International Journal of Engineering & Technology, 7 (2.15) (2018) 185-191

International Journal of Engineering & Technology

Website: www.sciencepubco.com/index.php/IJET

Research Paper

Applying the Kaizen Management System in the Manufacturing Process of Artistic Products in Handicraft Workshops

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Abstract

Being knowledge-based, handicrafts-manufacturing workshops established by art graduates are to design and manufacture innovative products in line with modern lifestyle. Unfortunately, such workshops are often encountered with challenges due to lacking the use of a specific management system in their production and supply processes. For this purpose, the application of Kaizen's management system was discussed in the present study because of its ease of implementation, high effectiveness of results, low costs, and emphasis on teamwork in the production of handicrafts. This study was applied in terms of the research purpose with a descriptive survey design. The statistical population of the study included 17 handicrafts-manufacturing workshops established by art graduates in the last fifteen years. The results of this study showed that the application of Kaizen's management system and its operational procedures could provide conditions for continuous improvement in the production process of handicrafts, reduce the cost and time of production, increase quality, and enhance delivery performance.

Keywords: *Kaizen, Artistic Works Management, Continuous Improvement, Handicrafts.*

1. Introduction

Significant factors such as high value-added, no need for advanced technologies, and exploitation of local raw materials in manufacturing artistic products as well as the functionality of the products in the domain of handicrafts in Iran can set up an entrepreneurial and profitable art-industry; however, the factor affecting the recession of this category of products can be explored in the management system or lack of a continuous and systematic management system.

In the traditional method of production, handicrafts and artistic products are often manufactured by the artist-artisan or in collaboration with craftsman's apprentices through a vertical and top-down production direction. In this method, creation of artistic works continues for generations unchanged regardless of users, consumer demands, as well as today's preferences and lifestyles and also there is always an attempt to maintain the existing status. Although manufacturing handicrafts based on the given production method is by itself a part of Iran's identity of traditional arts and should continue to its existence, it is required to have a macro view and adopt efficient management practices in this domain in order to expand and improve the status of handicrafts, the level of entry into global markets, and establishment of conditions for entrepreneurship.

The present study was to investigate the application of the Kaizen management system and its impacts on improving the production process and also address the following questions:

- Does the Kaizen management system meet the administrative requirements in manufacturing artistic products?
- Does the utilization of the teachings of the Kaizen management system lead to continuous improvement in artistic products?

According to the research hypothesis namely achievement to continuous improvement in the production process of handicrafts through the application of the teachings of the Kaizen management system, this type of management system and how it affects the management of artistic products were examined so as to answer the research questions and confirm the hypothesis..

2. Methodology

Research Methodology

This study in the form of a descriptive survey was applied it terms of its research purpose. To collect the data, library method and field study were used. The statistical population of the study included 17 workshops producing handicrafts established by university graduates in the last fifteen years. The given workshops were investigated in terms of dominating type of management in the workshops and their level of achievement through field visits and interviews. The purpose of this study was neither emphasize nor express the current problems in the form of statistical tables and even understand the absence of a continuous and systematic management system in most workplaces and weaknesses in management knowledge of their owners; rather, there was an attempt to adapt the applicable teachings of the Kaizen management system in the the workshops producing handicrafts.

Conceptual Model of the Study

In this study, the variables entitled management practices, scientific-artistic ability, creativity, interaction practices of members, teamwork skills, user familiarity level, and identification of target

markets were taken into account as the factors affecting success rate of workshops manufacturing handicrafts (Figure 1).

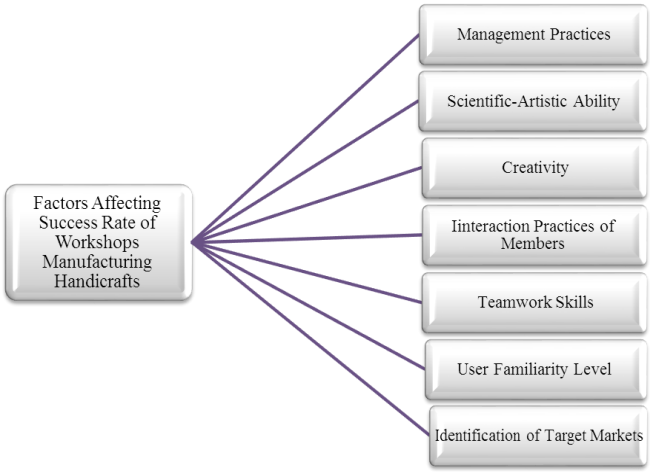

Figure 1. Conceptual model of the study

3. Kaizen Concepts and Artistic Production

"Kaizen" is composed of two Japanese words including "kai" and "zen" which mean change and better, respectively [1] and as a whole it refers continuous improvement which covers all the individuals including directors, employees, and workers. The philosophy of Kaizen is based on the principle that human lifestyle, career and social life as well as familial life should be continually improved (2). The starting point for improvement in everything is to identify shortcomings as well as strengths and weaknesses. The factor smoothing the way to improvement is recognition and acceptance of problems and their improvement if such a need is felt. Having a glance at the current status of artistic products in the domain of handicrafts; it can be argued that despite the presence of potential factors affecting these products which provide an entrepreneurial and profitable art-industry and convey cultural messages, no success is observed deserving such products in foreign and domestic markets and most of artists and producers are dissatisfied in this respect.

In a general definition, production of handicrafts includes a process of designing and manufacturing artistic-functional products with the following characteristics:

- Designing and manufacturing artistic-functional works by considering the originality of design in the field of Iranian arts
- Paying simultaneous attention to artistic, cultural, and functional characteristics of products
- Taking advantage of machinery and handwork and emphasis on manual work in artistic parts of products
- Considering the preservation of artistic nature of products in terms of using modern machinery and technologies
- Providing innovation taking artistic and cultural history of Iran into account
- Directing research, design, and simultaneous production in this type of manufacturing towards users and products unlike traditional production which is concentrated only on products
- Using modern type of traditional arts and handicrafts by considering today's lifestyles and ethnic originality

Taking into account the factors mentioned in design and production stages of artistic-functional products in the domain of handicrafts can distinguish artistic production from industrial one. Consequently, any changes and improvements in the existing status should first take a macro look at artistic products and then adopt efficient management practices in order to maintain the given nature and characteristics. Thus, the need for the production of handicrafts to keep pace with modern lifestyles and the power to meet the demands of domestic and foreign markets is vital and necessary in this respect. The production of handicrafts in the traditional way can also bring about problems in the manufacturing process as well as in the rate of meeting the needs of market due to high production time and costs. In this respect, "the analysis of the core functions of a product rather than focusing on the product itself, generating areas of innovation and creativity instead of relying on current traditional methods, doing teamwork and adopting systematic attitudes" [3] should be emphasized in the manufacturing process of artistic products.

4. Kaizen in the Manufacturing Process of Artistic Products

In the design and production of any product, there is a need to have sufficient knowledge of product characteristics, production goals, target markets, target population, as well as the strengths and weaknesses of each product in order to improve the existing status. In the domain of handicrafts, each product (effect) is beyond a functional object which not only meets the physical needs of users but also coveys the cultural messages of the nation creating it and responds to the aesthetic needs of the users. Moreover, identifying the main functions of these types of products can be helpful in the manufacturing process as well as adopted management practices (Figure 2). Thus, along with improvements in the quality of artistic production and economic factors, preservation and transfer of artistic identity of cultures are of utmost importance and lack of attention in this respect may leave out the given product from the domain of handicraft production; so the implementation of the Kaizen management policies in the management of manufacturing artistic products should be also conducted on the basis of the mentioned characteristics.

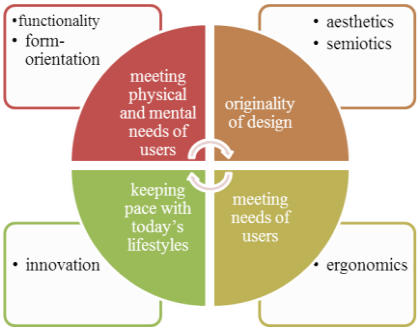

Figure 2. Main functions of handicraft products

Today, the production of handicrafts in Iran is conducted in three ways:

- The traditional method consists of the master and the apprentices in which the business and education are inherited from masters to apprentices. In these workshops, production is often conducted in a top-down and hierarchical manner and the purpose is to maintain the existing designs and conditions.
- Handicraft workshops established by one or a group of university graduates that are identical to teamwork system because of the similarity of experiences and business skills.
- A combination of members of university graduates and masters

In the traditional method of production, there is an attempt to keep the products in the traditional structure and design and the designs and products are manufactured in one form for years and even

centuries. Given the tendency of university graduates to change, innovation, and improvement and also new functions of handicrafts, this study was to investigate the way to implement the Kaizen management system and continuous improvement in the production process in order to achieve the mentioned goals.
Given the definition for improvement which is a set of Kaizen and innovation and encompasses general and detailed improvements, the areas in need of reform should be separate and distinct in order to make improvements in handicrafts. Kaizen is based on the philosophy that improvements in organizations does not need explosive and sudden changes, but any improvements or modifications, if they are continuous and constant, can promote efficiency in organizations.

Kaizen referring to continuous improvement is based on three dimensions:

- Enhance quality of products
- Lower the waste to zero
- Meet customer satisfaction

If the artwork in the domain of handicrafts is the language of the artist to express emotions, feelings, and intentions; it goes beyond the scope of artistic production and belongs to the scope of work production. However, in the context of handicraft production, an artistic-functional product is targeted in which the three given dimensions and ultimately fulfillment of user satisfaction along with artists' goals in conveying artistic-cultural concepts become of utmost significance.

5. Concept of Quality in Handicrafts

According to the definition of comprehensive quality, "the main goal is to manufacture a product that meets customer demands and expectations". To achieve this goal, efforts associated with quality should begin in the product design stage and continue in the production stage [4].
In a general definition, quality in handicrafts includes design and manufacture of products which not only satisfy users' demands but also meet the expectations of artist-craftsman in expressing concepts and preserving their personal styles. Therefore, those products are of quality in the domain of handicrafts in which artistic spirit, cultural identity, originality of design and materials are evident both in the production method and the final product. In these types of products, factors affecting product quality should begin in the product design stage. Thus, adherence to handicraft quality indicators in the design and manufacturing stages of a product has a considerable impact on the quality of the ultimate products (Figure 3).

6. PDCA Cycle and Artistic Production Management

Based on the Deming cycle, the PDCA cycle came into existence in the late 1940s by Dr. Edwards Deming in Japan. The Deming cycle is based on plan, do, check, and act in which a change is planned for improvement (Plan), then the change is tested or experienced on a smaller scale (Do); after that, the data are collected and analyzed in order to evaluate the effect of changes (Check); and finally if the results are satisfactory, the change is implemented in a large-scale and comprehensive manner (Act).

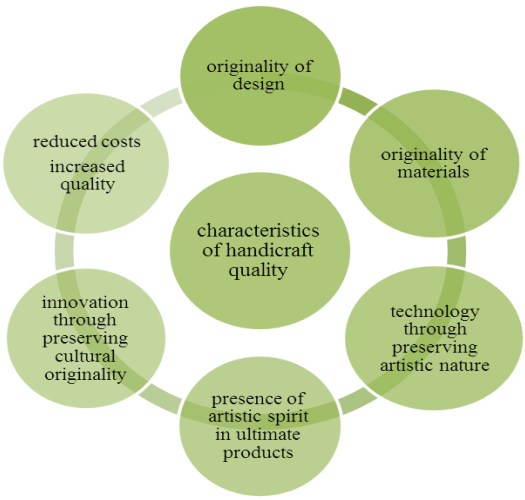

Figure 3.Characteristics of handicraft quality

The PDCA cycle (Figure 4) always repeats itself and improves the product because the cycle moves around an upward cylinder and a product that has already gone the cycle has higher quality and its problems have been solved. Through investigating the process of design and production of handicrafts in the cycle of plan, do, check, and act; the existing weaknesses in the production process of handicrafts can be identified as follows:

- Design of handicrafts often includes two parts of plan and act.
- Design of products in most cases is based on artist's personal taste or designs maintained from the past.
- Users and their satisfaction levels are often overlooked in design process.
- The stage of check is mainly focused on product itself and users and feedbacks received from target market are less attended.
- No macro view to production stage of artistic-functional handicrafts leads to inattention to adopting systematic management practices in this type of production.

Figure 4. PDCA cycle

"If satisfactory results are not achieved in the cycle of quality control, they are returned to plan or do stages in order to determine the causes of undesirable results. Once the solution is discovered, it is standardized and it is put into act in this stage." [5].
No attention to the check stage in the management of artistic production leads to unknown causes of failure in domestic and foreign markets and consequently no codification of improvement and modification strategies. This issue results in lack of codified standards in the process of designing, manufacturing, and supplying handicrafts.

The Japanese quality control circle considered standards as unlimited-incomplete; therefore, the PDCA cycle must be in a constantly swirling flow. Kaoru Ishikawa has a slogan in this case: "If the standards and guidelines are not revised within six months, it is obvious that no one will take them seriously (Ibid).
According to the results of investigating the causes of dissatisfaction in artists and producers, the external factors such as lack of capital and governmental support, economic problems of customers, and poor-quality but cheap imports of goods from foreign competitors have been highlighted in this respect. Although these factors can be effective, the results of interviews with users revealed that low acceptance in users were due to low innovation, lagging today's lifestyles, duplications, and in some cases high prices. Differences between the responses of manufacturers and users show disregard for the check stage among manufacturers including product feedback in market and customer satisfaction. In Figure 5, the process of producing handicrafts with regard to quality control cycle is shown.
Standardization is one of the elements of unique production. The process of standardization is the basis of the Kaizen continuous improvement. It should be noted that improvement of standardization activities never ends and any improvements and changes in the production process are completed by the development of standards. At the first stage, the objectives of the standards are doing things in the right manner without any errors and negative effects on people and the surrounding environment. If standards are developed, new standards turn into a foundation for future improvements [6].

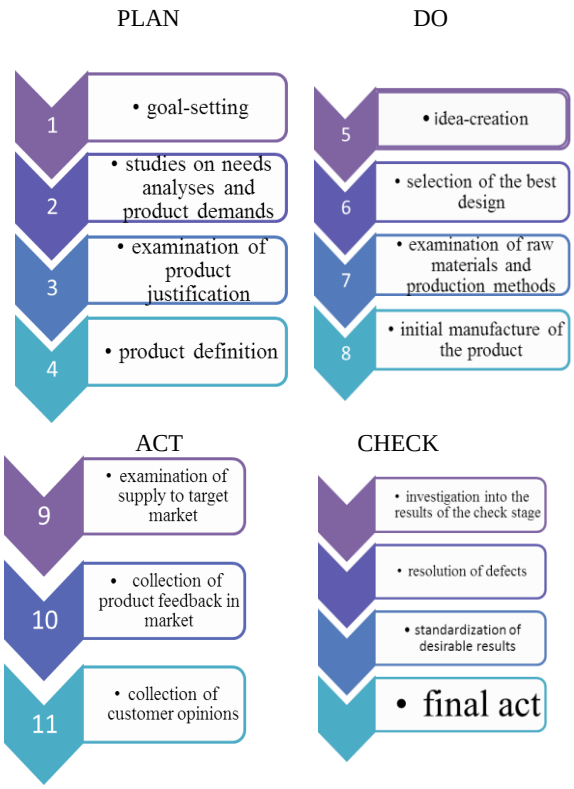

Figure 5 .Stages of the quality control cycle in manufacturing artistic products

7. Implementation of Kaizen in the Manufacturing Process of Handicrafts

Two methods of implementation can be observed through the review of the establishment mode of workshops by university graduates:

- Establishment and administration of workshops by university graduates through employing academic or non-academic workforce in the production process which is carried out through performing the whole production stages in personal workshops or outsourcing several stages of the production process.
- Establishment and administration of workshops by a number of university graduates and the implementation of the production process in teamwork or individually

According to the reviews, establishment of workshops by a group was more common due to the accumulation of small capitals, enhanced workshop administration power, utilization of each other's work power or collective power. Therefore, the implementation of the Kaizen management system was investigated in this study in accordance with teamwork. Among the benefits of teamwork are "the team is a common purpose and intention and team members can be effectively developed and achieve team objectives through mutual relationships [7]. In the process of collaboration in a team, ordinary people can achieve amazing results [8].
Kaizen in group work represents a permanent attitude to the core of quality control and other small group activities for which different tools are employed to solve the problems. This permanent attitude requires full implementation of the PDCA (plan, do, check, act) cycle as well as efforts of team members both in order to diagnose the problems and understand the causes and their analyses and also to carry out tests and propose solutions. These efforts should lead to the establishment of standards along with new guidelines [2].
In workshops manufacturing artistic products and run by teams, team members have general similarities in terms of their education and experiences; however, the presence of various individual talents provides conditions that make use of each member's capabilities for continuous improvement of goals in each part of design, production, supply, and research. Unfortunately; reviews of workshops established in the past fifteen years by university graduates revealed that more than half of the workshops have stopped working in the first two years due to lack of consensus among members and low profitability. Through an expert attitude, the causes of failure in workshops can be stated as follows:

- Weaknesses in team skills training in university education systems
- Establishment of teams by workshop members often due to lack of initial capital and in order to accumulate the capitals, but individual performance in practice
- Poor management skills despite artistic and technical talents in the domain of manufacturing products
- Lack of clear short-term and long-term objectives and plans
- No understanding of target markets and users

The performance review of such workshops makes it clear that the system of university education in the domain of handicrafts has been planned based education in terms of technical and artistic knowledge and university graduates are encountered by serious problems despite having sufficient capabilities in designing and manufacturing innovative products in the field of production management and marketing. Since there are no large handicraft production centers in which university graduates can be absorbed and continue their activities under the supervision of macro management, as well as lack of employment of individuals knowledgeable in terms of management due to the establishment of workshops by small capitals, the empowerment of university graduates in the area of management with applicability in the process of artistic production is important and necessary.
Kaizen and its continuous improvement techniques can be used as one of the most powerful methods outlined in the management and direction of these types of workshops. Kaizen teachings lead to reduced production costs and increased quality and delivery performance [9]. The purpose of the implementation of Kaizen is continuous improvement of price, quality, and flexibility [10] as well as productivity .

8. Kaizen Implementation Practices in Artistic Production Process

Basic measures taken for the operationalization of the teachings of Kaizen in the process of artistic production are continuous improvements via the implementation of the Kaizen management system. In this study, a number of the implementation practices of Kaizen in artistic production workshops were studied and compared.

9. 3-MU

In Kaizen management system, three basic steps should be taken to achieve continuous and gradual improvement:

- Muda: All activities that are costly and create no value should be removed.
- Muri: Activities that are carried out in parallel somewhere else should be integrated with each other.
- Mura: Those activities that are necessary to complete and improve quality should be added. This 3-MU movement constitutes the bases of Gemba Kaizen training workshop (practical Kaizen).

10. 3-MU in the Process of Artistic Production

Muda: Elimination or reduction of costs that do not have a major effect on artistic value such as reducing the costs in the preparation stage of raw materials through utilization of new technologies. In most fields of handicrafts, a part of the production process is not taken into account as the artistic value of the work and the use of existing technologies not only reduces the time and cost and avoids the physical depreciation of artist-artisan but also adds to the quality of the product.
Muri: In the study of the artistic production workshops established by university graduates, it seems there is a team approach, but in practice the spirit of individualism is dominant over collectivist aspects. For example; in the product design stage, individualistic movements are often observed instead of group meetings for creating ideas, designing products, and using group-based idea creation. For this reason, a parallel operation is performed to achieve a common goal (product design). In addition to the design stage, adoption of individual methods is also observed in the production and supply stages among groups.
Mura: Competition in domestic and foreign markets of handicrafts not only needs maintaining the artistic-cultural value and quality of the work but also requires adoption of competitive procedures. In addition to the quality and originality of the products, the issue of the final price of the work as well as supply and delivery functions can influence the success rate of producing artistic works. Therefore, the use of existing technologies to increase quality and reduce the time and costs without any damage to the nature of the artistic products as well as utilization of modern management practices in the production process of handicrafts are taken into account as vital and necessary issues.

11. 5S Kaizen Movement in Artistic Products

5S is a Japanese method of managing workplace that resulted from the application of the Kaizen culture (continuous improvement) in personal, familial, social, and professional life. The main idea behind the 5S method is rooted in social, historical, and philosophical origins (11). Many of the useful actions and habits in Japan are benefited with dual philosophical and technical characteristics (12). According to numerous existing books and articles, the 5S method is applicable to all workshops and laboratories across the world (13-18).
5S Kaizen method has taken its name from the initials of five Japanese words each starting with the letter S (19,20).

- Seiri: (organizing and sorting) discarding unnecessary objects and tools and separation of necessary tools from unnecessary ones and keeping only essential items.
- Seiton: (ordering) ordering the steps of work, equipment, parts, and instructions in a way that facilitates the working process.
- Seiso: (cleaning) cleaning the workplace and all the equipment and keeping them clean and tidy for future use.
- Seiketsu: (standardizing and controlling visually) controlling and reconstructing the three previous stages permanently through standardized methods and visual control in order to prevent disruptions in the order and cleanliness created in the previous stages.
- Shitsuke: (disciplining) discipline must be chosen in the form of habits and lifestyles which means commitment. To achieve this goal, it should be always ensured that the systems, methods, and procedures are followed.

In terms of artistic use of management practices to improve the production process, the perception of the complexity of management measures is one of the factors affecting low acceptance of university graduates as the workshop owners. But Kaizen and its methods of implementation can facilitate the improvement process simply and through a gradual process which sometimes does not impose costs. Although the 5S method is very simple at first glance; its maintenance and continuance, most importantly, has a significant impact on the production process.
In tests conducted at the workshops of wooden arts, implementation of 5S method in a short time had a 37% impact on the reduction in production time and prevention of time waste; moreover, compliance with the listed issues led to a 23% increase in the useful space of workshops. Such an increased space led to very important achievements because of the small size of most of the workshops. The most important implementation part of the 5S Kaizen was to achieve the goal of zero accidents and injuries in workshops [11].

12. 5 Why Method

Kaizen starts with a problem, or more precisely through notification of a problem. While there is no problem or issue, no progress potential is perceived. The first instinctive encounter in everyday management problems is hiding or concealing the problem and not dealing with it systematically [2].
The 5-why is a simple problem-solving technique which helps in quick rooting of the problem. The 5-why strategy includes paying attention to and raising the problems. In fact, the philosophy behind this strategy is what are usually called problems are symptoms emanated from a series of gaps between what has happened and what must have happened and such a gap has its own rooted causes that are usually hidden. The 5-why technique (Figure 6) is a simple problem-solving technique which helps in quick rooting of the problem, but more complex problems require more complete techniques.

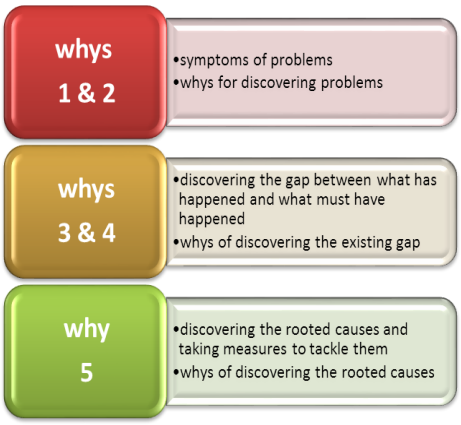

Figure 6 . Problem-solving steps in 5-why method

13. 5 W1H Method

The structure of the establishment of Kaizen provides a strong methodology based on what is known as 5W1H (Why, What, When, Where, Who, How) in order to produce Kaizen in all areas of business activities in a continuous and consistent way.
In this method, answers to questions and their sequence can lead to fundamental solutions in the process of idea-creation, design, implementation, and supply.
Since each six questions can be used in the steps of the processes of idea-creation to product delivery and examination of product feedbacks in market, Table 1 illustrated the main points of questions in various steps.
Although the mentioned methods in the present study are applicable in an individual form, studies conducted in the product design stage revealed significant differences in the results obtained from its application in individual and team-based methods. In a team method, more questions are raised, there is a high variety of ideas, and the fulfillment time of the final project is reduced.

Table 1. Illustrating the main points of 5W1H questions in artistic products

Kaizen creation	5W1H					
	Why	What	When	Where	Who	How
idea-creation step	√	√			√	
product design		√			√	
product manufacture			√	√	√	√
delivery performance			√	√		√
examination of feedbacks	√					

14. Artistic Production Requirements, Kaizen or Innovation

Improvement refers to Kaizen and innovation. To survive and progress; each collection, organization, or manufacturing workshop had better make use of both Kaizen and innovation. Kaizen refers to small modifications in the existing status through constant efforts and innovation in general reforms in the current situation by extensive investments in new technology or equipment (2).
Table 2
Comparison of Kaizen and rapid progress in artistic products

Kaizen (gradual progress)	rapid progress
applicable without costs or low cost	applicable with high investments
no need for advanced technologies	need for advanced and updated technologies
attention to details	attention to big steps
emphasis on existing facilities and their improvement	demand for new technologies
emphasis on group work	individualism
long-term and long-lasting plans	short-term plans
continuous and gradual changes	sudden and various changes
maintenance and improvement method	removal and improvement method
evaluation criteria include processes and efforts to achieve better results	team in the service of profitability
suitable for low to high capitals	suitable for high capitals

In fact, Kaizen refers to gradual development and innovation is development based on a big jump. One of the features of Kaizen is its uncertain need for complex technologies or the latest technological achievements. To realize Kaizen, common sense is the most important requirement. In contrast, innovation or rapid progress is mostly in need of advances technologies and huge investments.
Workshops of artistic products by university graduates are mostly established with small investments which lead to the failure of high-cost rapid changes in these workshops. However, the dominant management thinking line in most of workshops is based on rapid development and insufficient capital is taken into account as the cause of failure. With a quick glance at governing conditions in the workshops examined, no compliance with the rules of gradual development and continuous improvement was evident. In this respect, one of the Japanese managers acknowledged that “our workers are not smarter than workers in the West and also we are not equipped with more advanced technologies. We only make the best use of our energy” [21].
According to Table 2, it becomes obvious that the teachings of Kaizen are applicable in order to improve the existing situation in a continuous manner in each condition and place and through each amount of capital. Its implementation also leads to a gradual movement towards development and improvement. “In the Kaizen management system, satisfaction is the number-one enemy to Kaizen” [2].

15. Conclusion

The present study was an effort to investigate the teachings of the Kaizen management system in the production process of artistic products; in this respect, workshops established by university graduates were taken into account as the main criteria. Characteristics such as innovative thoughts in designing products in line with modern lifestyles, technical and artistic capabilities of university graduates which were an amalgam of science and art as well as the positive indices of handicrafts such as high value-added, no dependence to advanced technologies, and accessibility of raw materials can all provide for an entrepreneurial and profitable art-industry.
Considering the level of achievement in the workshops examined in this study and acceptance of their products in foreign and domestic markets, lack of selection of management practices to guide the collection as well as weaknesses in teamwork can be outlined as the most effective components in this respect. Therefore, the results of the present study can be illustrated as follows:

- Traditional view to artwork production methods is doomed to failure in competition with foreign and domestic markets.
- Adopting management practices in order to direct workshops and production of artworks is a vital and necessary issue.

- Due to the establishment of most workshops producing artistic works by small capitals, taking advantage of development practices is an inefficient jump.
- Low costs and inefficiency of the Kaizen management method in each condition and place provides a powerful tool for continuous improvement in the production process of handicrafts.
- Through taking advantage of the implementation methods of Kaizen; reduced costs and time as well as increased quality can be achieved.
- There is always continuous improvement with a slow and progressive movement due to gradual Kaizen system and continuous observance of developments fulfilled.
- Improvement can be insured and progress can be continued through the standardization of the results obtained.

The major benefits of Kaizen compared to other methods include:
- The Kaizen management system can meet the needs of artistic products with their own specific characteristics.
- It is applicable in all steps of construction and equipment of workshops, idea-creation for products, design and production, delivery operation, as well as research.
- Attractiveness in implementation
- High effectiveness of results
- Low costs
- Emphasis on teamwork
- Reinforced creativity in all individuals

Finally, it should be noted that, artistic production management is a field which has been always overlooked and documents as well as research studies in this respect are scarce. This field of art-industry has no competitors in global markets due to its ethnic characteristics, no need for advanced technologies, as well as high value-added and the functionality of its products. It can be also turned into a dynamic industry through enforcing efficient management practices which not only help in the fulfillment of entrepreneurial goals in terms of small enterprises established by university graduates and meeting the users' needs, but also plays the role of an appropriate messenger of Iranian culture in global markets.

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