

Accessible Innovation in the Digital Age: Customization and the Development of Cultural and Creative Products at the Capital Museum

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Abstract: The 2022 International Museum Day theme centred around "The Power of museums," emphasizing the capacity for innovation in digitalization and accessibility. It promoted the use of emerging digital technologies within the industry to aid visitors in understanding complex museum concepts, ultimately enhancing museums' accessibility and experience. This article delves into the principle of "accessible innovation" as it investigates the development of customized cultural and creative museum products, utilizing the recent advancements in products development at the Capital Museum as a case study. The Capital Museum builds a digital design platform, allowing more designers and ordinary people to participate in the process of "customizing" a product. This offers new ideas to boost product innovation in the digital era of museum cultural and creative products, providing a reference point for further exploration.

Keywords: Cultural and Creative Products; Customization; Museum; Souvenirs; Capital Museum

1. Introduction

In the digital age, the term "digital" has evolved beyond a mere buzzword to become an intrinsic part of our everyday experience. Visitors to museums are increasingly seeking cultural and creative merchandise that transcends visual appeal, craving a more profound connection with cultural artifacts that satisfy their intellectual and emotional needs. This thirst for enriched cultural engagements aligns harmoniously with the digital revolution, offering personalized, swift, and hassle-free channels of communication that cater to the diverse tastes and requirements of individuals seeking knowledge, information, or entertainment.

At the same time, China's industrial chain and

market competition landscape have undergone significant changes. The once reigning supremacy of traditional media is ceding ground to its digital and individual content creator counterparts. There lies an imperative for museums to evolve and innovate within the realm of cultural product development, a task both critical and daunting in its urgency.

2. Related Concepts

2.1 Innovative Strategies of Museum Cultural and Creative Product Design

Nowadays, museums face increasing competition for audience attention, evolving consumer expectations, and the need to remain financially sustainable. Innovative strategies in cultural and creative product design are crucial for survival because they enable museums to adapt to these challenges. By deepening the cultural value of museum IP, diversifying product categories, leveraging technology, and fostering cross-industry collaborations [1], museums can create products that resonate with both domestic and international audiences. Additionally, such strategies encourage collaboration with artists, designers, and local communities, fostering creativity and inclusivity.

2.2 Customization Simultaneously Enhances the Commercial and Cultural Attributes of Tourist Souvenirs

Tourist souvenirs hold a significant place in the museum tourism industry, acting as tangible mementos of travel experiences and cultural interactions. Customization has been shown to play a dual role [2] in enhancing both the commercial value and cultural significance of souvenirs. Customization empowers tourists to create unique, personalized souvenirs that reflect their individual travel experiences and

preferences. This active participation increases the perceived value of the souvenirs, making them more appealing and meaningful to buyers. Tourists are more likely to purchase souvenirs they have helped design, as these items carry a deeper emotional connection and serve as authentic representations of their journeys. By offering customization options, destinations can tap into this emotional engagement, driving higher sales and fostering customer loyalty. For example, souvenirs that allow tourists to incorporate personal elements, such as names, dates, or specific cultural motifs, are often perceived as more valuable and are more likely to be purchased. Beyond their commercial appeal, customized souvenirs play a vital role in preserving and promoting destination culture. When tourists incorporate local cultural and historical elements into their designs, they develop a sense of psychological ownership over both the product and the culture it represents. This sense of ownership fosters a deeper appreciation for the destination's cultural heritage and motivates tourists to actively contribute to its preservation.

3. Background

3.1 The Shift in China's Industrial Chain

China's industrial chain represents a move away from the dominance of content distributors toward a more consumer-centric model. Traditional channels such as newspapers, magazines, and television are waning in influence as the internet emerges as the preferred medium for information and knowledge acquisition. The evolution of the e-commerce and social commerce market have brought about a significant shift, particularly as the younger generation embraces new trends with increased openness. As consumers' needs become more diverse and intricate, it is essential for traditional sectors to embrace transformative innovations to maintain their viability and competitiveness.

The global cultural and tourism industries have taken a hit from the COVID-19 pandemic, leading to further economic strain. While policies have been implemented to stabilize consumption within the cultural and museum sectors, businesses are expressing concerns over obstacles aggravated by a lack of cash reserves and late payments. These challenges call for a strategic shift towards business models that align with contemporary consumer needs to ensure

sustainable long-term progress.

3.2 Challenges in Cultural and Creative Product Development

Since the enactment of the "Regulations on Museums" in 2015, Chinese museums have been legally permitted to engage in commercial activities. While museums are presented with a significant opportunity to develop sales strategies for cultural products, there is a lack of interaction among designers, copyright holders, manufacturers, and sellers. Traditionally, retailers engaged in the practice of stocking inventory on their premises, while manufacturers operated under a make-to-order paradigm, refraining from the production process until definitive customer orders were received. Within this framework, designers remained passive, initiating their creative processes only upon securing commissions. Consequent to this phenomenon, a significant proportion of creative output failed to achieve monetary success. The cultural and creative design sector is grappling with challenges attributed to the absence of an efficacious collaborative model which could equitably benefit all stakeholders.

3.3 High Inventory Pressures Affect Profitability and Business Stability

In the conventional business framework, companies generally rely on their market predictions to instruct manufacturers on product quantities. The sales performance of these products is directly tied to the firm's cash flow. Hence, timely sales of inventory are essential to prevent stockpiles and to shield the company from financial threats that escalate when the economy falters or sales decrease.

Excessive inventory typically stems from diminished market demand, overproduction, or ineffective sales strategies. In the past, it has not been uncommon to observe substantial quantities of unsold cultural and creative commodities, representing a significant financial risk and an inefficient utilization of resources. The extended storage of unsold items incurs additional costs for the businesses concerned. Without rapid clearance of surplus products, enterprises may face substantial economic repercussions. In highly competitive markets, some retailers resort to price reductions or promotional campaigns to clear old inventory and achieve

their sales objectives while attracting customers. However, small-scale enterprises with limited operational budgets and less capacity for risk absorption are particularly challenged in managing inventory surpluses. These firms may experiment with various strategies to ameliorate inventory issues, yet such endeavors frequently fail to address the underlying problems effectively.

3.4 Gen Z's Embrace of Customization

Traditional boundaries between different stages of the industrial chain, such as research and development, manufacturing, and marketing, are gradually dissolving. This shift is driven by the integration of internet technologies and the adoption of network-based collaborative approaches, which enable manufacturing enterprises to develop and produce products that better meet the personalized needs of users. Furthermore, the rise of user-centric personalized customization is reshaping the industrial chain. Compared to traditional standardized production, this approach not only better satisfies consumer demands but also unlocks greater value potential for products [3]. The cultural and creative industry shifted from traditional chain mode to a network structure due to Internet technology advancement, marking museums' entry into a new era of cultural and creative integration. However, the design status of cultural and creative products in most museums remains unsatisfactory, emphasizing the need for innovation [4].

Gen Z is a generation that values individuality and self-expression. Growing up in a digital age where social media platforms allow them to curate and share their unique identities, Gen Z seeks products and experiences that reflect their personal tastes and values. For Gen Z, customization is more than a trend—it reflects their values, preferences, and lifestyles. Customization provides an opportunity for them to stand out and express their creativity, whether through personalized sneakers, custom phone cases, or bespoke skincare routines. Social media plays a significant role in shaping Gen Z's preferences [5]. Platforms like Red note, TikTok, and Weibo are filled with examples of customized products and experiences, inspiring Gen Z to seek similar opportunities. Additionally, the desire to share unique creations with their peers drives their interest in customization. A personalized product becomes a conversation

starter and a way to showcase their individuality within their social circles.

4. Research Significance

The study aligns with the 2022 International Museum Day theme, "The Power of Museums". The principle of "accessible innovation" underscores the importance of making cultural and creative products more inclusive and engaging for diverse audiences. As technology reshapes societal norms, the digital and intelligent evolution of museums has solidified as an irreversible global trend. The pandemic accelerated the rise of a new consumption paradigm, compelling museums worldwide to prioritize digital innovation. The study provides new insights into leveraging digital platforms to boost innovation in museum cultural and creative products. The platform allows both designers and ordinary individuals to participate in product customization, exemplifies how museums can democratize creativity and foster greater public involvement in cultural preservation. Furthermore, by showcasing the Capital Museum's approach, it offers a replicable model for other institutions seeking to harness digital technologies for product development and audience engagement.

5. Case Study: The Capital Museum's Digital Design Platform - Democratizing Creativity in Customization and Cultural and Creative Product Development

5.1 Democratized Creativity: Online Design Maker for Custom Product Creators

In this era, individuals can freely share what they value, marking the dawn of universal expression. The cultural and entertainment sectors are transitioning from centralized, top-down models to decentralized, multi-party ecosystems. Every individual now has the tools to become a content creator, leveraging self-media platforms to rapidly disseminate ideas and foster diverse, dynamic content. The future will see everyone act as a self-media entity, connecting products and services to user emotions through personalized marketing. This shift sparks creativity and emotional engagement, transforming consumers from passive buyers into active co-creators. The traditional "producer - distributor - consumer" chain is evolving into a consumer-driven cycle—"consumer - designer -

producer"—where demand precedes production. Consequently, traditional distributors will decrease, while designers who translate consumer ideas into tangible products will see unprecedented demand.

The Capital Museum has developed an innovative online platform for design and cultural and creative product development, integrating personalized customization to transform consumers into active participants in product creation, helping to translate consumer ideas into tangible products, while also providing access to copyrighted stock images for enhanced creative possibilities (e.g., Figure 1. The Capital Museum's Digital Design Platform). Built on the principles of accessibility, innovation, and inclusivity, the platform leverages modular design frameworks and mobile optimization to empower users to create personalized museum-inspired products such as apparel, accessories, and home decor. The platform features an intuitive, user-centric online design maker that enables both professional designers and non-expert users to participate in cultural product customization, lowering technical barriers through tools like a drag-and-drop interface, which allows users to select from a curated library of digitized cultural motifs, patterns, and symbols derived from the museum's collections, such as traditional Beijing architectural elements or historical artifacts, with assets pre-processed into editable templates [6] for easy resizing and repositioning. It fosters a collaborative design ecosystem, with professional designers contributing foundational templates and users adding personal touches, blending expertise with public participation, while accessibility features such as voice-guided tutorials. Expanded functionalities include mobile terminal compatibility [7], allowing users to design and customize products on-the-go, broadening accessibility and engagement.



Figure 1. The Capital Museum's Digital Design Platform

5.2 Accessible Innovation: No Minimum Customization

"No Minimum Customization" enables products

to be made on-demand in response to individual customer requests. This approach significantly reduces inventory pressure by ensuring products are only manufactured after an order is placed, thereby eliminating the need to pre-produce and store large quantities of inventory. It minimizes overstock risk, as businesses no longer need to predict demand or maintain stockpiles, avoiding the risk of overproducing items that may not sell. Additionally, it enables efficient resource allocation by ensuring materials, labor, and storage space are utilized only when needed, reducing waste and optimizing operational efficiency. This approach also offers flexibility in product offerings, allowing businesses to provide a wider variety of designs and products without the concern of unsold inventory, as each item is produced only when ordered.

The advantages of the "No Minimum Customization" are multifaceted. It enhances cost efficiency by reducing storage costs and minimizing waste from unsold inventory, while also lowering upfront capital investment in production and inventory management. It boosts customer satisfaction by enabling personalized, one-of-a-kind products tailored to individual preferences, fostering loyalty through unique, made-to-order items. The approach promotes sustainability by minimizing overproduction and material waste, aligning with eco-friendly practices and supporting a more sustainable supply chain. It also enhances scalability, enabling small businesses and independent creators to enter the market without the burden of large-scale production and allowing businesses to test new designs with minimal financial risk. Furthermore, it improves cash flow, as businesses receive payment before production begins, reducing financial strain by eliminating the need to tie up capital in unsold inventory. Finally, it fosters innovation and creativity by encouraging experimentation with new designs and ideas without the risk of unsold stock, empowering designers to focus on unique, custom solutions.

The Capital Museum's platform combines "No Minimum Customization" with added features to boost accessibility and efficiency. The platform allows users to order single, personalized items without needing to buy in bulk, making it easier for individual customers and small creators to get started. The platform's pricing system gives real-time cost estimates based on design complexity, materials, and production methods,

helping users make smart decisions. By integrating seamlessly with manufacturers and logistics partners, the platform ensures smooth production and on-time delivery. It also supports drop shipping, letting users sell custom designs directly to customers without needing to manage inventory (e.g., Figure 2. Customized orders are sent straight to manufacturers). To protect users' work, the platform includes tools for registering and safeguarding original designs, along with sales management features for tracking orders, managing stock, and analyzing sales data, helping designers grow their businesses. Additionally, users can access a library of copyrighted images and designs from the museum's collections, allowing them to incorporate culturally meaningful elements into their creations. This all-in-one approach not only makes creativity more accessible but also deepens public engagement with cultural heritage and improves access to cultural content [8].

Consumers' customized product orders are seamlessly routed directly to manufacturers



Figure 2. Consumers' Customized Product Order are Seamlessly Routed Directly to Manufacturers

5.3 Flexible Intelligent Manufacturing for Customization

Traditional production methods for mass production typically involve seven steps: design review, drawing release, prototyping, product inspection, Sampling, mass production, and product shipment. The entire production process for a batch of canvas bags (100 pieces), from order placement to shipment readiness, takes approximately 10 to 23 days (e.g., Table 1. Time For Producing a Batch of Canvas Bags (100 Pieces)). Each step requires time and resources, leading to extended supply cycles and high costs. Traditional manufacturing systems are rigid, relying on batch production based on demand forecasts, and cannot easily accommodate personalized customization.

Table 1. Time for Producing a Batch of Canvas Bags (100 Pieces)

Production procedure	Time
Design Review	1~2 days

Drawing Release	1~2 days
Prototyping	2~5 days
Product Inspection	1~2 days
Sampling	1~3 days
Mass Production	3~7 days
Product Shipment Readiness	1~2 days

In contrast, "no minimum customization" focuses on inventory-free sales, producing only what customers demand. This approach minimizes storage requirements, simplifies management, and ensures production-sales synchronization, significantly enhancing production flexibility. With a diverse product range and a robust, comprehensive supply chain, the platform can produce a wider variety of products at lower costs.

Flexible intelligent manufacturing represents a transformative production model that prioritizes customer needs over traditional factory-driven orders. Unlike conventional manufacturing, with just a smartphone or computer, individuals can now oversee the entire process—from product creation and production to delivery. This approach not only reduces costs and lead times but also enhances the ability to respond to customer needs in real time. When an online order is placed on the platform, data is automatically sent to OEM manufacturers for production, streamlining the process to just three steps: no minimum customization (prototyping), product inspection, and product shipment, with prototypes delivered within 48 hours (e.g., Table 2. Time for Customizing a Canvas Bag by Flexible Intelligent Manufacturing). This eliminates the need for partners to search for manufacturers or navigate complex technical details, showcasing the efficiency and appeal of flexible intelligent manufacturing. It meets the growing demand for small-batch production while dramatically improving operational efficiency.

Table 2. Time for Customizing a Canvas Bag by Flexible Intelligent Manufacturing

Production procedure	Time
No minimum customization (Prototyping)	24~44 hours
Product Inspection	Within 2 hours
Product Shipment Readiness	Within 2 hours

5.4 Specialized Techniques Made Accessible

Traditional production models often encounter high costs and quantity restrictions when implementing specialized techniques such as embroidery (e.g., Figure 3. Embroidery Products

Via "No Minimum Customization"), glow-in-the-dark effects, gold foil, and UV printing (e.g., Figure 4. Glow-In-The-Dark Effects, Gold Foil, And UV Printing Products Via "No Minimum Customization"). These limitations make small-scale or customized production economically unfeasible. The platform effectively addresses these issues by significantly reducing costs to just one-tenth of traditional methods. This innovative approach allows for the production of highly specialized and intricate designs without the need for bulk orders, making it feasible for individual consumers and small businesses to access premium customization options. Furthermore, the platform will further enhance its capabilities, enabling the creation of increasingly complex and detailed molds by 3D printing. This breakthrough not only democratizes access to high-quality, specialized techniques but also fosters greater creativity and innovation in the production of customized cultural and creative products.

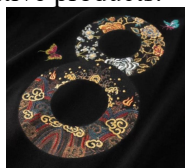


Figure 3. Embroidery Products Via "No Minimum Customization"

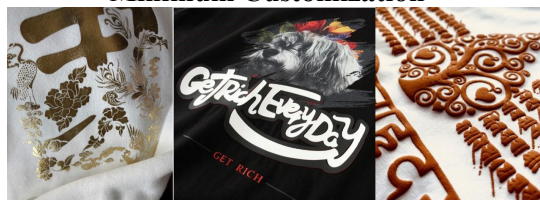


Figure 4. Glow-In-The-Dark Effects, Gold Foil, and UV Printing Products Via "No Minimum Customization"

5.5 Branding: Integrating Museum Cultural Creativity into Daily Life

The strength of museum cultural creativity comes from its deep cultural roots. The Capital Museum's cultural product designs highlight the rich meanings behind Beijing's unique traditions and heritage. By using digital technology to creatively reimagine traditional museum products, the museum boosts the value of its collections and keeps its cultural offerings fresh and engaging [9]. The Capital Museum's cultural creativity initiatives are deeply rooted in Beijing's traditional history and culture, incorporating modern elements and fresh artistic inspirations. These efforts focus on conveying

cultural values and exploring local cultural content to create products that highlight regional cultural characteristics.

The Capital Museum's "Museum Night" event, themed around Beijing's urban scenes, features immersive performances and interactive experiences such as hand embroidery, bringing museum exhibitions to life. The museum digitally disseminates culture, making knowledge more accessible, intelligent, and efficient. As Beijing's Central Axis has successfully been inscribed on the UNESCO World Heritage List in 2024, the Capital Museum has developed a range of cultural and creative products themed around the Central Axis, celebrating this achievement through its digital cultural creativity platform. This cultural self-sufficiency and regional cultural dissemination exemplify the true significance of museum cultural creativity, showcasing how heritage preservation and innovation can coexist to promote global recognition and local pride.

Furthermore, the museum keeps pace with modern societal trends and the evolving tastes of younger audiences [10], maintaining originality while emphasizing design and production quality. It integrates cultural and creative products with contemporary fashion elements, ensuring they are not mere imitations but thoughtfully consider consumer psychology and aesthetic preferences. Cultural and creative products serve as symbols of contemporary trends, embodying new consumption concepts and reflecting the values and cultural aspirations of today's youth.

While technology continues to reshape how we approach tasks, the core needs of people remain constant. At the 2021 China International Fair for Trade in Services, the Capital Museum introduced a series of cultural and creative products focused on the essentials of daily life—clothing, food, housing, and travel. These included traditional Chinese clothing adorned with cultural motifs, Bo Juli ice cream, Central Axis-themed mooncakes, decorative paintings, and travel kits. These efforts are designed to weave cultural and creative products seamlessly into everyday life. Expanding on this vision, the digital cultural creativity platform brings together a wealth of resources to provide thousands of customizable products online, covering everything from clothing and food to furniture and travel. This lifestyle-focused strategy strikes a chord with people, allowing them to experience the charm of Chinese culture

in a relaxed and enjoyable atmosphere, making cultural experiences a natural part of their daily routines.

6. Conclusion

The exploration of customized cultural and creative museum products, as demonstrated by the advancements at the Capital Museum, underscores the transformative potential of digital technologies in enhancing accessibility, engagement, and innovation within the museum sector. By embracing the principle of "accessible innovation," the Capital Museum's digital design platform has successfully democratized the creative process, enabling both designers and ordinary individuals to participate in product customization. This approach not only fosters greater public involvement in cultural preservation but also enriches the visitor experience by making complex museum concepts more relatable and engaging.

The case study of the Capital Museum provides valuable insights into how digital tools can drive product innovation in the cultural and creative industries. It highlights the importance of leveraging emerging technologies to create personalized, inclusive, and dynamic museum offerings that resonate with diverse audiences. Furthermore, this research serves as a reference point for other institutions seeking to harness the power of digitalization and customization to fulfill their educational and cultural missions.

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