

# *The Effect of Innovation Efficiency to the Cosmetics Industry*

Mengran Yuan<sup>1,a,\*</sup>

<sup>1</sup>Accounting, Beijing Institute of Technology Zhuhai, Zhuhai, 519088, China

a. Mengran.Yuan@zhuhai.bryant.edu

\*corresponding author

**Abstract:** With the development of technology, the improvement of people's requirements and the harder competition of cosmetics companies, continuous innovation has become one of the key capabilities of to occupy the market in the cosmetics industry. This paper mainly introduces how to improve the development status of cosmetics companies by improving innovation efficiency and uses the ratio of the number of patents to R&D expenses to measure innovation efficiency. By analysing the financial statements of L'Oreal Paris, Estee Lauder, Shiseido, Procter& Gamble and Beiersdorf, we conclude that companies with higher innovation efficiency are in the better business condition. Through our analysis, we point out that cosmetics companies should focus on innovation while cutting unnecessary costs and improving efficiency to improve their business conditions.

**Keywords:** Cosmetics Industry, Innovation Efficiency, Industry Competition

## 1. Introduction

With the development of information technology and people's requirements for cosmetics, innovation efficiency has become one of the criteria to measure whether the development status of beauty companies is good or not. The industry can only achieve long-term competitive advantage by focusing on technological innovation [1]. Innovation efficiency refers to the effectiveness of transforming inputs into outputs in technological activities, reflecting the utilization efficiency of innovation input factors [2]. At present, most of the research based on innovation efficiency stays in high-tech industries, such as biotechnology, information technology and the new energy automobile industry. However, no researcher has studied the effect of the cosmetics industry based on innovation efficiency. For multinational companies that mainly enter developed markets, the improvement of innovation efficiency is more beneficial to their development, and this theory is also applicable to the cosmetics industry [3]. The expenditure of research and development has a positive effect on the growth of productivity [4]. As a Packaged Mass Consumption Goods (PMCG) market, the cosmetics industry does not update its products as fast as electronic products such as smartphones, but it also needs to emphasize the ability to innovate. Otherwise, it cannot compete with other products in the market timely. Moreover, consumers use and buy such consumable products very frequently, which gives them more opportunities to learn about and buy new products. Innovation has characteristics of high cost and high risk [5], and it is difficult for enterprises to strictly control the cost and output of innovation. Therefore, it is necessary to study the guiding effect of innovation efficiency for the cosmetics industry.

This paper measures innovation efficiency through the ratio of the number of patents to research and development expenses [6]. Through analysing the annual report of L'Oreal Paris, Estee Lauder, Shiseido, Procter& Gamble, and Beiersdorf, we find that companies with higher innovation efficiency are in better business condition. Therefore, we conclude that innovation efficiency is important for the cosmetics industry and companies should focus on innovation as well as cutting down unnecessary costs and increasing efficiency to improve their business conditions.

## 2. Background of Companies

In this paper, we focus on the innovation efficiency of five cosmetics companies: L'Oreal Paris, Estee Lauder, Shiseido, Procter& Gamble, and Beiersdorf.

L'Oréal Paris mainly sells cosmetics, which has the largest scale in the cosmetic industry. It's the industry's leading enterprise and has huge development advantages and high market share. The L'Oréal Group has 33 research and development centres worldwide, and the number of patents filed increased by 10% in 2022. L'Oréal's main Bossin technology has a good effect on anti-aging. In 2022, L'Oréal launched Bossin PRO and a series of new products such as Skin Ceuticals A.G.E. Interrupter and Age Perfect Regenerating Serum.

Estee Lauder sells skin care products, cosmetics and perfumes. The company's "Green Chemistry" program aims to make its products more environmentally sustainable through innovative manufacturing processes. Estee Lauder's products are technologically advanced and innovative.

Shiseido has not performed well in the past two years due to the severe impact of the lockdown in China caused by the pandemic. The company's largest consumer market is China, accounting for 26.4% of the total revenue. Shiseido's operating profit grew by 12.8% after the pandemic was lifted, showing good development momentum. Shiseido has made a core breakthrough in the field of sunscreen, using Spirulina Burnaate extract and fluorescent zinc oxide to convert ultraviolet light into visible light that is beneficial to the skin.

As the world's largest household chemical brand, Procter & Gamble was the sixth largest company in terms of market value in 2008 and ranked as the tenth most admired company among the Fortune 500. Its main business includes personal care products, baby care products, and home care products. While cosmetics are not a major focus for the company, it produces a wide range of products that caters to a diverse customer base beyond just women. P&G innovates in the packaging and user experience of its products. DawnEZ-Squeeze (a dishwashing liquid brand), which use no-cover and self-sealing valve technology to allow consumers to squeeze every drop of dishwashing liquid with one hand, has seen good consumption growth in both the US and European markets. Innovative products such as Tide Power PODS also perform better in cold water due to technological breakthroughs, and organic sales per dose of detergent increased by about 10% globally.

Beiersdorf focuses on skincare products, with brands such as Nivea and Labello. It primarily sells in the European region but also has a sales presence in the Americas, Africa, Asia, and Australia. Beiersdorf expanded its product line by acquiring a majority stake in the skin microbiome technology company S-Biomedic.

## 3. Innovation Efficiency Analysis

In this paper, we collected net sales, patent numbers, and research and development expenses based on the L'Oreal Paris, Estee Lauder, Shiseido, Procter& Gamble, and Beiersdorf's published annual report in 2022. Through Table 1 we can find that due to the different size of the company, Procter& Gamble 's net sales and R&D expenses are the highest and are difficult to compare with other companies, but this does not mean that P&G has the highest efficiency in the utilization of R&D

funds. In that case, we use the more reasonable index to measure the innovation efficiency of these companies.

We measure innovation efficiency through the ratio of patent numbers to R&D expenses, and find that Estee Lauder has the highest innovation efficiency ratio.

Table 1: R&D status of companies

Companies	Net sales (million dollars)	Patent number	R&D expense (million dollars)
L'Oreal Paris	40775	561	1219
Estee Lauder	3751	346	307
Shiseido	8000	187	225
Procter & Gamble	54000	989	2000
Beiersdorf	8525	139	287

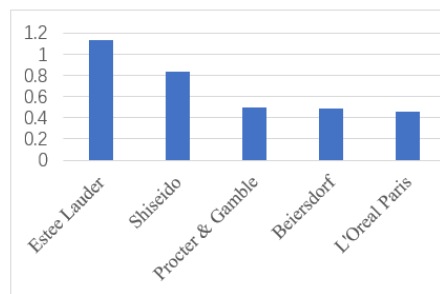


Figure 1: Innovation efficiency comparison

We obtain the R&D intensity by R&D expense over net sales [7]. According to Figure 2, Estee Lauder's R&D intensity is the highest. Estee Lauder's net profit fell 72% in 2021 due to the pandemic, and the travel retail channel, which sells in duty-free stores, was hit hard by the loss of tourism. Spending more on research and development at this time could help Estee Lauder get back to market with new products.

For further development of Estee Lauder, one is to continue to research on Sirtuin technology, so as not to be overtaken by other enterprises, and the other is to develop new technologies and develop some new areas. This company achieves anti-aging at the genetic level through Sirtuin technology, which can maintain cell telomere length, extend cell life, and promote cell regeneration and repair. However, this technology is not easy to implement on the product. Estee Lauder and Harvard University and Massachusetts Institute of Technology cooperation, after 15 years successfully deciphered Sirtuin1, Sirtuin2, Sirtuin3, Sirtuin6 four Sirtuin with the highest relevancy of skin. Published 20+ papers in top journals such as Nature, and applied this technology to the field of skin anti-aging. At present, Estee Lauder is the only company that continues to dig deep in Sirtuin technology and achieve considerable results, so Estee Lauder is spending more and more on research and development expenses.

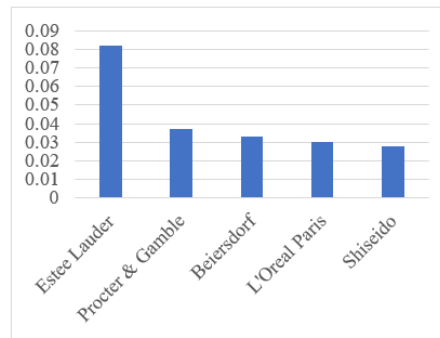


Figure 2: The R&D intensity of companies

#### 4. Suggestions

Through the comparison in Figure 1, We can find that for companies of the same size, the higher the innovation efficiency, the better the business condition. A large the company can invest more in R&D, but the innovation efficiency has been reduced to a certain extent. Although the output is more, it still not as effective as the effect on smaller enterprises. In the process of research and development, enterprises can specialize in a certain field and develop an exclusive technology to achieve higher customer recognition. Not only technological innovation, but also product packaging innovation is a part of improving customer satisfaction, which can bring better sales. Innovation can also be made more efficient by reducing the cost of innovation by adjusting the supply chain or using sustainable energy sources.

#### 5. Conclusion

With the rise of online shopping, people have more opportunities to learn about and buy new products launched by cosmetics companies. As a result, innovation speed has become one of the important criteria for consumers to evaluate products. By analysing the above data, we can conclude that more investment in R&D does not necessarily benefit the business operations, but high innovation efficiency will benefit the business conditions. The high risk of innovation and the uncertainty of the return are destined to prevent enterprises from focusing all their investment on innovation. However, neglecting innovation will not allow them to maintain good business conditions. Without the continuous introduction of new products, cosmetics companies will find it difficult to continue to develop in the cosmetics industry with many brands and fierce competition. Therefore, enterprises should pay more attention to innovation efficiency, balancing the R&D expense and outputs in order to avoid unnecessary waste.

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