

Original Paper

Printing Leads the Ancient and Modern, Heart to Heart—Research on the Inheritance, Innovation and Sustainable Development of Dege's Engraving and Printing Techniques

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Abstract

This paper takes the Dege engraved printing technology as the research object, and discusses its inheritance, development and digital dissemination strategy in the modern society. As a collection of traditional Tibetan printing techniques, Dege engraving and printing technology has rich cultural value, unique technical craft advantages and ecological advantages, but it also faces many challenges such as low productivity, material dependence, learning difficulty, and aging of inheritors. Through SWOT analysis, the article deeply analyzes the advantages, disadvantages, opportunities and threats of Dege's engraving and printing techniques, and proposes innovative and developmental solutions such as cultural and creative product development, experience economy, cultural and tourism integration and digital promotion. The study points out that in order to realize the living inheritance of Dege engraving and printing techniques, it is necessary to build a sustainable development system integrating "protection, transformation and dissemination", and to make use of modern technology and industrial power to explore its application value in the contemporary society and enhance the public's sense of cultural identity.

Keywords

Dege engraving, intangible cultural heritage, cultural and creative products, digital communication, SWOT analysis, inheritance and development

1. Introduction

1.1 Research Background

With the rapid development of science and technology, the inheritance and dissemination methods of intangible heritage skills have undergone great changes. In addition, people in modern society have a

deeper understanding of the value of traditional skills, which makes the inheritance of skills gradually establish a close relationship with digital technology. In this context, we take the development of cultural and creative products related to Dege engraving and printing techniques, the derivation and growth of the cultural and creative market, and how to disseminate them by digital means as our discussion topics.

1.2 Research Objectives

Under the influence of the increasingly sophisticated digital technology and the favorable conditions of national support policies, this research is committed to the multi-dimensional development of traditional skills, combined with the connotation and cultural value of the Dege engraving and printing technology to innovate, so as to make it bloom in the new era with a new luster.

2. Introduction to Dege Engraving and Printing Technology

Dege Engraving and Printing Technology is a collection of traditional Tibetan printing techniques, whose theoretical system integrates material science, process standardization, cultural inheritance and ecological philosophy, and is a local traditional handcraft in Dege County, Sichuan Province, one of the national intangible cultural heritages. Its program mainly includes three major stages: carving board production, pigment preparation and paper treatment.

2.1 Carving Board Production

2.1.1 Raw Material Processing

The Derge scripture institute generally chooses red birch trees that are more than 30 years old and have straight trunks without scars, which are hard and delicate and resistant to wear and tear from high-frequency printing. Trees that are dormant after the tenth month of the Tibetan calendar have a low resin content and are less susceptible to insect infestation, so it is advisable to cut them down. The wood is sawn into sheets according to the standard size for engraving plates (usually 60-70cm long, 10-15cm wide, and 3-4cm thick) and peeled, keeping the inner bast to prevent cracking. This is followed by a dewatering and stabilization process of about 2-3 years, in which the wood is placed in a ventilated, dry room or half-open shed, with wooden strips separating the cross-stacked layers of boards, and is left to dry naturally, and is regularly turned and inspected until the moisture content is reduced to 8-12%. The next step is the 7-15 day smoking process. In a closed smokehouse, branches and leaves of cypress trees and Tibetan herbs containing cypress smoke and hinokitiol are used as fuel to protect against insects.

Dehydration prevents the wood from warping and cracking; low moisture content prevents decay and insect infestation and improves mechanical strength, making it easier to work with; it also facilitates the adhesion of finishing materials and improves the surface finish. Finally, the boards are immersed in melted ghee (60-70°C) for 12 hours.

(60-70 °C) in 12-24 hours, remove and wipe the remaining oil, which can enhance the toughness of wood.

2.1.2 Writing Stage

The writing stage of Dege engraving is the core foundation of plate making.

Writing using bamboo pens made of arrow bamboo, made of ghee lamp ash mixed with yak skin glue made of ink can make the handwriting color and lustre everlasting, and its fine particles so that it can be uniformly attached to the Tibetan paper fibers (wolfsbane paper fiber porosity 35%-40%), but also comes with anti-bacterial properties can be anti-mothballs.

2.1.3 Carving Stage

When dealing with the board, the manual push planer 25 ° cut, along the wood grain for 108 times planing and polishing, so that the flatness error $\leq 0.2\text{mm}$, by the “water film test” (water dripping evenly after the diffusion of no stagnation) before the carving.

Carving pattern is divided into three steps, the first rough carving. Carve the outline with a large carving knife. After the fine carving, with a small carving knife fine carving, to ensure smooth lines and clear details. Finally, trimming, checking the pattern is correct and fixing flaws. If the carving of words, carvers often use “three knife to determine the universe” technique: carver sitting plate holding a knife, the first knife 45 degrees into the 0.5 ~ 0.8 cm to determine the bone of the word.

0.8 centimeters to determine the skeleton of the word (need to ensure the clarity of the printing and avoid cracking the board), the second knife 30 degrees to repair the

Stroke, the last knife 90 degrees vertical edge, and finally carved to achieve the best results. Each Tibetan letter has to go through about 27 runs of the knife, and the error of the arc of the pen is no more than the diameter of a hair (about 0.07 to 0.08 mm).

2.1.4 Acceptance Stage

The acceptance stage of Dege engraving has a unique “triple check” system.

Initial school - with charcoal black ink on ordinary paper test printing, marking the defective part after the repair; re-editing - through the engraved plate through the smoothness of the lines, perceive the depth of the engraving is consistent; and finally by the senior monk to confirm the final seal to complete the final school. Acceptance should ensure that the alphabetic symbols and grammar in the text are error-free, the engraved grooves are smooth and burr-free, and the printing is clear and halo-free.

2.2 Pigment Preparation Stage

There are often two types of ink used in the Dege printing technique. Ink production is carried out in a closed environment, and after the ink production materials are burned for 20-30 days, the “ink” (soot) on the wooden board shed is taken down, ground and collected for spare use. The ink made from local willow and alang is not easily smudged and is often bright in color, so it is often used for official writing. Another kind of ink made from the bark of the big azalea tree and the branches of the “Alang” tree has fine particles and is mainly used for printing, and these two trees have adhesive properties, so it can be written without the need to add glue to the carved board.

2.3 Paper Processing Stage

Tibetans use the Dege paper making method to make paper called “Axiu” paper, as early as the first Tibetan calendar around the back of the year of the Tuji (1078 AD), Dege region appeared with “Axiu” paper copy of the handwritten book, “Ridge - the biography of King Gesar”.

“The paper is made from the roots of a plant called “Ajiao Rujiao” (Ruixiang wolfsbane), and is yellowish in color and texture.

It is yellowish in color and thicker in texture, but the fibers are flexible and toxic, and are resistant to insects and moths. The paper made from this root is malleable, easy to store, and good for writing. In addition, the three layers of the roots can be used to make paper with different properties. The paper made from the outer layer is soft and delicate. The paper made from the middle layer has higher toughness and durability, making it suitable for writing. Outer, middle and inner layers of the combination of paper made of rough and thick, suitable for printing or packaging.

3. With SWOT Analysis Theory to Analyze the Development Prospects of Dege Engraved Printing Techniques

3.1 Strengths

3.1.1 Dege Engraved Printing has Rich Cultural Value

Dege engraving and printing technology is not only a treasure of Tibetan culture, but also an important carrier of Chinese civilization and world communication.

Dege engraving is the gene pool of Tibetan canonical books. The Derge Scripture Printing Institute now has more than 320,000 engraved plates covering more than 830 Tibetan classics.

Covering more than 830 Tibetan classics, the Derge Scripture Printing House has completely preserved the history, medicine, astronomy, art and other disciplines of the Tibetans since the 11th century, which can be called the “encyclopedia of Tibetan culture”. For example, the Eight Thousand Songs of the Prajna Paramita Sutra is engraved in the form of a Sanskrit-Tibetan bilingual book.

For example, the Eight Thousand Ode to the Prajna Paramita Sutra is engraved in the form of Sanskrit and Tibetan bilingual control, which is the only surviving copy in the world, reflecting the trajectory of Buddhism's southern transmission and northern translation, and is the evidence of the mingling of Indian civilization and Tibetan civilization. The Dege edition of Ganjur and Danjur is recognized as the “most authoritative edition” by the global Tibetan community because of its fine proofreading and standardized engraving, which directly influences the religious practices in the Himalayan cultural circle. The contents of the engraved plates cover the Tibetan social system, medicine and calendar, such as the Four Medical Classics plates provide first-hand information for the study of the development of Tibetan medicine, and the astronomical calendar plates can be traced back to the Tubo period.

The engraved plates also incorporate Tibetan calligraphy and thangka painting into the engraving system, forming a unique “Karmen style” and opening up a paradigm for the combination of scripture and art.

Its “pouring paper method” paper-making process and the Central Plains “paper copying method” to

form a complementary, wood smoked dehydrated technology and Jiangnan ancient books restoration techniques, showing the Chinese civilization of multiple and integrated technical interaction.

This kind of living inheritance also provides a “living specimen” for the study of the printing history of ancient China and fills in the blank of the history of traditional engraved printing technology after the popularization of movable-type printing in the Central Plains.

In 2009, it was selected as a representative list of UNESCO's non-heritage of humanity, and in 2024, the archival documents of engraved plates collected by the institute were selected as the Memory of the World Asia-Pacific Register, making it the only remaining sample of traditional printing civilization in the world that is still in operation.

The cultural value of Dege engraved printing lies in the fact that it is not only the “gene pool” of Tibetan cultural inheritance, but also a three-dimensional presentation of the technical wisdom and spiritual beliefs of Chinese civilization. The mode of its living inheritance provides a model for the protection of traditional skills, while the characteristics of multi-civilization fusion highlights the eternal charm of human cultural diversity. The continuation of this technique has far-reaching practical significance for the construction of the sense of community of the Chinese nation and the sense of community of human destiny and the community of human destiny.

3.1.2 Dege Engraved Printing has Unique Technical Process Advantages

Dege engraving technology is not only a carrier of Tibetan culture, but also contains unique technical wisdom, its technical value is reflected in the material science, process innovation and other dimensions, providing a valuable model for traditional handicrafts and modern technology research.

The Dege engraving and printing technology is a practical example of material science. In the wood treatment, craftsmen use natural shade drying process, cypress smoke moth-proof, ghee soaking toughening and other ways to greatly improve the wood's resistance to cracking, anticorrosion and service life; Dege engraving and printing techniques of pigment stability and weathering is far more than the organic dyes, and its unique plant ink formula can avoid the acidification of the corrosion of the paper, the Langdu (狼毒草) paper can be preserved for more than 1,000 years by the test; Dege engraving and printing techniques using toxic Dege engraving and printing techniques use poisonous Langdu roots to make Tibetan paper, both insect-resistant, folding-resistant, ink-absorbent and other characteristics of the process is called by UNESCO, “the miracle of the application of plant fibers”.

The Dege engraving and printing technique has made a technical contribution to the precision craftsmanship. Artisans through muscle memory to achieve the text mirror image engraving, that is, reverse engraving technology, to achieve the error $<0.3\text{mm}$ (modern laser engraving standard $\pm 0.1\text{mm}$), showing the limit of human craftsmanship accuracy; manual pressure $20\text{kg} \pm 2\text{kg}$, matching the fiber structure of Langdu (狼毒草) paper (porosity 35% -40%), the ink penetration depth of 0.05-0.1mm, to achieve a “Clear and non-blotchy” effect (modern offset printing penetration depth of about 0.03mm); printing with saliva wet paper (water content instantly increased to 8%), balancing the plateau dry environment of ink absorption, reflecting the environment adaptive wisdom.

3.1.3 Dege engraving has ecological advantages

Langdu (狼毒草) paper ecological chain: Langdu (poisonous plant) paper production to achieve “waste utilization”, its fiber anti-insect characteristics to reduce the reliance on chemical pesticides, the formation of “raw materials - production - degradation” zero-pollution cycle.

Ghee instead of synthetic materials: biodegradable animal fats and oils are used instead of modern resin coatings, avoiding micro-plastic pollution (each engraving plate reduces the use of plastic by about 50g).

Low-energy production mode: the whole process relies on natural energy (sunlight drying, human engraving), and the carbon emission intensity is only 1/50th of that of modern printing (measurement shows that the carbon footprint of single-page printing is 0.02kg CO₂, and that of offset printing is 1kg CO₂).

Ecological inhibition of bacteria by cypress smoking: hinokitiol released by burning cypress branches can specifically inhibit wood decaying bacteria (e.g., Colored Velvet Geoduck), but has no significant effect on the soil microbial community (experiments show that the diversity index of the soil bacterial flora only decreased by 0.3% after smoking). Compared to the toxicity of industrial preservatives (e.g., arsenic-containing preparations of CCA) to groundwater and insects, the damage to the surrounding ecological chain caused by the cypress smoke treatment is almost nil.

3.2 Weaknesses

3.2.1 Limitations of Production Efficiency

The core process of engraving is engraving, which requires craftsmen to hand-carve the entire board, which is extremely time-consuming. For example, the production of a large book engraving may take several years, and each page needs to be engraved individually, even if only one word is changed, the entire plate needs to be re-engraved. This manual plate-making method is not only inefficient, but also requires a high level of skill on the part of the craftsman, resulting in high labor costs.

The long production cycle of traditional crafts makes it difficult to realize large-scale mass production and penetrate into modern life.

3.2.2 Dependence on Materials and Technology

Red birch, the common raw material for Dege engraving, has a 30-year maturing cycle, and excessive logging has led to a crisis of raw materials (the coverage of red birch forests around Dege has declined by 60% in the past 30 years). The traditional Dege engraving plate has extremely high requirements on craftsmanship, for example, if the engraving error is more than 0.3mm, the whole plate should be scrapped. From the selection of materials, engraving to printing, engraving requires long-term training and experience accumulation, and craftsmen need to master complex manual skills, and the cycle of apprenticeship training is as long as 5-8 years (modern CNC engraving training takes only 1 month), which limits the dissemination of traditional skills.

3.3 Opportunities

3.3.1 Protection and Revitalization of Non-heritage under Policy Support

Strategic opportunity of national cultural park construction

As an important node in the Ganzi section of the Yangtze and Yellow River National Cultural Park, Dege County's cultural resources have been incorporated into the national strategic plan. The government, through financial investment, infrastructure construction (such as Maijiu Eco-tourism Demonstration Zone, cultural Creative Art Commercial Street creation, etc.), the government promotes the deep integration of engraving and printing techniques with the cultural and tourism industry.³⁷ For example, the Dege Printing and Scripture Academy has become a core cultural landmark in the construction of the National Cultural Park, attracting tourists while also enhancing the visibility of the techniques.

3.3.2 Deepening of non-heritage Protection Policies

The Tibetan engraving and printing techniques of the Dege Printing and Scripture Institute have been selected for UNESCO's list of human non-heritages and the Memory of the World Asia-Pacific Register, gaining international recognition. The local government has clarified the protection responsibility by formulating the Regulations and Administrative Measures for the Engraving and Printing Technique, and has set up special funds for the restoration of printing plates, characterization and archiving, and the cultivation of inheritors. For example, it repairs and mends more than 230 pieces of engraved scripture plates every year, and launches the project of reproducing rare books such as the Great Tibetan Scriptures.

3.3.3 Opportunities for Dege Engraving and Printing Provided by Rural Revitalization

The strategy of rural revitalization is a major strategic plan put forward by the Chinese government to solve the "Three Rural Issues" (agriculture, rural areas and farmers), promote the modernization of agriculture and rural areas, and realize the integrated development of urban and rural areas. It aims to promote the comprehensive upgrading of agriculture, the comprehensive progress of the countryside, and the comprehensive development of farmers, and is the overall grasp of the work of the "Three Rural Issues" in the new era. Rural revitalization strategy emphasizes cultural inheritance and protection, Dege engraved printing as a national intangible cultural heritage, the government attaches great importance to rural revitalization encourages the development of special cultural industries, Dege engraved printing can be deeply integrated with tourism, cultural experience and other industries, Dege engraved printing skills can be in line with the times, to seize the welfare of the policy, to help solve the problem of the three rural areas at the same time, to achieve the dissemination of the self and the development of the three rural issues.

3.4 Threats

Dege Engraving Printing is an ancient printing technique adopted by the Dege Printing Institute, which is the first of the three major printing institutes in the Tibetan area, and has a high cultural value. However, it is currently facing multiple threats.

3.4.1 Difficulty in Passing on the Skills

The learning threshold of Dege engraved printing is high, and its process is extremely complicated,

covering multiple links such as plate making, engraving, writing, ink making, paper making and printing. There are a lot of points to pay attention to in one link alone. Compared with other links, plate making is considered the simplest, but it is also necessary to select suitable wood according to different contents and plate requirements. This step takes into account the texture and dryness of the wood. The other steps are more complex. Each process requires the practitioner to invest a lot of time to learn and accumulate experience through repeated practice before he or she can master it. Each step of the skill requirements are almost harsh, so high learning difficulty and skill threshold, so that many people want to get involved in this field is discouraged.

The rapid development of modern society, employment options are rich and diverse, young people tend to favor those who can quickly bring returns, in line with the trend of the times of the emerging industries. In contrast, Dege engraved printing is not only a long learning cycle, the economic benefits are not obvious in the short term. This makes the younger generation willing to take the initiative to learn and engage in this traditional skills of very few people. In the long run, the older generation of craftsmen are getting older, their energy and physical strength are not as good as before, fewer and fewer people can master the Dege engraving and printing techniques, and there is a fault phenomenon in the inheritors, and the non-heritage skills are facing a serious situation of no one to succeed them.

In today's highly developed digital and industrialized era, modern printing technology with the help of advanced mechanical equipment and automated processes, to achieve high-speed, large-scale printing operations. For example, a modern high-speed printing machine can print thousands or even tens of thousands of documents per hour, and in the color reproduction, pattern clarity and other aspects can maintain a high degree of stability. However, Dege engraving relies entirely on manual operation, and each process is extremely complicated and time-consuming. A skilled craftsman, a day may only be able to complete a limited number of engraved prints, productivity is far lower than modern printing technology. Moreover, compared to the printing presses Dege engraving manual production costs are high. The production of engraved plates need to choose high-quality wood, a long time drying, processing to be used for engraving, engraving process, craftsmen need to invest a lot of time and energy, and ink, paper, engraving are also very need to pay attention to the need to spend a lot of raw materials and manpower. And modern printing relies on machinery and mass production, can effectively reduce the unit cost. Due to low productivity and high cost, Dege engraved printing in the market competition is at a disadvantage, the economic benefits are relatively poor. It is difficult to reduce the price of products and increase the sales volume significantly, which leads to the practitioners' income level is often not high. For the pursuit of economic returns, the desire to quickly realize the material accumulation of young people in their careers, such economic returns are really difficult to inspire them to devote themselves to the enthusiasm, which undoubtedly for the inheritance and development of the Dege engraving and printing techniques cast a shadow.

3.4.2 Shrinking Market Demand

In the wave of rapid development of science and technology, modern printing technology is moving

forward with rapid changes, which undoubtedly gave the Dege engraving printing has brought unprecedented impact. Computerized phototypesetting technology with its accurate and fast text entry and typesetting functions, so that information processing has become efficient and convenient. Operators only need to easily hit the keyboard on the computer, you can quickly complete the complex text layout work, not only on the font, font size, color and other diversified settings, but also a real-time preview of the layout effect, at any time to modify the adjustment. The same advantages of movable type technology is significant, through the flexible combination of movable type, can quickly complete the preparation of different content printing, greatly reducing the printing cycle.

Modern printing technology in terms of efficiency far beyond the Degree engraved printing. It can complete a large number of printing tasks in a short period of time, with stable printing quality and low cost. While Degree engraving printing requires a lot of time and manpower, each piece of engraving plate needs to be carefully carved by craftsmen, and once there is an error, the modification process is very cumbersome. In such a competitive environment, Degree engraved printing in the market does not occupy an advantage, the demand for the product has decreased significantly, many of the original reliance on Degree engraved printing business have turned to modern printing methods.

Dege engraved printing application scene there are obvious limitations. In the present time, it is mainly used for printing Tibetan canonical books for dissemination. The development of modern society is changing rapidly, people's demand for printed materials presents diversified and personalized characteristics. Exquisite business posters, fashion magazines and publications, full of creative personalized gifts, the market needs more and more different styles and contents of the printed materials. Dege engraved printing due to the complexity of the production process, the cycle is long, it is difficult to meet such printing needs. It is also impossible to design and mass produce according to customer's requirements as fast as modern printing technology. The limitation of this application scenario leads to the limitation of the development space of Dege engraved printing, and faces serious challenges in the modern market competition.

3.4.3 Insufficient Cultural Cognition

In today's fast-developing society, all kinds of emerging culture and trends are emerging, attracting the public. While traditional culture is gradually marginalized in people's vision, the public's understanding of and concern for non-heritage greatly reduced. Dege engraved printing technology carries a profound historical heritage and unique artistic charm, but due to the lack of extensive and effective publicity and promotion, most people do not know much about Dege engraved printing or even many people have never heard of it. It is not like modern popular culture as frequently in various media platforms and daily social topics, so people rarely have the opportunity to witness the production process of Dege engraved printing, and it is difficult to deeply appreciate the cultural value behind it. This lack of cognition has led to the society not paying enough attention to the protection and inheritance of Dege engraved printing.

In the school education system, the teaching of knowledge focuses more on modern science and

technology, examination subjects and other fields, and the content of intangible cultural heritage is relatively small, and Dege engraving has not been able to occupy a place in the school education as it should be. Textbooks often contain only a few words about intangible cultural heritage programs such as Dege engraving, lacking systematicity and depth. In the classroom, teachers seldom have the opportunity to explain the content in depth, and it is even more difficult to organize relevant practical activities for students. As a result, students' understanding of Dege engraving and printing only remains at a very superficial level, making it difficult for them to truly feel its unique charm and cultural value. In this kind of educational environment, it is difficult for students to cultivate their interest and love for the traditional technique of Dege engraved printing. Without interest as a guide, it is difficult to inspire students to take the initiative to understand, learn and pass on the enthusiasm of this skill. In the long run, it will not only lead to the fault of the inheritance talents of Dege engraved printing, but also is not conducive to the comprehensive inheritance and development of the excellent traditional Chinese culture, which will make these precious cultural heritages gradually lose their vitality in the future development of the society.

4. Modernization, Innovation and Development Plan of Dege Engraved Printing

4.1 Development of Cultural and Creative Products and Branding Operation Plan

As an intangible cultural heritage, Dege engraved printing technology has rich historical heritage and cultural connotation, and its artistic and cultural value is still a valuable and bright pearl in modern times. Through the development and design of cultural and creative products

This traditional craft can be presented in a way closer to modern life, so that young people in the new era are more willing to contact and understand. In the design process, the traditional themes and techniques of Dege engraving and printing techniques are innovatively transformed and creatively developed, and combined with modern aesthetics and technical means to create cultural and creative products that meet the needs of modern people. The generation and promotion of cultural and creative products provide new ideas for the dissemination of Dege engraving culture. It can be used as a cultural carrier to communicate and collide with modern mainstream culture, and promote the dissemination and penetration of excellent traditional culture. Carrying strong regional cultural characteristics, Dege engraved cultural and creative products can inspire people's sense of identity and pride in Tibetan culture. Through the use and appreciation of these cultural and creative products, the unique charm of Tibetan culture can be understood and felt more deeply in order to enhance cultural self-confidence (Zhong, Zhou, & Cheng, 2025).

4.2 Experience Economy

Dege engraved printing technology with unique cultural value, artistic value gradually involved in the construction of social culture, experience hall function orientation can be multi-faceted, non-heritage experience hall can not only meet the non-heritage living holding related to the basic functions, but also to meet a variety of socialization functions.

From the perspective of the non-heritage experience hall itself, to deal with the needs of the Dege engraving and printing techniques live holding, can provide a better holding space for the Dege engraving and printing techniques, at the same time, the socialization function for the development of Dege engraving and printing techniques experience hall injected vitality, the audience in the visit, the experience at the same time, the venue for the audience to provide more diversified functional support, such as to create a quiet and comfortable environment in which to Watching cultural films, reading cultural books and so on to attract more audiences, for the non-heritage experience museum business development constantly injected new vitality (Cui, 2021).

Create the Dege engraving technology experience hall. Experience hall to experience the Dege engraving and printing technology as the core, at the same time can put some books related to the Dege engraving and printing technology and Tibetan culture, penetrate its cultural spirit. Combined with Tibetan tea culture, it makes the cultural experience hall more diversified, creates a calm and comfortable environment, meets the demand of modern people for relaxation and leisure, and at the same time relieves the current situation of modern people's excessive pressure, it also makes the Derge engraving and printing techniques penetrate into people's daily life, and promotes the inheritance and development of the non-heritage skills.

4.3 Culture and Tourism Integration

In the current era of continuous upgrading of the consumer structure and the increasingly urgent pursuit of a better life, consumers have put forward more stringent requirements for the richness of the tourism experience and the diversification of tourism products. New products derived from the fusion of culture and tourism are becoming popular options in the tourism market.

In recent years, the field of culture and tourism has shown strong development momentum, with the market scale expanding steadily and the industrial chain improving. The in-depth exploration and sorting out of cultural resources, the careful conception, design and manufacturing of tourism products, the optimization and upgrading of tourism services and the marketing and sales links, the various industrial links are closely linked and synergistic, jointly promoting the prosperous development of the industry.

The integration of culture and tourism provides a continuous source of inspiration and a broad market development space for the innovative design of non-heritage cultural and creative products. Designers dig deep into the core cultural value of non-legacy projects, integrate these representative cultural elements into the design process of cultural and creative products, and create tourism souvenirs, creative handicrafts and other non-legacy cultural and creative products with distinctive regional characteristics and ethnic styles. The integration of culture and tourism has broadened the sales path of non-heritage cultural and creative products, attracted a wider group of tourists and consumers to pay attention to the purchase with the help of online and offline marketing mode, injected new vigor and vitality into the living inheritance of non-heritage, and made the ancient intangible cultural heritage reappear with unique charm and value in the modern social context (Fang, 2025).

The design of the Dege cultural exploration route connects the Dege Printing and Scripture Institute, the Gesar Cultural Theme Exhibition Hall, the Maijuku Handicraft Inheritance Park and other attractions, and designs the in-depth tour route of “engraving technology + epic culture + ecological landscape”. Can also be linked with ecological and cultural ecotourism demonstration area, the introduction of “natural tourism + non-legacy experience” complex products, to extend the stay of tourists. Through cultural and natural resources to attract tourists, in order to meet the needs of contemporary relaxation and entertainment at the same time, but also let tourists more deeply experience the charm of traditional culture.

5. Digital Promotion Strategy of Engraved Plate Printing Technology and Its Cultural and Creative Products

5.1 Existing Problems in the Promotion of Cultural and Creative Products

5.1.1 Lack of Innovative Ideas

At the moment when the cultural and creative industry is booming, the current market situation is not optimistic. The vast majority of cultural and creative products are only superficial to the cultural elements of the raw paste in the product appearance, to give the product a layer of cultural “coat”, but did not dig deep behind the rich cultural core, consumers are difficult to feel the cultural relics carried by the historical changes, the wisdom of the ancients, and the charm of a unique craft. Product form is full of problems, homogenization phenomenon is extremely serious. Into the cultural and creative stores in different cities, often the same style of bookmarks, postcards, notebooks, they are either printed with a few celebrity quotes, or a simple list of famous local attractions, the production process is crude, the design of a single idea. These cultural and creative products not only lack of dynamic design ingenuity, so that the form becomes lively and interesting, but also did not incorporate the interactive elements of the current popularity, so that consumers participate in it, to feel the dynamic beauty of culture. Such a monotonous, dull presentation, in the information explosion, consumer tastes increasingly picky today, naturally unable to stimulate consumer desire to buy, in the white-hot competition in the cultural and creative market to stand firm.

5.1.2 Fuzzy Target Audience

Many cultural and creative products are not precisely anchored to the target audience when they are introduced to the market. There is a lack of in-depth analysis of the diverse consumer demands derived from different age levels, gender differences and cultural backgrounds, which makes it difficult to build an effective bridge between the product and the potential consumers, and fails to accurately and efficiently reach the target customer groups, resulting in a greatly reduced marketing effect. The trendy cultural and creative products favored by young people are often coldly received due to the childish design of cultural and creative products; the delicate cultural and creative products required by young and middle-aged people are mostly left unused due to the rough workmanship and empty content; the traditional sentiment cultural and creative products favored by the elderly are difficult to be favored due

to the shoddy workmanship and piling up of elements. Romantic and delicate cultural creations preferred by women are often burdened by superficial efforts; functional and technological cultural creations valued by men are also unnoticed due to ordinary design and single function. Regional cultural creations are inaccurately tapped and styles are disorganized; ethnic cultural creations are developed superficially and copied rigidly; international cultural creations are integrated without depth and elements are put together. All these make it difficult to connect the products with potential consumers, and the marketing effect is greatly reduced as the products cannot accurately and efficiently reach the target customer groups.

5.1.3 Lack of Online Channel Development

Despite the surging wave of the Internet, which has opened up a wide world for business promotion, some cultural and creative enterprises still fail to fully realize the great potential of online marketing channels. Online store operation and management is sloppy, the page design lacks aesthetics and professionalism, the product display pictures are of poor quality, and the details are brief and lack of infectiousness, which cannot vividly show the rich charm of cultural and creative products. In addition, the use of emerging marketing tools such as social media marketing and live streaming is rusty, and the lack of operational skills has limited the exposure of the products on the line and made it difficult to expand the sales radius effectively.

5.1.4 Weak Brand Awareness

Many cultural and creative products lack precise and distinctive brand positioning; the brand image is loosely and vaguely constructed; the brand name is chosen arbitrarily and hastily, making it difficult to accurately convey the product's cultural qualities and core advantages; the brand logo design is mediocre and lacks visual impact and recognition; the compilation of brand stories is empty and hard, failing to closely match the real historical and cultural veins or regional characteristics, and failing to convey the brand's depth and temperature to consumers, making consumers have a deeper understanding of the brand and a greater appreciation of the brand. And temperature, so that consumer awareness of the brand stays on the surface, loyalty is naturally difficult to cultivate.

5.1.5 Weak brand Communication

At the level of brand communication investment, cultural and creative products are generally insufficient. The communication strategy is single and fragmented, lacking a systematic and global blueprint for brand promotion; advertising is blind and random, not combined with the target audience's media contact habits for precise layout, resulting in a serious waste of resources; PR activities are poorly planned, with few opportunities to participate in high-end industry exhibitions and creative events to enhance brand awareness, and few cultural celebrities and opinion leaders work together to endorse and empower the brand. Moreover, neglecting the guiding role of word-of-mouth marketing, consumer feedback mechanism is virtually non-existent, slow response to after-sales problems, improper handling, resulting in the rampant spread of negative word-of-mouth in the market, seriously damaging the brand's reputation, the brand communication effect is naturally unsatisfactory.

5.2 Digital Promotion Strategy

5.2.1 Youthful Translation Strategy of Short Video Platforms

In digital communication, the short video platform has constructed a new communication paradigm of re-contextualization of non-heritage culture. The social media represented by Jittery Voice has realized the cross-generational communication innovation of non-heritage skills through the dual mechanism of “algorithmic recommendation + circle dissemination”. For example, Lang Jiazi Yu, an inheritor of face sculpture, has symbolically grafted contemporary IPs such as Nezha's Magic Child Descends to the World with traditional techniques, which is essentially a cultural translation process based on the theory of cultural memory. This communication paradigm innovation not only confirms Henry Jenkins' theory of cross-media narrative (Henry Jenkins. *Convergence Culture: Where Old and New Media Collide.*), but also builds a new mode of intergenerational dialogue for the living inheritance of non-heritage.

6.2.2 Immersive Digital Experience Scene

AR/VR, holographic projection and other technologies are utilized to create online and offline integrated experience. Hainan Li brocade project has realized the migration from physical space to virtual field by constructing three-dimensional life scene and creating “digital pattern laboratory” interactive system. After wearing VR equipment, users can adjust the density of warp and weft lines in real time to observe the changes in the fabric, and the tactile gloves provide feedback on the feel of weaving different materials. This “eye-hand-brain” synergistic cognitive mode adopts Merleau-Ponty's framework of physical phenomenology (Maurice Merleau-Ponty. *Phénoménologie de la perception.*), and transforms the traditional tattoo creation into a perceptible digital body practice through the use of technical means such as dynamic capture and haptic feedback, which effectively breaks through the barrier from physical space to virtual field. digital body practice, effectively breaking through the time and space boundaries of traditional cultural dissemination.

5.2.3 3D Modeling and Virtual Display

High-precision restoration of non-heritage works through 3D scanning and modeling technology breaks through physical limitations. For example, Beijing's “noodle Lang” inheritor Lang Jiazi Yu team will “Sima Guang smashed the cylinder” and other miniature face sculpture works into dynamic 3D models, detail accuracy of millimeters, character demeanor, clothing texture can be three-dimensional presentation, to facilitate the dissemination of academic seminars, online exhibitions.

5.2.4 Cross-field Collaborative Innovation Mechanism

Digital technology is promoting the breakthrough of traditional boundaries of non-heritage culture and forming a cross-field collaborative innovation mechanism. Korea Culture

The concept of “digital media stimulating cultural activity” put forward by the Korea Culture Industry Promotion Agency (Korea Culture Industry Promotion Agency's “White Paper on Digital Culture Industry”) has been verified in practice: the game “Weaving Dreams of Mountains and Seas” has transformed the process of Li brocade weaving into an interactive level, and the data show that the retention rate of its knowledge of the technique has increased by 68% compared with that of traditional

dissemination, which has increased the rate of cultural authenticity and built up a new cultural culture while preserving the cultural authenticity. cultural authenticity while constructing a symbiotic relationship between non-legacy and modern industry, opening up new paths for living inheritance.

6. Conclusion

With the rise of digital printing technology, Dege engraving and printing techniques have encountered a series of systemic problems in the current digital era, such as the decreasing number of inheritors, changes in the cultural ecological environment, and difficulties in adapting their own technology to new development needs. Relevant research shows that the reason why the protection dilemma is rooted in the deep-seated contradiction between the static mode of protection and the real needs of dynamic development. To break through this dilemma, the key lies in creating a sustainable development system integrating “protection, transformation and dissemination”. In terms of innovation and transformation, the focus should be on the modernization of the interpretation of cultural symbols. Through SWOT analysis, the study puts the cultural value and spiritual connotation of engraved plate printing techniques into the contemporary cultural consumption scene, and fully explores the application value in real life with the help of the power of the industry, so as to jump out of the single role of the dissemination of engraved plate printing techniques and to adapt to the diversified social needs of the contemporary society. In the communication strategy, with the help of media narrative, with a more youthful way of expression, to enhance the public's sense of cultural identity. The study also points out that in order to realize the living heritage, it is necessary to follow the theoretical core of “creative transformation”, and realize technological innovation to realize the deep interpretation and inheritance of cultural connotation under the premise of ensuring the integrity of the core skills.

References

- Bado, & Zhang, Z. Y. (2021). An Empirical Study of Multi-ethnic Cultural Exchanges in Yunnan and Tibet: Some Historical Facts and the Source and Flow of the Litang Version of the Ganjur Scriptures. *China Tibetology*, (04), 98-107.
- Bardo, & Zhang, Z. Y. (2022). Examination of the Publication and Engraving of the Official Edition of the Tibetan Book of the Qing Dynasty. *Journal of Southwest Minzu University (Humanities and Social Sciences Edition)*, 43(02), 30-45.
- Bardo. (2020). Dege yinjingyuan creation and expansion process. *Journal of Southwest Minzu University (Humanities and Social Sciences Edition)*, 41(12), 39.
- Cui, P. (2021). *Research on composite design of intangible cultural heritage experience hall*. Zhengzhou University.
- Fang, L. (2025). Research on the innovative design of non-heritage cultural and creative products under the perspective of cultural and tourism integration. *Tiangong*, (05), 85-87.
- JIANG, L. P., LIN, J. B., & HU, Y. X. (2025). Current situation and strategy of sustainable

- development of Cai Li Fo Boxing in the new era. *Wushu Research Research*, 10(01), 5-7.
- Liu, S. Y., Xu, Y. S., Liang, S. Y. et al. (2025). Stimulating New Vitality in the Changing Times—An Overview of the International Symposium on Conservation and Sustainable Development of Living Heritage. *Natural and Cultural Heritage Research*, 10(01), 90-94.
- National non-legacy project—Tibetan engraving and printing technology of Dege Printing and Scripture Institute*. (2006). 5(20).
- Ten, G., & Cai, Z. H. (2021). The Dege Printing and Scripture Institute—The Miles of Ink on the Tibetan Plateau. *Tourism*, (01), 66-69.
- Yuan, X. B. (2025). Huishitiangong—Quyong Stone Sculpture's Historical Lineage and the Exploration of Sustainable Development Strategy. *Oriental Collection*, (01), 152-154.
- Zhong, J. X., Zhou, Y., & Cheng, X. J. (2025). Research on the innovation and practice of Huizhou bamboo carving art in the design of cultural and creative product development. *Tiangong*, (07), 89-91.