



Evaluation of alterations on historical urban structure of Erzurum with fractal analysis method

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Abstract: Like everything in the world, cities and the values they possess undergo a change process. So, all the components from districts making up a city to streets making up the districts and the architectural structures and elements forming them go through a constructive or unconstructive change or renewal process. Erzurum city heads the list of the cities under the influence of such a change to a great extent due to its historical qualification, too. The aim of this study is to reveal the extent of this change, determine the negative and positive sides of this process and prove using visual material whether we are on the right or wrong direction with respect to general progress and future of the city. In the study, totally eleven couples of images, which can constitute strong relationships between historical and modern structures of the city and represent the historical core were evaluated. The findings, obtained by comparing and evaluating the past, old state and visual materials produced by considering the old state, revealed that we are faced with a big destruction rather than a change process. In addition, another importance of the study is that it has filed a new and up-to-date visual archive of the cultural works, compiled and added new photos to the existing archive.

Keywords: Historical city, Urban renewal, Photograph, Erzurum

Erzurum tarihi kent dokusundaki değişimlerin fraktal analiz yöntemiyle değerlendirilmesi

Özet: Dünyada var olan her şey gibi, kentler ve kentlerin sahip oldukları değerlerde değişim gösterirler. Bu yüzden bir kenti meydana getiren mahallelerden, mahalleleri meydana getiren sokaklara ve onu şekillendiren mimari elemanlar ve unsurlara kadar tüm bileşenler olumlu veya olumsuz bir değişim ve gelişim süreci geçirirler. Erzurum kenti de tarihsel niteliği nedeniyle bu değişimden en büyük oranda payını alan kentlerin başında gelmektedir. Bu çalışmanın amacı bu değişimin boyutlarını ortaya koymak, bu sürecin olumlu ve olumsuz taraflarını belirlemek ve kentin geleceği ve genel gelişime göre doğru veya yanlış yönde olup olmadığını görsel materyaller kullanarak göstermektir. Çalışmada, tarihi kent çekirdeğini temsil eden ve kentin modern ve tarihi yapıları arasındaki güçlü ilişkiyi ortaya koyan 11 çift fotoğraf değerlendirilmiştir. Sonuçta, eski ve eski durum ve açılarına uyularak çekilen yeni görsel materyallerin karşılaştırılması ile elde edilen veriler değerlendirilmiş ve değişimden çok, büyük bir yıkımla karşı karşıya bulunduğu tespit edilmiştir. Ayrıca bu çalışma sonuçları, günümüzde yeniden fotoğraflanmış kültür varlıklarının görsel arşivlerinin oluşturulmuş, var olan arşivlerin derlenmiş ve arşivlere yeni tarihli fotoğrafların eklenmesi nedeniyle de önem taşımaktadır.

Anahtar kelimeler: Tarihi kent, Kentsel yenilenme, Fotoğraf, Erzurum

1. Introduction

The industrialization in parallel with the developing technology in the course of time, overpopulation, urbanization and suchlike change processes cause the silhouette of the cities to decay and let rapid and deviant structuring and therefore the historical core, generally in the central position of the city, is wiped out for different reasons or it undergoes great changes.

Cities are living organisms constantly being renewed and maintaining themselves by reconstruction. A city is worn by the time and its dwellers. Enemies burn, destroy and plunder it. Cities which resist destruction, fix and renew themselves to meet the changing needs succeed to remain standing. Cities are also center of information and culture. Cities have produced more information than rural areas in

every period. They constitute cultural richness. It is necessary for a city to augment information about itself, make the information widespread and easily accessible so that it can be a real information and culture center (Karatepe, 1999).

The situation is the same for cities in Turkey. A change process was started by new public improvement plans in our cities, which entered a rapid change process through the Republic Period. These plans did not usually have aesthetic anxieties perhaps because of the requisites of the time or due to the inadequate sources. As a result of the interacting processes, constructions sparing no thought on the historical city texture followed. The last traces are in most of the places at risk due to wrong restorations and planning. As is the case all over the world, Turkey has also experienced irregular structuring and destruction of historical texture

stemming from rapid urbanization. Especially in countries like Turkey, which are in a rapid development process, this destruction continues much faster, ugly, without identity and incoherent in the name of modernization. Cities of nowadays have turned into places jammed in narrow areas, dealing with several problems with higher flats and overpopulation, whereas they had specific principles, were accessible, lively, and distinctive cultural cities and they developed horizontally.

Turkey is one of the luckiest a few countries as it is on the territories richest in kind and samples with respect to its cultural heritage. Anatolia alone has hosted 28 civilizations so far. The intensive panorama of cultural history brings about the necessity to make the whole country an open museum. The structures within the development process of urban settlements identifying some periods become a means of cultural transfer for the establishment, progress, order and functions of the city by setting up a messenger web for understanding the city (Özek, 1992). Cities are living presences carrying the traces of every civilization established on them and they themselves also experience, learn and teach this civilization and culture. In the course of time they lose their teaching skill as they change through new civilizations, new movements and ages. This is because every renewal or regeneration in fact means extinction for a city together with its possessions, heritages and values.

All of the pieces forming the city texture from the texture of the smallest residence to city scale gain an identity and protect this identity through the sense keeping the culture establishing it alive and experiencing the same culture. In other words, culture is protected, kept alive and transferred by those who appreciate it. In a city like Erzurum, which has a rich history and which in fact heads the list of the cities with respect to the number of historical works per unit area, cultural transfer is a must. However, due to some dramatic issues such as impersonal urbanization, senseless modern understanding, intensive migration pressure, economical and commercial worries, uncontrolled tourism, wrong and inadequate planning, unconscious public and administration, deficits in law and regulations defining the protection principles, the city has a historical texture that is faced with the danger of extinction and destruction.

Erzurum city, where even a stone is a bridge between the past and future, was an important stop of Silkway and it maintained its existence along history during Byzantium, Saltuks, Seljuks and Ottoman periods respectively as a living city of culture. It is a pity that the countless historical works left by these civilizations can only be represented by few samples today due to earthquakes, wars and plunder. Especially, the samples of civil architecture are not efficiently preserved, and the historical neighborhoods and streets are replaced by ugly, un-aesthetical multi-story office buildings and apartments which do not reflect the traces of the past, in the name of modernization. However, it is ignored that future generations will need culture and that they will need to breathe the historical smell coming from the past to our time, for it is an unquestionable fact that a generation will undergo a big degeneration without knowing and learning its traditions, conventions, culture and history.

The aim of this study is to reveal the differences and general changes in the understanding of culture and urbanism between that of past and present. In the study, squares and streets of the city which are currently serving as

main axis and center of the city were evaluated and their favorable and unfavorable alterations tried to be criticized.

2. Material and method

2.1. Material

Erzurum city is in the northeast of East Anatolian Region. It is 25.066 km². It is located between 40° 15' and 42° 35' east longitudes and 40° 57' and 39° 10' north latitudes (Figure 1). According to the observations of 70 years, the coldest month average is -8.6 °C, and the hottest month average is 19.6 °C. The lowest temperature, -36 °C, was measured in January and the highest temperature, 35 °C, was measured in July. Annual rainfall is 453 mm. The number of days with snowfall is 50 and the duration of snow cover is 114 days (Anonymous, 2012a). Erzurum has a population of 395.472 people (Anonymous, 2012b). Although agriculture is the main source of living, the rapid development of winter tourism in the city which is located on a quite high altitude (1959 m) has made tourism a leading sector. As the city will host 2011 Universiade Winter Olympic Games, it is on a rapid change trend. Along with winter tourism, health and congress tourisms also occupy a significant place.

The material of the study consists of all historical monuments, samples of civilian architecture, social structures, squares, and streets within the boundaries of Erzurum Protected Urban Area. This area also forms the core of historical city and is a center defining the city and reflecting its identity and past.



Figure 1. The location of study area

2.2. Method

The positive and negative changes in the historical texture of Erzurum city in general were determined by comparing the differences between the past and present based on both old dated photographs obtained from different sources and the photographs we took during the field observations between 2003 and 2007 and on the updated photographs of the places where changes were met. We tried to observe the differences between eleven couples of the images belonging to streets, civil architecture examples and monumental structures, and taken approximately from the same angles and same perspectives and put forward the alterations in the entire city concretely. Fractal analyses theory provides a reliable base for understanding the different urban spaces. Fractal theory helps for understanding the open complex systems, while fractal geometry determines the complexity level of morphological differentiation and interrelation between space elements, evaluating its development process (Kaya, 2003). The old photographs were compiled from the archive of Cultural and Natural Heritages Protection Directory, internet, municipality, archive of governorship, relevant literature, Lieutenant Colonel Hakan Elginöz's personal archive and our own archive. In the subsequent stage, we visited the areas pictured in the photographs, and observed and examined the site. We interviewed the district headmen, old district dwellers one by one and evaluated the findings. Then we took photographs of the every square to be used in the study from the same angles.

Fractal values of the photographs tabulated in the form values of the old and new photographs. These values for the old and new photos of group are divided into 5 (very high, high, medium, low, very low) categories. The highest and lowest values were removed. The difference between the second highest and lowest values was divided into 5. The old and new photos were compared according to classification.

Fractal analysis is method which expresses one, two or three dimensioned spatial objects using fractional numbers instead of integer numbers like 1, 2 or 3. It is based on counting squares. View is processed in black and white in the program used. View is classed into two categories; black squares wholly covered by black objects (DB), black and white squares overlapping black object but not wholly covered by black object (DBW) and white squares not overlapping black object (DW). Basic view is prepared for the analysis in the form of black and white vectoral view. As the result of the analysis, fractal value is obtained with the graphic showing the distribution of fractal structure. As this value increases, form becomes complex, aesthetic value and organic structure and the rate of object in the space also increase. Different perspectives in urban analyses increase the site elaboration and visual quality and vice versa. In urban studies, features such as distribution of urban elements, comparison of urban and elements, density, urban complexity and aesthetic potential can be evaluated.

Graphics show the distribution of frequency for the determination of fractal values. Value selected and taken for the evaluation from these graphics belongs to black squares

(B) plus black-white squares (BW). Therefore, adjustment is performed using "B+BW" value shown by the sensitivity degree "0,001" and by correlation sensitivity degree "0,9".

3. Findings

In the study, past and present situations of the areas were compared considering the land-use properties and alterations. In order to determine the alterations, emphasis was given on the densely used areas and objects present in the historical core and carrying representative features. Alterations in the last image group were tabulated according to the previous ones.

In Figure 2a located at the corner linking Ali Ravi Street to Cumhuriyet Street, this place was a spot that had not been improved completely in 1930s yet. The streets were not opened and asphalted entirely. The old high building on the left is Government Hall. The mosque on the right is Lala Paşa Mosque, built in 1562. As it is seen in Figure 2b, taken in the same place in 2007, the Government Hall and the Mosque still stand. However, today the government hall is used as Judicial Court Hall. There is an underground car park still under construction along the street (Figure 2, Table 1).

The fractal analysis difference between the two pictures has shown a small decline from 1.526 to 1.495. As the linear value increases, the fractal analysis value increases as well. In previous studies, the increase in the linearity on the face of the buildings had been attributed to the increase in aesthetic value. In this photograph, the fractal value is seen to decrease as the aesthetic value declines.

Figure 3a, the dome in this picture, which is thought to belong to the early years of Republic, still stands. However, old structures collapsed. The dome in the Figure 3b is one of the monuments that still stand by restorations. However, it remains between the shopping centers at present. The street on which this monument is present is city's main axis and under dense use. New commercial centers were built demolishing the old structures. Restoration of the city is of course a positive approach whereas building ugly business offices around the dome is a negative attitude (Figure 3, Table 2).

The analysis of the two pictures shows that the fractal value declines from 1.826 to 1.527. This is therefore to show that the old structure of the setting displays a progress in terms of fading and corruption. Though the historical dome still preserves its existence, the traditional structures nearby have disappeared. This leads a decrease in fractal value and the aesthetic value changes in parallel to it.

Table 1. Alterations in the Old Governorship Office square

Stress type	Distorted urbanisation, false plantation, road, construction of parking lot
Stress degree	Very high
Field preservation	Absent
Structure preservation	Present
Perception	Low
Image alteration period range	Approximately 80 years



a) (Anonymous, 2012c), (Fractal value: 1,526) b) (Original, 2007), (Fractal value: 1,495)
Figure 2. Physical alterations in the Old Governorship Office square



a) (Anonymous, 1936), (Fractal value; 1,826) b) (Original, 2007), (Fractal value; 1,527)
Figure 3. Physical alterations in Cimcime Hatun Dome and its location

Table 2. Physical alterations in Cimcime Hatun Dome

Stress type	Distorted urbanization, road
Stress degree	High
Field preservation	Present
Structure preservation	Present
Perception	High
Image alteration period range	Approximately 85 years

Table 3. Physical alterations in Cumhuriyet Street

Stress type	Traffic
Stress degree	Middle
Field preservation	Present
Structure preservation	Present
Perception	High
Image alteration period range	Approximately 50 years

Figure 4a is thought to belong late 1960s. The dome on the left is partly destroyed. The mosque on the right is Ulucami, the oldest mosque of the city. The top of the minaret above the balcony is seen to have collapsed. In Figure 4b, due to the structures on both side of the street, the width was preserved exactly the same; however, the middle refuge was removed because of the intense traffic and constantly increasing vehicles. The part of the minaret above the balcony was restored. With later restorations, the structures were fixed and they gained their present conditions. The dome on the left was restored. There are new structures here in an increasing number but as is observed, this does not cause a negative change (Figure 4, Table 3).

Cumhuriyet Street is the location which constitutes the main axis of Erzurum city, shapes the development of the city and is the center. It is also the only trade center in the city in this scale. It is the representative of the city. It has undergone quite constructive developments and it has reached a desired level.

The fractal values of the photos show an increase from 1.254 to 1.638. This high difference between these values demonstrates significant changes in the configuration of the

setting. In addition, by approximating the traditional Turkish setting configuration value, which is 1.7 fractal value, it also expresses a progress. The ruined view of the historical structures in the first photograph can be shown as the reason why the fractal value yields low. The setting concept and aesthetic value was enhanced through restoration works; and this is the reason why the fractal value yields high.

Figure 5a is thought to have been taken in early 1900s, and reflects the traditional old urban tissue. The houses here have a traditional architecture with wide walls made of stone and earthen roofs fitting the climatic conditions. They are important actors of old city texture. The earthen roofs of these houses are the first representatives of today's roof gardens. The people in the city used the earthen roofs as terraces for years. The houses were planned in an adjacent order due to the climatic reasons and they were located along the narrow streets preserving the topography. In addition, the streams passing through the city were preserved in their natural state. In Figure 5b, which reveals the present situation of the area, it can be seen that the historical texture apart from tiny traces has been completely destroyed and the city has entered a degeneration trend through an unplanned structuring. As a result of irregular urbanization, we see that a city texture surrounded by shapeless, multi flatted and multi colored structures masking the historical elements, city identity and aesthetics is composed. There are few unchanged elements that we can see between the two photographs: bastion, graveyard and mountains (Figure 5, Table 4).

Although the fractal value of the traditional Turkish cities is determined to be 1.7, the result of the analysis indicates that the fractal value is high for both of the pictures. When the two photos are evaluated in isolation, instead of a planned setting, an improvisational setting system is observed in both photos. This structuring becomes

more haphazard and crowded in the second photo. This result is reflected in the fractal analysis as 1.923.

Figure 6a is thought to have been taken in 1940s, which belongs to historical core of the city representing the monumental and architectural characteristics of the city. In addition to monuments such as Çifte Minare Madrasa and Dome, Ulucami and Narmanlı Mosque, an urban tissue composed of single-story civilian architecture samples with earthen roofs can be seen. As can be seen in the image, new structures take their places in the traditional texture as well. In Figure 6b, a section from historical core of the present situation of the city is seen. Traditional houses have completely been replaced with roads and new structures. The rest are merely the monumental structures.

As in the entire city, the samples of traditional civilian architecture have been demolished in this area, too, and the trend continues. In fact, according to the "World Regulation on Protecting Cultural and Natural Wealth", the Works bearing the value of cultural heritage must be protected by international societies in cooperation. Especially when the whole city is observed, we see that the historical texture is

not protected as it should be. In fact the development areas of the city are not limited and the transportation net is quite developed; however, new housing areas are not utilized. The city silhouette is even on a second change process following the first (Figure 6, Table 5).

The fractal value between the two photographs shows a significant decrease and this also indicates a significant decrease in compactness, as well. Unlike those in the up-to-date photograph, apart from narrow streets, there is comparatively a compact setting order in the old photograph. In the up-to-date photograph, wide streets and the spaces caused by destroyed old buildings through time give rise to the decrease in compactness and fractal value.

Table 4. Physical alterations in Cedit Neighborhood

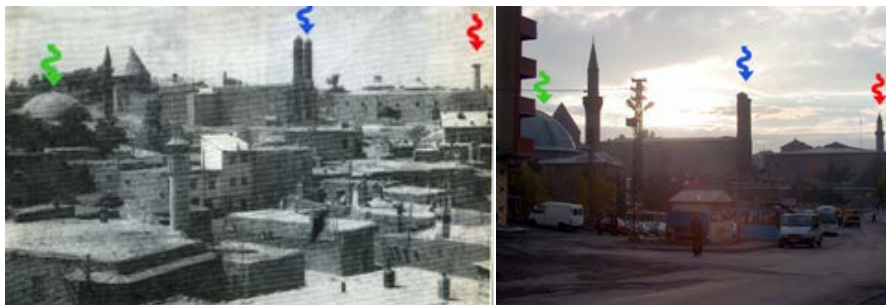
Stress type	Distorted urbanisation
Stress degree	Very high
Field preservation	Absent
Structure preservation	Absent
Perception	Absent
Image alteration period range	Approximately 100 years



a) (Anonymous, 2007), (Fractal value:1,254) b) (Original, 2007), (Fractal value: 1,638)
Figure 4. Physical alterations in Cumhuriyet Street and its location



a) (Elginöz, 2007), (Fractal value: 1,890) b) (Original, 2007), (Fractal value: 1,923)
Figure 5. Physical alterations in Cedit Neighborhood and its location



a) (Anonymous, 1936), (Fractal value: 1,874) b) (Original, 2007), (Fractal value: 1,102)
Figure 6. Physical alterations in Tebriz Kapı Neighborhood and its location

The structural compactness is pretty high in both photographs. On the other hand, though there is not much difference between the two photos, the biggest change is observed in the height of the buildings. This leads close fractal values between the two photos. The reason why the fractal value of the first photograph is comparatively a bit higher can be interpreted as it is much more harmonious and aesthetic.

Erzurum has an important place in gold workmanship with respect to its artistic creation and trade for a long time. Figure 7a is thought to have been taken in 1930s. It belongs to Stone Shops Street known as the place where golden products were exhibited and sold. The Stone Shops seen on the Figure 7b have not been preserved today. Either they were replaced with new buildings or new flats were built on them removing their old characteristics.

Protecting the cultural wealth is not only important for the people and societies using them but also vital for the future of the people of the world. While the Stone Shops Street, attracting us with its different texture until late 1900s is a component that could have added much to the city with respect to its aesthetic, cultural and recreational features and it could have contributed to city tourism and therefore boosted the economy if it had been preserved with its old features, today it is almost impossible to perceive this artistic value even from some of the spots of the city (Figure 7, Table 6).

In Figure 8a, which belongs to recent years, small shops constructed on the castle walls and their locations are seen. These irregularly built shops influence the castle walls negatively and they cover the scenery to a great extent.

These shops, covering the walls completely, were demolished; therefore, the walls can be seen today (Figure 8b). They were restored. However, the restoration around the walls still continues.

The restoration and cleaning has been an important progress since it has let the oldest historical structure of the city, the castle and its walls appear. However, the area should be prevented from irregular structuring, because more positive progresses and efforts and arrangements regarding recreational needs should be increased (Figure 8, Table 7).

A big difference emerges between the two photographs in terms of fractal values. The fractal value of the old photo yields a higher value compared to its new version. The reason of this difference stems from the fact that most of the buildings in the old photo do not exist or they have been destroyed when the new photo has been taken. Though the new state of the site has become plain, its old state is rather dense and complex. The old structures were removed to make the front side of the castle walls plain and put the walls into sight. When the application is compared to the fractal values, it can be said to be successful.

Table 5. Physical alterations in Tebriz Kapı Neighborhood

Stress type	Distorted urbanization, traffic density
Stress degree	Very high
Field preservation	Absent
Structure preservation	Partly
Perception	High
Image alteration period range	Approximately 70 years

Table 6. Physical alterations in Taşmağazalar Neighborhood

Stress type	Distorted urbanization, traffic density
Stress degree	Very high
Field preservation	Absent
Structure preservation	Absent
Perception	Very low
Image alteration period range	Approximately 70 years



a) (Elginöz, 2007), (Fractal value: 1,87)

b) (Original, 2007), (Fractal value: 1,844)

Figure 7. Physical alterations in Taşmağazalar Neighborhood and its location



a) (Anonymous, 2006), (Fractal value: 1,717)

b) (Original, 2007), (Fractal value: 1,412)

Figure 8. Physical alterations on the Inner Castle walls and its location

The passage seen in Figure 9a shows the characteristics of a quite beautiful spot displaying the traditional structure of the city, where there are some small shops. Today some of the old structures around this street were demolished and the ones seen in Figure 9b are in the list of structures to be demolished.

While the traditional street characteristics is preserved in the photograph on the left taken from Erzurum Castle Street, it is seen that most of this area has been demolished in later constructions and it is still being demolished. This type of traditional street structures displaying the city culture are no longer met. It stems from a big change in traditional city texture and urbanization concept. It is one of the most outstanding indicators proving that the street textures reflecting the city culture are on an extinction trend (Figure 9, Table 8).

There is a big difference between the fractal values of the two photographs; and this implies that there are considerable differences in the settings between the times when the two photographs were taken. Despite the change is not visually significant, the high difference in the fractal value indicates that the structure of the setting has shown a progress today and in the past within a socio-cultural and physical interaction independent of each other. In addition, that the fractal value indicates a change to a great extent and in an increasing trend implies an unplanned change pattern in the setting.

Çifte Minare Madrasa is at the junction of Tebrizkapı Street and Cumhuriyet Street. It is the symbol of Erzurum and the biggest Madrasa of Anatolia. It is considered to have been built in the late 13th century since it does not have an epigraph. The shops next to the castle walls near the Madrasa were demolished two years ago.

After the old shops had been demolished, the castle walls were restored and the front side was opened

completely. However, today new shopping centers have been built in the same place by the municipality, the aim of which is not understood (Figure 10, Table 9).

These shopping centers were built identical to their originals. They reflect all the characteristics of old shops and they are more aesthetic and compatible with the historical texture. It would have been possible to obtain positive outcomes if they had been placed in a more appropriate location of the historical texture. However, the castle walls and front side of the Madrasa is again covered with new structures.

The fractal values of the two photographs are rather low; however, the value of the old photo is comparatively higher. The removal of the electric post, the tree seen in the old photo and the restoration of the in-harmonious shops in front of the historical structure cause the setting in the second photo to become plain and the value to decrease. The setting in the old photo is much more in-harmonious and denser in comparison to its new state.

Table 7. Physical alterations on the Inner Castle walls

Stress type	Absent
Stress degree	Low
Field preservation	Present
Structure preservation	Present
Perception	Very high
Image alteration period range	Approximately 70 years

Table 8. Physical alterations in the passage between Cumhuriyet Street and the city Castle

Stress type	Distorted urbanization
Stress degree	High
Field preservation	Absent
Structure preservation	Absent
Perception	Middle
Image alteration period range	Approximately 5 years



a) (Anonymous, 2006), (Fractal value: 1,445)

b) (Original, 2007), (Fractal value: 1,682)

Figure 9. Physical alterations in the passage between Cumhuriyet Street and the city Castle and its location



a) (Anonymous, 2006), (Fractal value: 1,34)

b) (Original, 2007), (Fractal value: 1)

Figure 10. Physical alterations in the close proximity of Double Minaret Medrese and its location

Figure 11a belongs to 1970s. We can see the inner walls of the castle, the clock tower, a fountain and a sample of traditional civilian architecture just next to the fountain. Today, the walls of the castle, the clock tower and the fountain still stand (Figure 11b). However, the house, one of samples of the traditional architecture, was demolished in order to widen the street.

The castle, the clock tower and the fountain are public buildings. They are registered and protected by the government. Therefore they have succeeded to stand though the architectural structure near them is demolished. This is an important sample proving that cultural and structural transfer is possible through a protection and handling balance (Figure 11, Table 10).

The fractal values of the two photographs are high; however, the value of the old photo is comparatively higher than that of the new photo. The structure in the old photo and the density it causes lead this result. In the new photo of the setting, this building does not exist as it has been removed. This decreases the fractal value by making the setting plain.

We can see one of the most beautiful samples of traditional residence structure in this image, which belongs to 2000s (Figure 12a). The owners deserted the house long time ago. The spot is located in an area which is densely filled with the historical texture. Image (Figure 12b) belongs to 2007. The house on the left was demolished and it was reproduced in the same traditional architecture. The building intended to be a restaurant is still under construction (Figure 12, Table 11).

This is an important sample in revealing a misconception that a historical structure can be demolished and it can be reproduced using modern equipment and techniques instead of restoring it and that new version can replace the original.

The fractal value of the old dated photo is higher than that of the new dated photo. The ragged and deserted state of the old house in the old photo and the density of the setting cause this difference. On the other hand, the old structure has been restored and its surroundings have become plain in the new dated photo; and this has caused the fractal value to decrease.

The old and new photos are classified according to categories within the range of fractal values (Table 12, 13).

All data are tabulated for comparison (Table 14). Fractal values of old and new photos of some location are consistent. The values of some photos are different. This difference is not the change in location. The difference is the aesthetic and density. Assessment was made according to increasing and decreasing or no change of aesthetic impact. The aesthetic factor is not a reduction or increase in locations 1, 4, 9, 10 and 11. It is reduction in 2, 5 and 7 locations and increase in 3 and 8 locations.

Table 9. Physical alterations in the close proximity of Double Minaret Medrese

Stress type	Traffic density, faulty planning
Stress degree	High
Field preservation	Low
Structure preservation	High
Perception	Middle
Image alteration period range	Approximately 5 years

Table 10. Physical alterations on the southern walls of the city castle

Stress type	Traffic density, faulty planning
Stress degree	High
Field preservation	Low
Structure preservation	High
Perception	Middle
Image alteration period range	Approximately 5 years



a) (Anonymous, 2006), (Fractal value: 1,876) b) (Original, 2007), (Fractal value: 1,745)
Figure 11. Physical alterations on the southern walls of the city castle and its location



a) (Yeşil, 2003), (Fractal value: 1,694) b) (Original, 2007), (Fractal value: 1,478)
Figure 12. Physical alterations in the Tebrizkapı Street and its location

Table 11. Physical alterations in the Tebrizkapı Street

Stress type	Traffic density, inconvenient restoration
Stress degree	Very high
Field preservation	High
Structure preservation	Absent
Perception	High
Image alteration period range	Approximately 5 years

Table 12. The classification for fractal values of new photos

A (New)	
Range of Fractal Value	Description
< 1,340	Very Low
1,341 – 1,519	Low
1,520 – 1,699	Medium
1,700 – 1,879	High
1,880 <	Very High

Table 13. The classification for fractal values of old photos

B (Old)	
Range of Fractal Value	Description
< 1,102	Very Low
1,103 – 1,350	Low
1,351 – 1,598	Medium
1,599 – 1,846	High
1,847 <	Very High

Table 14. Fractal values of photos

Comparison	A (Old)		B (New)	
1	1,526	Medium	1,495	Medium
2	1,826	High	1,527	Medium
3	1,254	Very Low	1,638	High
4	1,898	Very High	1,923	Very High
5	1,874	High	1,102	Very Low
6	1,870	High	1,844	High
7	1,717	High	1,412	Medium
8	1,445	Low	1,682	High
9	1,340	Very Low	1,00	Very Low
10	1,876	High	1,745	High
11	1,694	Medium	1,478	Medium

4. Conclusion

There are different between fractal values of two photos groups that old and new photos. Fractal values have increased in 3 of the old photos and 2 of the new photos. The values haven't changed in 6 of the photos. As 2, 5 and 7 number of the old photos are aesthetic and detailed, the fractal values have increased. As 3 and 8 number of the new photos are complex, the fractal values have increased. As the others are balanced it's details and complex structures, the fractal values haven't changed. There are aesthetic different between the photos as visual.

It has decreased the aesthetic and the harmony of the new photos and has increased the complexity of the new photos in comparison with the old photos. The harmony and the aesthetic in the old photos have provided with kind of the structural material, similar structure kind and simple urban structure. Using of the different material, different structure style and complex urban structure have provided to be poor as harmony and aesthetic of the new urban.

Factors such as population growth, the progress of new urbanization concepts and modernization play an important role in the change of the cities. This necessity of change and progress, which distinguishes city from countryside and is also demanded by dwellers of a city in the name of keeping up with the requisites of the age, is an undeniable and irresistible reality.

As is the case in the samples in all over the world, the cities of our country undergo a rapid change process. Erzurum city entered this trend after the declaration of Republic like almost all other cities in Turkey. The city underwent an intensive restoration activity as far as the war ended.

Turkey has a deep historical past. A number of civilizations were emerged on the country and each of these civilizations traced its effects on Turkish cities. Cities have witnessed great changes in time such as functions, aesthetics, historical tissue and structures. In some of these cities, the size of changes was larger and deeper while in others traditional urban tissue was fully conserved. Most important examples for them are the cities such as Afyon, Bursa, Kayseri, Safranbolu and Amasya where the traditional tissue was conserved by restoring. However, because Turkey is a rapidly developing and changing country, urban structure in its cities is also facing transformations.

While these changes were on the process, the structures reflecting the history and the culture of the city were destroyed one after another by unconscious or malicious hands. Most of the structures influenced from this destruction were traditional residences and streets. The monumental structures were restored and therefore they reached our time in a protection and handling balance whereas private residences were destroyed one by one.

When we compare today's structures, which seem more modern and more practical, with the old ones, we see that they continue to cover the city day by day by removing the traditional texture. The demand to keep up with the age is a must. However this progress, which exposes the historical texture to the danger of extinction, is an unacceptable state.

The main objective of planning of every stone or meter square bearing the value of cultural heritage should be protecting and keeping the values alive by using them. Especially the local governments should consider the case as cultural values and attributes more than motivation to obtain profit and they should also bear aesthetic worries. When the cultural values are evaluated with a view point from particular to general considering the integrity principle, not only will a remnant be saved but also every object giving life to that area will maintain its presence with the value it deserves. Therefore the heritage will be transferred to its owners.

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