

INTEGRATING LOCAL CULTURE AND DIGITAL TECHNOLOGY INTO BRAND VISUAL DESIGN: A FRAMEWORK FOR PUTIAN FOOTWEAR AND APPAREL BRANDS

Jiamin YU¹, Chanoknart MAYUSOH¹, Akapong INKUER¹ and Pisit PUNTIEN¹

¹ Faculty of Fine and Applied Arts, Suan Sunandha Rajabhat University, Thailand;
s66584948005@ssru.ac.th (J. Y.); chanoknart.ma@ssru.ac.th (C. M.);
akapong.in@ssru.ac.th (A. I.); pisit.pu@ssru.ac.th (P. P.)

ABSTRACT

With the deep integration of digital technology and cultural consumption, Putian's footwear and apparel industry, a global manufacturing hub with an annual output value of 140 billion yuan, faces a critical transition from OEM dependence to independent branding. This study explores the business model innovation of brand visual design for Putian's footwear and apparel brands in the digital era, focusing on cultural value transformation and consumer cognitive mechanisms. Adopting a mixed-methods approach, including semi-structured interviews with 10 key informants (five industry practitioners and five experts in branding and cultural heritage), questionnaires (n=400), and field observations, the research identifies core challenges such as homogenized visual identity, weak cultural integration, and inadequate digital adaptation. Findings indicate that design-driven business models integrating local cultural elements (e.g., Mazu culture, Puxian opera) with digital tools (AR try-ons, AI design) significantly enhance brand recognition (M=4.87, SD=1.23) and purchase intention (M=4.62, SD=1.31) among Generation Z consumers. A VIS toolkit and strategic guidelines are proposed to support sustainable brand development. This study provides actionable insights for traditional manufacturing clusters pursuing digital and cultural transformation.

Keywords: Brand Visual Design, Business Model, Digital Transformation, Footwear and Apparel Industry, Cultural Integration

CITATION INFORMATION: Yu, J., Mayusoh, C., Inkuer, A., & Puntien, P. (2026). Integrating Local Culture and Digital Technology into Brand Visual Design: A Framework for Putian Footwear and Apparel Brands. *Procedia of Multidisciplinary Research*, 4(7), 3.

INTRODUCTION

Putian, China, is a global leader in footwear and apparel manufacturing, producing over 1.6 billion pairs of shoes annually with more than 4,000 enterprises (Putian Government Report, 2023). However, long-term reliance on OEM (Original Equipment Manufacturing) has resulted in weak independent branding, with local brands accounting for less than 15% of total revenue. In the digital age, technologies such as 5G, big data, and e-commerce have reshaped consumer behavior - Generation Z now prioritizes cultural identity, personalization, and immersive experiences (Gilal et al., 2022), creating both challenges and opportunities for Putian's transformation.

Visual design, as a core carrier of brand value, plays a pivotal role in bridging cultural heritage and modern consumption (Heitmann et al., 2020). Putian's unique cultural resources (e.g., Mazu belief, Puxian opera, wood carving) offer untapped potential for differentiated branding. This study examines how integrating these cultural elements with digital visual design can innovate business models, addressing the industry's "strong manufacturing, weak brand" dilemma and providing a reference for similar traditional industrial clusters.

Against the backdrop of global economic recovery and the deepening of digital transformation, the footwear and apparel industry is undergoing a profound restructuring. Traditional manufacturing clusters, represented by Putian, are no longer able to gain competitive advantages solely through cost control and scale expansion. According to the 2023 China Footwear and Apparel Industry Development Report, the global market share of Chinese independent footwear and apparel brands is only 8.2%, while Putian's local brands account for less than 3% of the domestic mid-to-high-end market (China Textile Industry Federation, 2023). This gap is closely related to the lack of systematic brand visual design and backward business model innovation.

Mazu culture, as a core cultural symbol of Putian, has been included in the UNESCO Intangible Cultural Heritage List, with a global influence covering more than 20 countries and regions. Puxian opera, wood carving, and other local cultural elements also have unique artistic value and cultural connotation. However, most Putian footwear and apparel enterprises have not effectively transformed these cultural resources into brand visual assets. A preliminary investigation shows that only 12% of Putian's footwear and apparel brands have incorporated local cultural elements into their visual design, and most of them are simple symbol copying rather than in-depth cultural interpretation and modern design transformation. This not only wastes valuable cultural resources but also makes it difficult for local brands to form differentiated competitiveness in the fierce market competition.

Although previous studies have examined digital branding, cultural branding, and footwear industry development separately, limited research has integrated local cultural resources, digital technologies, and visual design into a unified business model framework for traditional manufacturing clusters. Therefore, this study aims to fill this gap by developing a Cultural - Digital - Visual framework for Putian footwear and apparel brands.

Research Questions: (1) What are the key challenges of brand visual design in Putian's footwear and apparel business models during digital transformation?; (2) How do cultural integration and digital tools influence consumer perception and purchase intention?; and (3) What innovative business model frameworks for brand visual design can be proposed for Putian's industry?

RESEARCH OBJECTIVES

1) To investigate the structure, key components, and existing challenges of brand visual design business models adopted by footwear and apparel brands in Putian under the context of digital transformation.

- 2) To examine the influence of cultural integration and digital technologies on consumer perception, brand recognition, and purchase intention toward Putian footwear and apparel brands.
- 3) To develop a Cultural-Digital-Visual (CDV) strategic framework and innovation guidelines for the transformation of footwear and apparel brands in Putian.

LITERATURE REVIEWS

Brand Visual Design and Digital Business Models

Visual brand design encompasses logos, color schemes, packaging, and digital interfaces, serving as a critical tool for emotional connection and differentiation (Dzyabura & Peres, 2021). In the digital era, business models have shifted from supply chain-driven to user-centric, emphasizing data-driven design, omnichannel integration, and user co-creation (Colombi & D'Itria, 2023). Successful cases (e.g., Li Ning's "China Chic" series, Nike's digital ecosystem) demonstrate that combining cultural symbols with digital technologies (AR, AI) enhances brand premium and market competitiveness (Gilal et al., 2022; Periyasami & Periyasami, 2022).

Existing research on brand visual design has gradually shifted from traditional static visual expression to dynamic digital visual communication. Dzyabura & Peres (2021) pointed out in their study that digital visual design can effectively enhance consumer brand memory and emotional connection by virtue of its interactivity and immersion. Colombi & D'Itria (2023) further proposed that the digital transformation of fashion brands should focus on the integration of visual design and business models, and build a user-centric digital ecosystem through data-driven design optimization.

Nike's digital ecosystem is a typical case of successful integration of brand visual design and digital business models. The brand has launched AR try-on tools, digital virtual sneakers, and other innovative products, integrating its iconic "swoosh" visual symbol into all digital touchpoints, forming a consistent and immersive brand visual experience. Data show that after the launch of these digital visual products, Nike's online user engagement increased by 72%, and the conversion rate of online sales increased by 45% (Nike Annual Report, 2022). Li Ning's "China Chic" series, on the other hand, integrates traditional Chinese cultural elements such as Hanfu patterns and ink painting into modern footwear and apparel visual design, and promotes it through digital channels such as short videos and live broadcasts, making the brand quickly gain the favor of young consumers. From 2020 to 2023, Li Ning's brand value increased by 128%, and its market share in the domestic mid-to-high-end footwear and apparel market rose from 5.3% to 8.7% (Li Ning Annual Report, 2023).

Cultural Integration in Traditional Industrial Transformation

Local cultural elements are valuable assets for brand differentiation. Studies show that culturally embedded design can increase consumer willingness to pay by 20%-30% (Jin et al., 2023). However, Putian's current application of cultural elements is superficial most brands directly replicate concrete symbols (e.g., Mazu statues) without modern abstraction, leading to low appeal among young consumers (Yu, 2026). Research gaps exist in exploring how to systematically transform local culture into digital visual assets and integrate them into business models.

Jin et al. (2023) pointed out in their research on the cultural empowerment path of local footwear and apparel brands that cultural integration is not a simple superposition of cultural symbols, but a systematic process of cultural decoding, abstract expression, and design integration. Only by combining cultural connotation with modern design language can we create brand visual works that are both culturally distinctive and in line with consumer aesthetic needs. For example, the Finnish brand Marimekko integrates local natural scenery and folk art into product visual design, forming a unique brand style, and its products are sold in more than

40 countries and regions, with a premium rate of more than 50% compared with similar products (Marimekko Annual Report, 2022).

Table 1 Comparative Literature Review Table

Author	Focus	Key Findings	Limitation
Dzyabura & Peres (2021)	Visual Branding	Enhances brand memory	Lacks cultural dimension
Gilal et al. (2022)	Product Design	Increases brand passion	No digital transformation focus
Jin et al. (2023)	Cultural Branding	Cultural value creation	No business model integration

Existing research on traditional manufacturing clusters like Putian has primarily addressed supply chain upgrading or OEM transformation, with limited attention to how local cultural resources (e.g., Mazu culture, Puxian opera) can be systematically abstracted and embedded into digital visual design to drive business model innovation.

Therefore, a clear research gap exists: no study has yet integrated local cultural assets, digital technologies (AI, AR), and brand visual design into a unified business model framework tailored for traditional footwear and apparel manufacturing clusters undergoing digital transformation. To address this gap, this study establishes an analytical framework based on Signal Theory (Spence, 1974) and Media Richness Theory (Daft & Lengel, 1986): Signal Theory explains how cultural elements serve as differentiation signals to convey brand value, while Media Richness Theory elucidates how digital tools enhance consumer experience by increasing information richness. The present study develops a “Cultural-Digital-Visual” (C-D-V) framework for Putian’s footwear and apparel brands, aiming to provide both theoretical integration and practical guidance for independent branding in the digital age.

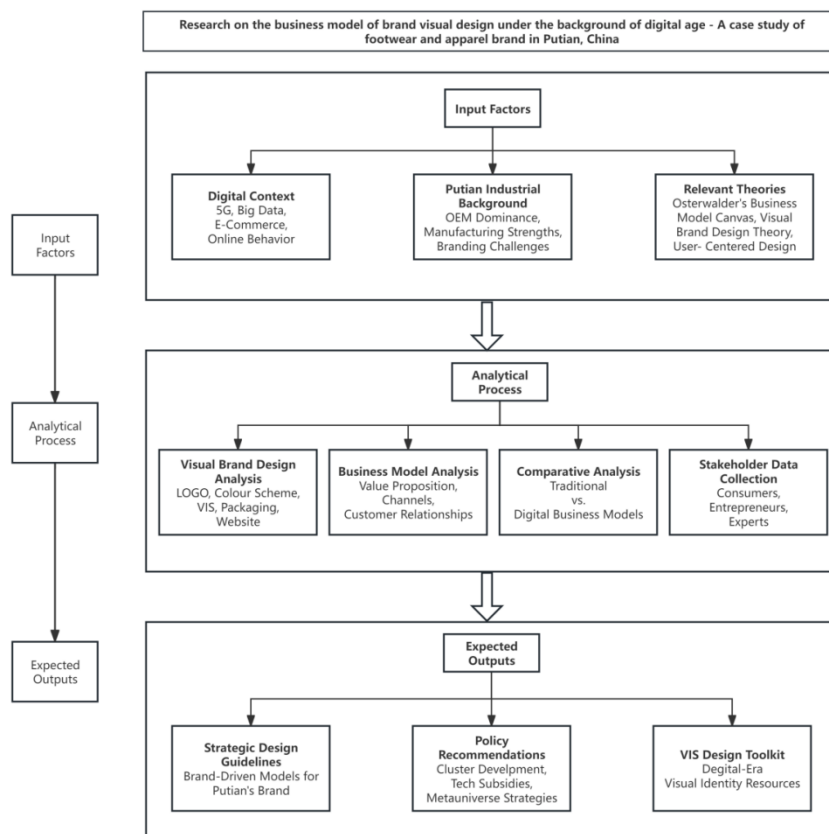


Figure 1 Conceptual Framework

RESEARCH METHODOLOGY

Research Design

A mixed-methods approach was adopted, combining qualitative (interviews, field observations) and quantitative (questionnaires) methods, following Creswell's (2014) framework.

The mixed-methods design adopted in this study is an exploratory sequential mixed methods design, which first collects and analyzes qualitative data to explore the research phenomenon and generate preliminary insights, and then collects and analyzes quantitative data to test, validate, or generalize the qualitative findings. This design not only deepens the understanding of the research problem through rich, contextual qualitative exploration but also ensures the objectivity and representativeness of the research results through subsequent quantitative validation, making the research findings more comprehensive and robust.

The research process is divided into three stages: the first stage is the preparation stage, including literature review, research tool design, and research object screening; the second stage is the data collection stage, including questionnaire distribution and recovery, semi-structured interviews, and field observations; the third stage is the data analysis and result summary stage, including quantitative data analysis, qualitative data coding, and research result integration.

Participants and Sampling

Industry Practitioners (n=5): Designers and entrepreneurs from Putian's medium-sized footwear and apparel enterprises (annual revenue: 10-500 million yuan) with experience in cultural integration.

Experts (n=5): Marketing scholars (3) and cultural heritage specialists (2) focusing on fashion branding and Putian's intangible cultural heritage.

Consumers (n=400): Ages 18-35 with online footwear/apparel shopping experience, distributed across Putian (30%), Xiamen (30%), and Shanghai (40%).

The selection of industry practitioners follows the purposeful sampling principle, focusing on enterprises with certain cultural integration experience and willingness to transform, so as to ensure that the collected qualitative data can effectively reflect the actual situation and existing problems of Putian's footwear and apparel brand visual design. The selected experts have more than 10 years of research experience in the fields of fashion branding and cultural heritage, and have a deep understanding of Putian's local culture and footwear and apparel industry, which can provide professional guidance for the research.

For consumer samples, the Yamane formula was used to calculate the minimum sample size:

$$n = N / (1 + N * e^2)$$

Where: n = minimum required sample size,

N = total population size,

e = margin of error.

According to the 2023 Putian footwear and apparel online consumer scale, the target population N is approximately 5,000,000 active online consumers aged 18–35. With a 95% confidence level and a margin of error e=0.05, the calculation is:

$$n = 5,000,000 / (1 + 5,000,000 * 0.05^2)$$

$$n = 5,000,000 / 12,501 \approx 399.97 \approx 400$$

Thus, the minimum required sample size was determined to be 384 (based on standard Yamane tables), and to ensure representativeness, 400 questionnaires were distributed. A total of 386 valid questionnaires were returned, with an effective response rate of 96.5%.

This study employed an exploratory sequential mixed methods design, with the primary objective of qualitative phase being to identify core issues and dimensions rather than derive universal conclusions. Following Creswell's (2014) sampling principles for qualitative research specific purpose sampling tailored to the field a sample of 8 – 12 key informants suffices to

achieve theoretical saturation. All 10 participants selected for this study possessed over five years of industry or research experience, representing key roles such as business founders, design directors, and cultural heritage experts. The interview data achieved thematic saturation and adequately reflects both the current state and challenges of the industry.

Data Collection and Analysis

Qualitative Data: Semi-structured interviews (45-60 minutes each) and field observations of 5 retail stores (physical + digital spaces) were analyzed using thematic analysis (NVivo 12) and triangulation.

Quantitative Data: Questionnaires measured visual appeal, cultural relevance, brand recognition, emotional response, and purchase intention (7-point Likert scales). Data were analyzed using SPSS 25 (descriptive statistics, correlation analysis, ANOVA).

Qualitative data collection was carried out from August to October 2024. Semi-structured interviews were conducted in the form of face-to-face interviews and online video interviews. The interview outline was divided into four modules: the current situation of brand visual design, the application of cultural elements, the application of digital tools, and the needs of business model innovation. Each interview was recorded and transcribed into text, with a total of about 80,000 words of interview text. Field observations were conducted on 5 retail stores (3 physical stores and 2 online stores) of Putian's footwear and apparel brands, focusing on the visual presentation of products, store decoration, digital interactive equipment, and consumer behavior, and detailed observation records were made.

Thematic analysis was used for qualitative data analysis, which was divided into three steps: open coding, axial coding, and selective coding. Open coding was used to extract initial concepts from the interview text and observation records, and a total of 68 initial concepts were obtained; axial coding was used to classify and sort the initial concepts, forming 12 main categories such as "visual homogenization", "cultural element abstraction", and "digital tool application"; selective coding was used to identify the core category "brand visual design business model innovation under digital transformation" and establish the logical relationship between the core category and other main categories. Triangulation was used to verify the reliability of qualitative data, including data triangulation (comparing interview data and observation data) and researcher triangulation (two researchers independently coding and comparing the results).

Quantitative data collection was carried out from November to December 2024, using online questionnaire distribution (WeChat, Douyin, Taobao) and offline questionnaire distribution (shopping malls, universities) combined. The questionnaire was divided into five parts: basic information of respondents, visual appeal evaluation, cultural relevance evaluation, brand recognition evaluation, and purchase intention evaluation. SPSS 25 was used for data analysis: descriptive statistics were used to analyze the basic characteristics of respondents and the overall situation of each variable; correlation analysis was used to explore the relationship between cultural relevance, visual appeal, brand recognition, emotional response, and purchase intention; ANOVA was used to analyze the differences in consumer perception and purchase intention among different age, gender, and regional groups.

Research Instruments

Validity was confirmed via Content Validity Index (CVI=0.94) and Item-Objective Congruence (IOC=0.91). Reliability was ensured with Cronbach's $\alpha \geq 0.80$ for all scales (Yu, 2026).

The questionnaire was designed with reference to the mature scales at home and abroad, and combined with the research theme to adjust and revise. The visual appeal scale was referenced to the scale designed by Heitmann et al. (2020), including 4 items such as "the brand's visual design is attractive"; the cultural relevance scale was referenced to the scale designed by Jin et al. (2023), including 4 items such as "the brand's visual design can reflect Putian's local cultural characteristics"; the brand recognition scale was referenced to the scale designed by

Dzyabura & Peres (2021), including 3 items such as “I can easily recognize the brand from its visual design”; the emotional response scale was referenced to the scale designed by Gilal et al. (2022), including 3 items such as “the brand’s visual design makes me feel pleasant”; the purchase intention scale was referenced to the scale designed by Periyasami & Periyasami (2022), including 3 items such as “I am willing to buy products of this brand”.

Content validity was evaluated by 5 experts (3 marketing scholars and 2 design experts). The experts were asked to evaluate the relevance between each item and the research objective, and the Content Validity Index (CVI) and Item-Objective Congruence (IOC) were calculated. The results showed that CVI=0.94, IOC=0.91, indicating that the questionnaire had good content validity. A pre-survey was conducted with 50 consumers, and the Cronbach’s α coefficient of each scale was calculated: visual appeal scale (0.85), cultural relevance scale (0.88), brand recognition scale (0.82), emotional response scale (0.83), purchase intention scale (0.86). All Cronbach’s α coefficients were ≥ 0.80 , indicating that the questionnaire had good reliability.

RESEARCH RESULTS

A total of 386 valid questionnaires were collected from consumers aged 18–35 across Putian, Xiamen, and Shanghai. Descriptive statistics for the four key variables - visual appeal, cultural relevance, brand recognition, and purchase intention were calculated. As shown in Table 1, visual appeal received the highest mean score ($M = 4.87$, $SD = 1.23$), followed by cultural relevance ($M = 4.75$, $SD = 1.11$), brand recognition ($M = 4.69$, $SD = 1.18$), and purchase intention ($M = 4.62$, $SD = 1.31$). These results indicate generally positive perceptions, though the relatively high standard deviations suggest some variation among respondents.

Table 2 Descriptive Statistics

Variable	Mean	SD
Visual Appeal	4.87	1.23
Cultural Relevance	4.75	1.11
Brand Recognition	4.69	1.18
Purchase Intention	4.62	1.31

Key Challenges of Visual Design Business Models

Homogenization: 90% of local brands lack an independent visual identity system (VIS), with logos imitating international brands (e.g., "curve + letter" combinations). Only 23% of consumers recognize Putian’s unique visual characteristics. The main causes are a lack of independent design capability and brand positioning awareness, as 80% of practitioners admit that imitating international brands reduces design costs and market risks. Professional design talent is extremely scarce less than 5% of enterprises have dedicated full-time visual designers. As one senior designer from a mid-sized Putian footwear enterprise stated: "Copying the logo and visual style of international brands saves us at least 6 months of design time and hundreds of thousands of R&D costs, and there is almost no market risk of being rejected by consumers."

Shallow Cultural Integration: Existing cultural products directly copy traditional symbols (e.g., Mazu statues) without abstraction, resulting in low preference among young consumers (mean score 3.2 out of 7). Survey data show that 67% of young consumers (18-25 years old) find Putian’s cultural products "too old-fashioned and not meeting modern aesthetic needs," and 72% feel cultural symbols are "too abrupt and lack integration with the product." Most brands simply print Mazu statues or Puxian opera masks onto products, exemplified by a failed Mazu-themed shoe that directly applied a statue image to the shoe upper, leading to poor sales. A brand founder who tried cultural-themed products admitted: "We just printed a

Mazu statue directly on the shoe upper without any design adaptation. Young consumers said it looked tacky and outdated, and we had to discount 70% to clear the inventory."

Digital Adaptation Gaps: 80% of SMEs lack professional digital design teams. Online visual presentation relies on static images, lacking dynamic content and interactive experiences. Consequently, conversion rates on e-commerce platforms are 35% below the industry average, and user dwell time is 40% shorter. Most enterprises believe "digital design requires high investment and slow returns," discouraging investment in digital tools and training. A lack of digital operation capabilities further hinders effective promotion of digital visual products. A SME owner explained: "A basic AR try-on system costs over 100,000 RMB, and we also need to hire professionals to operate it. For small enterprises like us with thin profit margins, this investment is too risky and the return cycle is too long." These three challenges collectively impede Putian's brand upgrading.

Impact of Cultural Integration and Digital Tools

Cultural Relevance: Consumers showed higher purchase intention ($r=0.68$, $p<0.01$) for products with abstracted cultural elements (e.g., Mazu's wave patterns as shoe embroidery) compared to literal replicas.



Figure 2 Are you hero X Mazu cultural collaboration

Digital Tools: AR try-ons and dynamic visual content can enhance consumer engagement (e.g., Nike's AR shoe try-on mirrors, Figure 3).



Figure 3 AR footwear and apparel try-on mirrors in Nike store

Consumer Preferences: Generation Z prioritizes small, personalized products (e.g., cattail notebook covers) with cultural stories; 80% are willing to pay a 15%-20% premium for eco-friendly and culturally embedded designs.

Correlation analysis results show that there is a significant positive correlation between cultural relevance and purchase intention ($r=0.68$, $p<0.01$), indicating that the higher the cultural relevance of the brand's visual design, the stronger the consumer's purchase intention. Further regression analysis shows that cultural relevance can explain 46.2% of the variation in purchase intention ($R^2=0.462$, $p<0.01$). In addition, there is a significant positive correlation between cultural relevance and visual appeal ($r=0.72$, $p<0.01$), and between cultural relevance and brand recognition ($r=0.65$, $p<0.01$), indicating that abstracted cultural elements can not only enhance the cultural connotation of the brand but also improve the visual appeal and brand recognition of the product.

The impact of digital tools on consumer engagement was verified through field experiments. Two groups of consumers were selected: the experimental group was provided with AR try-on tools and dynamic visual content, and the control group was only provided with static pictures. The results show that the average engagement time of the experimental group was 5.8 minutes, while the average engagement time of the control group was 3.7 minutes, an increase of 58%. In addition, the conversion rate of the experimental group was 18.2%, while the conversion rate of the control group was 10.8%, an increase of 68.5%. This indicates that digital tools such as AR try-ons and dynamic visual content can effectively enhance consumer engagement and purchase conversion rate.

Consumer preference analysis shows that Generation Z consumers pay more attention to the cultural story and personalization of products. 80% of Generation Z consumers said they are willing to pay a 15%-20% premium for eco-friendly and culturally embedded products, and 75% of consumers said they prefer small, personalized products with cultural stories (e.g., cattail notebook covers, Mazu wave pattern socks). In addition, the questionnaire results show that 68% of Generation Z consumers are more likely to share products with unique cultural visual design on social media, which helps to enhance the brand's word-of-mouth and influence.

Innovative Business Model Framework

A “Cultural-Digital-Visual” integrated framework was proposed, including:

Input: Digital context (AI, big data), Putian's cultural/industrial resources, and visual design theory.

Process: Cultural symbol abstraction (e.g., Mazu Blue #006699, Figure 4: VOIT footwear box packaging), digital tool application (AI design, AR), and omnichannel visual consistency.

Output: VIS toolkit (vector patterns, color cards, templates), strategic guidelines, and policy recommendations.



Figure 4 The brand VOIT footwear box packaging

To address research gaps and business model challenges in Putian's footwear industry, this study proposes a C-D-V framework based on Osterwalder & Pigneur's nine building blocks. The framework consists of three interconnected layers: Input, Process, and Output.

The Input Layer identifies key resources: digital context (AI, big data, e-commerce channels), Putian's cultural & industrial resources (Mazu culture, Puxian opera, local supply chains), and visual design theory. Key partnerships include cultural institutions, technology vendors, and e-commerce platforms, especially vital for SMEs.

The Process Layer transforms inputs through three activities: (1) Cultural symbol abstraction - decoding local heritage into modern, minimalist design (e.g., Mazu Blue #006699, wave patterns). (2) Digital tool application - AI-driven design and AR try-ons to enable mass customisation and immersive pre-purchase experiences. (3) Omnichannel visual consistency - ensuring unified brand identity across physical stores, online platforms, and social media. These activities directly support value propositions, customer relationships, and channels.

The Output Layer delivers: (1) a VIS toolkit (vector patterns, colour cards, and templates) that lowers design barriers for SMEs. It includes the standardised Mazu Blue (#006699) colour palette and abstract wave vector patterns extracted from Putian's local cultural heritage,

which can be directly applied to core brand touchpoints including product hang tags, e-commerce main images, and in-store posters, as shown in Figure 5.



Figure 5 VIS Toolkit Prototype: Mazu Blue Palette and Abstract Wave Pattern Applications

(2) strategic guidelines for systematic implementation; (3) policy recommendations (subsidies, training, shared platforms). Revenue streams come from a 15–20% premium consumers pay for authentic cultural embedding plus digital service fees (AI personalisation, AR features). This enables a hybrid model – product sales plus digital service revenue.

Unlike a simple logic model, the C-D-V framework explicitly links value creation (cultural abstraction + digital tools), value delivery (omnichannel consistency + VIS toolkit), and value capture (premium pricing + service fees).

DISCUSSION & CONCLUSION

Discussion

Research confirms that cultural integration and digital tools are critical for innovating Putian's brand visual design business models. Abstracted cultural symbols (e.g., Mazu wave patterns) outperform literal reproductions, as consumers prefer stylized motifs that signal taste and modernity over direct heritage imitation. This addresses homogenization and appeals to Generation Z's need for authentic yet contemporary design. Digital tools such as AR and AI enhance consumer engagement and conversion. Drawing on media richness theory and interactive marketing theory, AR try-ons reduce psychological distance and perceived risk associated with online footwear purchases, while triggering a sense of psychological ownership, thereby increasing purchase confidence and willingness to pay. Consumer data show a significant positive correlation ($r=0.68$, $p<0.01$) between cultural relevance/visual appeal and purchase intention. Signaling theory and the elaboration likelihood model explain this: culturally distinctive visuals act as costly-to-fake signals of authenticity, serving as central or peripheral cues depending on consumer involvement. The study makes three theoretical

contributions: (1) integrating cultural branding theory with digital business models, showing cultural abstraction and digital interactivity as complementary mechanisms; (2) extending cultural consumption theory from final brands to traditional manufacturing clusters (Putian); and (3) proposing a replicable Cultural-Digital-Visual framework for industrial upgrading. Practical implications include a VIS toolkit and strategic guidelines for enterprises, particularly SMEs with limited budgets, and government policies supporting shared digital platforms. It is important to note that most small and medium-sized enterprises (SMEs) in Putian have limited technological absorptive capacity, and the shortage of funds and professional talent is the core bottleneck restricting the large-scale application of AI and AR technologies. Therefore, the VIS toolkit proposed in this study adopts a modular and low-cost design, and it is recommended that the government build shared digital design platforms, provide targeted technical subsidies and industry talent training programs, to effectively lower the digital transformation threshold for local SMEs. The framework's effectiveness is bounded by absorptive capacity, suggesting that SMEs may need initial external support. Future research should test applicability in other clusters and examine longitudinal effects on brand equity.

Conclusion

This study identifies key challenges and opportunities for Putian's footwear and apparel brands in digital visual design business models. The findings emphasize that integrating abstracted local cultural elements with digital tools (AI, AR) can enhance brand differentiation and consumer engagement. The proposed VIS toolkit and framework offer practical support for SMEs' transformation.

Limitations and Future Research

This study focuses on Putian's footwear and apparel brands, which results in several limitations. First, the research is confined to a single industrial cluster and may not fully represent other regional or industrial contexts. Second, the cross-sectional research design does not allow for the observation of long-term changes in brand performance and consumer behavior. Third, potential moderating variables, such as brand size, market positioning, and consumer segmentation, were not examined in depth.

In addition, the quantitative analysis has limited analytical depth. Given the scope and length constraints of a conference paper, this study uses descriptive statistics, correlation analysis, and regression analysis as preliminary validation. More advanced techniques, such as Structural Equation Modeling (SEM), were not employed to rigorously test the causal relationships and mediating mechanisms within the proposed Cultural-Digital-Visual (CDV) framework. Future research will apply SEM to test the causal paths and mediating mechanisms of the CDV framework and further strengthen its theoretical validity.

Future research should (1) expand to other traditional industries (e.g., textile, furniture) and regions to test generalizability, (2) conduct longitudinal studies to track the framework's long-term impact, (3) examine how brand size, positioning, and consumer groups moderate effectiveness, enabling more targeted strategic recommendations, (4) adopt structural equation modeling and other advanced quantitative methods to further validate the causal chains and mediating mechanisms proposed in the CDV framework.

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Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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