

ANALYSIS OF SUSTAINABLE DESIGN IN CHILDREN'S CLOTHING FROM DESIGNERS' PERSPECTIVE: A CASE STUDY IN GUANGZHOU, CHINA

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Abstract

This study examines the perspectives of specialists on the sustainable design and development of children's clothing in Guangzhou. It primarily focuses on the factors that influence designers' sustainable practices, including the manufacturing environment, material selection, cost control, and consumer preferences. In-depth interviews were conducted with five children's wear design experts in Guangzhou using a semi-structured approach. Guided by grounded theory, data analysis was performed using Nvivo software and thematic analysis. The research reveals that the current design trends in Guangzhou emphasize style and color diversification, with a growing focus on environmentally friendly materials. While designers prioritize sustainable design, their considerations for corporate profits can sometimes limit this focus. The challenge of balancing profitability with sustainability, fashion, and children's health may lead to issues such as compromised innovation, lower-quality materials, and reduced overall product quality.

Keywords: Children's Wear, Sustainable Design, Guangzhou, Designer's Perspective, and Interview.

1.0 INTRODUCTION

As a significant sector of the fashion industry, children's wear design has a profound impact on society and the environment. Social development and increased attention to children's growth have created numerous opportunities for the children's wear market. In China, this has led to the emergence of numerous children's wear enterprises producing on a large scale. According to statistics from FORWARD-THE ECONOMIST (2022), the retail market for children's wear in China reached 256.364 billion yuan in 2021, representing a year-on-year increase of 15.6%. By November 2022, there were 4,942 enterprises in Guangdong Province engaged in the production of children's clothing, shoes, and accessories. This rapid growth has inevitably resulted in various outcomes, with the most prominent being the impact on the environment and children's health.

Many companies make unreasonable choices in fabrics, dyeing materials, and processes, compromising the safety and comfort of children's wear and demonstrating limited attention to environmental issues (Rhee & Johnson, 2019). In 2022, the General Administration of Market Supervision of China reported failure rates of 13.2%, 16.4%, and 14.9% in three random inspections of children's and infants' clothing, with the most significant issue being the inclusion of large amounts of chemical fibers in inferior products, primarily to reduce costs (Li, 2022). This practice contradicts the sustainable development goals (OWG, 2014).

Sustainable development is crucial for achieving global goals such as health, well-being, and responsible consumption and production (OWG, 2014). The clothing industry needs to transition to a transparent, low-carbon, high-quality, and high-

standard development model to address pollution and energy consumption issues (McDonough & Braungart, 2010). Guangzhou, as a major hub for children's wear design and manufacturing in China, has seen rapid industry development, attracting the attention of many experts and practitioners. Children's wear designers are key players in promoting the green development of the industry; their awareness of environmental protection motivates them to design children's clothing sustainably (Jalil & Shaharuddin, 2020). However, the current state of children's wear design in Guangzhou and experts' views on green design consciousness have not been thoroughly explored.

In response to this gap, this study focuses on experts' understanding and perspectives on green design by conducting interviews with children's wear design experts in Guangzhou. It examines their cognition and attitudes towards sustainable materials, production technology, and consumer preferences. This research aims to provide in-depth insights and practical recommendations for the sustainable development of the children's wear design industry in Guangzhou, offering strong support for future design practices and industrial growth.

2.0 A LITERATURE REVIEW

2.1 Challenges and Opportunities in the Sustainable Development of China's Children's Wear Industry

At the 68th session of the United Nations General Assembly, the Sustainable Development Goals (SDGs) were established. Seventeen specific targets under these goals cover many aspects, some of which are closely related to the clothing industry, such as health and well-being (SDG 3) and responsible production (SDG 12) (OWG, 2014). To achieve sustainable development, the textile industry needs to address the issues of excessive resource use, environmental pollution, and worker safety. McDonough and Braungart (2013) argue that enterprises need to abandon traditional production methods and transition to a transparent, low-carbon, high-quality, and high-standard development framework to mitigate excessive pollution and energy consumption. Sustainability in children's wear design plays a crucial role in the garment production process and should be a significant concern.

Children's wear refers to clothing suitable for minors of different ages, including infants (from birth to 1 year old), toddlers (1-3 years old), preschool children (3-6 years old), pupils (7-11 years old), and teenagers (12-15 years old) (Cui & Liu, 2015). Children's wear design encompasses all stages of clothing design for these age groups and focuses on elements such as styles, colors, fabrics, and embellishments. It must consider children's physical and mental needs, such as comfort, safety, mobility, and personalization. Sustainable children's wear design not only emphasizes the appearance and fashion of clothing but also considers fabric selection, design styles, and functionality to meet children's needs for different occasions and seasons (Tian, 2015). It also needs to consider the relationship between children and the environment to promote harmony among children, the environment, and sustainable development (Sang et al., 2017).

The children's wear industry in China began in the early 1990s and entered the market later than its international counterparts (Mo, 2019). The number of related enterprises exceeds 10,000, with a market size of about 200 billion yuan. However, the pass rates for market spot checks are currently unsatisfactory. The failure rates of the last three

spot checks were 13.2%, 16.4%, and 14.9%, respectively. The primary reason for the high fiber content in inferior products is cost-cutting (Li, 2022). Many enterprises make unreasonable choices in fabrics, dyeing materials, and processes, compromising the safety and comfort of children's wear (Rhee & Johnson, 2019). The industry's focus on cheap materials and manufacturing technology often neglects ecological impact and sustainable practices, hindering its development in a more sustainable and environmentally friendly direction. Designing or updating clothes without considering sustainable practices may lead to significant fabric waste in the production process, negatively impacting the environment (Nursari & Djamel, 2019). Additionally, some designers prioritize aesthetics over functionality, causing discomfort for children during actual wear (Tong, 2021).

Guangzhou is the city with the highest transaction volume in the national textile and garment market, exceeding 95.9 billion yuan. In 2020, the textile and clothing market below the specified scale was expected to generate about 100 billion yuan in revenue (Sun, 2023). Guangzhou, one of the most populous cities in China, recorded about 3.2 million children aged 3-6 in 2020 (China Census Yearbook). The city has numerous children's wear manufacturing enterprises that excel in scale, production capacity, and technical level. According to Forward-The Economist (2022), China has over 10,000 children's wear enterprises, with 4,942 in Guangdong Province alone. Guangzhou, as the textile and clothing center of this province, holds the largest share. By 2022, there were 1,132 related children's wear enterprises in Guangzhou (Qicha Cat and Economist). However, there are many issues within these enterprises. According to Mo (2019), inspection data from the Guangzhou Inspection, Testing, and Certification Group in 2017 and 2018 revealed various defects in children's wear, including unqualified accessories, harmful chemical components, and performance problems such as pilling, poor color fastness, dimensional changes after washing, and cracking.

Despite the large number of children's wear enterprises in Guangzhou, these enterprises generally exhibit weak innovation and high product homogeneity. Low-end products dominate the market, while high-end products are underproduced. In competition, these enterprises often rely on price rather than quality and brand to succeed (Lu, 2022). The industry's limited consideration of ecological impact, alongside cheap materials and manufacturing processes, and the lack of widespread adoption and implementation of sustainable practices have hindered the development of a more sustainable and environmentally friendly children's wear industry.

2.2 The sustainability of children's wear design

The clothing industry is widely acknowledged as one of the most environmentally damaging sectors globally (Fashion Innovation, 2023). This recognition underscores the critical importance of sustainable practices in children's wear design, given its profound implications for the well-being of future generations. Sustainable children's wear design involves producing clothing that integrates environmental and social considerations while maintaining economic viability (Diddi et al., 2019). Children's wear designers play a pivotal role in advancing sustainable development within this sector, driven by their growing environmental consciousness (Jalil & Shaharuddin, 2020).

Sustainable design principles advocate for minimizing environmental impact through strategies such as reducing consumption, reusing materials, and maximizing recycling efforts without compromising comfort or aesthetic appeal (Paço et al., 2021). This

approach extends across various dimensions of children's wear design, including the careful selection of eco-friendly materials, adoption of efficient production technologies to reduce waste, and efforts to prolong product lifespan (Bezerra, 2017). Moreover, sustainable design principles emphasize the importance of ensuring that children's clothing meets not only aesthetic expectations but also their physical and psychological needs, reflecting a nuanced understanding of child development (Köksal, 2007).

However, challenges persist within the industry. Some enterprises prioritize short-term economic gains over long-term environmental and health considerations, resulting in insufficient investment in sustainable technology research (Zhang & Wang, 2017). This issue is particularly evident in the design phase, where limited understanding of infants' psychological and physiological characteristics can lead to products that do not adequately meet children's needs (Li & Chen, 2020).

Technological innovations are crucial in advancing sustainable children's wear design. Recent developments include the use of biodegradable and recycled fabrics, such as organic cotton and recycled polyester, which reduce environmental impact throughout the product lifecycle (Blackburn, 2009). Innovative production techniques, such as 3D printing and zero-waste manufacturing, further enhance sustainability by minimizing material waste and energy consumption (Kantaros et al., 2021).

Consumer awareness and behavior play a significant role in driving demand for sustainable children's wear. Increasingly, consumers prioritize eco-friendly products and support brands that demonstrate ethical practices and transparency in their supply chains (Reynolds, 2024). This shift in consumer preferences has prompted many children's wear brands to adopt sustainable sourcing and manufacturing practices, thereby influencing industry standards and promoting sustainable innovation.

Regulatory frameworks and certifications, such as the Global Organic Textile Standard (GOTS) and various environmental regulations, play a critical role in promoting and regulating sustainable practices in the children's wear industry (Standard, 2008). These standards ensure compliance with environmental and social criteria, guiding manufacturers and designers towards more sustainable production methods. Collaborative efforts across the supply chain are essential for advancing sustainable children's wear design. Partnerships between designers, manufacturers, retailers, and consumers foster innovation and knowledge sharing, leading to improved sustainability practices and greater industry-wide impact (Ma et al., 2024).

Looking ahead, the future of sustainable children's wear design will likely be shaped by ongoing technological advancements, evolving consumer expectations, and regulatory developments. Challenges such as supply chain transparency, scalability of sustainable practices, and the need for continuous innovation will require concerted efforts from all stakeholders to achieve lasting environmental and social benefits.

2.3 The Significance of Sustainable Design Awareness

The design phase holds pivotal significance in shaping the environmental footprint of products across various industries, including children's clothing. Designers recognize that adopting sustainable practices can lead to positive outcomes throughout the product lifecycle (Black, 2008; Fletcher, 2007). Within the realm of children's clothing design, practitioners have explored numerous strategies to assess, minimize, or eliminate environmental impacts (Early, 2018). These strategies encompass

minimalist design approaches, reduction in material consumption, and the creation of versatile garment forms that extend product lifespan. Consequently, designers wield substantial influence over the sustainable trajectory of clothing production (Corvellec & Stål, 2007). Fashion designers serve as crucial agents within the product development cycle, possessing the ability and opportunity to introduce products that actively mitigate environmental harm.

Despite the potential benefits, designers who lack familiarity with sustainable frameworks often express skepticism or resistance towards sustainable practices (Gwilt, 2012). Research indicates that while sustainable design principles are increasingly integrated into circular business models within the broader fashion industry (Pedersen, 2019), there remains a gap in understanding how designers specifically perceive and engage with sustainability in the context of children's clothing. Therefore, it becomes imperative to explore the extent of designers' awareness regarding sustainable practices and their understanding of consumer demands within the children's clothing sector (Cooper, 2003).

Moreover, studies underscore the multifaceted challenges and opportunities that arise from integrating sustainability into design processes. Designers must navigate complexities such as sourcing environmentally responsible materials, optimizing production techniques to minimize waste, and aligning product aesthetics with evolving consumer preferences for sustainable products (Fletcher, 2013; Clark & Charter, 2007). The growing body of literature emphasizes the need for designers to not only possess technical knowledge of sustainable design strategies but also to cultivate a deeper understanding of consumer behavior and market dynamics to effectively implement sustainable practices (Fletcher, 2013; Joy et al., 2012).

Furthermore, the discourse on sustainable design extends beyond environmental considerations to encompass social and economic dimensions. Designers increasingly recognize the importance of ethical sourcing, fair labor practices, and the promotion of social equity within global supply chains (Fuad-Luke, 2013; Boks & Diehl, 2006). These aspects underscore the holistic approach necessary for sustainable design in children's clothing, where considerations of durability, comfort, and child safety are paramount alongside environmental stewardship (Shen & Chiou, 2010).

In conclusion, while there is a growing recognition of the pivotal role of design in shaping sustainable practices within the children's clothing industry, there remains a need for deeper empirical insights into designers' attitudes, challenges, and strategies towards integrating sustainability into their creative processes. Addressing these gaps will not only enrich theoretical understanding but also inform practical interventions aimed at fostering more sustainable and socially responsible design practices in children's clothing.

2.4 Research Gaps and Issues

China's current children's clothing industry faces numerous challenges, including low innovation capability, significant product homogenization, and insufficient focus on sustainable development. Particularly within children's clothing design, designers play a pivotal role in the product development process. However, there exists a noticeable gap in designers' awareness and attitudes towards sustainable design, leading to evident deficiencies in practical implementation. Therefore, this study aims to investigate the challenges and current status of sustainable development in the children's clothing industry in Guangzhou. The study seeks to analyze whether

designers recognize the significance of sustainability and have undertaken specific measures to promote sustainable design practices. Table 1 outlines the research questions and objectives of this study, providing guidance for subsequent research methodologies and result analyses.

Table 1: Research question and objectives.

Research question	Research objectives
What are the facts about children’s clothing design and development in Guangzhou?	1. To explore the current series of problems in children’s clothing design in Guangzhou.
	2. To explore the factors that affect designers’ sustainable design.
	3. To explore the perception and attitude of Guangzhou children’s wear design experts on sustainable children’s wear.
	4. To assess the future directions in sustainable children’s clothing design.

3.0 METHODS

The research employs a qualitative research method involving in-depth interviews with children’s wear design experts in the form of unstructured interviews. Unstructured interviews, also known as “in-depth interviews,” emphasize the use of open-ended questions to allow respondents to freely express their views. The format and content of the questions are not rigidly predetermined, which enhances personalization and flexibility, facilitating a deeper understanding of the unique perspectives and experiences of the interviewees (Fontana, 2005). This method involves three stages (see Figure 1): preparation before the interview, conducting the interview, and post-interview activities.

In unstructured interviews, the content, format, and questions are loosely structured, with researchers shaping questions based on the outlined topics to be covered in the conversation. This intentional structural design aims to strike a balance between flexibility and guidance, thereby promoting active participation and meaningful dialogue (Corbetta, 2003).

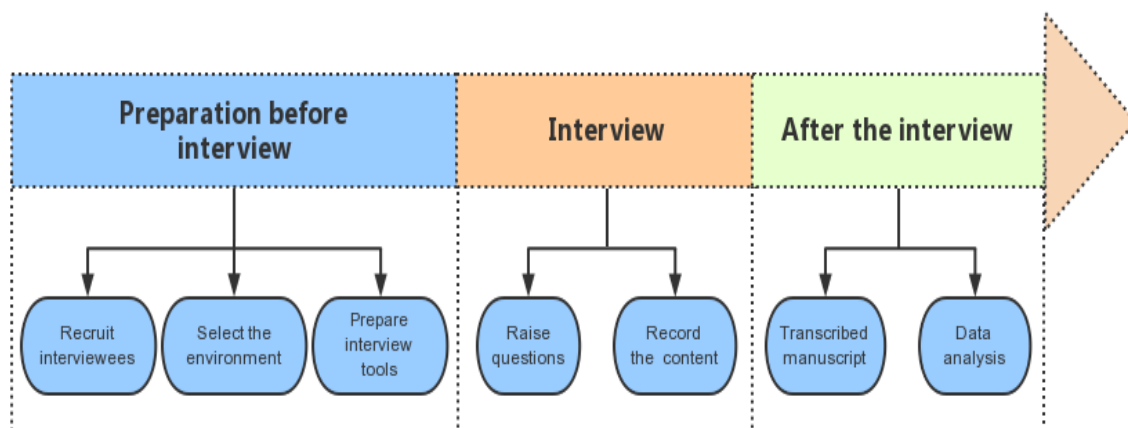


Figure 1: Three stages of interview in this research.

3.1 Preparation before the interview

During the data collection phase, the researcher gathered necessary information and data for the study through expert interviews. Five children’s clothing design experts were selected, comprising three from children’s clothing design companies and two full-time teachers of clothing design at universities in Guangzhou. These experts

possess extensive experience and expertise in children’s clothing and actively engage in projects related to sustainable children’s clothing design.

The researchers developed a series of open-ended questions to guide participants in sharing their insights, opinions, and personal experiences regarding sustainable children’s clothing design and its current landscape. Prior to the actual interviews, a pretest was conducted with one participant to ensure clarity and appropriateness of the questions. Based on feedback received, necessary revisions and adjustments were made to enhance the quality of the interview questions and align them with the study objectives.

Once the interview questions were finalized, individual meetings were scheduled with each participant, either in person or via video conference. The researcher accommodated participants’ preferences and schedules to ensure mutual convenience. To maintain confidentiality, participants were identified using specific codes instead of their names when presenting study results (see Table 2).

Table 2: Demographic Profile of Participants.

Participant	Gender	Age	Educational Background	Professional Experience	Selected Group	Parental status
P1	Male	35	Fashion Design Major	7 years	Designer	Yes
P2	Female	33	Fashion Design Major	5 years	Designer	No
P3	Female	32	Fashion Design Major	5 years	Designer	Yes
P4	Female	32	Fashion Design Major	6 years	Educator	Yes
P5	Female	34	Fashion Design Major	8 years	Educator	No

3.2 Interview

The interview followed a standardized process (see Figure 2). The author utilized a pre-determined interview outline as a guide during the interview. However, the process allowed flexibility for researchers to adapt and reorganize the sequence of topics based on the interaction with respondents. This adaptive approach ensured dynamic and insightful interviews. As the interview progressed, questions could be adjusted according to the unfolding discussion. Respondents’ responses often prompted the introduction of new related questions, thereby enriching the depth and breadth of interview findings. This methodology aimed to foster an environment conducive to open communication, trust-building, and the generation of rich and meaningful interview data.

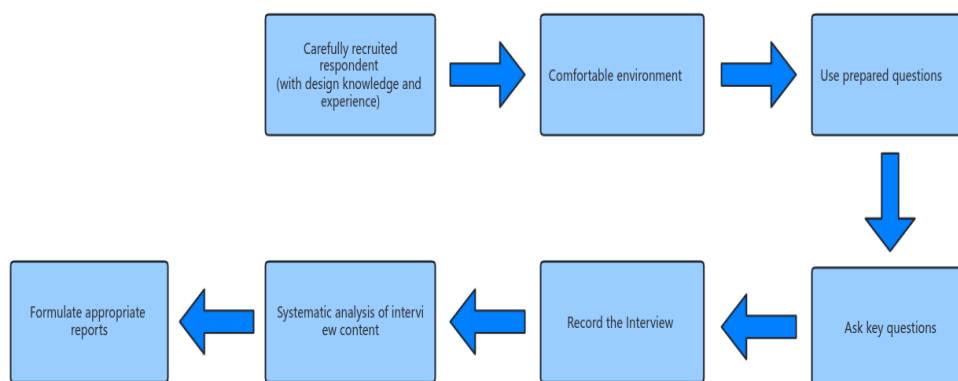


Figure 2: The process of interview.

3.3 After the interview

3.3.1 Data processing

Following the interviews, researchers proceeded with transcription, encoding, and analysis of the recorded content. Transcription ensured accurate capture of respondents' responses and expressions for subsequent analysis and interpretation. The interviews yielded a substantial amount of data, totaling nearly 26,000 words. On average, each interview lasted approximately 45 minutes, ranging from half an hour to an hour.

In the initial processing of textual materials, NVIVO software was employed to encode the transcribed manuscripts. To facilitate identification of interview content from each participant, the study developed specific codes for different types of interviewees, as detailed in Table 3. Each type of interviewee encompassed multiple individuals, with each participant assigned a unique identifier using a consistent numbering method. For instance, the first children's wear design teacher interviewed was coded as "T1," ensuring a systematic and organized coding system across all participants.

Table 3: Coding of interviewees.

Interviewee	Coding
Children's wear design teacher	T
Children's wear designer	D
Children's clothing buyer	B

3.3.2 Data analysis

Grounded in the principles of grounded theory (Glaser & Strauss, 2017), this study employs a three-level coding approach to analyze the data: open coding, axial coding, and selective coding.

During the open coding stage, researchers meticulously review and extract keywords and concepts from the raw data, organizing them into initial categories. This process involves close examination of the data, word by word, supported by software tools such as NVIVO to create coded entries and associate information with free nodes, thereby forming initial conceptual categories (Dhakal, 2022).

In the axial coding stage, researchers reassess the relationships among the initial categories to deepen their understanding of the research topic. This stage aims to identify a central category (main category) through thorough analysis and organization of the initial concepts. It establishes a more comprehensive and nuanced conceptual framework, laying the groundwork for subsequent analysis.

Finally, in the selective coding stage, core categories and their attributes are extracted based on insights gained from axial coding. This stage refines and enriches the conceptual framework, ensuring a thorough and profound understanding of the research phenomenon. The ultimate goal is to develop a rich and well-structured conceptual framework that provides deep insights and understanding for the research.

For a visual representation of the specific coding process, please refer to the accompanying figure:

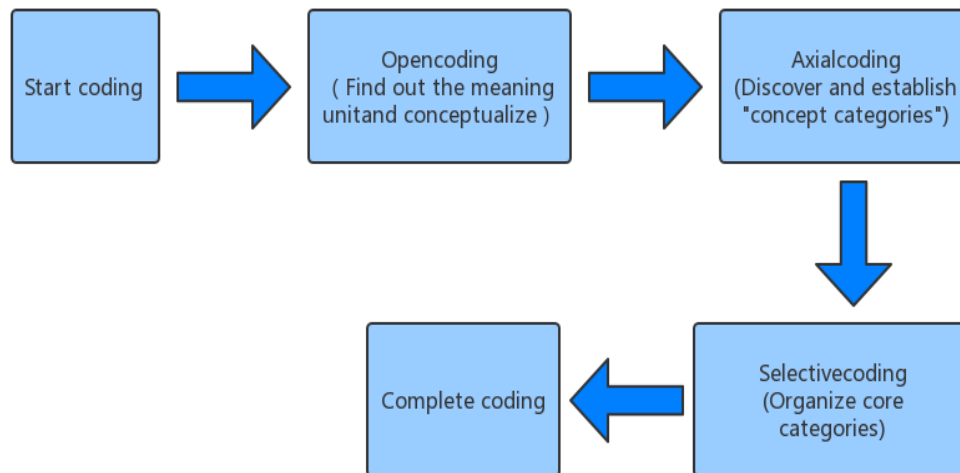


Figure 3: The specific coding process of this study.

4.0 RESULTS AND DISCUSSIONS

4.1 Coding analysis

4.1.1 Open coding

Through analysis and integration, the following results of open coding have been obtained (see table 4). The open coding results provide a comprehensive understanding of the current trends, preferences, and strategies in the children's wear design industry. The insights from these experts highlight the importance of balancing practicality, safety, and aesthetics while considering the economic and environmental impacts of design choices.

Table 4: Results of open coding

Initial category	conceptualize	Original data statement (taking P1 as an example)
Position and Experience	Children's wear buyer, designer, and design educator, each with over 5 years of experience	P1: Children's wear buyer with over 5 years of experience.
Experience in Caring for Children	All respondents have experience in caring for children	P1: Has experience in caring for children.
Evaluation of Local Children's Wear Brands	There is a scarcity of high-quality brands, with brands like Yingshi and Chanel being relatively well-regarded. Most brands prioritize designer interests and economic benefits over environmental and health concerns	P1: Many Guangzhou brand designers design based on their own interests, with insufficient focus on environmental and health considerations.
Environmental Protection and Health	There is insufficient attention to environmental protection and health among Guangzhou brands; intense competition leads brands to prioritize survival and growth	P1: Yingshi and Chanel are relatively well-regarded, but there is insufficient focus on environmental protection and health.
Basis of Parents' Purchasing Decisions for Children's	Parents primarily base their purchasing decisions on personal preferences, with children gradually	P1: Parents base their purchases on personal preferences, with children

Clothing	influencing these decisions as they grow older. The decision-making authority varies across different age groups.	gradually influencing decisions as they grow older.
Design Requirements for Children's Clothing Aged 3-4 Years	Designs should be simple, safe, and playful, avoiding adult-oriented styles and accommodating active movements	P1: Designs should be simple, safe, and playful, avoiding adult-oriented styles.
Color and Patterns	Colors should be rich, vibrant, and of high purity, with bright colors being particularly popular. Patterns should vary according to gender and age	P1: Colors should be rich, vibrant, and of high purity, with bright colors being particularly popular
Fabric Selection	Natural fabrics with a high cotton content and excellent breathability are preferred. Fabric choices should be adjusted according to the season and style requirements	P1: Natural fabrics with a high cotton content and excellent breathability are preferred.
Consumer Focus	Consumers prioritize both comfort and aesthetics, with younger consumers placing a higher emphasis on aesthetics, while older consumers prioritize comfort and safety	P1: Younger consumers prioritize aesthetics, while older consumers prioritize comfort and safety.
Craft Selection	Common techniques include embroidery, printing, appliqué, and tie-dye, chosen according to the style requirements	P1: Embroidery, printing, appliqué, and tie-dye are common techniques.
Cost Minimization Strategy	Strategies include craft selection, mass production, fabric selection, and packaging control; simplifying processes, reducing manual work, large-scale production, and online booking.	P1: Craft selection, mass production, fabric selection, and packaging control.

4.1.2 Axial coding

In the realm of children's wear design, open coding analysis has highlighted several critical aspects. Firstly, the balance between functionality and aesthetic appeal in children's clothing design emerges as a key issue. The study reveals that designers, in their pursuit of designing children's apparel, must consider not only the style's playfulness and allure but also its functionality, including fabric softness, breathability, and adherence to safety standards. This equilibrium not only meets consumers' demands for attractiveness but also addresses children's comfort and health protection during wear.

Secondly, the significance of environmental sustainability in children's wear design has been underscored. Interviews referenced brands such as English and Chanel, which not only prioritize quality and aesthetics in their designs but also actively adopt eco-friendly fabrics and production techniques to minimize environmental impact and ensure products are safe for children. This reflects growing market and consumer concerns regarding environmental responsibility, prompting the children's wear industry toward more sustainable practices.

Furthermore, consumer behavior and market trends constitute pivotal aspects of the research. Studies indicate that parents primarily consider product quality, price, and their children's preferences when purchasing children's clothing, directly influencing

brand competitiveness. Local brands aiming to distinguish themselves in the competitive landscape must not only focus on design innovation and quality but also prioritize understanding consumer preferences and purchasing motivations.

Overall, through open coding analysis of children's wear design, the study not only provides deep insights into the interactive relationships among designers, brands, and consumers but also unveils the challenges and opportunities facing the industry. Looking ahead, continual innovation and sustainable development in children's wear design will be pivotal drivers of industry advancement, ensuring children are provided with safer and more comfortable wearing experiences (see table 5).

Table 5.3: Results of axial coding

Principal category	Initial category	Conceptualize
Requirements for children's clothing design	Balance between simplicity and fun	Conceptualized as a functional and aesthetic balance of design to meet the needs of children and parents.
	Use and preference of natural fabrics	
	Application and demand of functional design	
Consumer Preferences and Behavior	Factors Influencing Parental Purchasing Decisions	Conceptualizing Dual Influences in Consumer Decision-Making: Parental Purchasing Power and Children's Preferences.
	Impact and Involvement of Children	
Environmental Sustainability and Health	Environmental Commitments of Children's Clothing Brands	Conceptualizing Sustainable Development and Health Orientation in Children's Clothing Design to Meet Market and Regulatory Demands.
	The Impact of Fabric Choices on Children's Health	
Design Craftsmanship and Technology	A Comparison of Embroidery and Printing Techniques	Conceptualizing Technological and Craftsmanship Innovation to Drive Quality and Creativity in Children's Clothing Design.
	The Potential of New Technologies in Children's Clothing Design	
Market Trends and Competition	Market Positioning and Competitive Advantages of Local Brands	Conceptualizing Local Brands' Competitive Advantages and Brand Building Strategies in the Children's Wear Market.
	Consumer Perception and Attitudes Towards Local Brands	

Based on coding, this study initially identified five principal categories: Requirements for children's clothing design, Consumer preferences and behavior, Environmental sustainability and health, Design craftsmanship and technology, and Market trends and competition. However, through detailed analysis and data synthesis, the study ultimately distilled three core themes: Consumer preferences in children's wear brand selection, Balancing functionality and aesthetics in children's clothing design, and Market trends and innovation requirements. Further analysis revealed a total of eleven nuanced sub-themes, encompassing a wide range of topics from consumer brand preferences to environmental sustainability, health considerations, design craftsmanship, technological innovations, and market competition. These themes reflect the study's exploration and comprehension of the complexity and diversity inherent in the current landscape of children's clothing design in Guangzhou (see figure 4).

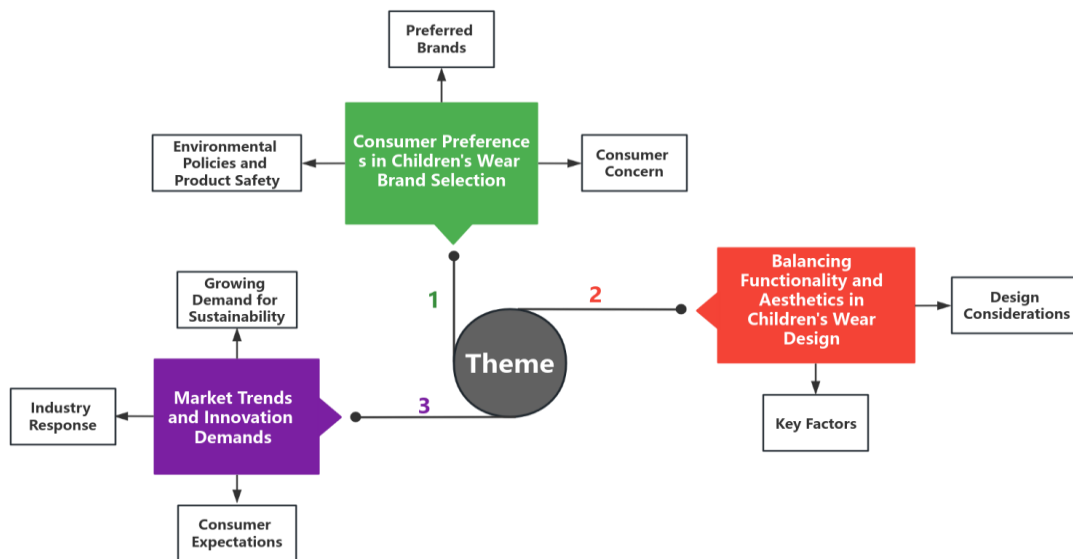


Figure 4: The final results of selected coding.

Theme 1: Consumer preferences in children's wear brand selection

1. Environmental policies and product safety: parents prioritize brands that demonstrate strong environmental policies and ensure product safety.
2. Preferred brands: brands like Yeehoo and Annil are favored due to their perceived environmental responsibility and high product safety standards.
3. Consumer concern: there is a significant consumer concern for brand responsibility and quality assurance in children's clothing.

Theme 2: Balancing functionality and aesthetics in children's clothing design

1. Design considerations: designers face the challenge of balancing functionality and aesthetic appeal in children's clothing design.
2. Key factors: fabric selection is crucial to ensure comfort and safety for children. Designers also strive to incorporate aesthetic trends into their designs to meet market demands.

Theme 3: Market trends and innovation requirements

1. Growing demand for sustainability: there is a noticeable increase in consumer demand for environmental sustainability in children's clothing.
2. Industry response: while some brands have taken steps towards sustainability, there remains substantial room for improvement across the children's clothing market.
3. Consumer expectations: Consumers expect brands to demonstrate authenticity and a genuine commitment to environmental responsibility. This expectation is driving the industry towards adopting more sustainable practices.

These themes highlight the complex interplay between consumer preferences, design considerations, and market dynamics within the children's clothing industry. They underscore the importance for brands to align with consumer values regarding

environmental responsibility while meeting functional and aesthetic demands in design.

4.2 Thematic analysis

Based on the aforementioned themes, we conducted a thorough analysis integrating insights from expert interview transcripts to uncover consumer preferences and concerns in selecting children's wear brands.

Perceived consumer preferences in children's wear brand selection, and attitude

Consumer preferences for children's clothing brands in Guangzhou reflect concerns over quality, environmental responsibility, and product safety. Participants (P1, P2, P3, P4) unanimously noted the scarcity of high-quality local brands, with many expressing dissatisfactions with the predominance of Japanese and Korean styles that often compromise on fabric quality to maintain affordability. Brands like "YeeHoO" are praised for their superior fabrics and craftsmanship, highlighting a gap in the market for brands that prioritize both aesthetic appeal and fabric integrity.

Perceived environmental policies and product safety, and attitude

Interviewees (P1, P3) expressed significant concerns about the environmental policies and product safety practices of children's clothing brands in Guangzhou. They highlighted instances where lower-tier brands use non-qualified fabrics or harmful dyeing methods, citing a disconnect between consumer expectations for green practices and industry practices. Some participants (P2) noted that while larger brands are making strides towards sustainability, smaller brands often prioritize economic benefits over environmental considerations, impacting both brand reputation and consumer trust.

Perceived consumer concern, and attitude

Consumer concern over brand responsibility and quality assurance in Guangzhou's children's clothing market is evident among participants (P1, P3). They emphasized the importance of brands demonstrating authenticity and a genuine commitment to environmental responsibility, with some expressing disappointment in the lack of local brands meeting these criteria (P2, P4). The dominance of Japanese and Korean-style brands was seen as limiting options for high-quality, locally sourced children's clothing that meets both aesthetic and ethical standards.

Perceived balancing functionality and aesthetics in children's clothing design, and attitude

Designers in Guangzhou face challenges in balancing functionality and aesthetic appeal in children's clothing (P1, P2). Fabric selection is crucial to ensure comfort and safety, yet the market's emphasis on affordability often leads to compromises in fabric quality (P3). Participants highlighted the need for innovative solutions that integrate sustainable practices without sacrificing design integrity, reflecting broader shifts in consumer preferences towards eco-friendly products (P4).

Perceived design considerations, and attitude

Design considerations in Guangzhou's children's clothing sector revolve around meeting practical needs while adhering to aesthetic trends (P1, P2). Participants emphasized the role of fabric technology and design innovation in creating competitive

products that resonate with consumer expectations (P3). However, they also noted challenges in maintaining quality standards amidst market pressures for cost-effective production and the proliferation of imitation styles (P4).

Perceived key factors, and attitude

Key factors influencing children's clothing design in Guangzhou include fabric selection, technological advancements, and consumer-driven demands for sustainability (P1, P2). Participants highlighted a growing awareness among consumers for eco-friendly practices and ethical sourcing, pushing brands to adapt their strategies to meet these evolving expectations (P3). Despite these challenges, opportunities exist for brands to differentiate themselves by prioritizing quality and transparency in their operations (P4).

Perceived market trends and innovation requirements, and attitude

The children's clothing market in Guangzhou is witnessing a shift towards sustainability and innovation (P1, P2). Participants noted an increasing demand for eco-friendly products and transparent brand practices, challenging the industry to adopt greener manufacturing processes and ethical sourcing methods (P3). Brands that embrace these trends are positioned to attract a growing segment of environmentally conscious consumers, driving market competition towards more sustainable practices (P4).

Perceived growing demand for sustainability, and attitude

There is a noticeable increase in consumer demand for environmental sustainability in Guangzhou's children's clothing market (P1, P2). Participants highlighted a preference for brands that demonstrate clear commitments to sustainability through their products and operations (P3). However, they also pointed out inconsistencies in industry responses, with some brands lagging behind in adopting comprehensive sustainability practices despite growing consumer expectations (P4). This gap underscores the need for greater industry-wide collaboration and transparency to meet evolving consumer demands.

Perceived industry response, and attitude

The response of the children's clothing industry in Guangzhou to sustainability demands varies among brands (P1, P2). While larger brands are making efforts to integrate eco-friendly practices into their operations, smaller brands often struggle to balance economic pressures with environmental responsibilities (P3). Participants emphasized the importance of industry-wide initiatives to standardize sustainability practices and improve transparency, fostering greater consumer trust and loyalty (P4).

Perceived consumer expectations, and attitude

Consumers in Guangzhou expect children's clothing brands to demonstrate authenticity and a genuine commitment to environmental responsibility (P1, P2). Participants highlighted the influence of consumer perceptions on brand reputation, emphasizing the need for brands to align their practices with evolving consumer preferences for sustainability and product safety (P3). The disconnect between consumer expectations and brand offerings underscores opportunities for brands to differentiate themselves through ethical practices and transparent communication (P4).

5.0 CONCLUSIONS

Through an in-depth analysis of expert viewpoints in Guangzhou, this study explores the sustainable development of children's wear design in the city. The research identifies a scarcity of high-quality local children's wear brands in Guangzhou, with brands from Jiangsu and Zhejiang dominating the market. Challenges facing the market include a lack of design diversity and inadequate awareness of quality and environmental considerations, which constrain market development and influence consumer decisions and trust in children's wear products. Factors influencing sustainable design for designers encompass production environment, material selection, cost control, and consumer preferences, with cost control emerging as paramount. However, concerns among designers regarding the environmental commitments of Guangzhou children's wear brands, particularly concerning fabric quality and dyeing processes, underscore the complex challenge of balancing cost control with environmental standards. Consequently, emphasis is placed on simplifying designs, selecting appropriate materials, and utilizing digital platforms to reduce costs and promote green initiatives. Designers acknowledge the significance of style, cost-effectiveness, fabric functionality, and craftsmanship in children's wear. Cotton and knitted fabrics are widely recognized in fabric selection, with digital printing technology being favored for decoration. The significance of this study lies in its deep analysis of expert insights, addressing sustainable development issues in Guangzhou's children's wear design industry and revealing current market trends and critical issues. This not only enhances understanding of market demands among designers and industry practitioners but also offers theoretical guidance and practical insights for sustainable children's wear design. Moreover, the study underscores the importance of cost control and environmental considerations in an increasingly competitive market environment, contributing significantly to industry development. Future research could further explore consumer perceptions and attitudes towards sustainable children's wear to devise more effective marketing strategies. Additionally, deeper investigation into material selection, production processes, and supply chain management in children's wear design could optimize cost-efficiency and environmental sustainability. Lastly, integrating new technologies such as artificial intelligence and wearable tech could explore innovative design concepts and propel the children's wear industry towards greater sustainability and intelligence.

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