The role of contemporary technologies in developing local copper industries

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An introduction

The problem of copper industry and craftsmanship exists due to its relation with another profession that has disappeared, which is "copper whitener", which is defined as painting of utensils from the inside when after a long period of usage to return them to their original state, though copper crafts are a popular commodity for tourists who are keen to acquire them, as they are from the scents of the East and a special feature for Egyptian industries.

The artistic work must have a shared value, and this is what earns a social value for it, and also makes it a kind of image culture, meaning that the artwork must be distinguished as a phenomenon that has an objective basis shared in the appreciation of society, so that the artwork does not remain an individual work. By which we value artistic work with common social standards that is not limited to a particular individual taste (Amira Helmy Matar, 1989, p. 23).

The artistic work is not just a material from which the work was formulated, but rather in itself it helps to form the aesthetic subject of the copper work, where all the materials are composed to form the work piece, as the copper work depends in its formation on a group of homogeneous materials working together in a frame of synthesis, and to be consistent with the purpose of the artifact, the used techniques represent the plastic pallet of the wrought iron artist, with its surface touches and sensory connotations, but the artist is not satisfied with these techniques only as a source of his artistic creativity. From it stems the philosophy of his artistic work, which carries with it his idea and concept, and what he wants to convey to the public through his use of his artistic work as a means of communication.

The technology on the material itself plays an important role in changing the shape of the copper work, so every artist must be in constant contact with these techniques that he inherited as a heritage craft and link them with modern technologies in addition to his continuous pursuit of research and experimentation in these techniques to identify their characteristics that distinguish each technique from others. They are also considered as plastic media that the artist makes use of in the copper work. Some techniques give linear shapes or give spaces, or give a sense of mass and space, or give tangible values and others that give permeability to light. In addition, the material has its plastic capabilities that allow the artist to devise artistic and technical methods suitable for their plastic treatments. Although the technique does not acquire an artistic form until after the artist's hand has extended to it, creating an aesthetic sensation from it, and thus it becomes clear that the artist takes the raw material to transform it into an aesthetic material, and this indicates the relationship and connection of the material to be formed to create a content (Bernard Smith, 1977).

The twentieth century witnessed many artistic trends that influenced the field of plastic art in general and copper work in particular, considering it one of the fields of art that is related to the trends of the era and its intellectual philosophy, so we must take into account the modern artistic trends in the construction of the copper work, especially the postmodern arts.

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The research aims:

- Monitor the role of contemporary technologies in developing local copper industries.
- Producing contemporary metal designs using laser engraving.

The research importance:

The importance of this research stems from shedding light on the technique of engraving on copper, as art in general cannot remain isolated from advanced technical software and modern media and communication means that are expressive means that can support the creative, sensual and aesthetic vision.

Research problem

The research problem focused on the following questions:

١ .Has technology created new aesthetic values?

.٢ Has technology created a modern vision for the artist in the world of plastic art?

.٣ Did aesthetic values collapse in the face of technology?

.٤ What is the possibility of using modern technologies and accompanying them with the development of local copper industries?

Research hypotheses:

- The role of contemporary technologies in the development of local accounting industries can be monitored.
- The possibility of producing contemporary metal designs using laser engraving.

Research methodology and procedures:

The descriptive approach was used in this study to extract the problems of designing and producing the art of local copper industries, and the modern technology that contributed to its production and provision of manual labor. The descriptive method does not aim to describe phenomena or describe reality as it is, but rather to reach conclusions that contribute to understanding and developing this reality.

Copper ores:

The most important copper ores available in Egypt are malachite, azurite, chrysocolla, and copper sulfide.

The most important types of copper alloys used in (metallic) molding:

First: copper alloys:

Copper and its alloys can be classified as follows:

Brass: (brasses)

Red Copper

Methods for forming copper:

Methods of forming metals were distinguished by several methods. The researcher will deal with a simple tabulation of the processes and methods of formation and production methods:

١ -Casting Process

Mechanical Working of Metals, Metal Formation

Hot formation: One of the basic methods of hot forming is:

•Extrusion
•Forging
•Hot Rolling

A- Cold Working

Problems with the copper engraving craft:

A common problem encountered in the copper engraving craft:

• The great increase in the price of copper, which led many craftsmen to abandon this craft.
• The lack of benefits for this craft.
• Importing cheap copper products from abroad, despite its poor quality.
• Creating drilling operations by means of chemical drilling.

Modern technologies as they are keeping pace with the development of local copper industries. Copper ores are found in Egypt mixed with zinc and lead ores in different regions, such as south of the Eastern Desert in the Red Sea Governorate, and the most important of these areas is Umm Sumiuki area, which is located southwest of the city of Marsa Alam, about (150 km) and to the southwest of the port of Abu Ghosun by about (90 km). The crude is in it in the form of medium-sized lenses. Copper ore is also found in Egypt in the "Abu Sweil" area, which is located east of Aswan, and the ore is found in it in the form of lenses of medium dimensions. Copper ore is also found in the mineralized peridotite rocks in the Jaber and Akram region, which is located in the middle of the Eastern Desert, about 130 km east of Aswan and 24 km south of Jabal Hamar Akram.

Copper is extracted incidentally when mining other metals and it is included in a number of useful alloys, which are widely used, and the percentage of these alloys varies greatly, as it is mixed with some other metals such as zinc, tin and nickel to make alloys with multiple qualities and characteristics that can be used in different industrial fields.

Since copper metal is characterized by its high ability to be recycled and used, many copper alloys and wires industries are made using scrap copper and not on its metallurgy. Copper industries in Egypt depend on copper scrap as a main source in manufacturing, not on ore mining. This caused the theft of copper cables to telephone lines, especially in the new areas, and led the Ministry of Communications to switch to fiber cables. The severe shortage of copper scrap has also caused its price to rise, and the government has placed restrictions on its export in its raw form, which is circumvented by making statues and bars of copper smelting as soon as it reaches its destination, or even smuggling copper into other export shipments. This is the most important challenge facing the copper industry in Egypt, especially when mining opportunities are not maximized by reducing mining costs and increasing the yield on the processed ore.

Two-thirds of the amount of copper produced since 1900 is still used to this day. Few resources can be recycled with this efficiency, and then copper becomes one of the most efficient resources for preserving the environment and its natural resources, and for achieving sustainability. And because the sustainable development goals are at the top of the world's priorities today, more manufacturers will resort to copper metal more intensely, to replace it as much as possible for plastic and paper products. Also, copper is very important in recycling other metals such as gold, silver and nickel.

The challenges posed by antibiotic resistance are pushing health care workers to work harder to reduce the risk of general infection. Copper is naturally resistant to microbes, which makes it ideal for use in public areas such as hospitals, schools, and clubs.

Laser processes used for brass

Laser annealing
Laser cutting
• laser piercing
Laser engraving
Laser engraving of molds
Laser mechanization
Laser punching
Laser engraving of images
Laser slotting
Laser felting
Laser surface modification
Laser selective ablation

To sum up the research paper; the researcher believes that copper formation can be reformulated in the light of technological developments, as the visual arts could be employed through shaping copper as a method for dialogue with the material and thinking of plastic vocabulary to offer alternatives to the starting points in the form of formative relationships that include uncommon connotations and meanings that enrich the field of research and achieve the optimal perception. For the study, it also examines the approaches of experimentation in adapting traditional techniques in forming copper through new facts in the composition of plastic relationships together and their connection with the artist's goals in building his formations, in addition to taking advantage of the technological development in techniques as his creative thinking grows to be practiced on plastic fluency that gives multiple solutions to the subject. The one personifies ideas, feelings to be crystallized, and chooses between plastic alternatives in an integrated synthesis, so that the new formative connections and the new relationships emerge.

The field of copper shaping combines the development and synthesis of many techniques in addition to the adaptation of different materials, such as yellow and red copper, or wires of all kinds, as the interposition between various ores and the mixture between them achieves the goals of the artistic work and the artwork becomes of aesthetic and utilitarian value in order to achieve its desired role in the communication process between the creative artist and the other party through communication process with the recipient in a frame of creative synthesis.

Results:

By reviewing and analyzing the research results and their variables in light of the research hypotheses and objectives, the researcher was able to draw the following:

1- The researcher was able to discover the aesthetic and plastic potentials that could result from the models between the innovative expressive visions and the traditional methods of copper craft, and the use of contemporary technological plastic techniques for copper ore as a connection to produce innovative copper artifacts.

2- The entry of digital technology in the field of art helped to develop human thought.

3- Digital technology increases the creative designer's imagination and creates many new designs.

4- The technique using the laser cutter machine facilitated the artist's work as a tool, which is completely different from the traditional manual methods.

5- The researcher was able, through conducting the theoretical study, to reach a relationship between metal forming technologies and the traditional craftsmanship techniques of the craft of copper forming to support the technical features and characteristics that can be used in finding new expressive approaches in the copper work.

6- It is possible to find new expressive approaches to more creative copper work by employing technology and digital techniques to achieve more modern plastic artefacts concepts.

7- Methods of teaching copper formation in technical colleges can be developed by employing technology in the field of copper forming.

8- Digital processors created for copper forming processes are an important input for experimentation that can be used in the development of copper artifacts of aesthetic and utilitarian value at the same time.

9- The ability of modern technologies to produce artistic designs that depend on accuracy and speed, though it is difficult to achieve this, but it is impossible to produce them manually.

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