Research on AR Technology Packaging Design for Coffee Brands in New Retail Model - Take Luckin Coffee as an Example

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Abstract. With the continuous development of the Internet and big data technology, the new retail model has enough room for development, and Luckin Coffee, as the representative company of new retail coffee in China, has become an emerging brand in China in just one year, gaining a good reputation and being able to stand out from Starbucks' unique situation to become the second-largest coffee chain brand in China. Nowadays, with the help of 5G technology, the application of augmented reality technology provides an opportunity for packaging design innovation, provides ideas to enhance the experience of packaging design, and adds interaction between packaging design and users as well, thus making the product more interesting. From traditional packaging design to AR technology design is undoubtedly a qualitative leap. Taking Luckin Coffee as an example, this paper discusses and studies the new retail model of Luckin Coffee, takes its coffee brand packaging as an object, carries out user demand analysis and simulation model establishment, and studies how to improve offline user experience and bring a new consumer experience by applying AR technology to packaging design.

Keywords: New Retail Coffee · Luckin Coffee · AR Technology · User Experience

1 Introduction

First is the integration of online and offline, the new retail maintains the convenience of traditional e-commerce network shopping and introduces offline stores to enhance consumer experience and feeling. Secondly, it has advanced technologies such as big data and artificial intelligence and realizes shopping and computing functions through small programs and cell phone APPs, which is conducive to collecting user data at a later stage. Finally, the target positioning is clear, which can meet the target customers' demand for consumption upgrades and is more cost-effective than a traditional business [1] (Table 1).

1.1 "Two-Line" Consumption Model Provides Convenient Services

The "dual-line" consumption model refers to the "online + offline + delivery" sales model. In the small program and APP, through efficient online payment, Luckin Coffee

Table 1. New retail channel development and evolution process.

+	Time	Mode
Single-channel retail	Before 2000	Traditional brick-and-mortar stores
Multi-Channel Retail	2000–2009	Traditional physical stores + Internet e-commerce
Cross-Channel Retailing	2010–2012	Traditional physical stores + Internet e-commerce + mobile e-commerce
Omnichannel Retail	2012–2015	Tangible stores + Intangible stores + Media information, etc.
Omni-channel New Retail	After 2016	A comprehensive experience with multiple channels of online services, offline experiences and the deep integration of modern logistics

can reduce the queue and have a better experience, and pay attention to digitalization to realize "order online, pick up in-store", and can deposit all consumption behavior data in the system to better understand customer consumption preferences. In terms of offline business, the main layout is in the lobby of office buildings or commercial centers, and stores are opened in the working and living circles where young people gather to meet the convenience of 5-min coffee there and to meet the needs of consumers in various scenes through self-pickup and take-out.

1.2 Take Innovative Sales Tactics to Gain User Attention

The founder of Luckin Coffee has rich experience in Internet marketing. In terms of marketing methods, the company mainly adopts innovative models such as social pulling and advertising pulling. Social pulling, with "free coffee" at the time, through sharing WeChat links and other ways, quickly informed the people around the store, and generate a radiation effect. The advertising campaign, with celebrity endorsement, enhances the brand image and can locate customers according to their geographical location, collecting customer data and consumer preferences, which is highly consistent with its target customers mainly being office workers [2].

1.3 Return to the Essence of Coffee to Grasp the Consumer Trend

The positioning of Luckin Coffee is to return to the coffee itself, Luckin is not selling space, it is selling coffee, affordable and high-quality coffee, raw materials using Arabica coffee beans, contracted to the world barista competition champion. Starbucks' concept of creating a "third space" for coffee social scenes has a good experience, but there must be some weaknesses because the scene-based experience makes its price high, and also makes it resistant to Internet takeaway, which also gives Luckin a contrasting brand positioning strategy. These two differentiators, so cheaper and more convenient, are aimed at Starbucks. Compared with Starbucks coffee, Luckin Coffee boldly "de-spatialize" to reduce the threshold of coffee consumption, so that the majority of students and young

people entering the workplace can often afford to spend, to ensure that consumers are provided with a cup of high-quality coffee. Each cup of coffee is 16–27 yuan, much lower than similar products of Starbucks, and will provide multiple channels to get coupons, so that consumers can experience high-cost performance.

2   Analysis of the Current Situation of Luckin Coffee

2.1   New Retail Model

The business model adopted by Luckin Coffee is a new retail model driven by new technology, which has allowed it to rise in a blitzkrieg fashion from the beginning and quickly become a unicorn, taking only 17 months from birth to IPO, creating a record for the world's fastest IPO company with a market value of nearly $5 billion on the IPO. This new retail model is built on a mobile app and store network. Luckin burned money for crazy expansion, mainly distributed in the offline store expansion, overwhelming advertising, crazy subsidies, and so on. Through online sales constantly burning money to achieve increased revenue and customers, forming economies of scale to improve, reduce costs and thus generate profits. It is to use Internet thinking to reconstruct the coffee industry, promote model innovation through technological innovation, and ultimately bring consumers a new user experience, interact with customers, and achieve a comprehensive Internet of store operations inventory and supply chain management [3].

2.2   Reasonable Price of Products

Luckin uses subsidies for fission marketing. Compared with directly handing over store advertising fees to advertising companies, fission advertising subsidy marketing is more effective, as it can turn store advertising fees into products and benefits for consumers when they are known to them, thus enhancing consumers' trust and goodwill towards the brand and getting more traffic as a result. Luckin Coffee is to make it easy for every customer to enjoy a cup of good coffee that is worth drinking, so its product pricing is relatively low, and will also increase consumer desire to buy by giving away coupons or buying activities.

2.3   Brand Communication Seen to Be Effective

Luckin Coffee in product innovation continues to iterate, to create explosive products, raw coconut latte in the first anniversary of the market took a year 100 million cups of "certification", today ushered in a heavyweight annual new product coconut cloud latte, the first day of single-store sales of more than 130 cups. Along with the arrival of the new product, an overwhelming amount of publicity also appeared on social media, co-branding with recognizable brands, adopting characteristic packaging, interacting with co-branded spokespersons, all these series of operations undoubtedly added a wave of fans and curious consumers to Luckin, achieving a good brand communication effect. Luckin Coffee has been carrying out online and offline publicity at the same time. Offline advertising is the main focus, with ads placed in major central cities, office

buildings, and large commercial areas, mainly to cover the target group. Online is the social media and APP advertising, updated every Monday public number, maintaining a simple page header layout. Now Luckin Coffee also pays great attention to consumer product feedback, when consumers put forward the new coffee taste is not good, Luckin official is to flirt with the form of cartoons to express apologies for not being able to meet most consumers, to give everyone a platform to spit, this way also put consumers have a certain good feeling and a sense of belonging [4].

2.4   Brand Spokesperson Support

In July 2021, Luckin established a partnership with Gu Ailing, and officially signed the contract in September of the same year. When focusing on Gu Ailing's two races for gold and silver, Luckin was the first to send out blessing posters on Weibo and launched a prize interaction to send coffee and Gu Ailing's autographed photo to enhance user engagement. In addition to the public domain traffic, Luckin also updated Gu Ailing's recommended menu in the private domain traffic for the first time, adding the label of winning the championship, sending coupons to the official community to celebrate, and pushing the news of the race to the APP. One hour after the offline Gu Ailing competition, brand posters celebrating Gu Ailing's first gold and congratulating Gu Ailing for winning silver appeared in elevators, theaters, and other offline media. The store also set up a flash theme store, with a skiing wall, a photo wall, and other materials such as Gu Ailing cup sleeves and cheering straws. On the product side, we launched the new Gu Ailing customized products, Luckin Walden Ski Latte and Blue Velvet ZaXue Latte. Consumers placed orders, punched cards, took photos together, and spontaneously spread them on social media platforms, making drinking Luckin a ritual to celebrate the Winter Olympics.

2.5   Unique Brand Vision

The visual presentation of Luckin Coffee is very unified, the use of a large area of blue is very consistent with the business attributes of white-collar circles, and the "elk" logo against a solid background is very bright, visually leaving a memory point in the minds of users. Users are affectionately called "little blue cup", or even "blue" friends. People's default coffee represents a high quality of life, and the visual image of Luckin starts from this point to enhance the uniqueness of the brand image so that consumers and the actual consumption needs have a good fit. The latest co-branded products have adopted recognizable and unique packaging, which has aroused the interest of consumers, and many people have made some DIY works out of the packaging bags, which are so popular that the packaging is out of stock, and Luckin has generously sent the source files of the packaging design to consumers so that they can download and print them by themselves.

3   The Application Value of AR Packaging Design

AR is a new technology that can fuse and overlap some virtual models with the surrounding environment, which means that users can complete operations such as moving and
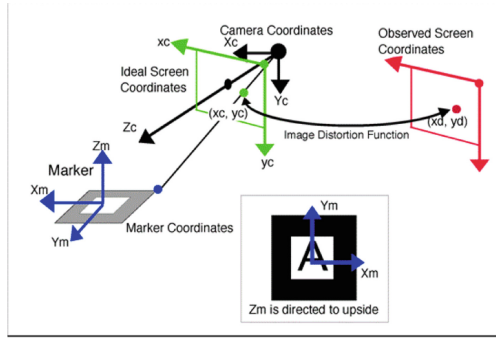
Fig. 1. Mapping Coordinate Chart.

$$h \begin{bmatrix} x_C \\ y_C \\ 1 \end{bmatrix} = \begin{bmatrix} C_{11} & C_{12} & C_{12} \\ 0 & C_{22} & C_{23} \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} R_{11} & R_{12} & R_{13} & T_1 \\ R_{21} & R_{22} & R_{23} & T_2 \\ R_{31} & R_{32} & R_{33} & T_3 \end{bmatrix} \begin{bmatrix} X_m \\ Y_m \\ Z_m \\ 1 \end{bmatrix} = CT_m \begin{bmatrix} X_m \\ Y_m \\ Z_m \\ 1 \end{bmatrix}$$

Fig. 2. Matrix formula.

zooming through movements, forming a dynamic form of interaction with the product itself, thus bringing a more special scene experience.

AR-based on computer vision is to use computer vision methods to establish the mapping relationship between the real world and the screen so that the graphics or 3D models we want to draw can be shown on the screen as if they are attached to real objects. For example, Marker-Based AR is to put a pre-made Marker, similar to a QR Code, on a real location, which is equivalent to The Marker is then recognized by the camera and its position is determined, and then the coordinate system with the center of the Marker as the origin is called Marker Coordinates, which is the template coordinate system. See Fig. 1 for details.

In the actual coding, all these transformations are a matrix, the matrix in linear algebra represents a transformation, and the coordinates of the matrix left multiplication is a linear transformation (for the translation of this nonlinear transformation, you can use the chi-square coordinates to matrix operations). Formula details are shown in Fig. 2. Matrix C is the camera internal reference matrix, matrix Tm is the camera external reference matrix, where the internal reference matrix is supposed to be calibrated in advance to get the camera, while the external reference matrix is unknown, according to the screen coordinates (xc, yc) and a well-defined identifier coordinate system and internal reference matrix to estimate Tm, and then based on Tm for graphical drawing.

This way can solve the problems of single form and limited information communication in packaging design, but also increase the quality packaging effect of products, increase the interactive experience between users and products, and let consumers experience the fun and freshness of combining virtual and reality, which is also a kind of brand
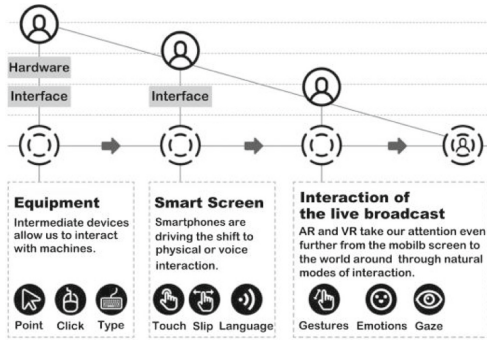
Fig. 3. Evolution of Interaction.

communication in disguise. Compared with traditional packaging design, AR technology packaging design can meet the diversification of service content, and visual performance, and allow users to get the first time to access product information, breaking the traditional single and boring, so that the user from the beginning of the two-dimensional experience upgraded to three-dimensional multi-sensory interaction, but also to further enhance consumer goodwill towards the brand image, increasing the interaction between consumers and the brand time, so that consumers want to take the initiative to understand the brand [5] (Fig. 3).

Luckin Coffee is a typical new retail model. Through the accurate analysis of integrated user feedback data, the brand can deeply understand users' consumption needs, carry out the iterative transformation and upgrade of consumer services, and finally realize the positive enhancement of brand value and complete the cycle and closure of the consumption chain. AR packaging can be said to bring a brand new technology, and also create a brand new form and meaning for product packaging design. Its application value is mainly reflected in the fact that AR technology packaging design is more interesting and can penetrate the hearts of users, more in line with the preferences of modern young groups, giving a more immersive experience belonging to the product, thus enhancing the sense of brand interaction. Secondly, in this data-based network era, AR technology can well digitize the packaging design, which can both facilitate the user and understand the user's preferences and habits through data, thus forming a distinctive digital analysis of the brand to carry out the next offline activities or brand strategy research.

4   AR Technology Applied to Luckin Coffee Packaging Design

Traditional packaging design is generally through the common printing technology and static display to convey product information, but the packaging design of AR technology is very different from it, usually through three-dimensional or animation video and other forms to convey the display [6] (Table 2).

According to the research, it can be seen that when users buy coffee, they pay more attention to its packaging for the convenience of carrying and storage, but on top of that users are also full of expectations for the new technology design style of AR coffee packaging.

Table 2. The appeal of coffee packaging.

Category	Numerical value
Easy to carry and store	82
Design Style	67
Additional New Technologies	21
Rich in information	12

4.1 Before User Purchase

AR technology packaging design should have a precise shopping guide function, which can be applied in unmanned retail or self-service shopping offline stores, allowing consumers to identify the packaging through the mobile terminal to trigger the "Luckin AR assistant", so that consumers can intuitively see the product information and various physical display diagrams on it to It also avoids the awkwardness of communication for some "social phobic" groups and makes the sales model more humane. And also can use the background data upload to analyze consumer preferences and frequently purchased products, information screening, pushing more efficient information, to give users a diversified quality experience. The interface design of "Luckin AR Assistant" remains the same, simple and clear, which not only conforms to the brand tone but also reduces the cost of packaging design and makes offline purchases more intuitive and convenient.

4.2 After User Purchase

When the AR package is applied to consumers, "Luckin AR assistant" will display the variety of coffee, characteristics, product story, and the best way to drink time at the terminal, and also provide related product games, adding infinite fun. When consumers get the products, they actually pay more attention to the taste and ingredients of the products, so it is a very crucial step to make the ingredients transparent to gain consumers' trust. This form can be applied to AR packaging, so that each different coffee bean has its own story, making consumers want to know more about the brand and its story. Create a unique personalized scene experience of the product, and present the boring information more concretely and with storytelling [7].

4.3 After Drinking by Users

A good brand should also be very rigorous for after-sales service, how to achieve AR packaging technology in the case of users to drink the product can also be used to the fullest is an additional service experience. The "Luckin AR assistant" will carry out dynamic demonstration tutorials, so that each user can personally experience the wonderful experience of brewing coffee, with the after-smell of coffee, visual senses, and olfactory senses to form a unique experience. After tasting the delicious coffee, there is no shortage of soothing chicken soup for the soul. Users can receive their chicken soup for

the soul through AR packaging, which can comfort the young group under work pressure and awaken the emotional interaction between them and the brand. Star endorsement is also an introductory topic nowadays. The spokesperson of Luckin Coffee, Gu Ailing, is a hot Olympic star nowadays, so using AR packaging to take a virtual photo with the star and also share it on the media platform is a kind of surprise return for consumers, and it is also encouraging consumers to actively share their self-consumption experience.

5   Conclusions

To sum up, Luckin is not only a coffee retail store, but more like an Internet company, and its specimen significance lies in the exploration of digital reconfiguration of retail. The use of big data analysis for site selection, management of supply chain, and scientific layout all achieve truly refined management, which greatly saves costs and realizes user value in all aspects. And the visual effect of combining virtual and reality with AR technology can bring more freshness and interest to Luckin Coffee in packaging design, and also form the interaction between consumers and products. In a fully competitive environment, analyze the worst or missing points of the benchmark companies in the industry, make this point stronger, that is, differentiation, and you will naturally be able to stand out, and at this point, Luckin has done very well. The company's advertising budget has been converted to allow consumers to obtain benefits by sharing a friend's registration code to get a cup of coffee, and friends can also get it, so that the online traffic can be integrated, first building the enterprise traffic, and then using the existing traffic pool to do user activation strategies. The key to the success of Luckin coffee also lies in the ability to capture the social needs of young people, starting with the product packaging, so that young people will want to take pictures to place on social platforms, creating hot topics. The addition of AR technology can add a sense of technology to the product packaging on this basis, so that consumers have a more sense of experience, presenting a lively and interesting way. And AR technology can also solve the problem that product information is not conveyed in place and the spatial location is limited, so that product promotion is no longer stuck in the flat era, 3D three-dimensional display can be more attractive to consumers so that the packaging has the ability of self-marketing. Whether AR packaging design introduces product information, provides news, explains the brand story, or some interactive mini-games, it can realize the informationization and digital innovation of product packaging, thus promoting the trend of intelligent packaging.

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