Journal of Textile Science and Technology, 2018, 4, 151-157
http://www.scirp.org/journal/jtst
ISSN Online: 2379-1551
ISSN Print: 2379-1543

Research on the Adaptability of Textile Intangible Cultural Heritage Protection Based on ANP

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How to cite this paper: Zhao, H., Zhao, K., Zhao, K.Y. and Gao, S. (2018) Research on the Adaptability of Textile Intangible Cultural Heritage Protection Based on ANP. *Journal of Textile Science and Technology*, **4**, 151-157.
https://doi.org/10.4236/jtst.2018.44011

Received: October 27, 2018
Accepted: November 24, 2018
Published: November 27, 2018

Abstract

In this paper, the mathematical model is introduced to make quantitative research into the microcosmic level. The adaptive measure model of textile intangible cultural heritage protection based on ANP is constructed and the adaptability of the protection is scientifically judged. The paper uses the super decisions to calculate the index weight and divide the rating standard, and selects the protection path according to the evaluation result. Then it can realize the dynamic adjustment of the textile intangible cultural heritage protection path and improve the effectiveness of the protection.

Keywords

Textile Intangible Cultural Heritage, The Adaptability Measure, ANP

1. Introduction

Considering that the textile intangible cultural heritage projects are productive projects, this study uses the resources, market and product (RMP) theory to explore the logic and value of adaptive protection of textile intangible cultural heritage [1]. According to the actual situation of the textile intangible cultural heritage, the adaptive content of textile intangible cultural heritage protection is divided into three levels: The level of resource elements, the level of product elements and the level of market factors. The adaptability measurement model of textile intangible cultural heritage protection is constructed (**Figure 1**).

Resource element B1 is the foundation of intangible heritage projects, and it is the material guarantee that intangible heritage projects can be manifested and carried forward. It mainly involves the situation of raw materials needed for intangible heritage projects, the situation of inheritors.

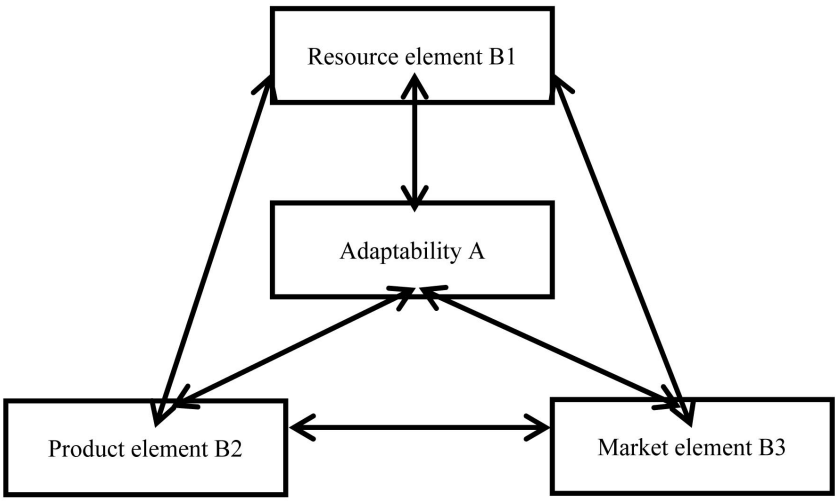

Figure 1. Adaptive measure model.

The product factor B2 is the main body of the intangible heritage project, and it is the external manifestation that shows to the world. The number of products is directly related to the sustainability of the intangible heritage projects. It mainly deals with the development mode and innovation direction of intangible products [2].

Market element B3 is the embodiment of intangible projects to the public, and it is an important factor that directly reflects the protection and inheritance of intangible cultural heritage. It mainly involves the competition among regions, the coupling of ecological environment, and the willingness to consume.

2. The Construction of the Index System

Due to the lack of research on the adaptability measurement of textile intangible cultural heritage project, there are few references for reference. This research adopts the methods of literature research and expert consultation to construct the evaluation index [3]. Combined with the measurement model of the textile intangible cultural heritage, this study constructs 3 two level index, 14 three grade index, and 32 evaluation index of the adaptability measure of textile intangible protection (**Table 1**).

3. Quantitative Evaluation of Adaptability of Textile Intangible Cultural Heritage Protection

3.1. The Establishment of a Network Structure

According to the model and index system constructed, it is considered that factors within the elemental layer not only affect the upper layer itself, but also the interaction between the elements inside the element layer. This study used ANP method in order to make a more reasonable basis for the evaluation. The mutual influences and interactions between the elements of the criteria level are as **Figure 2**.

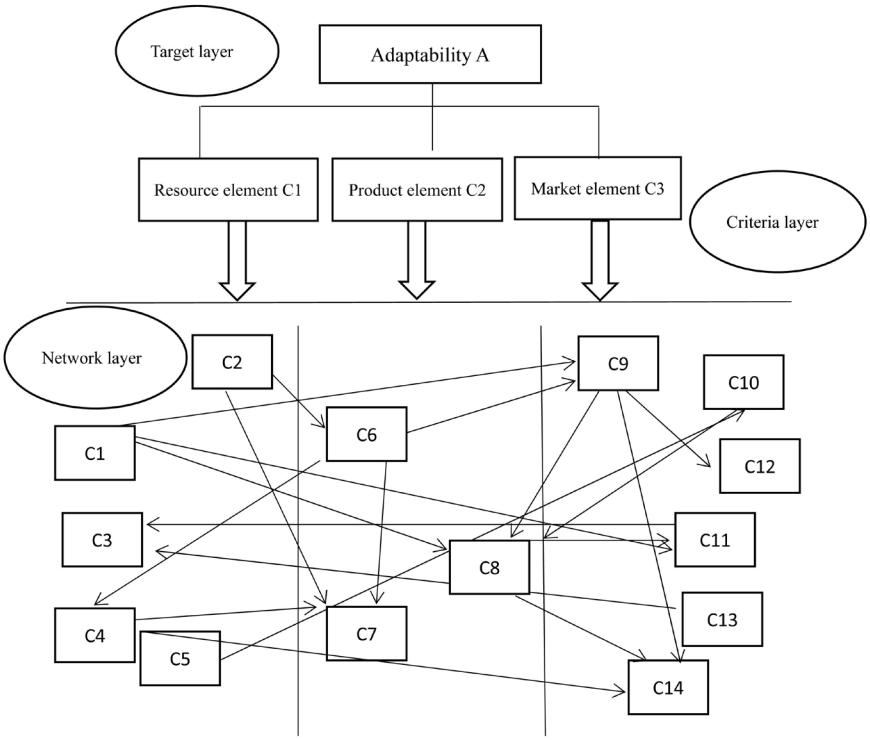

Figure 2. Inter-factor relationships between indicators.

Table 1. Adaptive measure model index system.

Target layer	Criteria layer (secondary indicators)	Element level (third-level indicators)	Measure index
Adaptability of textile nonmaterial cultural heritage protection	Resource element B1	Resource Development Value C1	Inheritance project scale, expected return of development
		Resource richness C2	Raw material type, quantity
		Resource exploitation intensity C3	Easy access to raw materials, ease of raw material processing, raw material prices
		Inheritor scale C4	Number of inheritors, age structure
	Product element B2	Product Type Form C5	Product, work expression
		Development Mode C6	Museums, souvenirs, festivals
		Innovation direction C7	Product experience upgrade, product form richness
		Innovative external environment C8	Project selection application, government policies and regulations, protection agencies and protection funds
		Regional distribution difference C9	Regional Dispersal of Ethnic Minorities Projects and Economic Development Level in Localities
		Inter-market competition C10	Similarities in the occurrence, distribution, and manifestation of similar projects
	Market element B3	Coupling degree of ecological environment C11	Damage to the ecological environment during mining, production, and expression
		Tourist participation intention C12	Number of visitors
		Willingness to consume level C13	Consumption amount, time
		Skill Level C14	The use of raw materials, the use of original skills

3.2. Establishment of Impact Relationship between Indicators

As shown in Figure 2, the elements not only include the relationship between the groups, but also affect each other between the elements of the group. This study uses a combination of questionnaires and interviews (researchers from Qinghai, Gansu, Yunnan, Shandong, Hebei, inheritors of textile intangible projects, practitioners, related research scholars from universities) to judge the relationship between indicators. The relationship between these indicators was found out, as shown in Table 2: (where "1" means there is an impact relationship; "0" means there is no impact relationship.)

3.3. Determination of Indicator Weights at Each Level

This study uses the decision-making software super decision made specifically for the ANP method to calculate. The judgment matrix is constructed by analyzing the results of the questionnaire.

According to the ANP method, considering that the relationship between indicators exists incomplete information. The results need to be processed stably. In this regard, Professor Satie proposed a way to amplify the power base of the super matrix and perform $2k + 1$ power evolution. When $k \to \infty$, the result of the matrix will be stable and form a long-term stable limit hyper matrix. In this part, due to the large amount of computations, super-decisions are used for computer operations to obtain the ultimate hyper-matrix results. These results can represent the weights corresponding to each index. The specific results and sorting are shown (Table 3).

Table 2. Table of influences between indicators.

Index	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
C1	\	1	1	0	0	0	0	0	0	0	0	0	1	0
C2	0	\	1	0	0	1	1	0	0	0	0	0	0	0
C3	0	0	\	0	0	0	0	0	1	0	1	0	0	0
C4	0	0	0	\	1	1	1	0	0	0	0	1	0	1
C5	0	0	0	0	\	0	0	0	0	1	0	0	1	0
C6	0	0	0	1	1	\	1	1	0	0	0	1	1	1
C7	0	0	0	1	1	0	\	0	1	1	1	1	1	1
C8	0	0	0	0	0	0	0	\	1	1	1	0	0	0
C9	1	1	0	1	0	0	0	0	\	0	0	0	0	0
C10	0	0	0	1	1	1	1	1	0	\	0	0	0	0
C11	1	0	1	0	0	0	0	0	0	0	\	0	0	0
C12	0	1	0	1	1	0	0	0	0	1	0	\	0	1
C13	0	0	0	1	1	0	0	0	0	0	0	1	\	0
C14	0	1	1	1	1	1	1	0	0	0	0	0	0	\

Table 3. Index weights and ranking.

Secondary indicators	Third-level indicators	Comprehensive weight	Comprehensive sorting
Resource Element B1	Resource Development Value C1	0.05485	7
	Resource richness C2	0.03482	12
	Resource exploitation intensity C3	0.03739	11
	Inheritor scale C4	0.14250	1
Product Element B2	Product Type Form C5	0.13877	3
	Development Mode C6	0.03804	10
	Innovation direction C7	0.09665	4
	Innovative external environment C8	0.01468	14
Market Element B3	Regional distribution difference C9	0.01656	13
	Inter-market competition C10	0.05369	8
	Coupling degree of ecological environment C11	0.05112	9
	Tourist participation intention C12	0.09068	5
	Willingness to consume level C13	0.14041	2
	Skill Level C14	0.08985	6

Table 3 shows that in the adaptive measurement system, the six main indicators of weight impact are: B1 resource elements: C4 inheritance scale (0.1425), C5 product type form (0.1388). B2 product elements: C7 innovation direction (0.0967). B3 market elements: C12 willingness to participate in tourism (0.0907), C13 willingness to spend (0.1404) and C14 skill level (0.0899). The sum of the weights of these six indicators reached 70% of the total weight and was distributed among the three secondary indicators. The results are in line with the current protection and development of textile intangibles, with emphasis on important factors such as inheritors, product richness, and craft authenticity, direction of innovation, tourism participation, and consumption level.

When analyzing specific intangibles, the indicators in the adaptive measurement system may be scored according to the specific circumstances of the intangibles. The scoring criteria can be achieved by means of questionnaires and comprehensive methods of in-depth investigations, inheritance interviews and expert assessments, with a score of 10 points for each indicator. After multiplying the score of the corresponding three-level index by the weight of the corresponding index, the sum of the scores of each secondary index can be obtained. Considering that there are differences in the sum of the weights of the secondary indicators, in order to ensure that the experimental results are comparable, satisfying $\sum B1 = \sum B3$ in the ideal state eliminates technical errors. In this study, the weights of B1:0.4083 and B3:0.4423 were processed in a uniform manner. The two weights were simultaneously amplified to 1 and the magnification was calculated. The experimental results of each secondary index are multiplied by the magnification factor to ensure that each secondary index has a full

score of 10, making the experimental results horizontally and objectively comparable. According to the calculation results available:

$$\sum B1' = 2.449\sum B1 \tag{1}$$

$$\sum B3' = 2.261\sum B3 \tag{2}$$

$$\sum B2' = 6.693\sum B2 \tag{3}$$

When making decisions, judge by comparing the size of $\sum B1'$ and $\sum B3'$. The study found that when the score of $\sum B1'$ is high and the score of $\sum B3'$ is low, it means that the resource element score of the non-heritage project is high and the market element score is low. In the protection system based on RMP perspective, the project did not open the market space well and adapt to the market demand. Therefore, it is judged that the project adaptability is weaker; on the contrary, it is more adaptable. That is, when the score difference between $\sum B1'$ and $\sum B3'$ is less than 1 point, it is considered that the adaptability is relatively stable; when the score difference between $\sum B1'$ and $\sum B3'$ exceeds 1 point, the adaptability level is considered to change, and the specific grades are shown in Table 4.

4. Conclusions

Based on previous literature research, this paper innovatively constructs a set of value system of textile intangible cultural heritage of ethnic minorities, and puts forward an adaptive measure model based on ANP to evaluate the adaptability of ethnic minorities. According to the results of Super Decisions' calculation of the weights of ANP indicators, the adaptability of the intangible cultural heritage of ethnic minorities is defined: The factors that can effectively promote the protection of intangible cultural heritage items (economic value, aesthetic value, spiritual value, educational value, etc.) account for the weight of all factors, the non-heritage items with high weight are called intangible cultural heritage items with strong adaptability, and the intangible cultural heritage items with low weight are called intangible cultural heritage items with low adaptability.

On this basis, the degree of adaptability is divided into three levels: Strong, medium and weak, which is used to explain the status quo of intangible cultural heritage protection: The problem of the adaptable textile intangible cultural heritage project is that excessive development leads to distortion; the protection of

Table 4. Classification table of adaptability.

Evaluation basis	Adaptability level	Inheritance status	Corresponding strategy
$\sum B1' - \sum B3' > 1$	Less adaptable	Poor protection, activation path	R → P → M
$\left\|\sum B1' - \sum B3'\right\| < 1$	Adaptive equilibrium	Develop health, benefits spread	Radiation surrounding
$\sum B3' - \sum B1' > 1$	Strong adaptability	Overexploitation, reengineering	M → P → R

the intermediate level of adaptability is general, and the benefits are weak; the weak adaptability of the textile intangible cultural heritage project protection is insufficient and it is in danger of being lost. As long as the level of adaptability of the protection to be evaluated is below the acceptable range, the protection path can be re-selected or the protection mechanism can be adjusted to avoid the double losses caused by subjective or qualitative judgments in the past.

Acknowledgements

This article has been funded by National Social Science Foundation Art Project "Study on the Value Evaluation and Classification and Protection Path of the Textile Intangible Cultural Heritage" (17BG135).

This article has been funded by Tianjin Philosophy Social Science Research Program Funding Project "Adaptation Study on the Protection of Textile Intangible Cultural Heritage of Ethnic Minorities from the Perspective of RMP" (Key) (TJYY16-004).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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