



Trends and Sustainable Development of the Hair Care Market

Eun-Jung SHIN¹

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Abstract

Purpose: The cosmetics industry is dynamic and constantly evolving. The hair and beauty field is characterized by being very sensitive to social trends. Therefore, it is necessary to understand the intellectual structure of the social function of hair beauty and to analyze the research and industrial trends related to the beauty field. This study is a literature review and presents specific and practical development plans and growth strategies for the hair care market. **Research design, data, and methodology:** This review study was conducted by searching PubMed, Google Scholar, Riss, Scopus, and Research Gate. We prepared this by referring to keywords such as the beauty care industry, sustainable development, hair care, hair cosmetics, and hair care market. A total of 468 papers were searched, of which 60 were finally included in this study on the PRISMA flowchart. **Results:** For good consumption and continuous development of hair cosmetics, it will be necessary to clearly understand the beauty and cosmetic needs of various generations. **Conclusions:** As income level improvement and quality of life become more important, Korea's beauty industry is attracting a lot of attention as a growth industry that transcends gender and age amid social and cultural development, and its importance is expected to grow in the future.

Keywords : Beauty Care Industry, Sustainable Development, Hair Care, Hair Cosmetics, Hair Care Market

JEL Classification Code : H11, J24, O14, Q01, Q02

1.Introduction

Due to rapid changes in modern society, the living environment and industry have developed. As living standards improved, modern people differentiated and specialized in beauty. Not only clean and beautiful skin, but also a healthy and shiny hair style has come to be preferred. Hair can be manipulated and changed according to fashion and culture, and is also important psychologically (Harrison & Sinclair, 2003; Shin & Kwon, 2022).

The rapid changes in modern society have led to increased lifespan and increased social activities due to the development of science and industry (Secchi, 2016; Indicators, 2015). Accordingly, as the desire to look healthy and young naturally emerges, healthy hair is required as a symbol of youth. (Peretti et al.,

2020; Lee & Kwon, 2022). As mass media became more specialized, drastic hair style changes spread among the masses. Hair styling has become a common practice among young people due to lifestyle changes and the emergence of new salons. As a result, the use of hair styling products has increased (Nayak et al., 2017). Color and style, including hair care, play an important role in people's overall appearance and self-awareness (Trüeb, 2001; Peretti et al., 2020). This natural change is an important part of our identity that can be manipulated according to fashion, culture, or social direction (Harrison & Sinclair, 2003). Chemical procedures such as perm, dyeing, and bleaching are increasing due to increased aesthetic awareness (Trüeb,2001; Giacometti, 1967).

People modify the length, color, and style of their hair according to their desired appearance (Trüeb,

¹ First and Corresponding Author. Ph.D. Researcher in the Department of Beauty Arts Care, Dongguk University, Korea. Email: choishin0732@naver.com

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2001). Frequent hair chemical treatment, such as straightening products and dyeing, causes protein loss and damages hair (França-Stefoni, 2015). Hair dyeing, which is mainly used by women and men, can damage the hair as much as it requires chemical and physical processes to change the fiber structure and change surface properties (Da Gama et al., 2018). Failure to properly manage may result in loss of individual self-esteem, interest, and confidence (Marahatta et al., 2021). The main cause of hair damage comes from the scalp. Currently, scalp -related diseases are increasing in relation to lifestyle and eating habits (Song & Kim, 2017; Lim & Kim, 2008; Crawford & Hernandez, 2014; Franbourg & Leroy, 1986).

Bio internal factors include stress, drinking, smoking, lack of sleep, nutritional imbalances, and drug abuse. External factors include chemical factors caused by excessive shampoo and hair products. Environmental factors are damaged by the scalp and hair due to ultraviolet rays, yellow dust, and acid rain (Janz & Becker, 1984; Thom, 2016). As a result, it becomes a problematic scalp accompanied by itching, dead skin cells, dandruff, inflammation, and erythema. Hair cracks and thinning, losing gloss and elasticity, or even hair loss in severe cases (Lee & Kim, 2002).

The Hair loss phenomenon, which has been genetically influenced, is also decreasing due to this environmental impact. Increasing the number of female hair loss population is increasing interest in consumers' hair loss. As a result, consumers' interest in hair is increasing. The hair cosmetics market has grown rapidly and the hair -related industry is growing. Based on France, hair care lines in advanced countries such as the United States and Japan are steadily being developed. The size of the hair care market is growing, and numerous products are being produced to meet people's diverse needs for hair health care. Hair and scalp management areas include a specialty of skin care departments, hospitals (oriental, Western medicine), and scalp hair care shops. It is also a trend that consumers are changing into the concept that consumers directly manage at home (Lim & Kim, 2008).

2. Literature Review

2.1. Beauty Care Industry

The beauty industry is largely divided into three categories: beauty manufacturing, beauty service, and beauty-related industries. The beauty service industry is a convergence industry that creates new demand by linking with medical care, health, science, life, culture, art, and emotions. The beauty industry is a high value-added industry such as creativity, artistic sense, and experience based on human resources. Detailed businesses in the beauty service industry include hair, aesthetic, makeup, nail, plastic surgery, dermatology,

dentistry, silver care, beauty healthcare, beauty food, and beauty medical tourism. The beauty industry is an industry that includes everything that experiences and consumes services to keep the body beautiful and healthy (Lee, 2016).

2.2. Hair Cosmetics

Hair cosmetics include products that have a function of cleaning sweat, dust, sebum, cosmetic residues, dead skin, etc. present on the scalp or hair. In addition, there are treatment products with functions of hair protection and nutrition supply, and styling products for hair styling. The demand for various hairstyles is causing hair loss by causing damage to the scalp as well as hair as the frequency of physical and chemical beauty activities in the hair increases.

2.3. Hair Care Market

Hair care cosmetics are actively being released in the public market, including professional products, and the market is gradually spreading. Accordingly, interest in hair products has increased, and consumption of various hair cosmetics is increasing. The use of hair care products that do not match the hair type can lead to weak hair, hair loss, and hair damage (Crawford & Hernandez, 2014; Franbourg & Leroy, 1986). The product industry in the hair care market allows new product research and user experiences to be reflected in product design from a consumer perspective (Ding et al., 2016; Agost & Vergara, 2014; Seva et al., 2007). Recently, there are more businesses specializing in hair care. Public interest in the need for hair treatment has increased.

3. Materials and Results

3.1. Method

This study used a narrative review approach and is a review of trends in the hair management market and sustainable development plans. It was written by referring to keywords such as Beauty Care Industry, Sustainable Development, Hair Care, Hair Cosmetics, and Hair Care Market. This review study was conducted by searching PubMed, Google Scholar, Scopus, and Research Gate. A total of 468 papers were searched, of which 82 were finally included in the PRISMA flowchart (Nguyen et al., 2022) as shown in Figure 1. Regarding the beauty care industry, the following hair care market trends and sustainable development measures were considered.

3.2. Types and Characteristics of Hair

Hair is an accessory organ that arises from the epidermis of the skin and is mostly composed of proteins and consists of melanin pigments, lipids, trace elements, and moisture. It also serves to protect the body from external stimuli and cold (Cruz et al., 2017). The type of hair can be divided into normal hair, dry hair, oily hair, and damaged hair depending on the amount of sebum secreted and the degree of damage like skin. It is effective to manage hair with products and management methods that suit the characteristics of hair.

3.2.1. Normal Hair

Normal hair is the most ideal hair in the type of hair and is in its original state. The hair is glossy and does not get tangled easily and is glossy. It has strong tension strength, so it is easy to touch and comb without breaking easily (Valkovic, 1988). There is almost no damage to the mother's skin, and it is densely arranged in the shape of a tile. The appropriate amount of sebum is secreted, and the hair is glossy. It is healthy hair without physical, chemical, or environmental damage. Hair is not capable of recovering to its original state when damaged, so it is recommended to take care of it so that it is not damaged. To maintain healthy hair, hair products that nourish the hair can be used to prevent damage to the hair and prevent the hair from drying.

3.2.2. Dry Hair

Due to the hair generation process, there is a lack of a mixture of amino acids, which are natural moisturizing factors of hair. Since there is no power to store moisture and lack sebum secretion to form a film, it does not prevent moisture from escaping from the hair. It is recommended to avoid excessive hair procedures and provide plenty of moisture and

nutrition to the hair. Dry hair products include polymers that fill cracks in cuticles, making the damaged part smooth and glossy. It is recommended to refrain from using products containing excessive oil or strong alkaline products (Trüeb, 2001; Dawber, 1996).

3.2.3. Oily Hair

The amount of sebum secreted is higher than normal hair. Microorganisms or substances that cause contamination are adsorbed on the hair and do not look clean. Due to sebum, it provides a good condition for bacteria to inhabit. Unlike dry hair, hair is sticky due to excessive sebum secretion. Seborrheic dermatitis with dandruff and itching on the scalp is easy to occur. People who use oily hair or hair care products every day should consider washing their hair once every 1-2 days. When shampooing, it is recommended to rinse thoroughly so that shampoo fluid and waste products can be washed away (Bakhati & Agrawal, 2022).

3.2.4. Damaged Hair

When chemical cosmetic procedures such as dyeing and permanent wave are repeated, it becomes damaged hair. Chemical damage causes split ends of the hair. If you continue to apply aggravating factors without managing split hair, it will split inward from the end of the hair. This kind of hair is called insulating hair. The hair is unmanageable and must be cut. Damage hair can be classified into weak damage hair and extreme damage hair depending on the degree of damage. Medicinal damaged hair is partially cuticle-free, glossy, and inelastic hair. Extremely damaged hair refers to hair that has little cuticles and has leakage of hair follicles to the outside. When the content of cystine decreases, the hair naturally decreases in strength and elongation, resulting in weak hair (Trüeb, 2001). shown as a Table1.

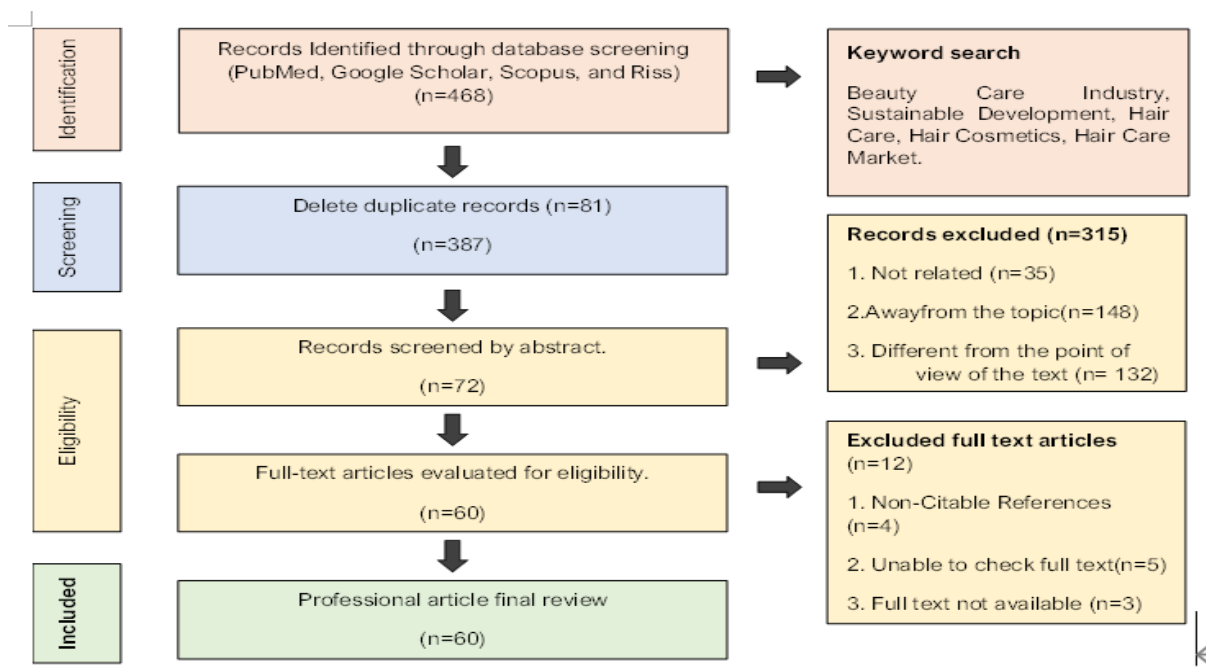


Figure 1: PRISMA flow diagram for narrative review search results

Table 1: Types and Characteristics of Hair

NO	Journal name	Author	Year	Discussion
1	CRC PressLLc	Valkovic, V.	1988	Normal hair is the most ideal hair in the type of hair and is in its original state.
2	Hoddle Doyle Meadows Limited	Dawber, R.P. (Ed.).	1996	The hair has no power to store moisture and does not form a film, so it does not prevent moisture from escaping from the hair.
3	Dermatology	Trüeb, R.M.	2001	Due to the hair production process, there is a lack of a mixture of amino acids, the natural moisturizing factor of hair.
4	International journal of biological macromolecules	Cruz, C.F. et al.	2017	Hair also protects the body from external stimuli and coldness.
5	Journal of Cosmetic Dermatology	Bakhati, D. et al.	2022	It is easy to develop seborrheic dermatitis with dandruff and itching on the scalp.

3.3. Causes of Hair Damage

3.3.1. Internal Factors

Hair is called hair when hair cells are provided with nutrients and oxygen through capillaries and grow by cell division. If the intake of nutrients is uneven, nutrients cannot be delivered to the mother cells through capillaries, preventing proper cell division. The hair becomes weak and dry, and the surface grows into rough hair. It was defined as hair damage due to endocrine hormone abnormalities, drug action, and stress. Factors that occur in the human body, such as hormonal imbalance, were cited and defined as physiologically causing hair damage. It was defined that lack of nutrient intake due to heredity, stress, and diet causes disruption to hair growth (Kim & Ahn, 2012).

3.3.2. External Factors

Due to physical and chemical procedures such as drying, dyeing, and perming, hair follicle falls off due to frequent friction and chemical procedures. In addition, the surface of the hair follicle changes very roughly, causing damage to the hair. Hair follicle protects fur and prevents the internal substance of the hair, the liver insect, from escaping out of the hair. When the cuticle of the hair is damaged, the cortex is also damaged. This kind of hair is called porous hair. Hair dyeing, which is mainly used by women and men, can damage the hair as much as it requires chemical and physical processes to change the fiber structure and change surface properties (Da Gama et al., 2018). It was defined that damage caused by excessive heat temperature, such as combing, drying, and iron, caused by physical friction, caused by denaturation and excessive swelling of proteins in the hair.

Table 2: Causes of Hair

NO	Journal name	Author	Year	Discussion
1	Kor J Aesthet Cosmetol	Kim, J.H.	2012	It was defined that lack of nutrition due to heredity, stress,

				and diet interferes with hair growth.
2	Journal of Cosmetic Dermatology	Da Gama, R.M. et al.	2018	Due to physical and chemical procedures, frequent friction and chemical procedures lead to hair follicles falling out.

Table 3: How to Take Care of Your Hair (Self-Beauty Health Care).

NO	Journal name	Author	Year	Discussion
1	Dermatology	Trüeb, R.M.	2001	Hair care is to restore hair to a healthy state.
2	Journal of Investigative Cosmetology	Kim, J.H.	2005	For hair care, it's important to take care of and choose products.
3	Journal of dermatology investigative symposium proceedings	Sinclair, R.D.	2007	Modern cosmetics are designed to restore hair.
4	Journal of Cosmetic Dermatology	Shiel, S.	2007	Proper use of the product provides long-term protection from further damage.
5	Cosmetics	Gubitosa, J. et al.	2019	Hair cosmetics are to remove foreign substances from hair and improve hair physiology.
6	Skin Appendage Disorders	Peretti, M.C. et al.	2020	Hair care uses supplements while keeping hair clean when hair damage is excessive.
7	Journal of Cultural Industry Studies	Yoon, Y.D.	2020	After the 4th Industrial Revolution, consumers became able to easily obtain beauty information
8	Journal of Cosmetic Dermatology	Abelan, U.S. et al.	2022	Essential oils can yield satisfactory results in the treatment of some scalp dysfunction.
9	Acta Biomaterialia	Pereira-Silva, M. et al.	2022	Hair care and treatment have developed greatly over the years.
10	Sustainability	Godeto, Y.G. et al.	2023	Herbal shampoo has the same acceptable properties as commercially available shampoo.

3.4. How to Take Care of Your Hair

3.4.1. Self-Beauty Health Care

Hair management refers to recovering hair to a healthy state by maintaining the moisture content of the hair at 10-20% using additives or supplements while keeping the hair clean when hair damage is excessively progressed. Hair defines an individual's gender, social status, and sexual attitude (Trüeb, 2001; Peretti et al, 2020). Self-management refers to the primary health care-level process of maintaining and improving health, preventing and early detection of diseases, and treating them to take care of themselves. It refers to home care that is managed at home to prevent hair damage or improve damaged hair. Self-home care refers to a method of selecting and managing the right product by oneself without expert guidance (Kim & Ahn, 2012).

Home care is basically a widely used management method because it is the easiest to manage and has a low economic burden. It's easy to get back to pre-administration conditions if you don't do continuous management after specialized management. Home care is recommended after receiving professional care (Robbins & Robbins, 2012). Since the 4th Industrial Revolution, it has become easier for consumers to obtain beauty information, creating new cultures such as self-beauty care and self-beauty people. Consumers doing self-beauty and healthcare are also increasing. The categories of home care include management and the use of specialized products that correct lifestyle such as diet and sleep.

It is an important and basic management method because it is the easiest and least economically

burdensome. Modern cosmetics are designed to remove foreign substances from hair and improve and restore hair physiology (Yoon, 2020). You can do home care using specialized products such as shampoo, hair treatment, hair pack, essence, etc. that can supply moisture and nutrition to damaged hair. Self-care is necessary in daily life to effectively maintain the professional care of the hair stylist at the hair shop. If you do not manage your hair steadily with home care, you can return to your original hair condition before specialized hair care. Sustainable Use of Extracts of Some Plants Growing in Ethiopia for the Formulation of Herbal Shampoo and its Antimicrobial Evaluation. Background: Shampoos prepare surfactants to remove dirt and skin debris from hair and scalp without harming the user.

Herb shampoo was formulated using Ethiopian plant extracts and quality parameters were evaluated. Conclusions: Indicates that the blended herbal shampoo has the same acceptable properties as the commercially available shampoo (Gubitosa et al., 2019). Potential use of essential oils in cosmetic and dermatological hair products. Background: Essential oils are attracting great attention as demand for herbal cosmetics increases in the market. Several studies have evaluated the effectiveness of these physiologically active ingredients for use in Cosmetic, primarily in recovering hair scalp and axillary damage. Conclusions: The use of essential oils in cosmetics (industrial) and oil carriers (individual protocols) shows that you can get satisfactory results in some scalp disorders (Sinclair, 2007).

Hair health and management of common hair disorders. Background: In today's image-sensitive

society, hair plays an increasingly central role in the way we express ourselves to the outside world. Conclusion: Proper use of products such as shampoo and conditioning treatments provides immediate benefits as well as long-term protection from further damage (Godeto et al., 2023). The main recommended as a home care are product is the nutrition care line including shampoo and conditioner, as well as essence and treatment agents (Abelan et al, 2022).

To meet the demands of the cosmetics and pharmaceutical sectors, hair care and treatment have evolved significantly over the years as new formulations have been constantly explored (Shiel, 2007). Proper care and selection using various products are recognized as important along with hair care and home care (Pereira, 2022). shown as a Table 3.

3.4.2. Hair Care Behavior and Hair Clinic

Hair care attitude refers to the overall attitude toward awareness, interest, and habits of scalp and hair care. Hair care attitudes can be psychologically stable when you use protective products to make your hair healthy, when you are treated at a hair care shop, or when you use shampoo or nutritional supplements that are good for hair loss. Hair care behavior means using hair cosmetics such as shampoo, conditioner, treatment, permanent wave agent, hair dye, hair dye, and hair dye to make it healthy and beautiful, depending on the ecology, shape, structure, and chemical, mechanical, and physical properties of hair (Kim, 2005).

The dictionary meaning of the clinic is hospitals, treatments, and clinics, which can be seen as hair management behavior in hair shops at beauty sites. In this study, the concept of a hair clinic is defined as a procedure including all hair care steps performed in a hair shop. The dictionary meaning of the treatment is used as healing and treatment. It is largely accepted as a meaning of nutrition in the beauty field. The concept of general hair treatment can be said to be to apply a treatment agent to damaged hair, massage it, and then apply heat to penetrate it to manage the damaged hair in normal condition. The best condition for hair is to keep the hair strong with adequate oil and moisture and to prevent damage caused by environmental, physical, and chemical problems. Conditioners reduce friction, loosen hair, minimize curls, and improve the

possibility of combing. Improves gloss, softness, and manageability of hair (Simonson, 2005).

The substances that make up the conditioner can reach the surface of the cuticle or the inside of the cortex, mainly depending on the molecular weight (Robbins & Robbins, 2012; Warren, 2015). Consumers are attracted to products that promote moisture and minimize damage and use countless different hair styling products (Draelos, 2013). If you repeatedly perform cosmetic procedures using chemicals such as permanent waves or dyeing, normal hair becomes damaged hair due to chemical action. Follow management is needed so that the damage does not worsen. To modify damaged hair, the hair care industry is developing many products (Bolduc & Shapiro, 2001).

The right use of the product provides immediate benefits. Keratin contained in hair care products promotes the surface coating of hair and has a beneficial effect on hair structure, so it protects hair from additional damage for a long time (Bhushan, 2008; França-Stefoni, 2015). The device plays a role in managing the scalp and hair and facilitating the penetration of the product. It can be divided into diagnostic devices, cleaning devices, exercise promotion devices, and product absorption promotion devices (Cruz et al., 2016). Beauty devices are uneconomical to use for home care. Due to the size, it takes up space, it can be a burden to use at home. Hair care using beauty devices is done a lot in hair salons. For chemically damaged hair care after cosmetic procedures, experts select products according to the characteristics of the hair and use the appropriate amount specified by the product company.

In addition to managing through a device that maintains an appropriate temperature, shampooing and hair rinsing out the product. For chemically damaged hair care after cosmetic procedures, experts select the product according to the characteristics of the hair and use the appropriate chart specified by the product company. It is a place that provides systematic management through various techniques, such as a device that maintains an appropriate temperature, a shampoo action to rinse out the product, and a dry method to dry the hair (Abelan et al, 2022). shown as a Table 4.

Table 4: How to Take Care of Your Hair (Hair Care Behavior and Hair Clinic)

NO	Journal name	Author	Year	Discussion
1	Clinics in dermatology	Bolduc, C. et al.	2001	The material constituting the conditioner may reach the surface of the cuticle according to the molecular weight.
2	Progress in Materials Science	Bhushan, B.	2008	The material constituting the conditioner may reach the inside of the cortex according to the molecular weight.
3	Chemical and physical behavior of human hair (Vol. 4)	Robbins, C.R.	2012	The best condition for hair is to prevent damage caused by environmental, physical, and chemical problems.
4	Dermatologic clinics	Draelos,	2013	Consumers use products that promote moisture and minimize

		Z.D.		damage
5	Cosmetics	Cruz, C.F. et al.	2016	To repair damaged hair, the hair care industry is developing many products.
6	Harry's cosmeticology	Warren, C.	2015	Conditioners reduce friction, loosen hair, minimize curls, and improve the possibility of combing.
7	Journal of Cosmetic Dermatology	França-Stefoni, S.A. et al.	2015	Keratin has a beneficial effect on hair structure and protects hair from damage.
8	Journal of cosmetic dermatology	Sanad, E.M. et al.	2019	Keratin promotes hair surface coating and protects hair from damage for a long time

Table 5: Sustainable Development of the Hair Care Market

NO	Journal name	Author	Year	Discussion
1	Journal of Health Care Marketing	Joseph, W.B.	1995	It is a corporate strategy for business competition.
2	Journal of Cosmetic Dermatology	Harrison, S. et al.	2003	Hair cosmetics are widely available and manipulate the structural properties of hair
3	Journal of marketing	Simonson, I.	2005	It is to provide what the customer wants in some way at the right time.
4	Journal of Investigative Cosmetology	Kim, J.H.	2005	The current market size of scalp and hair clinics, which began to be introduced in Korea in 1997, is growing by 20-30% every year
5	Indian Journal of Dermatology, Venereology and Leprology	Madnani, N. et al.	2013	Hair styling products for calming and purifying hair are made to suit the type of hair
6	The Journal of Business Education	Shin, J.A.	2015	The hair and beauty industry in Korea accounts for the largest proportion of the beauty industry
7	Dong-A Ilbo	Jeong, J.H.	2017	Estimated value of global hair care market expected to reach \$102 billion by 2024
8	statistics & facts	Statista.	2020	The estimated value of the global hair care market is expected to reach \$102 billion by 2024.
9	International Journal of Cosmetic Science	Tamashiro, F.L. et al.	2021	Nano-based products, including hair treatments, have many advantages over existing cosmetics.
10	Journal of Cosmetic Dermatology	Lee, J. et al.	2022	The value of the beauty industry is steadily increasing.
11	Cosmetic Dermatology: Products and Procedures	Schwartz, J.R. et al.	2022	The beauty industry is a service industry to solve customers' needs for beauty.
12	Introduction to cosmetic formulation and technology	Baki, G.	2022	As the social perception that appearance is competitive spreads, interest in appearance is increasing very much.
13	Frontiers in psychology	Chang, Y.W. et al.	2022	The use of the beauty industry app platform can lead to new consumption patterns and career opportunities and can lead to more business action activities
14	Acta Biomaterialia	Pereira-Silva, M. et al.	2022	Hair care and treatment have evolved significantly over the years as new formulations continue to be studied to meet the needs of the cosmetics and pharmaceutical sectors
15	International Journal of Cosmetic Science	Santos, J.S. et al.	2022	Used to treat multiple hair conditions, including dandruff and other hair damage conditions

3.5. Sustainable Development of the Hair Care Market

The beauty industry is a service industry to address customers' desire to be beautiful. Recently, the value of the beauty industry has been steadily increasing as people pursue healthy and happy lives and at the same time their interest and concentration in beauty has increased (Sanad et al., 2019). It is not surprising that the estimated value of the global hair care market is expected to reach \$102 billion by 2024 (Schwartz et al., 2022). According to the Ministry of Food and Drug Safety (MFDS), Korea's cosmetics production in 2016 was 13.514 trillion won, up 21.6% from 10.7328 trillion won in 2015. By type of cosmetics, basic

cosmetics were the highest at KRW 7.5858 trillion (58.12%). It is followed by color makeup (KRW 2.2919 trillion, 17.56%), hair (KRW 1.4098 trillion, 10.8%), and body cleaning (KRW 1.1637 trillion, 8.92%) [65]. As the social perception that appearance is competitive spreads, interest in appearance is increasing very much. Due to these needs and cultural trends of the times, the beauty industry plays a very important role in the service industry. The reason why the beauty industry was able to grow significantly is that as the consumption trend of caring for and investing in oneself spreads, the beauty industry closely related to expressing itself is spreading in line with consumer trends. This can be seen as a factor that accelerates the popularization and specialization of

the beauty industry.

As the creation of new images, self-satisfaction, and individual expression become important in modern society, the subdivision and diversification of the beauty industry is accelerating. It not only conveys physical awareness of hair appearance, but also plays an important role in more intimate and emotional levels, namely self-esteem, social and psychological issues (Statista 2020). Korean cultural contents are spreading worldwide as K-Beauty. In the future, it will be possible to secure the market in a wider area and it can be expected to continue to be competitive. A major axis of the expansion of the beauty care industry is the hair beauty industry. The hair and beauty industry in Korea accounts for the largest proportion of the beauty industry (Jeong, 2017). According to Statistics Korea the number of hair and beauty industries increased by 16.3% compared to 2006 as of 2014, and the number of employees increased by 19.6% compared to 2006. As of 2014 (KRW 4.29 trillion), sales increased by 47.3% compared to 2006 (KRW 2.91 trillion) (Baki, 2022).

Beauty companies are making efforts to preoccupy the market early by preparing customized cosmetics and services that fit the personalization trend. In particular, the 4th Industrial Revolution is promoting customized production across all industries. Customized cosmetics are being carried out through skin measurement and current skin condition, lifestyle, and interviews. Genetically customized cosmetics, customized cosmetics incorporating 3D printing technology, and AI-based customized cosmetics are being developed. The use of the beauty industry app platform can lead to new consumption patterns and career opportunities and can lead to more business action activities (Shin & Yang, 2015). Customization refers to the production of a product or providing services that reflect the needs of a specific consumer. This concept is to effectively meet consumer needs. As a corporate strategy for business competition, it is to provide what customers want in any way and at the right time (Chang & Hsu, 2022).

As the first purpose of introducing a customized cosmetics system, it was introduced to meet various consumption needs through customized product services in accordance with changes in the social and cultural environment where individual values are emphasized in modern times. The hair and cosmetics industry has changed its purpose from the concept of hair washing to promoting growth, increasing tensile strength, and reducing hair oxidation damage. Hair styling products for calming and purifying hair are made to suit the type of hair (Joseph, 1995).

The current market size of scalp and hair clinics, which began to be introduced in Korea in 1997, is growing by 20-30% every year. The scalp and hair loss-related industries began as part of hair clinic services in hair salons. It has become increasingly popular to the extent that hair salons and professional

scalp care centers have been created. The beauty market has expanded by various methods such as wigs, hair transplants, and home care (Simonson, 2005). Hair cosmetics are widely available and manipulate the structural properties of hair (Harrison & Sinclair, 2003). Hair care and treatment have evolved significantly over the years as new formulations continue to be studied to meet the needs of the cosmetics and pharmaceutical sectors (Shiel, 2007).

With the development of nanotechnology-based hair care products applied to hair shaft and hair scalp diseases, regarding hair care formulations, nanocarriers can target the hair shaft, hair follicles and scalp. Therefore, it has been used to treat several hair disorders including dandruff and other hair damage conditions (Madnani & Khan, 2013). Over the next few years, nano-based products, including hair treatments, are expected to have many advantages over conventional cosmetics, and hair cosmetics are expected to grow remarkably (Kim, 2005). shown as a Table 5.

4. Discussions

Hair has a function to protect our head from the outside and has a decorative function. The hair that covers the head is located at the top of the human body, performs the function of protecting the brain, and plays an important role in forming an impression. Hair is a unique personal feature that plays an important role in self-awareness. The general chemical styling process causes changes in hair cuticles and cortex, which damages the fiber. In some cases, it is also known to damage the health of human or hair care specialists.

The hair cosmetics industry has traditionally focused on developing products or procedures for hair cleaning and controlling the shape of hair fibers (Santos et al., 2022). Hair care products containing nanotechnology have been used to capture bioactive substances. Cationic and non-polar carriers improve hair follicle, hair follicle and hair scalp dysfunction. Use cationic nanocarriers for hair conditioning to improve combing and polishing (Tamashiro et al., 2021; Adhikari et al., 2016). Inorganic nanoparticles and organic nanocarriers are used to improve color persistence after hair dye formulation and dyeing-hair treatment. In the case of the scalp, inorganic nanoparticles that act as antifungal reduce and control dandruff. The hair care industry has developed many products to provide beauty and modify some hair characteristics (Bolduc & Shapiro, 2001; Cruz et al., 2016; Santos et al., 2022; Lee et al., 2001). Thanks to the spread of social media and market trends, the demand for natural cosmetics is increasing day by day. Currently devoted to natural cosmetics research, development and evaluation based on plants, algae, and other bioactive compounds such as peptides, vitamins, flavonoids, phenolic acids, tannins,

glycosides, terpenes, and alkaloids (Madnani & Khan, 2013).

Based on innovative technology, it can play an essential role in producing sustainable, optimized natural cosmetics for hair care applications (Shiel, 2007). Therefore, this literature review focused on the trends and sustainable development of the hair and cosmetics market. For the good consumption and continuous development of hair cosmetics, it is necessary to clearly understand the needs of various generations. The limitation of this study is that close analysis and experimental research by consumers are insufficient in the continuous development of the hair and cosmetics market.

5. Conclusions

Hair cosmetics are widely used by both women and men. Exclusive cosmetic formulations are extensively tested before use by consumers. Widespread hair problems are not common across the board but tend to affect people who often style and dye their hair. Hair professionals and hair product industries can expect to improve sales in the product industry along with consumer hair health if they use customized strategy marketing such as classifying hair products according to hair characteristics, distributing them to consumers, measuring hair conditions, and recommending customized products. Nevertheless, there are still significant challenges to overcome. The development of cosmetic formulations relies on new technologies and well-trained collaborators, which can eventually lead to increased research and development costs. These investments can affect the final cost of a product.

This narrative review article focuses on trends and sustainable development in the hair care market. As income levels improve and quality of life is more important, Republic of Korea's beauty industry is drawing much attention as a growth industry beyond gender and age amid social and cultural development, and its importance is expected to grow further in the future. The hair care market of Republic of Korea needs to prepare for somatization so that greater added value can be created by establishing customized strategies to respond to the new environment of the future society. It is expected to implement various services that provide products and brand experiences that satisfy customers' emotions through constant research and development in the global beauty market.

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