We Are All Connected

Behnoush Tavasolinia

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WE ARE ALL CONNECTED

A Thesis
Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Fine Arts

in
The School of Art

by
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B.S., University of Tonekabon, 2006
December 2022
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ABSTRACT

Upon personal reflection, I have discovered that economic, cultural, and social issues have become very important in my life. As an Iranian graphic designer, I used current events and responded to Iranian stories to reflect that people’s problems anywhere in the world affect other people’s lives worldwide. My thesis investigation aims to reveal the global connection with commodities by focusing on Iran’s economic inflation to create a conceptual and visual representation of impacted consumables. Persian rugs and tile designs are the centers of the culture and symbols of the Iranian people. I used graphic design to illustrate tiles utilizing economic consumables, Persian typographic patterns, and geometric style. I shared a strategy regarding chaos theory and fractals that challenges the audience to contemplate commodities and perceive the worldwide connection and direct and indirect impacts of each other.


1. INTRODUCTION

“Today, I bought tomatoes twice as expensive as last week,” a taxi driver said to a passenger. “If I did not have kids, I would not buy them anymore,” the passenger replied. This is a normal conversation between two strangers in Iran complaining about the cost of living. The economic crisis in Iran is a continuation of the exchange rate crisis in this country, and the current Iranian government is facing this challenge. The Iranian people face an economic crisis which affects many commodities, including meat, chicken, medicine, gas, tomatoes, carrots, diapers, tampons, etc.

I believe that any activity that happens in one corner of the world will affect many things in another corner of the world. This idea comes from the concepts of “Chaos Theory” and “Fractals”, which in simple words, is described as the “butterfly effect”, similar to the chaotic behavior of fractals in nature.\(^1\) There is vast literature on the applications of fractals and chaos theory in art and socioeconomics separately, considering the mathematical background and scientific aspects. Here, I have left the mathematical discussion aside and addressed a socioeconomic issue through fractal art with my philosophy. Chaos theory and fractals have unique features that can explain many events in the world around us.

Focusing on inflation in Iran was my main goal in my thesis investigation. After researching fractal and chaos theory, I asked myself questions such as: how could I visually represent Iran’s inflation crisis and its worldwide impact? What elements could be used in my design to communicate Iranian culture while anyone could resonate with them visually?

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Thinking of these questions gave me direction in using commodities affected by Iran’s inflation which are familiar worldwide. I believe that although we use consumables daily, we often overlook how they connect all of us collectively as a part of a greater global community. I decided to apply these products to my design and build a bridge between my philosophy inspired by fractal and chaos theory and global connection.
2. RESEARCH FRAMEWORK

2.1. Fractals

As my study started by considering the commodities, which will be called “daily objects” or “objects” for convenience in this paper, affected by inflation in Iran, I carefully examined these objects visually. My goal was to design patterns and tiles with these objects. This approach drew my attention to fractals and their relationship with chaos theory. “The word fractal is derived from the Latin word fractus”\(^2\) and, in translation, means “composed of parts.”\(^2\) Benoit Mandelbrot proposed it in 1975 to refer to irregular but self-similar structures. Fractals are infinitely complex patterns that are similar at different scales. They are created by repeating a simple process over and over in a continuous feedback loop. They have inspired many natural artists to create their works of art. Attractive and pleasant fractal patterns are abundant in nature. Repetition is one of the fractal’s features. In general, this repetition can be obtained from the juxtaposition of an object or one subject being smaller than another. In geometric patterns, repetition and rotation are seen to reach a new concept (Figure 2.1).

![Fractals](https://web.stanford.edu/class/archive/cs/cs106b/cs106b.1206/lectures/fractals/)

Figure 2.1. Fractals.

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2.2. Chaos Theory

Chaos theory is an interdisciplinary branch that expresses how small changes in a deterministic and non-linear system can lead to large differences in one of the next states. The main idea behind this theory is the basic belief that small events significantly affect the outcomes of seemingly unrelated and unpredictable events. This theory, in simple words, is explained by the “butterfly effect”, as Edward Lorenz poetically phrased it: “A butterfly flapping its wings in Brazil can produce a tornado in Texas” (Figure 2.2).

Figure 2.2. Chaos Theory-Butterfly Effect. (https://commons.wikimedia.org/wiki/File:Lorenz_attractor2.svg)

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4 Edward N. Lorenz, “Predictability; Does the flap of a butterfly’s wing in Brazil set off a tornado in Texas?” AAAS Section on Environmental Sciences, December 29, 1972.
At first glance, fractals and chaos theory seem unrelated, but they are progressively connected. Repetition is fundamental in both fractals and chaos, and fractals in nature display complex, chaotic behavior. Considering fractals and chaos in the fields of experimental sciences, mathematics, behaviorism, management, economy, and sociology has caused a change in the way humans view solving unforeseen problems. Fractals develop by repetition which means that the deformation is created repeatedly and depends on the starting position. Simple algorithms can show it, which means a series of regular rules behind natural disordered elements. Systems and processes are usually repeated with different levels of substructures, with the same overall pattern. This point of view gives us an understanding of how our social and economic systems are connected and interrelated.

2.3. Fractals in Iranian art

Nature has always been one of the main sources of inspiration for art and artists, directly and indirectly. As we mentioned, the nature we are surrounded by is full of fractal shapes that are not regular in any way. Fractal design has been used unconsciously, knowingly, or unknowingly in traditional Iranian motifs and patterns.5 These designs are increasingly visible in Iranian paintings, architecture, tiles, and rugs. Fractal multiplication and the spiral forms obtained in fractal equations are the main foundation of Islamic motifs. On the other hand, consistent patterns seen in Islamic arts and their philosophical relationship with theories of chaos and fractal geometry are compatible with the theory of unity in multiplicity and multiplicity in unity.6 The best examples of fractals in Iranian-Islamic architecture can be found in the tiling design


under the dome of Jameh Mosque and the Shah Mosque (Isfahan) (Figures 2.3 & 2.4). By examining the internal array of the mosque’s dome and its similarity to natural shapes with fractal geometry, this hypothesis comes to mind that the architect has reached such an amazing design with inspiration from natural patterns and fractal geometry.

Figure 2.3. Image by Amir Pashaei. Jameh Mosque (Iran, Isfahan) Own work, CC BY-SA 4.0. (https://commons.wikimedia.org/w/index.php?curid=82829667).
Analyzing Iranian carpet design exposes the similar behavior of fractals. There are many geometric shapes in the center, which are repeated and patterned within each other. Iranian carpet and tile designs in various forms are composed of geometric lines and shapes and arabesque forms combined with objects such as trees, branches, leaves, flowers, birds, animals, and Persian typography. All these architectural structures, carpets, and tiles are considered parts of Iranian identity and symbols of Iranian culture (Figure 2.5).

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2.4. Inflation in Iran

Due to the dependence of Iran’s economy on imports and the role of the US currency as a protection against inflation for many Iranians, the decrease in the value of the Rial (Iran’s currency) will quickly translate into higher prices for the consumer. The price of essential commodities is affected by the decrease in the value of the currency quickly and shows its effect on the inflation of these goods. These commodities include chicken, beef, fish, eggs, dairy products, edible oils, fruits, vegetables, gas, sugar, clothing, etc. Food products directly related to people’s livelihood have experienced a much more intense price spike between 2014 and 2022.

Figure 2.5. Image by Mostafameraji. Fractals in Iranian carpet design. Own work. CC BY-SA 4.0. (https://commons.wikimedia.org/w/index.php?curid=61555689)
Afrasiabi and Baharlouei, in their paper called The Consequences of the Inflation in Everyday Life of Low-Class Youths, interviewed 30 people and claimed that one of the most important and basic challenges that the participants talked about due to the experience of inflation is the loss of internal energy and motivation for work, activity, and planning. Motivation is the internal human force to strive towards desires and goals. Motivation acts as a driving force for humans to achieve goals, ideals, and success. In the conditions of increasing inflation, the motivation of young people is noticeably weakened, and they develop feelings of depression, despair, lack of enthusiasm, demoralization, confusion, and helplessness. In conditions of high economic inflation, young people feel helpless and unable to think of solutions and plan properly for their future. Therefore, the impact of inflation on Iranians’ daily lives is quite evident and understandable, and it is a familiar phenomenon and a repeated experience for people.

According to Iranian Statistics Center data in recent years, inflation reached 40.2% in 2021, an unprecedented number in the last 25 years. One of the most important reasons for this record inflation belongs to edible goods. Looking at the graph below, we see that inflation in Iran has mostly had an upward trend (Figure 2.6). The global inflation rate had risen in 2021, and the U.S. had the highest increase over three decades.

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9 Pegah Pasha, “An analysis of Iran's economic conditions by looking at the results of the global risks report,” Kohan Journal (2022). https://kohanjournal.com/wp-content/uploads/2022/08/%D8%A7%D8%B4%D8%A7%D9%85%D9%81-%D9%88%BF%BC%EF%BF%BC%EF%BF%BC-%D9%87%DA%91-%D8%A7-%D9%85%BF%BC%DA%98%BF%BC-%D8%A8-%D9%81%DA%97%D9%85.pdf
Figure 2.6. Iran Inflation Rate 1960-2021.
(https://www.macrotrends.net/countries/IRN/iran/inflation-rate-cpi)
3. METHODOLOGY

Since I started graduate school at Louisiana State University, I have been using graphic design as my tool to connect different cultures and nations and tell their stories. As an Iranian graduate student, Iran is my most familiar place. During my graduate studies, I have cautiously created a bridge between my Iranian and Western cultures to develop mutual understanding among different countries and communities. This approach motivated me to study in-depth how all people in the world connect socially, culturally, economically, and politically through the lens of art. I sought a way to transform an experience that may not be unfamiliar to people in the West but who did not attentively engage in before. I desired to create an environment making people feel connected to the lives of others on the other side of the world. From there, I began my study of commodities affected by inflation in Iran. During my investigation, I realized these commodities are essential worldwide objects. We often overlook how these objects connect all of us collectively as part of a greater global community. We face or pass by objects every day but do not notice how important they are in our day-to-day lives. In my opinion, an object is not just an object. It conveys information about social dilemmas, culture, economy, and people’s daily lives. I paid special attention to the objects and how they can tell an interesting and unique story and express a specific message.

When I was visually considering each object, I observed fractals everywhere, from rug flowers and cabbage flowers to the shape of mountains, clouds, snowflakes, rain, the shape of roots, trunks, and leaves of trees, and finally, the shape of black veins. I saw the world as a huge fractal in which all its parts are connected and intertwined. I saw it as a geometric pattern in which each structure is hierarchical and clustered. They create an unending pattern, and its growth continues until they encounter an obstacle.
Learning about fractals and their relationship with chaos theory and their coincidence with what I have learned from COVID-19 (a minuscule virus) made me realize that everything that happens in one corner of the world will affect many things in another corner. Indeed, the whole world is connected. In that regard, the pandemic and the Russian invasion of Ukraine have caused inflation and increased prices worldwide. My philosophy of the world is shaped around the thought that, for example, inflation in Iran forms a pattern that sequentially couples, mirrors, repeats, and multiplies until it spreads around the world either in its original shape or in a new shape. This means that inflation in Iran can expand worldwide in the form of inflation or socially, economically, and politically affect people’s lives in other parts of the world.

To tell the story of Iranians related to other countries based on my philosophy, I decided to create my tiles with objects known to all people affected by inflation in Iran. As I mentioned, these objects include chicken, beef, fish, eggs, dairy products, edible oils, fruits, vegetables, gas, sugar, etc. To mirror Iranian culture and their financial problems, I employed Iranian carpet and tile design as a source of inspiration which has always been my inspiration during my graduate study. To emphasize inflation's impact on daily life, I determined to create an abstract visual representation of a line graph of inflation alongside my tiles. Through my research and making tiles and typographic patterns, I developed various media such as installation, poster series, stain glasses, and videos to find the best solutions for design problems and engage my audience.
4. PROCESS

4.1. Inflation Graph

After researching and considering materials and mediums, I focused on creating a conceptual and visual representation of inflation objects to simultaneously express Iranian culture, Iran’s financial problems, and its effect on other parts of the world. The process started with designing the inflation graph, which is not just a line. Rather, it is designed with the Persian alphabet and typographic pattern. I drew more than twenty Persian typographic patterns in a traditional way by hand on various papers. I utilized black chisel tip markers in different sizes to have a slanted end and draw thicker and thinner lines, as artists use Qalam (a type of pen) in traditional Persian calligraphy. I soon discovered that applying traditional Iranian calligraphy is not in line with my goals since letters form, composition, and twists and turns of lines give a sense of lightness and peace.

The main idea of my project is to reflect on the chaotic situation caused by inflation and, at the same time, convey a sense of connection. I decided to combine a western approach with Persian alphabet patterns for this goal. I got inspired by one American artist, Keith Allen Haring, who is known for responding to political and social events in his works. Among all patterns I created with this background, I selected the one representing people stuck in a maze struggling to survive, like an ant colony (Figure 4.1). I scanned the pattern and digitized it through the simplifying process in Adobe Illustrator. I imported the inflation graph picture on Illustrator (top part of figure 2.6) and left it in the background. I took the pattern and repeated it along the inflation path. Then I started cleaning up all overlapping shapes by removing some parts of the pattern. I changed the background color to black in sections inflation goes high to display hard times and chaotic situations for people (Figure 4.2).
Figure 4.1. Selected Persian typographic pattern. 2021. Illustrator. 11 x 8.5 inches

Figure 4.2. Inflation graph is replaced by the pattern. 2021, Illustrator. 44 x 8.5 inches
The next step was to design a large format installation with the inflation graph. After considering various materials, I used transparent and light plastic acrylic sheets. My idea was to engrave the pattern into the sheets. Due to size constraints, I could not fit the whole graph on one sheet. I designed a puzzle configuration to resolve this issue and divided the graph into 42 pieces with five different colors. The black color represents a chaotic situation when inflation is high. The Illustrator file is imported to Rhino to prepare the model for the CNC router machine for engraving and cutting using information from my file. I tried different bit sizes, but the results needed to be more satisfactory. The pattern lines were too narrow and were not aesthetically pleasing. Therefore, I redesigned and magnified the patterns on each piece (Figure 4.3).

![Figure 4.3. Final inflation graph design. 2022. Illustrator. 22 x 8.5 inches](image)

At this point, I defined the desired dimensions of the graph in the Rhino based on the intended exhibition space. The graph was a 20 feet installation displayed on the wall with a one-inch gap between the wall and puzzle pieces. The file was transferred to Velocity CNC software
for engraving the pattern on acrylic sheets. Afterward, they were cut into several pieces. The practice of creating this installation without the indispensable support of Mary Ratcliff was not possible (Figure 4.4).

Figure 4.4. Examples of engraved and cut pieces of inflation graph

Figure 4.5. Inflation Graph. 2022. Acrylic. 20 feet
4.2. Tile Designs

The next step in my process was designing a series of tiles featuring objects affected by inflation in Iran. The process started with inspecting the list of edible objects to create an icon archive. Furthermore, I collected examples of Persian tile and carpet designs to get inspired by the forms, geometric patterns, and ornamental designs. I had the idea of using the main characteristics of fractal, repetition, in my design. Therefore, I learned mathematical and geometrical calculations to be able to translate them. First, I took pictures of the objects and created tiles in Photoshop, and I was not satisfied with the result. I soon realized that utilizing the objects icon was the best solution for my intention. I developed a series of icons from reference photos based on inflation objects (Figure 4.6). Then using mathematics, combination tools, and the Transform Effect in Illustrator, I constructed more than 80 patterns with all objects.

![Series of icons with inflation objects. 2022. Illustrator](image)

While using the Transform Effect, I played with the number of copies of the objects, scale, movement, rotation, and reference point. To achieve a circular pattern, I divided 360° by
the number of objects in the rotation section. I got some interesting effects as the objects began to circle in symmetrical configurations. Seeing the Transform Effect live, I could continue to edit the patterns and apply new effects even after closing its dialog box. That was a fascinating point that if the object had more than one layer, moving, scaling, and rotating any layer in the Isolation Mode caused the displacement of the other layers and created a new pattern. That means all the pieces in the patterns are dependent and connected, and even a change in a small layer affects the other parts and creates infinite patterns with one object based on the initial move, representing the chaos theory feature (Figure 4.7).

Thinking of using color in my patterns, I decided to use 2 or 3 high-contrast colors because I wanted each object to be recognizable in patterns. Using more colors might distract the audience. I believe commodities are significant indications that can connect us to people, places, and things. I wanted my audience to briefly think about these products because these unimportant things can change their view of the world and their view of themselves, and their view of the people around the world. I hope this project will be reminded in the minds of my audience whenever they come across these items.

To engage my audience in the project, I devised a strategy to encourage them to guess the objects applied in the patterns. For this purpose, I designed a flyer containing a list of the objects illustrated in the tiles. Also, two wall tags on top of each other are placed next to the printed tiles. The audience is then asked to match the objects on the list to their associated pairs in the pattern. Eventually, the audience can slide the top tag and see if they have guessed correctly and read the educational sentence related to that object.
Figure 4.7. Creating infinite patterns with one inflation object.
Figure 4.8. Tile Design with Daily Objects. 2022. Print. 14 x 14 inches each
Figure 4.9. Tile Design with daily objects. 2022. Print. 14 x 14 inches each
Figure 4.10. Tile Design with daily objects. 2022. Print. 14 x 14 inches each
4.3. Video

While using the Transform Effect to create my tiles, I realized I could do a screen recording, using motion design to show how the whole pattern can change and affect the other parts by moving just one small subset layer. Using different mediums could help my audience to communicate better with my project and idea. I edited the videos and put them together to display on a screen.

Figure 4.11. The final exhibition of tiles. 2022
4.4. Stained Glass

Stained glass takes me back to my childhood and traditional Iranian architecture. In the past, these colored glasses were seen in all the old houses and gave a special beauty and warmth to the houses. The use of color in the building affects the soul and mind of a person. It creates a sense of peace and relieves environmental tensions.

As my topic is about the chaotic economic situation, bringing a sense of peace and connection to this project was one of my purposes. Stained glass highlights the common features of Iranian and western cultures as seen in mosques and churches and adds a sense of connection to my exhibition. During my thesis process, I had this opportunity to practice at the Stephen Wilson Stained Glass studio and apply one of the patterns in this wonderful art. The process
started with designing a bean pattern in Illustrator, and the following steps were creating a glass pattern, cutting and grinding glasses, and joining the pieces with lead and the end soldering (Figure 4.13).

Figure 4.13. Beans. 2022. Stain Glasses. 26 x 26 inches
5. CONCLUSION

I discovered the relationship between fractal and chaos theory and Iran’s inflation through my thesis research. Also, the global spreading of this issue in the form of a pattern through my personal lens has been discussed. Imagining the whole world as patterns gave me the idea to develop a strategy in which we are all connected. I utilized daily objects as my tool to create a sense of connection through tile and pattern making.

The process of this study allowed me to express my philosophy in a new visual language. It gave me the opportunity to design different Persian typographic patterns, apply my designs to various materials, experience using a CNC router machine, work in a stain glasses studio and discover a new way of using graphic design. I hope my audience will feel more connected with the people of the whole world after experiencing my exhibition and learning about other countries’ problems. My goal for the future is to expand this project and explore more ways of telling stories by objects.
BIBLIOGRAPHY


Lorenz, Edward N. “Predictability; Does the flap of a butterfly’s wing in Brazil set off a tornado in Texas?” AAAS Section on Environmental Sciences, December 29, 1972.


Pasha, Pegah. “An analysis of Iran's economic conditions by looking at the results of the global risks report.” Kohan Journal (2022). https://kohanjournal.com/wp-content/uploads/2022/08/%D9%85タル%DA%AF%DB%8F%DB%8C%DB%8C%DB%82%DA%98-iran-%D9%85%DB%8C%DB%8C%DB%82-%D9%85%DB%82-2022.pdf

VITA

Behnoush Tavasolinia was born and raised in Iran. She earned her Bachelor of Arts degree from Tonekabon University in Iran. She received her Master of Fine Arts at Louisiana State University in 2022. Her work centers around cultural and social-artistic projects, such as posters, book design, visual identity, etc. She is passionate about people and places, connecting different cultures and nations, and telling their stories. In addition, she is fascinated by the impact of material objects on cultures. In her creative practice, she pays special attention to objects to create a dialogue between objects and us to tell interesting and unique stories and express specific messages.