Measuring Architecture and Urban Fabric: The Case of the İMÇ and the SSK Complexes

Mario Lodeweik Lionar[1], Özgür Ediz [2]

ORCID NO: 0000-0002-6125-400X[1], 0000-0002-0486-8806[2]

[1] Bursa Uludağ University, Faculty of Architecture, Department of Architecture, Bursa, Turkey
[2] Bursa Uludağ University, Faculty of Architecture, Department of Architecture, Bursa, Turkey

Located in the District of Zeyrek in Istanbul, Turkey, the İstanbul Manifaturacılar Çarşısı (İMÇ) or Manifaturacılar Retail Center İstanbul by Doğan Tekeli, Sami Sisa, and Metin Hepgüler, and the Sosyal Sigortalar Kurumu (SSK) or Social Security Agency Complex by Sedad Hakkı Eldem are regarded as two of the most prime examples representing the major shift in the development of Turkish contemporary architecture in the 1960s. As opposed to the trend of single monolithic buildings characterizing the previous era of International Style, these two complexes offered a new formal approach in which new, large building complexes were articulated into smaller fragments. Dubbed as the "small, multipart approach", this strategy was—and is—perceived as an appropriate strategy to generate new type of architecture considered more sensitive and respectful to the smaller urban fabric of the older, traditional Turkish neighborhood as the historical context. This paper measures this very relationship between architecture and urban fabric by utilizing fractal dimension analysis to calculate the visual complexities of the İMÇ and the SSK Complexes and the urban fabric of District of Zeyrek adjacent to these two complexes, represented in the form of block plan drawings, in a comparative manner. Thus, it is possible to evaluate the formal relationship between these two complexes and the surrounding urban fabric in terms of the visual complexities in a mathematically measurable manner.

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Corresponding Author:
mario.lionar@gmail.com

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Mimari ve Kentsel Dokuyu Ölçmek: İMÇ ve SSK Kompleksleri Örneği

Mario Lodeweik Lionar[1], Özgür Ediz [2]

ORCID NO: 0000-0002-6125-400X[1], 0000-0002-0486-8806[2]

[1] Bursa Uludağ Üniversitesi, Mimarlık Fakültesi, Mimarlık Bölümü, Bursa, Türkiye
[2] Bursa Uludağ Üniversitesi, Mimarlık Fakültesi, Mimarlık Bölümü, Bursa, Türkiye

İstanbul'un Zeyrek bölgesi'nde yer alan; Doğan Tekeli, Sami Sisa, ve Metin Hepgüler'in tasarlamış olduğu İstanbul Manifaturacılar Çarşısı (İMÇ) ve Sedad Hakkı Eldem'in tasarladığı Sosyal Sigortalar Kurumu (SSK) Kompleksleri, 1960'larda Türk çağdaş mimarlığının gelişiminde yaşanan büyük değişimi temsil eden en önemli örneklerin arasında yer aldıkları kabul edilmektedir. Uluslararası Tarzın önceki dönemini karakterize eden tek-monolitik bina eğiliminin aksine, bu iki kompleks, yeni, büyük-anıtsal bina komplekslerinin daha küçük parçalar halinde eklemlendiği yeni bir biçimsel yaklaşım sunmuştur. Bu yaklaşım, tarihsel bağlam olarak eski, geleneksel Türk mahallelerinin daha küçük ölçekteki kentsel dokusuna duyarlı ve içinde çeşitli mimari hassasiyetleri barındıran yeni bir mimari yaklaşımı oluşturmak amaçlı uygun bir strateji olarak algılanmaktadır. Bu makale, İMÇ ve SSK Komplekslerinin görsel karmaşıklıklarını ve yakın çevrelerindeki Zeyrek Mahallesi'nin özgün kentsel dokusunu karşılaştırmalı olarak "fraktal boyut analiz yöntemini" kullanarak ölçmeyi hedeflemektedir. Bu analiz kapsamında bahsi geçen iki farklı mimari kurgu ve mevcut yerleşimin kentsel dokusu, yerleşim planı ölçeğinde ve mimari kurguyu oluşturan "Euclidyen plan çizimleri" şeklinde ifade edilmiştir. Böylelikle çalışma kapsamında; SSK ve İMÇ kompleksleri ile bulundukları kentsel oluşum arasındaki biçimsel ilişkiyi, "planimetrik görsel karmaşıklık ve süreklilik" açısından ele alarak, sayısal olarak ölçmek ve sonrasında ortaya çıkan sonuçlar ışığında yeniden tartışabilmek mümkün olmuştur.

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mario.lionar@gmail.com

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Anahtar Kelimeler: Doğan Tekeli-Sami Sisa-Metin Hepgüler, Kentsel doku üzerinde fraktal boyut analizi, İMÇ Kompleksi, Sedad Hakkı Eldem, SSK Kompleksi

1. INTRODUCTION

Located in the District of Zeyrek in Istanbul, Turkey, facing each other with the Atatürk Boulevard in between, the İstanbul Manifaturacılar Çarşısı (İMÇ) or Manifaturacılar Retail Center İstanbul and the Sosyal Sigortalar Kurumu (SSK) or Social Security Agency Complexes are among the most representative specimens reflecting the major shift in the development of architecture in 1960s' Turkey. As a response of the immense monolithic buildings of the International Style which characterized the previous era, these two architectural works offered a new formal approach in which relatively large buildings are articulated into a number of moderate-sized masses; thus, the newer and larger buildings might be blended into the small-scale urban fabric of the older traditional Turkish neighborhood. Both the İMÇ and SSK Complexes are considered successful in this sense, perceived by many as respectful, sensitive, and in a well manner responsive to the old, historical surroundings (Alsaç, 1973; Yücel, 1983; Kuban, 1985; Bozdoğan et al., 1987; Tanyeli, 1994; Tanyeli, 2001; Bozdoğan & Akcan, 2012; Özbil, 2014). However, beside few certain exceptions (Ediz, et al., 2011; Lionar 1 & Ediz, 2020), such claims are generally never tested in mathematically measurable manner. The present paper proposes fractal dimension analysis to quantitatively measure the İMÇ and the SSK Complexes in comparison to the surrounding urban fabric.

Fractal dimension is a mathematical measurement of two- and three-dimensional geometric object's visual complexity (density of visual info). First proposed by Benoit Mandelbrot (1982) and later by Richard Voss (1986), fractal dimension analysis is currently developed as an alternative analytical method in architecture (Ediz & Ostwald, 2012; Burkle-Elizondo et al., 2014) and urban scale (Qin, et al., 2015; İlhan & Ediz, 2019) as well as a tool for computational design (Ediz & Çağdaş, 2007; Sedrez & Pereira, 2012).

This paper starts with general descriptions of the İMÇ and SSK Complexes and the historical context of architectural development in Turkey at the time these two complexes were realized. A brief overview of fractal dimension analysis is then presented. Thereafter, the results of the calculations of the complexes and the surroundings are presented, finalized by the analysis and interpretive discussions.

While respecting the historical and cultural importance of the works, the scope of the paper is restricted to the mathematically measurable aspect of the İMÇ and SSK Complexes and the adjacent neighborhood. More specifically, since the objective of this study is to measure the architecture in comparison with the *urban fabric* of the surroundings, the analysis is focused only on the two-dimensional planimetric representation; namely, the block plans of both the architecture and the urban fabric. Thus, other aspects such as elevational properties are beyond the scope of this study. This is explained further in the Methodological Concerns section.

2. THE İMÇ AND SSK COMPLEXES

During the 1960s, Turkey experienced a major shift in the development of the republic's architecture. The beginning of the decade was marked by the architects' growing dissatisfaction with the previous mainstream tendency to follow the International Style, which was based on the notion that the Western modernization was the universal and all-encompassing paradigm. Indeed, the 1950s and early 1960s witnessed the birth of some of the prime examples of International Style-inspired architecture in Turkey, such as the Istanbul Hilton Hotel by SOM and Sedad Hakkı Eldem (1952–53) and the Istanbul Municipality Building by Nevzat Erol (1953). These buildings are characterized by the pristinely geometric, prismatic, monolithic forms, contrasted to the intricate urban fabric of vernacular Turkish neighborhood.

It was this stark, and for some observers intrusive, formal contrast between such new buildings and their older surrounding environment which became one of the sources of the newer generation of architects' dissatisfaction during the 1960s. As a response to the monolithic slab of International Style, a new formal strategy, dubbed "small, multipart approach" (Akcan, 2016), was born. This approach dictated that the functional requirements of a building should be accommodated in a series of moderately sized, relatively small fragments of masses instead of a single large volume; in other words, the "fragmentation" of the prism (Gürel, 2016: 4). Such a formal strategy was perceived as more dynamic, more flexible, and in terms of scale, more human. Furthermore, this approach enabled new projects of considerably large scale to blend more comfortably into the relatively small-scaled urban

fabric of the older neighborhood of the city. Thus, the “small, multipart approach” was also considered a potential alternative to generate a new kind of architecture that is more context-sensitive and responsive, particularly in significantly historical settings. Both the complexes discussed in this paper are prime examples in demonstrating this advantage of the approach.

Designed by Doğan Tekeli, Sami Sisa, and Metin Hepgüler, the İstanbul Manifaturacılar Çarşısı (İMÇ) or Manifaturacılar Retail Center İstanbul (1959) was a product of a design competition for a large-sized market retail complex. Facing the Atatürk Boulevard to the west, the İMÇ Complex is located in the District of Zeyrek, on the skirt of a hill upon which the Süleymaniye Mosque is located. According to the architects (Tekeli et al., 1960; translation was provided by the authors), the whole complex was “broken into numerous building masses”, which forming “a dynamic composition constructed by multiple dynamic parts”; furthermore, these parts were “designed as small as possible to reflect the characteristics of historical urban districts”. Meanwhile, located right across the İMÇ Complex, on the other side of the Atatürk Boulevard, the Sosyal Sigortalar Kurumu (SSK) or the Social Security Agency Complex (1962–64) is one of the most celebrated works of architect Sedad Hakkı Eldem and granted Aga Khan Award for architecture in 1986 for the effort to visually connect with the original fabric of vernacular Turkish houses in the district. Although it is much smaller than the İMÇ Complex, the SSK Complex, being an office compound, was also designed as a number of building masses vary yet moderate in sizes. Eldem himself (1970) stated that, in an effort of the architect “not to lose the intimate character of the historical site”, the masses of the buildings were “designed as small and low as possible” and that “care has been taken to a great extent to preserve the dimensions and proportions of the building masses” (Eldem, 1971; translation was provided by the authors). These statement of the architects serve as testaments that the two complexes were indeed designed to be as respectful and sensitive as possible to the scale of urban fabric of the historical context, by adopting the “small, multipart approach” particularly in articulating the building masses of the complexes. It is precisely this notion that is evaluated mathematically in this study using the fractal dimension analysis.

3. RESEARCH METHOD: FRACTAL DIMENSION ANALYSIS

Fractal dimension is a tool for measuring visual complexity. Instead of an integer (1, 2, or 3), a fractal dimension takes form of a fraction, with the decimal value is directly proportional to the complexity of the measured object. For example, a fractal dimension of 1.10 indicates a relatively low visual complexity in a 2-dimensional object, whereas a value of 2.80 indicates a relatively high complexity in a 3-dimensional object. Most commonly, fractal dimension is measured using box-counting method, which was proposed by Mandelbrot (1982), although Richard Voss (1986) is the one credited with the first use. There are numerous examples of the utilization of fractal dimension analysis in architecture, be it for the objective of analysis (Rian, et al., 2007; Ostwald & Ediz, 2015) or design (Ediz, 2009; Sakai, et al., 2012). The use of fractal dimension analysis to evaluate the relationship between architecture and the surrounding context, as in this paper, was pioneered by Bechhoefer and Bovill (1994), in which comparative analysis was conducted upon the houses in Amasya, Turkey, and the natural surroundings; this study was later revisited by Lorenz (2003) and Vaughan and Ostwald (2009). The comparative analysis on the elevational properties of the SSK Complex and District of Zeyrek as the built-environment context was conducted as a part in the work of Ediz, et al. (2011) and later revisited using a developed methodological application by Lionar and Ediz (2020).

3.1 Representational Concerns

As previously mentioned, in this study, only the two-dimensional planimetric representations were measured; or, in other words, only the block plans. Part of the reason is that the focus of the study is evaluating the relationship between the architecture and the urban fabric of the surrounding, which is best represented in the block plans. Yet the other reason is that, in terms of the relationship with the surroundings, the block plans is likely the only possible valid comparison between the İMÇ and SSK Complexes. It is true that the architects of both complexes provided two types of drawing depicting their design in the context: block plans and principal elevation drawings. However, while the block plans are relatively similar in representative manner, the elevation drawings are different.

Eldem depicted the "contextual elevation" of part of the District of Zeyrek on the west of the Atatürk Boulevard in a considerably detailed manner, almost as detailed as the depiction of the principal elevation of the SSK Complex. This, along with his description of the project, suggests that Eldem designed the complex as a mimetic response to the surroundings not only in terms of mass articulation but also in terms of more detailed elevational aspects, such as architectural components and materials. Meanwhile, the principal "contextual" elevation drawing of the İMÇ Complex depicts the surroundings in a more loose, more abstract manner. The Süleymaniye Mosque in the utmost back is rendered more artistically than technical, and part of the District of Zeyrek on the east of the Atatürk Boulevard adjacent to the complex is depicted almost totally impressionistically. While this lesser degree of detail may be caused of the complex's large size (thus preventing the depiction of more delicate visual components), it possibly also suggest that, while the architects did take the small scale of the urban fabric of the surroundings as a mimetic inspiration for the mass articulation, they decided not to mimic the more detailed elevational characteristics of the neighborhood, at least not in the same manner as Eldem's. Therefore, while it is reasonable to conduct analysis on the elevational properties of the SSK Complex and the surroundings, this type of analysis may not be suitable for the case of the İMÇ Complex, although it is still possible to be carried out in the future. Nevertheless, this paper thus focuses on planimetric representation: the block plans.

3.2 Image Preparations

For this study, the authors used AutoDesk AutoCAD 2018 to digitally retrace of a number of images. The block plan of the İMÇ Complex (Figure 1) was redrawn based on the drawings in the article by Tekeli, et al. (1960) titled *İstanbul Manifaturacilar Çarşisi Proje Müsabakasi* (*Design Competition for Manifaturacılar Retail Center Istanbul*). The block plan of the SSK Complex (Figure 2) was redrawn based on the drawings in unpublished manuscript written by Eldem (1970) titled *Social Security Complex Zeyrek Istanbul*. The contextual block plan depicting the complexes together with the surroundings was produced based on a drawing by Eldem (1970) in the same manuscript, which was considered most appropriate for this study. This drawing depicts both the İMÇ and SSK Complexes, positioned nearly in the center of the

frame and surrounded by the urban fabric of the District of Zeyrek as it was in the 1960s in all sides in a balanced manner, thus representing both the complexes in relation with the context in a proportionate sense. For this study, two versions of the contextual block plan were calculated. In the first one (Figure 3), the urban fabric of the District of Zeyrek is depicted without the İMÇ and SSK Complexes, while in the second one (Figure 4) the two complexes are present.

Following the principle for architectural fractal dimension analysis, only the concrete and physical architectural elements are represented in lines. Since this study is comparative in nature, the block plan drawings used in this study are depicted in a similar manner and similar degree of complexity, with the lines representing the most outer footprint of the buildings and, for the bigger building blocks consisted of multiple masses, the differentiation of those masses (as is most apparent in the block plans of both the İMÇ and SSK Complexes). The images then must be finalized according to certain parameters (Foroutan-Pour, et al., 1999; Ostwald & Vaughan, 2013) summarized in Table 1.

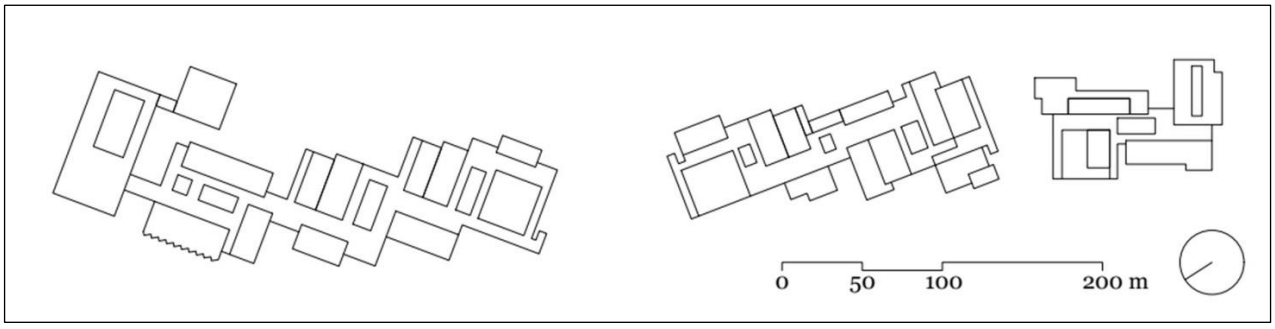

Figure 1: The block plan of the İMÇ Complex.

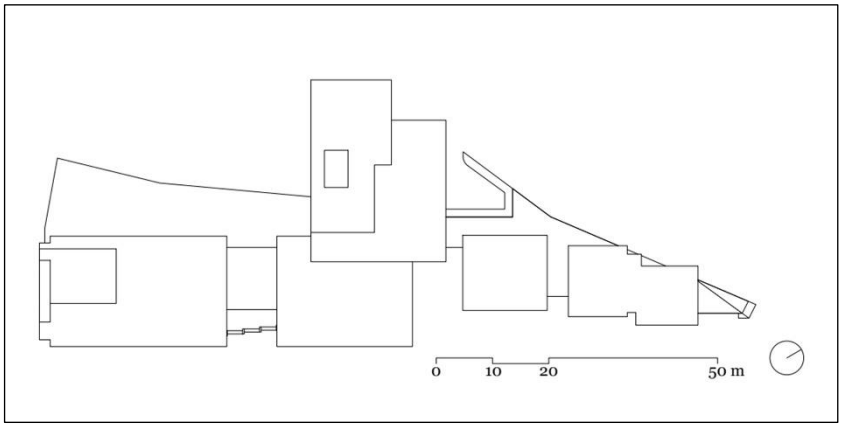

Figure 2: The block plan of the SSK Complex.

Figure 3: The urban fabric of the District of Zeyrek without the İMÇ and the SSK Complexes.

Figure 4: The urban fabric of the District of Zeyrek with the İMÇ and the SSK Complex.

3.3 Fractal Dimension Calculations

To measure fractal dimension, this study utilized the box-counting method, which is commonly appraised as the most reliable and accurate (Ostwald & Vaughan, 2016: 12). According to the box-counting method, a series of grids containing boxes are super-imposed over the drawings, and the boxes containing parts of the drawings are counted. In each of the successive grids, the boxes' sizes are diminished according to the *scaling coefficient* (SC); this study using the SC of √2, or approximately 1.4142. Thus, all the grids contain different numbers of boxes and consequently *the numbers of boxes intersecting the drawing* (N#, in which # = the #th iteration) differ as well. Following the suggestion (Ostwald & Vaughan, 2016: 40–41) about the ideal number of iterations, this process was repeated ten times (Figure 5). Thereafter, *the approximate fractal dimension* (D#) is calculated using Equation 1:

$$D\# = \frac{[(\log(N\#+1) - \log(N\#)]}{\log(SC)} \quad (1)$$

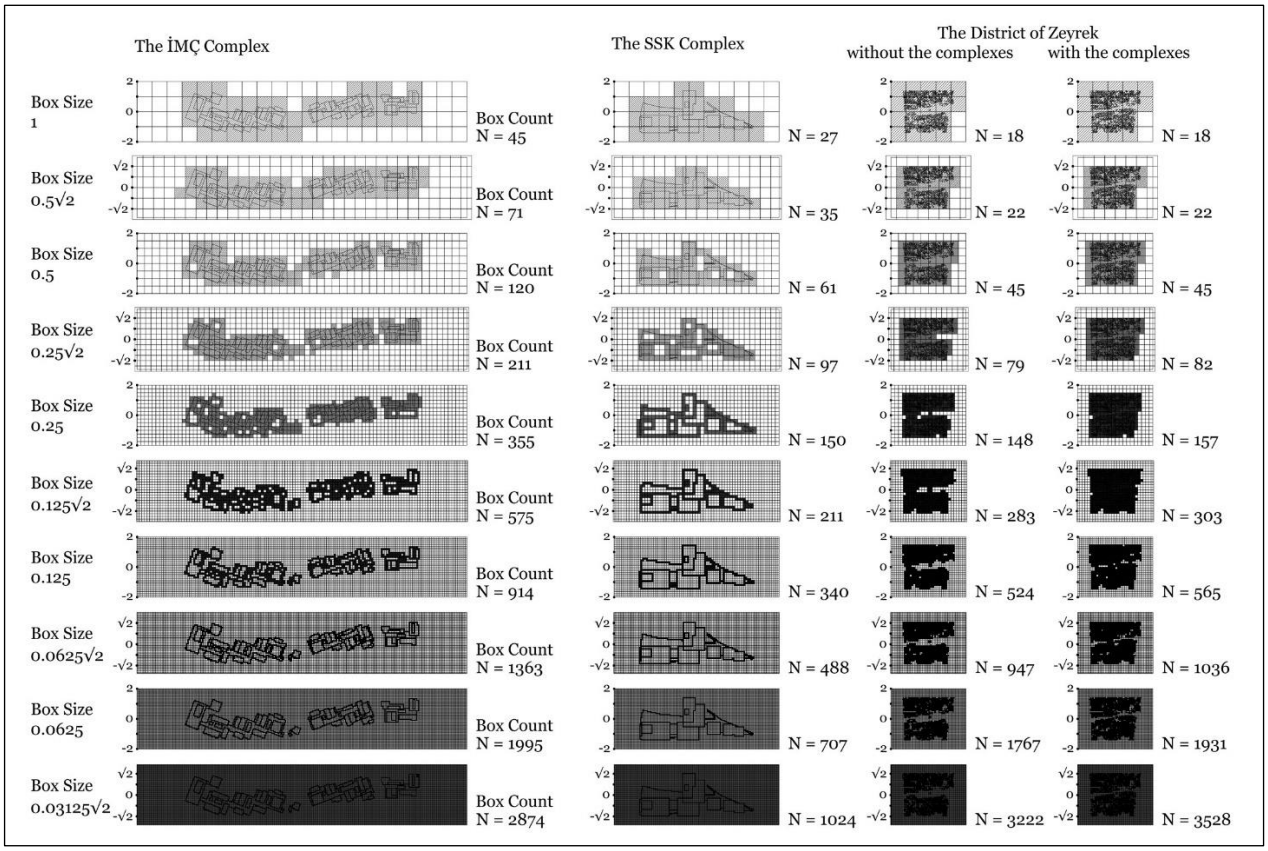

Figure 5: Box-counting process.

Stage	Variable	Setting	Notes
Image Preparations	White space	50/50	The dimension of the field was established by enlarging the rectangular outline of the image by the scale of √2, or approximately 1.4142, thus producing the ratio of 50/50 between the image area and the area surrounding the image (white space)
	Image position	Center-center	The image was positioned at the center of the field
Fractal Dimension Calculations	Scaling coefficient (SC)	√2:1	The ratio by which successive grids are diminished in size
	Grid disposition (GD)	Centre-growth	The grids were generated from the center of the image
	Grid iteration	10	The number of grids
	Starting grid size	0.25 l	The boxes' size in the first grid was determined by dividing the shortest dimension of the field by four

Table 1: Methodological settings and variables.

The final fractal dimension (D) is calculated as the mean value of D# values. The methodological variables and settings for the fractal dimension calculations are resumed in Table 1. Several publications (Lorenz, 2003; Ostwald & Ediz, 2015; Ostwald & Vaughan, 2016) have described these variables and settings in more details. For this study, a set of four images were analyzed, and a total of 40 grid comparisons were calculated, recording over 26000 data points.

4. RESULTS AND DISCUSSIONS

Four fractal dimension values (D) of the block plan drawings were produced: the İMÇ Complex (D_i), the SSK Complex (D_S), and the District of Zeyrek without the two complexes (D_Z) as well as with the two complexes present ($D_{Z'}$). Six difference values (Diff) between the fractal dimensions were calculated as well: between the İMÇ and the SSK Complexes ($Diff_{i/S}$), between the İMÇ Complex and the District of Zeyrek without the two complexes ($Diff_{i/Z}$), between the SSK Complex and the District of Zeyrek without the two complexes ($Diff_{S/Z}$), between the İMÇ

Complex and the District of Zeyrek with the two complexes present ($Diff_{i/Z'}$), between the SSK Complex and the District of Zeyrek without the two complexes ($Diff_{s/Z'}$), and between the two fractal dimensions of the District of Zeyrek, without and with the presence of the two complexes ($Diff_{Z/Z'}$). These results are summarized in Table 2.

Settings		The İMÇ Complex	The SSK Complex	The District of Zeyrek	
				without the complexes	with the complexes
Grid	Box Size	Box Count	Box Count	Box Count	Box Count
1	1	45	27	18	18
2	1/2√2	71	35	22	22
3	0.5	120	61	45	45
4	0.25√2	211	97	79	82
5	0.25	355	150	148	157
6	0.125√2	575	221	283	303
7	0.125	914	340	524	565
8	0.0625√2	1363	488	947	1036
9	0.0625	1995	707	1767	1931
10	0.03125√2	2874	1024	3222	3528
Fractal Dimension (D)		**D_i 1.333**	**D_s 1.166**	**D_Z 1.663**	**$D_{Z'}$ 1.692**
Differences (Diff)		The İMÇ Complex / The SSK Complex			**$Diff_{i/s}$ 16.7%**
		The İMÇ Complex / The District of Zeyrek without the complexes			**$Diff_{i/z}$ 33.0%**
		The SSK Complex / The District of Zeyrek without the complexes			**$Diff_{s/z}$ 49.7%**
		The İMÇ Complex / The District of Zeyrek with the complexes			**$Diff_{i/Z'}$ 35.9%**
		The SSK Complex / The District of Zeyrek with the complexes			**$Diff_{s/Z'}$ 52.6%**
		The District of Zeyrek without / with the complexes			**$Diff_{Z/Z'}$ 2.9%**

Table 2: Results of the fractal dimension calculations.

Some scholars offered that the upper limit of visual complexity in architectural context should be the fractal dimension value of ~1.8 (Ostwald & Vaughan, 2016: 62), and that the lower limit should be the value of ~1.1 (Vaughan & Ostwald, 2008). In this respect, the urban fabric of the District of Zeyrek (without the presence of the two complexes) can be considered more than moderately complex (D_Z = 1.663). In contrast, the measurements on the block plans of both the İMÇ and the SSK Complexes produces fractal dimension values lower than moderate ($D_İ$ = 1.333 and D_S = 1.166, respectively), indicating a relatively low degree of visual complexity.

Difference between fractal dimensions (Diff), presented in percentage (%), is used to measure the similarity between objects or architecture in terms of visual complexity. It has been suggested that to be considered similar, the maximum difference between the fractal dimension values should be 4%, and to be considered *highly* similar, the maximum difference should be 1% (Vaughan & Ostwald, 2009). Therefore, the difference between the İMÇ and the SSK Complexes ($Diff_{İ/S}$ = 16.7%) suggest that the degree of complexity of these two complexes' massings are not remarkably similar. It is interesting that, despite the much larger size of the İMÇ Complex, the İMÇ Complex's mass articulation is actually more complex than that of the SSK Complex. Or, rather, it *is* indeed this much larger size which gave the architects chance to experiment with more delicate complexity. The immense site of the İMÇ Complex enabled and encouraged the architects to break the whole complex into far more numerous building masses, with greater possibility to make the size of these masses as small as possible relative to the size of the whole İMÇ Complex, as well as greater possibility to arrange these building masses, resulting in a higher degree of visual complexity. Meanwhile, while Eldem did intend the massing of the SSK Complex to reflect the delicate urban fabric of the surrounding neighborhood as well, the much smaller site along with the functional requirement resulted in a far fewer number of building masses, and the sizes of some of these blocks are still unavoidably large relative to the size of the whole SSK Complex, even though such blocks are far smaller than the masses of the İMÇ Complex. This explains the lower visual complexity of the SSK Complex's mass articulation compared to that of the İMÇ Complex.

However, the differences between these two complexes and the District of Zeyrek are undoubtedly high. The İMÇ Complex is closer to the surrounding urban fabric ($Diff_{i/Z}$ = 33.0%) than the SSK Complex is ($Diff_{s/Z}$ = 49.7%); still, these results suggest no similarity between these two complexes and the urban fabric in terms of the visual complexity represented by the block plans. Yet, these mathematical results do *not* simply mean that the architects failed to response sensitively and respectfully to the context. It should be noted that the mass articulation, represented here by the block plans, is a reflection of the arrangement of the functional requirements as well as the design logic. In this respect, the functional requirements of the traditional Turkish houses which form the neighborhood resulted in a remarkable small masses of buildings. This, combined with the highly irregular, organic nature of the growth and the development of the neighborhood—the "natural design logic"—produces a remarkably small, irregular texture with relatively high complexity. Conversely, both the İMÇ and the SSK Complexes are public buildings; the functional requirements demanded building blocks with relatively large size. This, combined with the design logic of public building typology which demanded certain level of regularity and efficiency, resulted in the larger, more regular texture with degrees of complexity understandably lower than that of the surrounding urban fabric, despite the architects' best effort to response to it. While the mass articulations were to certain degree dependent to the functional and typological requirements, the possibilities were available to the architects to more freely explore the elevations, so that a higher similarity in terms of *elevational* visual complexity between the complexes and the surroundings might be achieved; this is true in the case of the SSK Complex. Eldem was (and still is) successful in establishing a concurrence between the visual complexities of the SSK Complex and the district in terms of some elevational aspects by utilizing the structural skeletons to visually break the masses into smaller fragments (Lionar & Ediz, 2020). For a project with the scale of the SSK Complex, it was probably more reasonable to aim (successfully) for such concurrence in the human-scaled elevation rather than the block plan. As for the İMÇ Complex, as previously explained in the Representational Concerns section, the analysis on its elevation(s) is beyond the scope of this paper. Nevertheless, such analysis has great potential for future work.

Finally, it is important to consider this words from Tekeli (translation was provided by the authors), in an interview with Atilla Yücel (Ekincioğlu [Ed.], 2001: 52), that "... harmony with the old is sufficient. This harmony can be achieved both by contrast and by similarity. Yet, when looked at, it should not make an unattractive effect." Indeed, an absolute similarity (in the context of this paper, similarity in terms of visual complexity) is not a sole guarantee for harmony. What the most important in the end is the whole effect of new designs for the older, often historical context. The İMÇ and the SSK Complexes are regarded as significant impacts for the surroundings, and for that, both take noteworthy parts in the history of contemporary Turkish architecture.

5. CONCLUSION

This paper measures the relationship between two contemporary complexes located in the historical District of Zeyrek, the İMÇ and the SSK Complexes, and the urban fabric of the surroundings, in terms of the visual complexities of the mass articulations represented by the block plans, by utilizing the fractal dimension analysis. The absence of mathematical similarity or concurrence between the complexes and the surrounding urban fabric can be explained by the principal typological and functional differences as well as the nature of the design logic, and does not negate the architects' effort to produce works which are sensitive and respectful to the context.

Future work(s) may include the quantitative analysis of the elevational aspects of the İMÇ Complex in relation with the surroundings (as has been done previously to SSK Complex). Considering that these two complexes are remarkably different in style—the SSK Complex adopted a formal style far closer to the regional architecture of vernacular Turkish houses, while the İMÇ Complex demonstrated a more modern, more Rationalist approach—it will be interesting and valuable to gain insights on how the architects responded to the historical context with these two different formal approaches. In addition, this present paper has great prospect to be developed further into *multi-layered* analysis, in which several aspects or properties of the architecture and the urban fabric may be measured in parallel, be it on the micro scale such as the ground plans of the buildings or the macro scale such as circulation networks; these are the possibilities for the future work(s).

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The images in this paper were produced based on the drawings by Doğan Tekeli, Sami Sisa, and Metin Hepgüler (1960) in the article titled *İstanbul Manifaturacilar Çarşisi Proje Müsabakasi* (*Design Competition for Manifaturacılar Retail Center Istanbul*) published in the *Arkitekt* magazine 1960-03 (300), accessed via the digital archives of The Chamber of Architects of Turkey, and the drawings by Sedad Hakkı Eldem (1970) in the unpublished manuscript titled *Social Security Complex Zeyrek Istanbul*, accessed via the digital archives of the SALT Research Center, Istanbul. The AutoDesk AutoCAD 2018 program for educational purposes was used for producing the drawings and conducting the fractal dimension calculations.

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