



Semiotics and Cognitive Dimensions in the Design of Corporate Visual Identity for Chemical Enterprises

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Abstract: This research explores the semiotic and cognitive dimensions underlying the design of corporate visual identity for chemical companies. Specifically, the study focuses on analyzing and systematizing the visual features of logos from leading global chemical enterprises to inform the development of a comprehensive design project for a chemical company's corporate identity. The research adopts a multidisciplinary approach, utilizing methods of visual and analytical analysis alongside a case study of 12 chemical companies' logos.

The findings reveal common artistic and compositional strategies used in the visual identities of chemical enterprises. These logos predominantly feature geometric shapes such as circles, ellipses, squares, and crosses, and often incorporate stylized representations of laboratory equipment or natural elements to signify industry affiliation or environmental values. The use of color, particularly green, serves as a signifier of ecological responsibility.

This study's systematic categorization of logo elements demonstrates how visual identity serves as a tool for brand representation and communication of core values. The research results in the creation of a corporate identity concept for SK CHEM (Ukraine), including a logo, pattern, corporate colors, and a range of branded materials, such as business cards, product packaging, and corporate clothes.

Keywords: Visual identity, logo design, pattern, souvenir and printing products, packaging, corporate clothes.

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1. Introduction

In today's economy, the chemical industry plays a critical role, forming a key component of industrial infrastructure. Companies that supply chemical products, distribute components, and provide construction materials, paints, coatings, and food ingredients must establish themselves as reliable partners with high-quality offerings. To achieve this, the development of a strong, recognizable corporate visual identity is essential. A well-crafted corporate identity not only creates a lasting visual impression on customers and partners but also contributes to the company's reputation, reinforcing its credibility and fostering trust. This visual identity serves as a strategic tool that can positively influence business operations, communication, and overall market presence.

2. Theoretical Overview of the Main Concepts

According to the results of the review of Kim and Lim [13], the scientists consider the issue of the brand logo design mainly by its basic elements: font, shape, color. The size and preferred location of the logo on the objects, as well as sound and animation, etc. can be the additional characteristics of the logo. In a related study, Yezhova et al. [22] analyzed the corporate identity design of baseball teams in the United States, China, and Ukraine, focusing on logo design and its cultural influences. Their research revealed distinct patterns in shape, color, and iconography across different countries. Gryshchenko et al. [11] explored the intersection of science, art, and engineering in the context of design education through a Ukrainian-Chinese collaborative program. This work highlights the growing role of scientific methodologies in creative fields, emphasizing the integration of research in the design process.

The research made by Bresciani and Del Ponte [4] is an important basis for the creation of the design of a new brand logo. The authors prove the greater attractiveness of the logo, which consists of an icon and a brand name, compared to logos that consist of only one element. Also, the regularity of using the frame in the logo and its impact on the attractiveness to the consumers of different categories, presented in the paper by Chen and Bei [6], is of interest for the development of the logo. In particular, the authors prove the effectiveness of the use of an open frame or even its absence for the companies that are actively growing, and the availability of the frame for the companies that present themselves as stable and reliable ones. The authors of the article Bednárík and Augustínová [3] emphasize the role not only of logo and color but also of texture and pattern in the creation of the corporate design. Some aspects of the use of cultural heritage in the development of logos of modern Chinese brands are discussed in the article by Liu et al. [15]. The study of Torres et al. [18] is also of practical interest since it describes the consumers' commitment to the logos with natural elements. The study of Vinitha et al. [20] has a similar result, as it presents the consumers' confidence in brand logos with biomorphic elements. A study by Wong et al. [21] revealed the dependence of logo size preferences on the psychological strength of consumers. Of interest is the study of the aesthetic appeal of the visual identity of the brand, conducted on the example of banks in Saudi Arabia [17]. In the study by Ganushchak-Efimenko et al. [9] highlights the importance of company's corporate identity for brand equity.

Many studies are devoted to the design of the corporate identity of educational and cultural institutions. In particular, Vasylieva et al. [19] have explored the role of the logo and emblem in the corporate identity of an educational institution and as a component of school uniform design. The article of Čábyová et al. [5] describes how the logo design allows educational institutions to convey their mission to the entrants and attract the target audience to study at the institution. The study of Koca [14] analyzes the design of the university campus environment, in particular the interior and furniture used in academic buildings as the elements of the corporate identity of an educational institution. Bayirli and Kilic [2] analyzed 200 emblems and logos of Turkish universities in terms of shape, color and context. Graphic brands of world museums are analyzed in the article by Garbellini and Ramallal [10]. The article by Morton [16] considers the case of the evolution of the logo and branded sound of the BBS company.

The article by Gutiérrez [12] provides a visual identity analysis through the last logo of the Colombian Oil Company Ecopetrol S.A. The logo of the company is considered from the points of view of advertising, communicative and economic.

As follows from the conducted analysis of the corporate identity, the scientific research on the design of corporate visual identity of brands of certain industries, including the chemical one, is still relevant.

3. Methodology

The methodology of this study is grounded in a comprehensive approach, integrating visual and analytical methods to examine the corporate visual identity of chemical companies. The primary objective was to analyze the design features of corporate identities for companies supplying chemical products to various industries, ultimately developing a visual identity system—including logo, patterns, printing products, and souvenirs—that enhances the aesthetic appeal and communication of brand values.

In this research, corporate identity was understood as a combination of color, graphic, verbal, and other elements that represent a company's brand. A case study design was employed, focusing on the systematic analysis of logos from leading global chemical companies. This analysis informed the development of a tailored corporate identity for SK CHEM (Ukraine), incorporating the company's specific characteristics and using methods of design practice to create a cohesive brand identity..

4. Discussion

The main components of corporate identity design are the development of logo and corporate colors, and the selection of branded font and pattern. Based on the executed developments, the printing and souvenir products of a brand, the design of the website, as well as the additional elements of corporate identity are created.

Corporate identity helps the consumer to navigate the flow of information, and quickly and accurately find the company's product. Having an advantage from using the corporate identity, the company can present new products with lower costs, increase the efficiency of advertising, reduce the cost of communications, as well as achieve the unity of not only advertising but also other means of marketing communications of the company.

The company's adherence to corporate identity has a positive effect on consumer confidence. This is an indicator of organization and order. Therefore, it is common to distinguish three main functions of corporate identity: image, identification, and differential functions.

The concept of "corporate identity" was introduced by advertising theorists. And such corporate identity synonyms as "corporate identification system", "coordination of design", "designing of the enterprise appearance" are often used.

The fundamental element of any corporate identity is the logo. A logo is a visual representation – either an image or an abbreviated name – that symbolizes an organization, product line, or individual product. It plays a critical role in shaping the first impression, emotional response, and long-term brand recall among consumers.

So let's consider some examples of corporate identity and logos of chemical companies.

The leading Chinese chemical company *Sinochem* exemplifies effective logo design with its monochrome blue mark, which instantly communicates the industry through a stylized laboratory flask that merges with the company name. This design evokes both emotional and logical responses, ensuring strong brand recognition and recall (Figure 1).



Figure 1. Sinochem logo

Source: <https://www.logolynx.com/topic/sinochem>

Seventh Generation produces environmentally friendly and organic chemicals for cleaning and personal hygiene. Looking at this logo, it is possible to note its naturalness. The design of the logo includes an image of the letter, which verbally emphasizes the positive message of the company, its commitment to nature protection, and the environmental friendliness of the product (Figure 2).



Figure 2. Seventh Generation logo

Source: <https://www.seventhgeneration.com/home>

Usually, green color is associated directly with nature and the environment.

In contrast, the logo of the Chinese petrochemical corporation *Sinopec* (China Petroleum & Chemical Corporation) is not typical for the chemical industry. Its logo (Figure 3) consists of the original inscription of the company's name in English and a red circle, which symbolizes the sunrise and is associated with Asia. Against the background of the circle, there is a name of the company in Chinese, which emphasizes the adherence to the traditions and national culture of China. Black, red, and white colors reflect the corporation's authority and influence, showing its power, confidence, and trustworthiness.



Figure 3. Sinopec logo

Source: <http://www.sinopecgroup.com/group/en/>

The Chinese Wanhua Chemical Group is one of the largest chemical manufacturers in the world. As seen in Figure 4, the company logo consists of text with the name of the company and a sign. The sign of Wanhua Chemical Group features a stylized letter "W". The design represents the company's core values of innovation, cooperation, and harmony. The two circles in the logo represent the combination of technology and talent, as well as the integration of Wanhua's domestic and international operations. The main color of the logo is blue, on a white background. The color blue in the logo represents trust, stability, and reliability. Overall, the Wanhua Chemical Group logo conveys the company's dedication to innovation, collaboration, and sustainable development.



Figure 4. Wanhua Chemical logo. Wanhua Chemical Group

Source: <https://en.whchem.com/>

Formosa Plastics Corporation is a Taiwanese plastics company based in Taiwan that primarily produces polyvinyl chloride resins and other intermediate plastic products. As seen in Figure 5, the Formosa Plastics Corporation logo with the character Tai is a powerful representation of the company's commitment to quality, innovation, and its Taiwanese heritage. Sign color magenta, text color black on white background. The magenta color is atypical for a chemical company logo; it makes the company's branding stand out from competitors. Of interest is Formosa Plastics Group brand, that has now more than 120 subsidiaries. As seen in Figure 6, Formosa Plastics Group combines the logos of its subsidiaries as a common symbol to show the vertical and horizontal connections and collaboration between these companies [8]. It symbolizes the harmony, consistency,

and liveliness, as well as its constant and strong ability to progress. The color of this symbol is blue on a white background. The brand mark of each subsidiary company is inspired by Chinese characters, which is aimed at promoting the traditions of Chinese culture.



Figure 5. Formosa Plastics Corporation logo
Source: <https://www.fpcusa.com/>



Figure 6. Formosa Plastics Group logo
Source: [8].

Among the world leaders in the chemical industry is the Saudi multinational company *SABIC*, which holds a leading position in the production of petrochemicals, polymers, and fertilizers. Its simple logo consists of the SABIC word mark in English and Arabic (Figure 7). The colors of the brand are blue and yellow.



Figure 7. SABIC logo
Source: <https://www.sabic.com/en>

The *BASF* logo is one of the main examples of minimalist design. It is a combined sign consisting of a symbol and the name of the chemical organization that includes a slogan. The square in the middle of the square is a symbol that represents the door and the key. The desired message is that this company will offer appropriate solutions that will open the door for the customers (Figure 8). Achromatic colors (black, white, gray) create a clear but understandable image that gives the company credibility and overall attractiveness. Depending on the situation of use (naturalistic, faithful and attractive), the logo is also depicted in other colors: green, blue, red, orange.



Figure 8. BASF logo
Source: <https://brandportal.basf.com/global/en/create/corporate-design/logo.html>

The well-known German company *Henkel* has chosen its logo in a strict and modern style. This company sells personal hygiene products, cosmetics, and products for cleaning. The Henkel logo (Figure 9) looks restrained and informative, the inscription is made along the frame of an elliptical shape, the color scheme is dynamic, and white and red colors are used.



Figure 9. Henkel logo
Source: <https://www.henkel.ua/>

DuPont, which is one of the world's leading companies in the field of chemical technology for civil and military use, changed its logo in 2018. As we can see in Figure 10, the oval shape was preserved as a sign of the quality of the company's products, but the frame was removed, which means the openness to innovations. The colors of the new logo are red and white.



Figure 10. DuPont logo

Source: <https://www.dupont.com/>

Dow Chemical Company, also known as Dow Inc., is an American multinational chemical corporation that produces a wide range of products, including plastics, chemicals, and agricultural products. The company was founded in 1897 by Herbert Dow, a chemist, in Midland, Michigan. Dow Chemical Company is a global leader in the chemical industry, known for its innovative products and commitment to sustainability. The Dow Chemical Company logo is "Dow Diamond" [7]. The logo consists of three elements that make up a single whole (Figure 11): a symbol, a logo and a trademark. The symbol is a red diamond; logo - the name of the Dow company in white; and the trademark is a standard registered trademark symbol.



Figure 11. Dow Chemical Company logo

Source: <https://www.dow.com/en-us>

Sumitomo Chemical is a Japanese company that was founded in 1913. The Sumitomo trademark is the symbol Igeta, a diamond-shaped grid pattern representing the wooden frame of a well. In the Sumitomo Chemical logo, the red color Igeta symbol is located to the left of the black color company name in a stylized form (Figure 12). The use of the Igeta symbol in the logo is meant to emphasize the company's connection to the Sumitomo Group and its commitment to the traditional values of the group, including a focus on long-term success and stability.



Figure 12. Sumitomo Chemical logo

Source: <https://www.sumitomo-chem.co.jp/english/>

A good example of a simple and thoughtful design is the logo of the *Bayer* pharmaceutical company. The cross-shaped logo formed by the intersection of the horizontally and vertically written word Bayer - the so-called "Bayer Cross" - is one of the most recognizable logos in the world. The last redesign of the logo (Figure 13) was made in 2017. Green and blue colors with the use of the transition areas have made the logo more adapted to the digital age.



Figure 13. Bayer logo

Source: [1]

To sum up all the above, the logos in the chemical industry are very important for businesses and brands, as they create an overall impression of the organization from the beginning. Chemical

companies use different colors to design the logo, in particular white and blue, as well as red, green, black, and yellow. Also, the following geometric shapes are used in the compositions of logos: circle, ellipse, square, and cross. The design of the logo in the frame emphasizes the permanence of traditions and reliability of the company, while the logo without the frame symbolizes growth and openness to innovations. A stylized image of laboratory equipment can point to the affiliation to the chemical industry, and the image of natural elements or the green color in the logo can indicate the company's environmental values. The national identity of the company is emphasized by the font traditional for the region, the inscription of the brand name, made in the national language next to English, as well as symbolic images (for example, the image of the rising sun).

5. Synopsis of the Main Research Outcomes

The development of SK CHEM's corporate identity design was based on a detailed analysis of the company's operations, along with theoretical research and comparisons with established chemical industry brands. The design process followed a structured approach, incorporating several key stages:

1. Defining Goals and Problem Statement: SK CHEM positions itself as a supplier and distributor of chemical products, including construction materials, paints, lacquers, and food ingredients. The company's concept revolves around providing "smart" materials – integrating distribution, product development, and intelligent solutions. The design task, therefore, was to reflect this business model, clearly communicate the company's expertise, and help consumers quickly identify the nature of SK CHEM's services.

2. Target Audience Identification: The primary audience for SK CHEM consists of consumers aged 20-50, primarily men with average to above-average incomes. Additionally, the target group includes chemical and construction companies, paint and coatings manufacturers, and end users. The corporate identity needed to resonate with these professional and industrial consumers while conveying reliability and innovation.

3. Action Plan: The design concept for SK CHEM aimed to attract the target audience by highlighting the company's reliability and adherence to European standards. A distinctive design, tailored specifically to the chemical industry, was developed to convey trust and professionalism, reinforcing SK CHEM as a partner whose products meet high regulatory standards.

4. Image and Concept: The visual identity was designed to be simple and harmonious, embedding positive associations in the minds of consumers. The goal was not only to appeal to potential clients but to shape public perception of the company. SK CHEM's logo uses a combined text-graphic mark where the graphic element interacts with the company name. The modular grid, based on circles of varying radii, forms a stylized molecular structure, reflecting the company's focus on advanced chemical solutions. The use of asymmetry in the logo design helps to create a dynamic and memorable image, drawing attention to the balance of forms while conveying a sense of movement and innovation.

Additionally, a unique corporate pattern was developed for SK CHEM, incorporating a stylized hexagonal molecular motif. This pattern aligns with the company's scientific and industrial focus, providing visual consistency across all branding elements. The design was created in collaboration with the Faculty of Design at Kyiv National University of Technologies and Design by A. Lisovyk, under the supervision of the research authors.

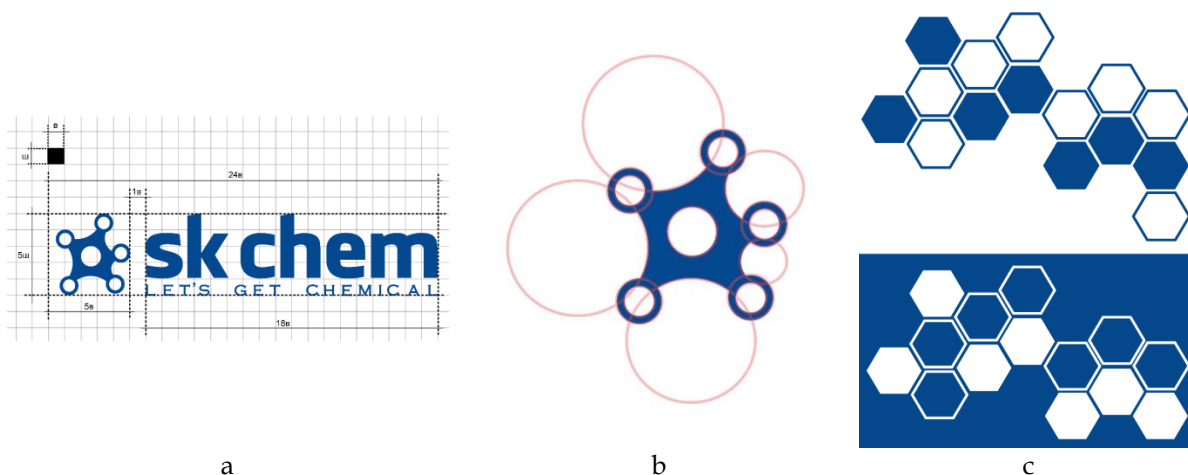


Figure 14. Design of the elements of SK CHEM corporate identity: a – modular grid of name and icon; b – modular grid, icon; c – pattern
Source: designer A. Lisovyk, 2023

Based on the results of the study, a series of souvenir and printing products are developed for SK CHEM, in particular: business card, letterhead, envelope, company folder, product packaging, as well as a gift notebook, pen, cup. The prints for corporate and gift clothes (t-shirt, jumper) are also developed (Figure 15).



Figure 15. The elements of the chemical company's corporate identity
Source: designer A. Lisovyk, 2023

6. Conclusions

The fundamental elements of a chemical company's corporate identity typically include the logo, corporate colors, and pattern. Logos in this sector often feature both a company name and icon, utilizing graphic design to convey key values such as reliability, innovation, environmental responsibility, and cultural commitment. A variety of colors—most commonly white, blue, red, green, black, and yellow — are employed to express these attributes, while geometric shapes like circles, ellipses, squares, and

crosses are frequently used in logo compositions. Additionally, stylized depictions of laboratory equipment signify the company's connection to the chemical industry, while natural imagery and green tones highlight environmental values.

7. Limitations, Implications, and Further Directions of Research

This research led to the development of a comprehensive corporate identity for SK CHEM (Ukraine), including a logo, pattern, and corporate colors. A range of branded printing materials, souvenir products, and corporate apparel with enhanced aesthetic qualities were also designed. Future research will expand on this by exploring the artistic and compositional strategies involved in corporate identity design for companies in other industries.

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