contributes to the literature by providing an analysis of packaging design evolution in Indonesia based on actual industrial design filings, offering both quantitative and qualitative insights. It also offers valuable insights into the future of packaging in Indonesia through a brief analysis of case studies and market trends. The findings underscore the pivotal role of industrial design in creating competitive advantages for businesses, fostering consumer engagement, and addressing environmental concerns. It advocates for a holistic and forward-thinking approach to packaging design, which is crucial for the future of Indonesia's industrial sector.

2. Methods

This study uses descriptive research methods to provide an overview of the current situation without manipulating variables or conditions. The focus is on describing today's characteristics, functions, and phenomena (Yusup & Jasun, 2024). The stages involve five stages: defining the data source, specifying the keyword, including inclusion and exclusion criteria, data extraction, and analysis and discussion. Figure 1 illustrates the research stages that the author carried out as follows:

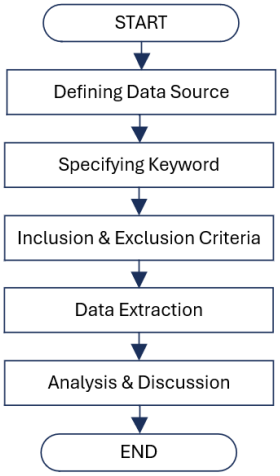


Figure 1. Research methodology

Defining data sources. The author uses the following data sources: (1) WIPO Global Design Database (https://www3.wipo.int/designdb/en/); (2) Indonesian Intellectual Property Database (https://pdki-indonesia.dgip.go.id/); and (3) Compilation of Annual Reports of the Directorate General of Intellectual Property (https://dgip.go.id/unduhan/laporan-tahunan).

Specifying keyword. The keywords used by the author to search for Indonesian industrial design application data regarding packaging are as follows: *(Title: "*kemasan*" OR "*botol*" OR "*termos*" OR "*drum*" OR "*kotak*" OR "*wadah*" OR "*kaleng*" OR "*hampers*" OR "*keranjang*" OR "*tas*" OR "*sachet*" OR "*tabung*" OR "*kapsul*") and (Country="ID")*.

Inclusion and exclusion criteria. The following are inclusion and exclusion criteria used in the study as follows: (1) The study begins with the year 2001 because industrial design protection in Indonesia was formally established with the enactment of Law No. 31 of 2000 on Industrial Design, which came into effect in 2001. The endpoint of 2023 was selected because applications filed in 2024 are still undergoing administrative processes, including formality examination, publication, and substantive examination, and therefore are not yet fully available for analysis. (2) All industrial design applications submitted to the Directorate General of Intellectual Property (DGIP) are titled in Bahasa Indonesia. Consequently, the keywords used in this study were constructed in Bahasa Indonesia to ensure accurate and comprehensive identification of relevant packaging design applications. (3) The Locarno Classification Class 09 generally encompasses industrial designs related to packaging. Therefore, this class served as the primary reference for identifying

and filtering relevant design applications for the study.

Data extraction. The author conducted data extraction from a pre-selected search database. The extracted data encompasses several essential details: the application number uniquely identifies each industrial design application, the filing date indicates when the application was submitted, the applicant's name reveals the individual or organization behind the application, the origin denotes the geographical source of the application, the title provides a brief description or name of the design, the Locarno classification categorizes the design according to the international system for organizing industrial designs.

Analysis and discussion. The author thoroughly scrutinized the data obtained from the search process. It involved meticulously examining the extracted information to identify patterns, trends, and insights relevant to the study. The analysis focused on various aspects, such as the frequency of certain types of designs, the distribution of filing dates over time, the diversity of applicants, and the prevalence of different Locarno classifications. After completing the analysis, the author provided a detailed discussion of the findings, interpreting the results in the context of the research objectives. This discussion highlighted key observations, drew meaningful conclusions, and offered insights into the implications of the analyzed data.

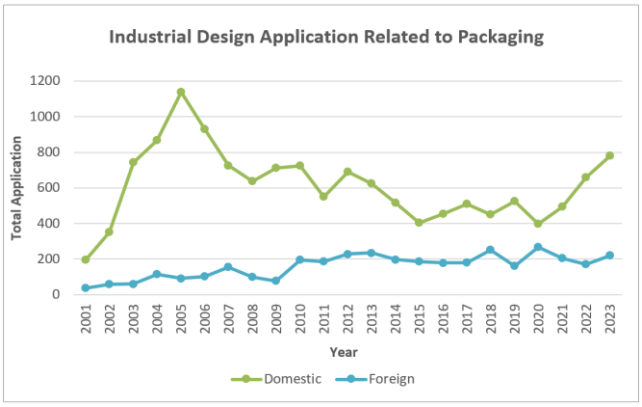


Figure 2. Industrial design applications related to packaging in Indonesia (Source: IIPD and WIPO GDB)

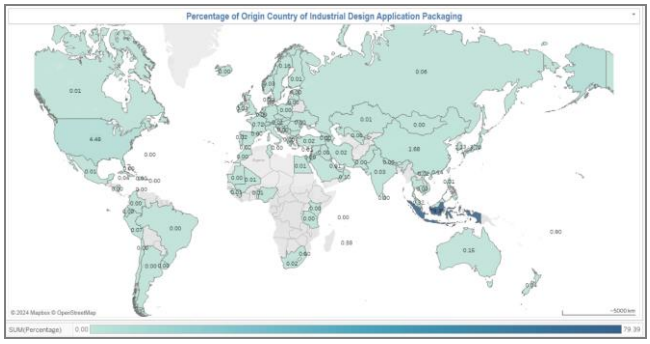


Figure 3. Percentage of origin country of industrial design application packaging 2001-2023 (Source: IIPD and WIPO GDB)

3. Result and discussion

Packaging application per year

The Figure 2 is the industrial design application submitted in Indonesia with a keyword related to packaging. It illustrates the data on industrial design applications related to packaging in Indonesia, revealing notable trends from 2001 to 2023. Domestic applications have generally shown an upward trend, with significant peaks and fluctuations. For instance, domestic applications surged from 197 in 2001 to 1,140 in 2005, reflecting the country's growing awareness and emphasis on industrial design. However, the numbers have fluctuated since then, with noticeable declines in specific years, such as 2014 and 2015, before stabilizing and showing a steady increase again in recent years, reaching 780 in 2023. This upward trajectory suggests domestic entities' sustained interest and investment in packaging design, likely driven by the increasing importance of packaging in product differentiation and consumer appeal (Prayogi et al., 2022).

Foreign applications, while fewer in number compared to domestic applications, also display significant trends. The number of foreign applications increased from 37 in 2001 to 268 in 2020, indicating a growing interest from international players in the Indonesian market. This trend underscores the global nature of the packaging industry and the need for companies to protect their designs across different markets. The data suggests that Indonesia is becoming an attractive destination for foreign businesses looking to register their packaging designs, possibly due to its expanding consumer market and the strategic importance of having a local presence. The consistent presence of foreign applications throughout the years also highlights the global nature of the packaging industry and the need for companies to protect their designs across different markets (Dokter et al., 2021). The dynamic nature of industrial design activities in Indonesia, influenced by economic conditions, regulatory changes, and market demands, is underscored by the peaks and troughs in domestic and foreign applications.

Table 1. Locarno Classification regarding packaging applications

Rank	Locarno	Count	Rank	Locarno	Count
1	09-03	4,987	26	19-06	49
2	09-01	3,607	27	23-02	41
3	09-05	2,805	28	07-06	40
4	03-01	711	29	09-99	39
5	07-07	656	30	24-02	37
6	19-08	575	31	12-11	37
7	09-07	500	32	10-05	36
8	07-01	301	33	07-99	32
9	09-02	240	34	14-03	32
10	07-04	201	35	21-01	31
11	09-04	190	36	20-02	31
12	12-16	185	37	26-05	31
13	19-02	115	38	25-02	30
14	28-02	111	39	14-01	29
15	07-02	98	40	24-01	29
16	06-04	97	41	08-08	29
17	11-02	86	42	01-99	28
18	05-06	86	43	09-09	28
19	13-03	78	44	01-01	25
20	19-01	74	45	31-00	25
21	23-01	57	46	14-02	24
22	28-03	57	47	08-07	24
23	27-06	53	48	02-04	23
24	32-00	51	49	07-05	22
25	13-02	49	50	Other	1014

(Source: IIPD and WIPO GDB)

The origin country of applicant

Figure 3 illustrates the origin country of the industrial design application submitted in Indonesia with a keyword related to packaging. It represents the data on the origin countries of industrial design applications for packaging in Indonesia from 2001 to 2023. It reveals significant insights into international participation and domestic dominance in this field. Indonesia leads overwhelmingly, with 79.39% of the applications originating domestically. This solid domestic presence indicates a robust local industry that actively develops and protects its packaging designs. It reflects the importance of industrial design within the country, driven by a need for innovation and differentiation in a competitive market (Bu & Li, 2020).

The remaining 20.61% of the applications are a testament to the international interest in the Indonesian market. The United States (4.48%) and Japan (3.70%) are the most significant contributors, followed by the Netherlands (2.18%) and China (1.68%). This distribution underscores the strategic importance these major global economies place on protecting their packaging designs in Indonesia.

Clearly, these countries view Indonesia not just as a manufacturing hub, but also as a crucial market for their products. The presence of other countries like the Republic of Korea, Switzerland, the United Kingdom, and Germany, each contributing over 0.7%, further amplifies the diverse international interest. The long tail of smaller contributions from countries like Austria, Bahrain, and Turkey reflects a broad but less concentrated international engagement. In summary, the data underscores Indonesia's pivotal role in the packaging industry in Southeast Asia and the global interest in participating in this burgeoning market (Haspazah et al., 2023).

Locarno Classification

The Table 1 exemplifies the Locarno classification of the industrial design application submitted in Indonesia with a keyword related to packaging. It illustrates a dynamic and diverse landscape of industrial design applications in Indonesia. Significant emphasis is placed on enhancing the functionality and aesthetic appeal of packaging across multiple industries. This trend underscores the importance of packaging as a critical element in product strategy and consumer experience (Spence & Velasco, 2018).

Dominant Packaging Categories (Locarno 09-03, 09-01, 09-05). Locarno 09-03 (Bags, Sachets, Tubes, Capsules): with 4,987 applications, this subclass is the most prevalent, indicating a significant focus on flexible packaging solutions. The versatility and wide usage of bags, sachets, and tubes in various industries such as food, cosmetics, pharmaceuticals, and consumer goods contribute to this. Locarno 09-01 (Bottles, Flasks, Pots). The second most common category, with 3,607 applications, highlights the importance of rigid packaging, especially in sectors like beverages, personal care, and chemicals. Bottles and similar containers are crucial for safe and convenient storage and transport of liquids and semi-liquids. And Locarno 09-05 (Barrels and Large Containers). With 2,805 applications, this subclass indicates substantial activity in bulk storage and transport packaging, which is essential for industries dealing with large quantities of goods, such as agriculture, chemicals, and food processing.

Other Noteworthy Categories. Locarno 03-01 (Pharmaceutical and Cosmetic Products): 711 applications in this subclass suggest a significant overlap between packaging and the design of

containers specifically for pharmaceuticals and cosmetics, emphasizing the importance of secure and aesthetically pleasing packaging in these industries. Locarno 07-07 (Closures and Caps): With 656 applications, this subclass underscores the innovation in closure mechanisms, which are critical for ensuring product safety and usability. This category includes caps, lids, and other sealing devices.

Emerging and Specialized Categories. Locarno 19-08 (Garment Accessories): Including 575 applications under this category, which might seem unrelated to the packaging at first glance, suggests the innovative use of packaging designs for garment-related items in terms of presentation and protection. Locarno 09-07 (Handles, Spouts, and Accessories): This subclass, with 500 applications, indicates a focus on enhancing the functionality and convenience of packaging through additional features like handles and spouts. Locarno 09-02 (Storage and Transport Containers): With 240 applications, this category is vital for products requiring sturdy packaging solutions for transportation and storage.

Lesser-known and Niche Categories (Locarno 09-04 and 09-09). Locarno 09-04 (Cans, Jars, and Similar Containers): With 190 applications, these are critical for products needing durable, often resealable, packaging solutions. Locarno 09-09 (Specific Packaging Elements): Though lower in count (28 applications), this category highlights the niche innovations within packaging components like labels and strips.

The top 10 applicant

The Table 2 provides an overview of the Top 10 industrial design applicants submitted in Indonesia with a keyword related to packaging. Table 2 reveals the robust participation of both domestic and foreign entities in the Indonesian packaging design landscape. Domestic companies, research institutions, and individual designers actively contribute to innovative packaging solutions, reflecting a dynamic and competitive local industry (DJKI, 2023). Foreign applicants, including major multinational corporations, recognize the strategic importance of protecting their packaging designs in Indonesia, a growing market with significant consumer demand. This blend of local innovation and international presence underscores the vital role of packaging design in product strategy, market differentiation, and intellectual property protection in Indonesia (Elkhattat & Medhat, 2022).

Tabel 2. Top 10 industrial design applicants submitted in Indonesia

Rank	Domestic Applicant	Count	Foreign Applicant	Count
1	LPPM Universitas Andalas	310	Dart Industries Inc.	284
2	PT. Cahaya Perdana Plastics	211	Unilever IP Holdings B.V.	232
3	Mak Herman	158	Hisamitsu Pharmaceutical Co., Inc.	101
4	PT. Trisinar Indopratama	119	Zhang Zhao	100
5	PT. Forisa Nusapersada	111	Blissful Centany International Limited	67
6	PT. Vitapharm	95	CJ Cheiljedang Corp.	60
7	PT. Garudafood Putra Putri Jaya	94	Reckitt Benckiser (Brands) Limited	46
8	PT. Petrokimia Gresik	70	Inner Mongolia Yili Industrial Group Co., Ltd.	44
9	PT. Paragon Technology and Innovation	68	Suntory Holdings Limited	43
10	PT. Suryapasifik Sejahtera	66	Honda Motor Co., Ltd.	39

(Source: IIPD and WIPO GDB)

Domestic Applicants

(1) LPPM Universitas Andalas (310 applications): Leading the list is LPPM Universitas Andalas, a research institution with a strong academic interest in packaging design. Their many applications suggest focusing on research and development to create innovative and sustainable packaging solutions. (2) PT. Cahaya Perdana Plastics (211 applications): This company's significant number of applications highlights its active role in the plastics packaging industry. Their efforts likely focus on improving plastic packaging's functionality and sustainability. (3) Mak Herman (158 applications): As an individual applicant, MAK HERMAN's high ranking demonstrates independent designers' impact on the industry, potentially bringing unique and creative solutions to packaging design. (4) PT. Trisinar Indopratama (119 applications) and PT. FORISA NUSAPERSADA (111 applications): Both companies strongly engage in packaging design, indicating their commitment to enhancing their product packaging to stay competitive. (5) PT. Vitapharm (95 applications) and PT. GARUDAFOOD PUTRA PUTRI JAYA (94 applications): These companies represent the pharmaceutical and food industries, respectively, underscoring the importance of specialized packaging designs that meet industry-specific requirements for safety, hygiene, and consumer appeal. (6) PT. Petrokimia Gresik (70 applications): As a significant player in the chemical industry, their packaging designs likely focus on ensuring the safe and effective

transport and storage of chemical products. (7) PT. Paragon Technology and Innovation (68 applications) and PT. SURYAPASIFIK SEJAHTERA (66 applications): These companies' positions highlight their efforts to innovate in packaging, likely to improve the user experience and product protection.

Foreign Applicants

(1) Dart Industries Inc. (284 applications): This leading foreign applicant's high number of applications indicates a strong commitment to securing their packaging designs in the Indonesian market, reflecting their global strategy of protecting intellectual property in key markets. (2) Unilever IP Holdings BV (232 applications): Unilever's substantial presence demonstrates its importance in packaging design as a crucial element of its product offerings in Indonesia, aligning with its global brand image and sustainability goals. (3) Hisamitsu Pharmaceutical Co., Inc. (101 applications): This pharmaceutical company's significant number of applications highlights the critical role of innovative packaging in ensuring product safety, efficacy, and regulatory compliance. (4) Zhang Zhao (100 applications) and BLISSFUL CENTANY INTERNATIONAL LIMITED (67 applications): These applicants show individual solid and corporate interest in penetrating the Indonesian market with unique packaging designs. (5) CJ Cheiljedang CORP. (60 applications): This company's engagement underscores its efforts to innovate in food packaging, ensuring freshness, safety, and consumer convenience. (6) Reckitt Benckiser (Brands) Limited (46 applications): Their applications reflect the company's focus on packaging that enhances product usability and consumer satisfaction. (7) Inner Mongolia Yili Industrial Group Co., Ltd. (44 applications) and SUNTORY HOLDINGS LIMITED (43 applications): These food and beverage giants' presence in the top 10 highlights their investment in packaging that protects product quality and aligns with their brand values. (8) Honda Motor Co., Ltd. (39 applications): Though primarily an automotive company, Honda's inclusion indicates their interest in packaging designs, possibly for product accessories or promotional materials.

The case study

Table 3 illustrates the evolution of industrial design applications related to packaging across five Locarno classes (09-01 to 09-05) over five distinct periods (2001-2005, 2006-2010, 2011-2015, 2016-2020, and 2021-present). The following are the key insights as follows:

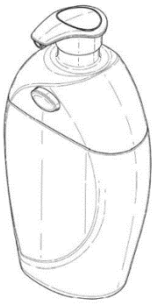
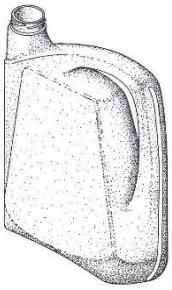
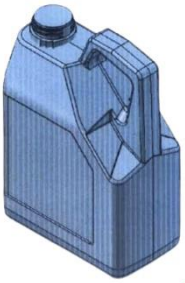
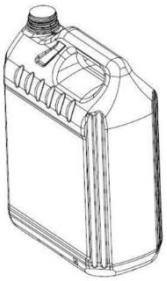
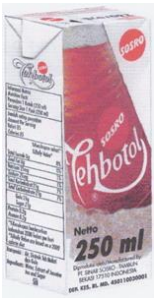
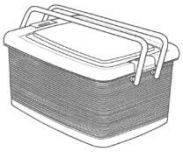
Locarno Class 09-01: Bottles, Flasks, Pots. Between 2001-2005: The designs are relatively simple and functional, focusing on basic shapes with essential dispensing features. Between 2006-2010: A shift towards more ergonomic and visually appealing designs, emphasizing user comfort and aesthetics. 2011-2015: Manufacturers introduce innovative shapes and more sophisticated designs, reflecting technological advancements and material use. Between 2016-2020: The designs become more streamlined and modern, focusing on minimalism and functionality. From 2021-present: The latest designs show a move towards sustainability by introducing reusable and eco-friendly materials.

Locarno Class 09-02: Storage and Transport Containers. Between 2001-2005: The designs are utilitarian, focusing on durability and practicality for industrial use. Between 2006-2010: Improvements in design ergonomics are evident, with containers that are easier to handle and transport. Between 2011-2015: The designs show increased innovation, incorporating improved sealing mechanisms and enhanced structural integrity. Between 2016-2020: There is a clear focus on improving usability and convenience with designs incorporating user-friendly features. From 2021-present: Recent designs emphasize sustainability and material efficiency, reflecting a shift towards environmentally conscious packaging solutions.

Locarno Class 09-03: Flexible Packaging (Bags, Sachets, Tubes, Capsules). Between 2001-2005: The focus is on essential flexible packaging solutions for liquids and semi-liquids, emphasizing functionality. Between 2006-2010: Manufacturers introduce more diverse and innovative shapes, catering to different product needs and consumer preferences. Between 2011-2015: The designs incorporate branding and marketing elements, making the packaging more visually appealing. Between 2016-2020: There is a trend towards convenience, with packaging designs that enhance ease of use, such as resealable features. From 2021-present: Sustainability becomes a key focus, using biodegradable and recyclable materials in packaging designs.

Locarno Class 09-04: Cans, Jars, and Similar Containers. Between 2001-2005: The designs are practical and straightforward, aimed at efficient storage and transport. Between 2006-2010: Manufacturers introduce enhanced aesthetics and user-friendly features, making the packaging more appealing and functional. Between 2011-2015: Innovative designs that focus on convenience, such as easy-open lids and ergonomic shapes, became prevalent. Between 2016-2020: A noticeable trend

Table 3. The Evolution of Industrial Design Applications Related to Packaging

Locarno	Time Span				
	2001-2005	2006-2010	2011-2015	2016-2020	2021-Now
09-01	 A00200100594	 A00201000250	 A00201402173	 A00201701619	 A00202101654
09-02	 A00200200813	 A0 0200702162	 A00201303048	 A00201603574	 A00202100670
09-03	 A00200202242	 A00200802687	 A00201204348	 A00201803263	 A00202101227
09-04	 A00200201631	 A00201000451	 A00201302392	 A00201903821	 A00202301761
09-05	 A00200400209	 A00200800583	 A00201402396	 A22201801620	 A00202100752

towards modern, sleek designs that effectively incorporate branding elements. From 2021-present: Recent designs emphasize environmental sustainability and reusable materials, reflecting the growing consumer demand for eco-friendly options.

Locarno Class 09-05: Bulk Storage and Transport Containers. Between 2001-2005: The designs focus on robustness and capacity, suitable for industrial use. Between 2006-2010: Manufacturers introduce more ergonomic designs, making handling and transporting large quantities of goods easier. Between 2011-2015: Innovations in material use and structural design improve the durability and efficiency of bulk containers. Between 2016-2020: The designs emphasize usability and efficiency, incorporating features that enhance the storage and transport process. From 2021-present: Recent designs highlight sustainability, reducing material waste and improving recyclability.

Over the years, there has been a clear trend towards more innovative and aesthetically pleasing designs across all categories. Enhancements in functionality and user experience have been a consistent focus, with designs becoming more ergonomic and user-friendly (Ketelsen et al., 2020). The most recent designs strongly emphasize sustainability, with increased use of eco-friendly materials and design features that reduce environmental impact (Femi Oluwatoyin Omole et al., 2024). These trends indicate a dynamic evolution in the packaging industry, driven by technological advancements, changing consumer preferences, and a growing emphasis on sustainability.

In the most recent period (2021-present), a noticeable shift toward sustainability is evident across multiple categories. For example, current designs in Classes 09-01 and 09-02 (storage and transport containers) focus on using eco-friendly, recyclable materials, aligning with a broader global emphasis on environmental responsibility. This evolution in design applications indicates that Indonesian companies are not only responding to local market demands but are also aligning with global sustainability trends (Yousif & Moalosi, 2024). Such changes in the packaging industry underscore Indonesia's commitment to advancing its industrial design practices while adapting to environmentally conscious consumer preferences and stricter regulatory requirements.

Discussion

While the data clearly highlight the dominance of domestic design applications and increasing foreign participation, a deeper look reveals notable fluctuations in application volumes that warrant further analysis. For example, the sharp rise in domestic applications between 2001 and 2005 could be attributed to heightened awareness following the enactment of Law No. 31/2000, which formalized design protection (Pemerintah Republik Indonesia, 2000). Conversely, periods of decline, such as between 2014 and 2015, may reflect broader economic slowdowns or shifts in government priorities and industrial policy. The peak in foreign applications in 2020, reaching 268 filings, coincides with heightened global supply chain activity and Indonesia's growing role in regional manufacturing—a pattern potentially accelerated by trade realignments during the COVID-19 pandemic (WIPO, 2022).

The comparative analysis reveals that Indonesia has demonstrated strong domestic engagement in industrial design registrations related to packaging since the implementation of Law No. 31 of 2000. While the country has seen significant growth in applications and innovation, its formal emphasis on sustainable design is less pronounced compared to its regional counterparts (Wenhong et al., 2024). Packaging design activities in Indonesia reflect a maturing industrial landscape, yet opportunities remain to align more closely with global sustainability trends and to leverage industrial design as a strategic tool for eco-conscious branding and product differentiation.

In contrast, Malaysia, Thailand, and Vietnam have integrated sustainability more deeply into their packaging design ecosystems. Malaysia's legal reforms and consumer demand have encouraged recyclable packaging innovations (Wahab et al., 2021). While Thailand's government-backed initiatives and market demand have propelled sustainable design growth across sectors (Tseng et al., 2022). Vietnam stands out for its rapid packaging industry expansion and targeted eco-design campaigns that engage both businesses and young creators (Nguyen et al., 2021). Collectively, these countries exemplify how industrial design policies, market readiness, and sustainability initiatives can converge to shape competitive and environmentally responsible packaging sectors—providing valuable insights for Indonesia's future development.

4. Conclusion

The analysis of industrial design applications related to packaging in Indonesia from 2001 to 2023 reveals a vibrant ecosystem shaped by both domestic and international contributors. Domestic institutions—including universities, manufacturers,

and independent designers—have consistently driven innovation across diverse packaging types, particularly in flexible and rigid packaging categories that serve key sectors such as food, cosmetics, and pharmaceuticals. At the same time, sustained foreign interest, marked by registrations from multinational corporations like DART Industries, Unilever, and Hisamitsu Pharmaceutical, demonstrates Indonesia's strategic significance as both a manufacturing base and a growing consumer market. These findings underscore the critical role of industrial design in strengthening brand identity, enhancing product differentiation, and supporting market competitiveness. Policymakers and industry stakeholders should capitalize on these insights by expanding IP education, incentivizing local design innovation, and promoting collaborative R&D programs that focus on packaging solutions tailored for domestic and export markets.

However, to fully understand and leverage the dynamics of packaging design innovation, future research must address several current limitations. This study focuses solely on registered industrial designs, leaving out informal, unregistered, or traditional design practices that may influence packaging trends at the grassroots level. Broader studies should integrate data from alternative sources—such as market research, ethnographic studies, and industry reports—to offer a more comprehensive view. In addition, comparative regional analysis shows that countries like Malaysia, Thailand, and Vietnam have taken further steps to align packaging design with sustainability goals through regulatory support and innovation ecosystems. Indonesia should consider incorporating similar sustainability-driven strategies into its national design policies. Future studies should also explore the impact of digital transformation, environmental regulations, and consumer behavior shifts on packaging innovation, and examine how industrial design can contribute to circular economy goals. Such insights will be essential for guiding Indonesia's packaging industry toward a more competitive, inclusive, and sustainable future.

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