

DOI: 10.7596/taksad.v6i2.868

Citation: Mahjoubi, S. (2017). The Pathology of Weaving and Production of the Hand-woven Carpets: Heriz Region Case Study. *Journal of History Culture and Art Research*, 6(2), 153-168. doi:<http://dx.doi.org/10.7596/taksad.v6i2.868>

The Pathology of Weaving and Production of the Hand-woven Carpets: Heriz Region Case Study

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Abstract

The carpet, as one of the most precious achievement of people, is a culture. The world's recognition of Iranian carpet and its glorification originates from endeavor of people who have integrated artistic verve with mysterious attractions of national culture and arts. This study is descriptive-analytic. The data were collected through field research method and direct communication with people and workshops of drawing, weaving, and dyeing. In fact, the assessment tools were taken to the field, and data collection was completed by questioning, interview, observation, and shooting. Then, they were used for derivation, classification, and analysis. SPSS software also used to analyze collected data. . According to the result of this study, regarding the latest forecasts for Iranian hand-woven carpet industry, carpet exports will increase in the future. Therefore, it is better to consider the weaving and marketing of the carpet as a luxury product in order to achieve the profits maintaining the incentive of production in all units involved in the hand-woven carpet's production and also to reduce poor quality carpets available in the market.

Keywords: Hand-woven carpets, Pathology of weaving and production, Heriz region.

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Introduction

Iranian hand-woven carpet is a product that is of great importance in the domestic and foreign markets. Therefore, many parameters ought to be considered in production of the hand-woven carpet. Since the marketing of hand-woven carpet is not performed scientifically and has a traditional sight, a lot of damages are imposed from two sides to economic and qualitative aspects of carpets. From one side, in production of the carpets many damages are imposed to them from early stages such as shearing, dyeing, drawing, weaving, etc. and from the other side, after weaving the carpet and turning it into an economic product, it is not valorized as it should be. And finally, this product is marketed on a price which does not satisfy its production units. Regarding the important role of hand-woven carpet and its cultural, artistic, economic, and social position, investigating the situation and identifying the problems of this field in Heriz County is very important because the carpet is associated with the economy of both families and country. Currently, people in the small city of Heriz, supply their life expenses by weaving the carpet. It is obvious that expenses of modern life in developing countries like Iran cannot be supplied by carpet weaving because of the inflation people facing with. Hence, the manufacturing institutions play down the complete carpet and just seek to supply their own costs and its consequence is poor quality carpets existing in the market.

Today, the imported materials are placed in the production process using the imported machinery. The weaver needs for imported medical services to provide his/her medication. The product is exported to foreign countries by means of transportation system. The government pays subsidies for imported materials, machinery, and transportation. In such conditions, if the weavers work at home and the government pay the subsidies to them directly, they will live in better economic situation. In addition, wool, dye, drawing tools, and many other raw materials used in production of the (apparently native) carpet are provided from other lands. Then, it is woven by hard work of the weavers whose wage does not meet the basic needs of a family. In these kinds of circumstances, weavers lose their motivation and attempt to double-knot or triple-knot or other actions which damage the carpet. In this regard, this study aims to show; 1) pathology of the weaving, draw, color, and at the end production of the hand-waved carpets belonging to the Heriz region and 2) representing a method to study the carpet pathology for all weaving regions in order to help the researchers and producers.

- **The drawing art in Iranian carpet**

The pure beauty and art of Iranian carpet is reflected obviously in its drawings. In the art of designing the Iranian carpets, the drawings are simple and tabloid so that they want to express the summary and extract of the meaning. The drawings of Iranian carpet are the drawing of

message and expression which sometimes manifests explicitly and sometimes manifests like metaphor and mysterious latency. That is why some western scholars are not able to understand some drawings of Iranian carpet.

- **Color**

The color is a decisive factor which like the nature of a painting is inseparable from the carpet. Iranian scrumptious colors are always a manifestation of oriental culture and art and creative talent of the weaver and designer.

- **Defects of drawing**

Consideration of the ethnic and historical background and inspiration of traditional art of each region is one of the most important points which must be regarded by the carpet designer. The distribution of the flowers and other drawings applied in the texture must be equal and balanced. Any vacancy in different parts or overcrowding drawings together both can harm the beauty of carpet and have an adverse effect on the viewer's mind. It is important especially within the Afshan and Sarasari (overall) designs. Moreover, the mismatch of the design and knot count is one of the defects in the carpet drawing.

- **Wrong weaving**

Wrong weaving leads to the smaller, bigger, or even inharmonious designs. Accuracy of implementation of the carpet drawing in accordance with the original one avoids such defects. In the case of wrong weaving in the semi-woven carpet, it should be uncoupled to the necessary amount, if possible and weave it again. Otherwise, eliminating this defect is impossible (Nasiri, 1995).

- **Inappropriate pulling**

Before finishing each "Raj²" of the carpet, the weavers have to pull the knots using the comb, and with this action avoid the ends of knots to come out of the back of carpet. This action is called pish-keshi (pulling). The weavers' neglect to this action leads the back of carpet not to have that expected uniformity, regularity, and beauty after finishing.

- **Inconsistency in the carpet**

Finding the weavers who are identical in terms of weaving skill, physical and even mental conditions is associated with many problems. If the second weaver is physically stronger than the first one who is replaced, the comb's severity of impacts and even weft traction's amount cause the inconsistency between the first and second parts of the carpet. Also, carelessness in

² Refers to each course of the knots in weaving the carpet.

snipping the excess piles by two different weavers leads to level difference, and ripple and non-smooth vision of the carpet's surface. Therefore, after finishing the weaving, all over the carpet must be sheared uniformly by an electric scissors.

- **Hollowness in the carpet**

It is obvious that the usage of double-knot increases the weaving speed, and the thickness of wool-yarn decreases the wool consumption and consequently results in the cheap price carpet. It is a form of cheating and to avoid it, the table of fibers' coordination ought to be considered and act on its basis.

- **Overshoot and compaction**

In some semi-woven carpets, the woven Rajs are not placed in a direct line and some parts are higher or lower than the other parts. These defects are called overshoot and compaction. In such a case, there is bulge and fovea on the last woven Raj.

- **Warping**

The warp is a set of high-twist yarns which are wrapped with a certain stretch on the above-rod and bottom-rod. Delicacy and thickness of the warp's yarns are different depending on the number of intended knots. For example, for the coarse woven the twelve-ply warp yarn is applied, for more elegant carpets (40 and 45-knots in 6.5 cm) the nine-ply yarns are used, and for fine-woven carpets silk warps are applied. The white warp yarns are used more in urban weaving centers, while the tribal carpets of Qashqai, bakhtiari, Lurish, and Balochi almost use the colorful warps.

- **Export and global markets of Iranian carpet**

One of the most important reasons of Iranian carpet's significance is the currency earning of this product of art. Among the non-oil exports, there are few goods like hand-woven carpet acquiring the currency for country, or having the special position in the global market due to its quality. According to the head of Iranian Carpet Center, annually, one billion and 200 million dollars is the global share of hand-woven carpet trade in average, and the share of Iranian carpet is 30% of this market. Even in the period of export reduction, Iran was on the top, and countries such as India, Pakistan, Afghanistan, and Nepal were in the next ratings. According to the report of customs, 330 million dollars of Iranian carpet was exported to 80 countries all over the world in 2014. This figure, when compared to 2013, shows an increase both in value and weight aspects. Based on the National Carpet Center, 2014 was the worst period for the carpet export.

- **The pathology of production and export of hand-woven carpet**

In order to motivate the hand-woven carpet sector for more production and being more active in Iranian economy, it is necessary to consider two factors directly and implicitly. To be more precise, it should be said from the policy-making aspect that:

1. Stimulation of the final demand factors particularly export and policy of the market party can promote the production of the hand-woven carpet (direct policy).
2. As a supplementary policy, the links between the hand-woven carpet sector and other sectors (furniture, yarn and cloth, synthetic fibers, dyes, wholesale and retail services) must be improved (N. Firouzjaji, 2002).

- **History of carpet in Heriz**

According to Cecil Edwards, Heriz is located four miles to Tabriz and in a most remarkable and most pristine areas of Iranian carpet weaving (Edwards, C.,1989). The carpets of Heriz and other villages were brought to the bazaar of Tabriz every day for exchange. Among 30 villages of this area, Heriz is the widest and most significant one and provides the best quality carpets. Therefore, it can be the leader of other villages.

The extent of this area is 35×35 miles and is located in the west and south of the Sabalan Mountains. Most people of this region speak Turkic and like other Turkic weavers apply the Turkish knot. This area is not significant agriculturally and does not export wheat. But its progressive carpet weaving industry has led people living there to become significantly wealthy. The reason is that the famous carpets full of distinctive features, yet cheap belong to this area and people know it for half a century as the Heriz or Goravan carpet.

Undoubtedly, since the beginning of the nineteenth century and probably before that date, the profession of carpet weaving has had been common. The history of carpet weaving industry in Bakhshayesh village is longer than the others. Yet, some small pieces of rugs belonging to this village are available. All are woven based on the Harati pattern and almost have beautiful themes of blue, buff, and light purple. If these rugs with buff color be examined closely, it will be proved that their main color has had been red which has been oxidized and turned to this color (Bassam, 2014).

A few ancient Heriz carpets show that today extensive industry of weaving belonging to this area with 10000 pieces of carpets in a year besides the rugs is the recent development in this field. In fact, its history is more than half a century. The unique weaving style which today is called Heriz or Goravan does not exist before this period and this type of carpet cannot be found in any other areas.



Figure (1): Heriz carpet, the charm of broken lines (www.heriz.arzublog.com)

Heriz weavers have a specific skill in weaving based on the drawing that like of which only could be found in (Uşak) carpet weaving center in Turkey. In these two regions, the designs are drawn on a checkered paper and a skillful person reads the drawing. In order to do this, a piece of calico (the design drawn on it) is pinned on the wall and the carpet is woven based on the order through occasional looking at. This amazing skill is instinctive and intuitive (Molavi Tabrizi, 1994).



Figure (2): some details of Heriz carpet (www.heriz.arzublog.com)

Nasiri (2015) also examined the reasons causing the descent in hand-woven carpet's export and its impact on job creation and investment. The examined variables consisted of the quality of hand-woven carpet, the lack of certain market, and competing countries. The statistical population of included 18500 people engaged in the hand-woven carpet industry of Lorestan province that 377 of them were chosen through random sampling and using Morgan table. The results of Kolmogorov-Smirnov test suggested the normality of variables. Moreover, T-

test and binominal test indicated that there is a significant and positive relationship between the quality of hand-woven carpet, the lack of certain target market, and competing countries and job creation and investment. In addition, T-test indicated that the factors causing the carpet's export descent affect the job creating and investment. Therefore, it can be declared that there is a significant relationship between the indicators of carpet's export descent and job creating and investment.

Also, Morshedi et al. (2014) evaluated the estimation of comparative advantage of Iranian hand-woven carpets. This paper studies the existence or lack of Iranian hand-woven carpet export's comparative advantage and its changing procedure during the 1972. For this purpose, revealed comparative advantage, symmetric revealed comparative advantage, and Chi-square are used. The results suggest that the export structure of hand-woven carpet has been stable during the period under review.

Salehi (2001) in her thesis titled "designing textiles, scarves, and dresses inspired by the Heriz carpet's designs" in Art University has presented a favorable classification of designs and drawings of Heriz carpet.

Methodology

The method of this study is descriptive-survey. The primary data are collected through library research and the results are recorded in appropriate tools like tables and forms. In this section, all data collection tools are printed documents such as books, encyclopedias, dictionaries, magazines, books, scientific conferences gathered in books, printed materials indexed in databases and the Internet. Finally, the collected data were classified and utilized. The research goes to field stage after finishing the library studies and the process of each parameter's affect is evaluated. The researcher had gone to weaving workshops and has gathered required data by asking knowledgeable people and direct communication with and workshops of design, dyeing, and weaving in order to complete the process of research. The assessment tools are taken into the field as like interview, questioning, observation, and shooting. Then, the gathered data are used for derivation, classification, and analysis.

Reliability and validity of the questionnaire

1) Reliability

In order to measure the reliability of the questionnaire, an index named reliability coefficient is used. The domain of the reliability coefficient is from zero to +1. The coefficient zero represents the lack of reliability and coefficient 1 shows a perfect reliability. The "perfect reliability" is observed rarely and if observed, first of all, should doubt the results. Various

measuring tools and methods are applied for calculating the reliability coefficient such as Cronbach's alpha.

In this study, Cronbach's alpha is preferred to assess the reliability of the questionnaire. Actually, in the questionnaires that have multiple choice answers, the use of this method is quite useful. In order to gain the reliability coefficient, the 15 questionnaires are distributed among a random sample through the pre-test and then, the coefficient of Cronbach's alpha is calculated using the SPSS software. The questionnaire will be reliable when the Cronbach's alpha is higher than 0.7, and as this amount be closer to 1, the questionnaire is more reliable. The data gathered and classified by the questionnaire are utilized as the basic source of new information about the phenomenon under study.

Reliability analysis with Cronbach's alpha

This method is applied to calculate the internal coordination of the measurement tools such as questionnaire or the tests measuring the various characteristics. In such tools, each question can adopt different values. For calculating the coefficient of Cronbach's alpha, at first the variance of scores belonging to each subset of questions and the total variance are calculated. Then, the alpha coefficient is obtained using following formula.

$$r_{\alpha} = \frac{j}{j-1} \left[1 - \frac{\sum s_j^2}{s^2} \right]$$

In equation,

- j = the number of subset questions of questionnaire or test,
- s_j^2 = the variance of subtest j ,
- s^2 = The variance of whole test.

The amount zero shows the lack of reliability and +1 indicates the perfect reliability.

2) Validity

It means that whether the intended measurement tool can assess the feature that the tool is designed for. The comment of experts can improve the validity of the measurement tool. The validity is important because disproportionate measurements can make any scientific project worthless.

Then, the researcher confirms or rejects the H_0 through the hypotheses test or significance test. It means that if H_0 is accepted, it is assumed that H_1 is rejected and if H_0 is rejected, H_1 is confirmed. In order to determine the statistical significance of a research study, the

researcher should assess its possible level or significance level to examine the H_0 . If the results of possible study show the value lower than this level, the researcher can reject the H_0 . When prove of study results has a high possibility, the researcher can confirm the H_0 ; in fact, since the H_0 generally is not expressed, the “research” hypothesis is confirmed or rejected not H_0 .

Both analogy and induction are used to develop the research hypotheses. Therefore, there are two potential sources for hypotheses development:

- A. Available general and comprehensive theories; these hypotheses by a series of given analogy lead to the forecasts causing the identified results in the certain conditions.
- B. The results of previous researches; the goal of these hypotheses is to induce the relationship between two or more variables in the present.

Hypotheses

1. The pathology of weaving, design, color, and production of hand-woven carpets affects the economy of region.

Given the collected data about the pathology of weaving, design, color, and production of hand-woven carpets, there was seeking for a relation between the pathology and economy of that region. For this purpose, the following table is developed based on the gathered data.

Table (1): Pearson correlation coefficient of carpet pathology and regional economy

Pathology	
Pearson correlation coefficient	0.589**
Significance level	0.000
Total	60

In table 1, it is indicated that the significance level is lower than 0.05 suggesting that it is significant. Significance means that there is a significance relationship between two mentioned variables. But the level of correlation is expressed regarding the correlation coefficient. According to the correlation coefficient in table 1, this correlation is relatively good. Hence on the basis of table 1, the first hypothesis of this study is accepted; i.e. as the

weaving, design, and color in producing the carpets are inferior, the region's economy changes and these changes are direct. That means the poor quality of the carpets affects the regional economy, too.

2. The management of hand-woven carpet manufacturers has impact on the regional economy.

Within the collecting data about the management style of the producers, it was seeking for a relation between the management style and regional economy. Table 2 is in accordance with the gathered data.

Table (2): Pearson correlation coefficient of the manufacturers' management style and regional economy

Management	
Pearson correlation coefficient	0.729**
Significance level	0.000
Total	60

It can be observed in table 2 that the significance level is lower than 0.05; so, it is significant. Significance means that there is correlation and significant relationship between two mentioned variables. But the amount of correlation is expressed based on the correlation coefficient. Regarding the correlation coefficient in table 2, the correlation level is relatively good. In general, the hypothesis is accepted according to the table above; hence, as the management of carpet production in the region is weak, the regional economy changes directly. It can be said that improper management of carpet production harms the regional economy and in contrast, the appropriate management style improves it.

3. The consideration of low quality and standards in hand-woven carpets is effective in the economy of country.

Regarding the gathered data about the production standards, the relationship between the production standards and regional economy is examined. The examinations resulted in table below.

Table (3): Pearson correlation coefficient of the standards applied by producers and regional economy

Standards	
Pearson correlation coefficient	0.546**
Significance level	0.000
Total	60

In table 3, the significance level is lower than 0.05 and shows that it is significant. Significance means that there is correlation and significant relationship between two mentioned variables. But the amount of correlation is expressed based on the correlation coefficient. According to the correlation coefficient contained in table 3, variables have a relatively good correlation. Therefore, the hypothesis is confirmed based the table above. It can be declared that as the standards of producing the carpets are considered lower in this region, the regional economy is weakened directly. In the other words, not respecting the standards in the production of carpets leads to poor regional economy and on the contrary, more and better compliance with these standards improves the economy of that region.

4. Application of high-quality raw material in producing the hand-woven carpet influences the country economy.

It was seeking for a relationship between the quality of raw material and the regional economy within collecting data about the raw material used by the producers. The searching led to the following table.

Table (4): Pearson correlation coefficient of high-quality raw materials in production and regional economy

Raw material	
Pearson correlation coefficient	0.619**
Significance level	0.000
Total	60

Table 4 indicates that the significance level is lower than 0.05; so, there is a significant relationship and the correlation between these two variables. But the correlation level is specified by correlation coefficient. According to this coefficient in table above, this correlation is relatively good. Therefore, the fourth hypothesis is confirmed. In the other words, as the raw materials used by producer in the carpet are inferior, the regional economy descends and vice versa.

5. The study of manpower efficiency in the production of hand-woven carpets is effective in country economy.

Within the collecting data about the production team, it was seeking for a relation between the efficiency of the manpower employed by producers and country economy. Table 5 is in accordance with the gathered data.

Table (5): Pearson correlation coefficient of manpower efficiency and country economy

Efficiency of manpower	
Pearson correlation coefficient	0.636**
Significance level	0.000
Total	60

According to the table 5, the significance level is lower than 0.05; therefore, there is a significant relationship and correlation between these two variables. But the level of correlation is determined by the correlation coefficient that based on this coefficient in table 5, a good correlation can be observed. Hence, the fifth hypothesis of this study is confirmed. As a result, the regional and country economy depends on the manpower employed by producer and it changes directly by the change of manpower efficiency because carpet is the product directly associated with the economy of Iran.

Results

The carpets woven in Heriz region do not have desirable quality, and that is why the economy of this region is not in the position which ought to be. In addition, the results indicated that all variables in a direct association with the regional economy are in an average level, and for this reason, the carpets of this region are not in a favorable position. Among all issues related to

the carpet, the quality definitely is important for purchaser and seller. In all definitions of various carpets' desirability, except some general principles, there are many significantly different factors.

The good carpet generally is the one having favorable and beautiful designs and desirable and constant colors, and also woven with high-grade wools. Moreover, the weaving quality is another characteristic of a good carpet. Seller's guarantee about the color consistency and quality of the materials used in carpet usually is enough. The carpet, as a man-made product has no bad type because all people acting to manufacture perform it based on their facilities and capabilities. This whether results from poverty, ignorance or illiteracy or the lack of proper raw materials and training, and finally leads to low-quality product and losses. It is in absolute conflict with the interests and the results of the weavers' efforts. These carpets which unfortunately are not few cause following damages.

The application of low-grade materials including low-quality wools such as old wools tanned from short rough fibers which are the wastes of scouring, cotton and wool spinning, and synthetic fibers factories.

The usage of unstable colors (often because of inappropriate dyeing procedure) ranging from chemical to natural color, over-usage of spicy colors such as orange, pink, purple, and yellow and green cause two-color or multi-color and disharmony.

Overall, inappropriate colors of carpet may be due to the use of bad-quality dyes or improper dyeing of yarns or due to that color scheme is not in accordance with coordination commonly known in Persian carpet.

Choosing the design is associated with the taste of the weaver or purchaser to a large extent. Although the quality is important, it is not considered in most cases. It should be mentioned that this true about the urban and workshop carpets.

Inefficient weaving, not using of commonly known knots, not using of thin weft in the regions where the usage of thin weft has been one of the carpet weaving principles. The use of thick wefts to thicken the carpet, weaving with double-knot, triple-knot, or without knot, tight and loose weaving, wrong implementation of the design, not resulting in intended size of carpet, irregularity in kilim (which is woven above and in the bottom of the carpet in order to protect the knots against opening), irregularity in wrapping and shearing, defects in carpet, tilt of loom, carpet's becoming short and tilt, and inconsistency and two-colored, irregular rows, and many knots on the back of the carpet.

In addition, the variables related to the region's carpets affecting the regional economy directly, are within the factors of raw materials and also factors related to management style,

consideration of the standards, and manpower efficiency. The results show that only the parameters such as material, color, and weaving which are descriptive parameters do not affect the economy in relation with to these carpets. But others such as management style and considering the standards are remarkable. Therefore, it is confirmed that these variables and their consideration affect the regional economy and subsequently the country economy. Regional economy transformation is in a way that as the related variables are changed in an appropriate regard, the quality of carpets belonging to this region will be higher and therefore, the economy of intended region will improve. In contrast, as the quality of raw materials, standards, and management style of this region is ignored, this product descends and the dependent economy weakens.

However, the efficiency of manpower producing the carpet is in a direct relationship with country economy. In such a way that as the manpower efficiency is higher, the economic development will be more. This not only is important in the studied product, carpet and in studied region where Heriz is, but also has a direct impact on all country products and economy. This principle is confirmed in this study and is in accordance with other studies and what was forecasted.

Practical suggestions

According to the findings of this study, it is tried to represent some practical suggestions. It is hoped that responsible organizations care about these offers.

- The sample considered for this study was 60 which was enough regarding the number of producers and weavers in Heriz. So, the results are acceptable and some recommendations can be suggested to improve this product.
- In this region, because of the special style of carpet weaving and the type of raw material, the carpet is not considered as an economic commodity as it should, and its most utility is in the regional level and is low in global level. However, the existing conditions avoid globalizing this product and it requires the usage of high-grade raw materials.
- As it was expected, carpet weaving is passed from generation to generation in this region. So, the youth should be considered more because they do not have prejudice about the designs of carpets and can be more creative in this field. Moreover, weaving and designing classes can be held to train them in order to think about the carpet as a global product.

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