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A MORPHOLOGICAL COMPARISON OF URBAN TISSUES OF TRANI AND GALATA

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Abstract. The morphological tissues of two Mediterranean coastal colonies; Galata and Trani have been examined in macro-scale, together with the variations, linked to the distinct phases of economic and socio-cultural change in different time cycles, which is one of the bases of the Conzen approach. The effects of road-system changes, city walls, urban regulations and socio-cultural tissues on the urban morphologies of the cities throughout the history were investigated during the comparison of these two cities. Common features were found in both regions with respect to the urban morphology of newly developing and re-structured areas. According to the old map analysis, the urban growth inside the walls, the growth after the destruction of the walls, the developments of the minority regions and its effects on the urban texture, and the gridal growth of newly developing and destroyed regions are similar in Trani and Galata. Moreover, it was attempted to apply urban regulations which would largely demolish the region, in these two Mediterranean colonies with the effect of Hausmannization. In addition, during the urban regulatory initiatives in Galata, though it was not appropriate to the region, an attempt was made to apply a radial urban square, which is a western urban strategy. Galata, although it is a part of Istanbul, in contrast with the urban growth of Istanbul, shows a western type growth, very similar to that for Trani, which has been a most important buffer point of the trade in Adriatic Sea. This study demonstrates that there is an intermingling between urban form and culture, in addition to the contextualisation of 'global' cultural influences on local regulations and urban development practices, and has further investigated their effects at a particular time and, in that in another period such urban coexistence has been lost.

Keywords: urban morphology, history, Trani, Galata.

Introduction

Urban morphology is a branch of research, which was established to examine the forms of physical elements of human settlements. The studies are, in general, performed to make a physical evaluation of the forms of buildings/open spaces together, in a settlement and the changes/transformations in the urban tissues. The present paper focuses on macro-scale urban morphogenesis through urban regulations in relation to historical urban development of two cities, Galata and Trani. The comparison of these cities has been made in terms of urban development together with Conzen's approach (but not with the application of his method). Periodical urban regulations, municipal urban arrangements and their social dimensions are considered to be effective on the macro-scale morphological change or continuity of the regions. Samuels (2009) has commented on about Conzen's methodology, giving mention to the letter's important work on the city of city Alnwick, saying that: "Alnwick established a way of seeing the urban landscape as changing according to different time cycles linked to distinct phases of economic and social change- this is clearly illustrated in the paper first published in 1962 and then in Whitehand's edition (1981) of some of M. R. G. Conzen's papers." As a result, some similarities and differences have been determined regarding the morphological developments of the regions.

For as long as people have lived there, the coastal area which can be described as the intersection of water (the greatest resource for maintaining the lives of humans) and the land (living space), has been shaped by technological developments according to their daily needs. Hence, the area has been used in various ways,

one of which is the creation of ports. Over history, maritime transport and the establishment of overseas relations gave rise to the port cities of the coastal area and the port property has been an important factor in the development of the cities.

Throughout history, Mediterranean port cities had commercial relations with other nations acorss the seas. Thus, Italian settlements were observed in the coastal areas of Turkey. Galata was formerly the most important port of Istanbul (Fig. 1), and where Italians used to live: therefore, the Italian influence should be considered in this area. The port had an intensive trade relationship with the other Mediterranean cities, and so, it was thought that cultural and physical relationships could occur with them. In this context, urban formation, the forms of regional settlement, residential use and lifestyle were chosen as topics for study.

Over the centuries, Trani (Fig. 1) has been very active in trade and has had close relations with Venice: thus, Venetian nobles have played an important role in the development of trade in the city. Although the economic circumstances have varied over time, Trani has been very successful as a trading point in comparison with the other cities in the Puglia region. There was a commercial route between Istanbul and Venice along the Adriatic Sea and the most important common buffer zone for trading between these two cities was Trani. Also, the Puglia region which had many small settlements such as Trani, was a suitable area for the Ottomans to enter Rome from the south. Therefore, over the years, the commercial and military relations continued between Ottomans and this region of Italy military.

The Ottoman Empire always had significant trade relations with Venice, which spread indirectly to many other small Italian cities. An image (Fig. 2) drawn by Piri Reis (an Ottoman admiral, geographer and cartographer, who lived between 1470–1555) is an interesting indicator that shows the direct relationship of the Ottoman Empire with Trani. The image could be drawn in terms of the military

Fig. 1. The map, showing Trani and Istanbul (Google Earth)

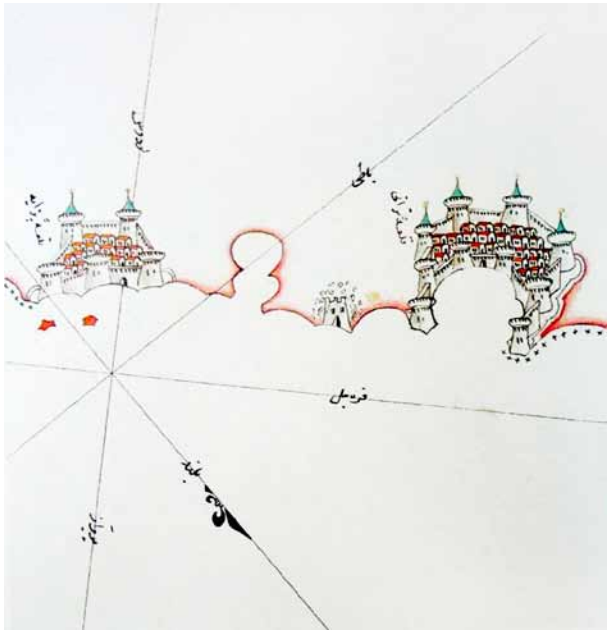


Fig. 2. The image of Bisceglie and Trani drawn by Piri Reis (Schiralli 1999: 21)

aim as well as commercial relationships. Additionally, Otranto city in the province of Puglia, which belonged to the Kingdom of Naples at that time, was conquered by Gedik Ahmed Pasha on the orders of Fatih Sultan Mehmet on July 28, 1480 (Oltayli 2011). Otranto remained under the auspices of the Ottomans for 13 months during which time attacks were also made on the other cities in Puglia, with the intention to reach Rome from the South. Upon the death of Fatih Sultan Mehmet, the navel forces were withdrawn from the coast.

To look for common cultural roots in the Mediterranean cities is one of the important topics in research on new forms for the multi-ethnic city where Muslim communities co-exist. Hence, Trani (the Italian city) was chosen to compare with Galata. These two selected cities were examined together with their historical developments and morphological changes in their urban tissues were compared. Common features between the regions have been found with respect to the urban morphology of newly developing and re-structured areas.

Comparison of the city walls and their effects on the urban morphology

Most of the ancient settlements were located at the protected areas on the coast such as in intra-bay, on peninsula and at hillside. The environment was dominated by the settlements. Today, the inner-land settlements are connected to the shore settlements and have similar sea facilities. The coast creates a suitable environment for human activities. It is a resource for economic, social and individual purposes

of use. Defense and tourism activities are also important coastal activities, along with many others (Karabey 1978). Trani and Galata, both of which have long histories, are located at the coastal areas as are most of the ancient settlements, for which water is the most important factor. The geographical features of the regions are also important. For example, it is no coincidence that the Galata settlement is at the entrance of Golden Horn and the Trani settlement is at a cove. These areas are sheltered areas whose environment can be easily controlled. Furthermore, since the Galata settlement is at a steep slope and the Trani settlement has a topographic structure which rises rapidly from the sea level, some protection for their populations is provided.

Overseas trade relations played an important role for these locations. Galata was the most important sea trade region of Istanbul, while Trani which had close trade relations with Venice, became an important center for sea trade in Southern Italy. The functions of the ports rapidly developed in these two coastal cities: sea trade and overseas relations improved and a major trade axis were formed.

Old Trani and Galata, with their walls and gates which were connected to the port and pier, exhibited the appearance of Mediterranean colonial cities. When we look at Galata and Trani as urban structures, in general, the development of inside regions of old walls show similar growth. The walls and the connections to the ports have a great effect on the formation of their urban tissues. The gates of the walls which open onto the both port areas are similar. In both regions, the way the walls provide surroundings is the same and the walls grow by adding one to another. The city walls were demolished in the past in both regions, as happened in many European cities.

In Trani, the positions of the corners of the walls and gates were determined from the examination of the curved road lines. The original city walls were probably destroyed in the middle of 9th century during the dominion of Saraceni (Generic name given to the North African Muslims in the Middle Ages) over the city of Bari. However, the walls are possible to trace when the boundary lines of buildings are followed (Strappa *et al*. 2003). In the 11th century, the first city walls of Trani had four Gates: Porta Antica, Porta Nuova, Porta Vetere and Porta Vassalla. In the 13th century, due to the growth of the city towards the outside of the walls, new walls were built by II. Frederick in the city. These walls surrounded many churches and settlements which were outside the first city walls (Ronchi 1984) (Fig. 3).

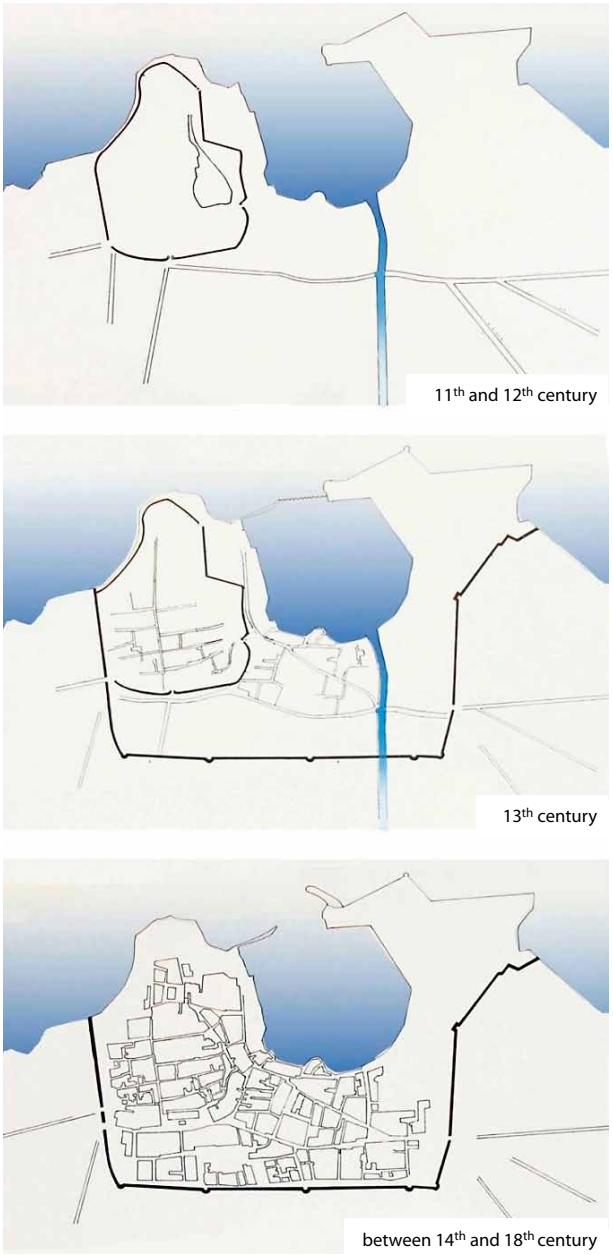


Fig. 3. Historical development of the city walls of Trani (11th–12th, 13th and 14th–15th centuries respectively) (drawn by the author, in accordance with Ronchi 1984)

The Galata walls were built by the Genoese (as understood from the Latin inscriptions). Miniatures, and engravings and drawings dating from the 15th century indicate that the other walls were also present in the region. The walls divided the inner part of the area into five districts (Fig. 4). During the period 1864–65, an important portion of the walls was demolished. The walls were about 2 feet thick, 2.8 km long and enclosed a 37-hectare area. The walls had twelve gates and twenty-four towers. The twelve towers were located at the sea side and were about 33 meters apart (Akin 1998).

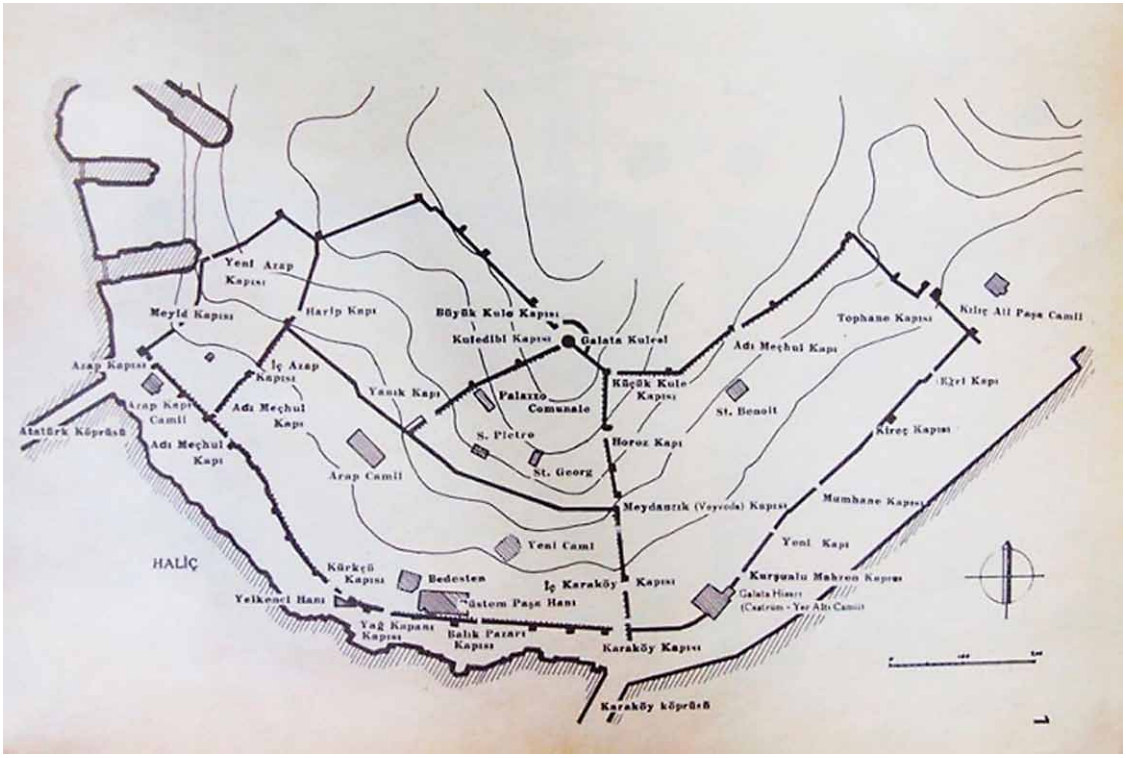


Fig. 4. The walls, gates and historic buildings of Galata (Eyice 1969)

Comparison of the urban regulations and their effects on the road system morphology

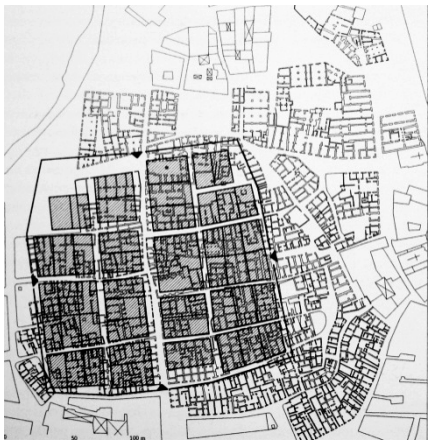
From the ancient settlements to the present day, the transport systems which are the backbone of the settlement tissues, have been instrumental in the development of urban space. The topography is also known to be determining for the development of the urban tissue in a natural way (Ozer 2006).

Variations of the road systems of Galata and Trani have been known throughout history, and Galata has remained as one of the most important residential areas of Istanbul metropolis. As a part of this metropolis, Galata's trade identity and port functionality reached a high level of activity. It is not surprising that the region, as a major transit point, has experienced great changes over time. Poor maintenance of the streets and alleys has resulted from a lack of infrastructure, increasing car use (depending on technology) and a desire for an easy connection between the regions. Rearrangements of the 6th Office, the imposition of municipal regulations after the fires and the greater expectations of modern life have greatly changed the morphological structure of the streets and alleys. As was obsereved by Conzen, road tissue is the city's most enduring element unless it is interfered with. The road tissue changes may be caused by destruction due to war, natural disaster and with an extensive renovation (Conzen 2004). As seen in Galata, changes are caused by comprehensive interventions in the road tissue of a city.

The situation in Trani is much different. Urban growth of Trani occurred outwards and is still continuing. With the topographic suitability, this growth is developing along the coastal area and along the main axis that is connected to the cities of Andria and Corato. During this period of growth, the ancient region was not impacted by the planning decisions. However, in the draft plan of 1888, decisions were made that would alter the ancient road system completely. It was proposed to demolish some parts of most buildings in the ancient settlement. The new developing region grows within a grid system and the formation of the road system follows a particular order. The ancient narrow streets still exist in the region, because the settlement of Trani does not have a population and mobility transition as Galata has, and therefore they do not pose a problem. These narrow streets still exist in ancient settlement and are used as pathways, while vehicles rarely enter them. These streets exhibit an authentic look and trade activities are ongoing there. Figure 5 gives examples and assumptions of the morphological road system changes in Trani and Galata that have occurred over time.

In Trani, Via Beltrani Street (today's matrix road), which was formed by polarization determined by the special areas of Cathedral and Diocese, is the center of the city. Intensive construction in the regionoccurred along this axis without a connection to the sea. Here, consistency and order are observed in relation to dimensions (Strappa *et al*. 2003). Since the 11th century, the expansion (expressed as *extra moenia*) has reflected characteristic features of the ancient urban structures. Here, the special buildings were organized by antinodal positioning. The reason being that large churches and other buildings were occupying a fairly large surface area. Therefore, these large structures could not be built in the city centers since these areas had already been filled. This case can be seen in the transformation of ancient cities. In Trani, this situation exists for special buildings such as great monasteries which were built between the 11th and 12th centuries, following a long period of crisis. Special buildings were generally built in the outside wall areas of the region. Caniggia kept special structures outside the base building fabric and suggested that the functions of these structures differ from the others (Caniggia, Maffei 2001). Petruccioli also indicated that base buildings were constructed for housing purposes. He suggested that special structures were multi-functional monumental buildings in the cities such as mosque, hospital and theater (Petruccioli 2007).

Trani



The assumption of geometric order inside the first walls of Trani

Roman Castrum which develops in the form of grid system, shows itself in the ancient plan of Trani. Orthogonal axes clearly stands out. The city walls can be proven by regular geometric shapes intensified in the inner areas.

In Trani, the road which was parallel to Via Beltrani, are considered to be present in the Middle Ages and was continuing until the Cathedral

Carlone suggests that, other than Via Beltrani, a road which does not exist today, was a main transit point of the city in the Middle Ages. The presence of this transition road in the past can be determined by San Martino Church. This church gives an idea that this road was continuing until the cathedral. The road is considered to be corresponding to Via Quintana road which has a tissue of Roma plan.

Galata

a b

A comparison of Galata road system morphology through D'ostoya map of 1858–1860 and Huber proposed map of 1887–1891.

a – D'ostoya, G., Map of 1858–1860
b – Huber, R. Map of 1887–1891.

a b

A comparison of Galata road system morphology through D'ostoya map of 1858–1860 and latest satellite image of Galata

a – D Ostoya, G., 1858–1860 map.
b – Latest satellite image of Galata.

Fig. 5. Examples of morphological changes of the road system (morphogenesis) (prepared by the author in accordance with Strappa *et al.* 2003; Carlone *et al.* 1981; D'Ostoya's map of 1858–1860, Istanbul Metropolitan Municipality Ataturk Kitapligi, Demirbas No: 5692; Huber's proposed map of 1887–1891, Istanbul Metropolitan Municipality Ataturk Kitapligi, Demirbas No. 5319/5).

Although the road system of Trani still bears the traces of ancient planning, some changes have occurred over time. Carlone suggests that a road other than Via Beltrani was the main transit point of the city in the Middle Ages. Today, this road has vanished (completely filled with buildings). The existence of this transition which was occurred over a certain period of time, can be determined from San Martino Church. This church gives an idea that the transition continued up to the Cathedral (Carlone *et al*. 1981) (Fig. 5). This road (parallel to Via Beltrani as Carlone mentioned) had a binding property. It is also considered to be corresponding to Via Quintana (the axis in a typical Roman plan are named according to the importance and function such as Via Praetoria, Via Principalis and Via Quintana) road which has a tissue of the Roman plan. It is also thought that the *Forum* in the Roman plan took place at the region of today's S.Martino Church of Trani (Strappa *et al*. 2003).

In Galata, the main artery comes though the Galata Bridge as if it divides the region into two. All first-degree roads in the region combine at Karakoy Square and connect to this main artery. The maritime line transport and the tunnel also connect to this area. Thus, the density of both vehicle traffic and pedestrian traffic are very high in the region. The major roads between Galata Bridge and Ataturk Bridge are Tershane and Bankalar streets. Kemeralti, Necatibey and Rihtim streets run between Galata Bridge and Tophane. In general, large commercial buildings are mainly present between these main arteries. The reason for having the main axes close to each other in the region is the heavy vehicle traffic and therefore, vehicles are able to use more than one road. Other than the main arteries, the narrow street tissue is preserved in Galata. The narrow streets are of an Italian city character and today this can be still seen in Galata (Esenkaya 1992).

In 1838, there was a strict street network compatible with the topography in Galata. The coastal part and inner part of Galata were connected together in an irregular fashion. Although there was no main street, some streets were more important than the others (Celik 1998). In 1857, the 6th Municipality Office was established for Beyoglu and Galata by an official declaration. In 1858, the Sultan's decision indicated that Istanbul was divided into 14 municipal offices and with the work of the 6th office, the applications would commence. This would be an example to the other regions. The reason for this was the presence of many buildings in Galata and Beyoglu and their importance. In addition, the owners were not unused to such applications and knew their significance. The region kept its privileged status until the municipality law was declared (Akin 1998) in 1876. At the same period, another organization under the name of the Islahat-i Tutuk (Road Improvement) Commission was established. This organization continued to work between 1865 and 1869. After a period of ten years, the work of these two organizations (6th Office and Road Improvement Commission) caused radical changes in the urban tissue. The first work of the municipality was partial expansion and rehabilitation of the existing roads. This continued until the destruction date of the Galata walls. Later, more extensive work was carried out. The old city walls were demolished and instead, new roads were constructed. The roads inside the city walls were also expanded (Oncel 2010).

In Trani, the destruction of the city walls ended in 1846 and in parallel, the new city tissue began to be formed. In fact, the growth outside the city walls began in 1840 along with the modern expansion movement of the city. The draft, designed by architects De Giorgio and Ravillon, was accepted in 1847. Although the draft was related to the expansion of the ancient city area, it also contained the 19th century's type of city-expansion. In the plan, the connections of organically grown part inside Frederick walls with the developing planned region by roads (Strappa *et al*. 2003) (Fig. 6), was anticipated. A counter axis to the new road (today's Via Imbriani road) which was in line with railway, was envisaged with the draft plan of 1888. But, the plan contained some factors that could cause radical changes in Trani. It was proposed to open a parallel road to Via Beltrani Street. The aim was to connect Piazza del Municipio with the new built region. This draft also included the creation of new urban poles that made the structure of existing routes useless. The draft was changing the original roads of ancient part of the city with the new axis for direct connection to the most important areas. This draft was not applied and the traditional building character of the area was preserved. In addition, the degradation of urban tissue character of ancient region in Trani was prevented (Strappa *et al*. 2003) (Fig. 7c). The style of connecting the two poles together in the draft of 1888 is reminiscent of the 'break-through route' which is mentioned by Italian theorists: Caniggia and Maffei (Caniggia, Maffei 2001). If the matrix road cannot provide the linkage between the poles, the 'break-through route' connects these poles by passing through the old tissue.

In Galata, the case was opposite for Voyvoda street. The importance of Voyvoda (Bankalar) Street is understood by the presence of *Palazzo del Comune* (The parliament building of Genoese) and *Piazza* here in 14th century. The importance of this street was maintained for many years since one of the local adminis-

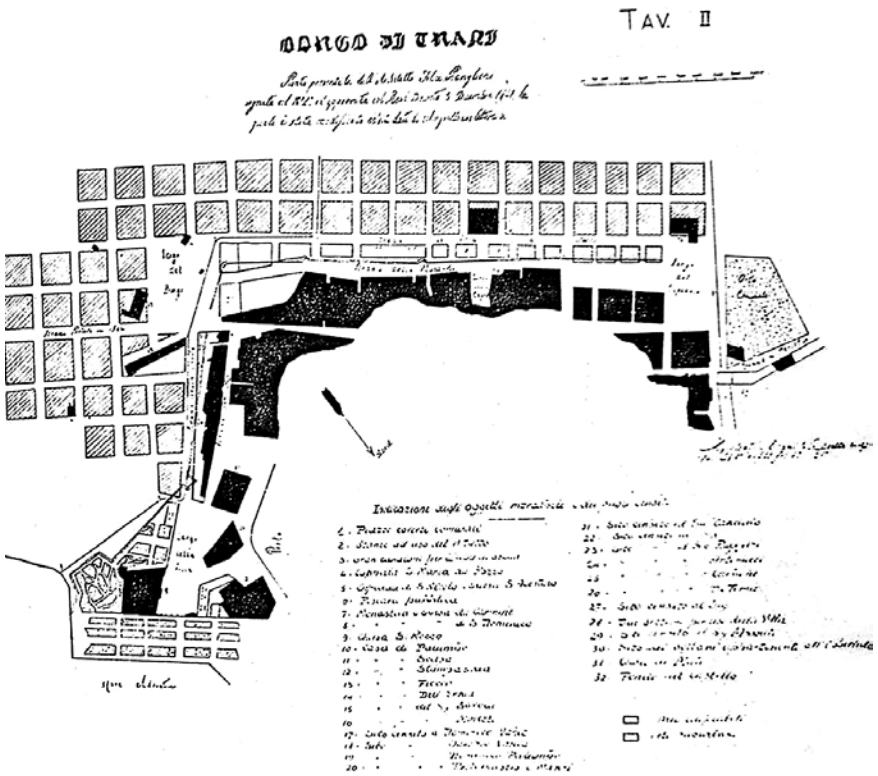


Fig. 6. Urban regulatory plan of Ravillon and De Giorgion for Trani belonging to the year of 1847 (Strappa *et al.* 2003)

Figure 7a **Examples of the filling stages of urban blocks**

Trani

In Trani, the assumption of the change of selected urban block in time.

a – A selected block and the road which was assumed by Carlone that it was present in the Middle Ages and Jewish settlement outside the city walls in the ancient period.
b – In Trani, the selected blocks according to the today's cadastral plan.

In Trani, the assumption of the morphological change of a block between Via Fra Diego Alvarez and Via Romito.

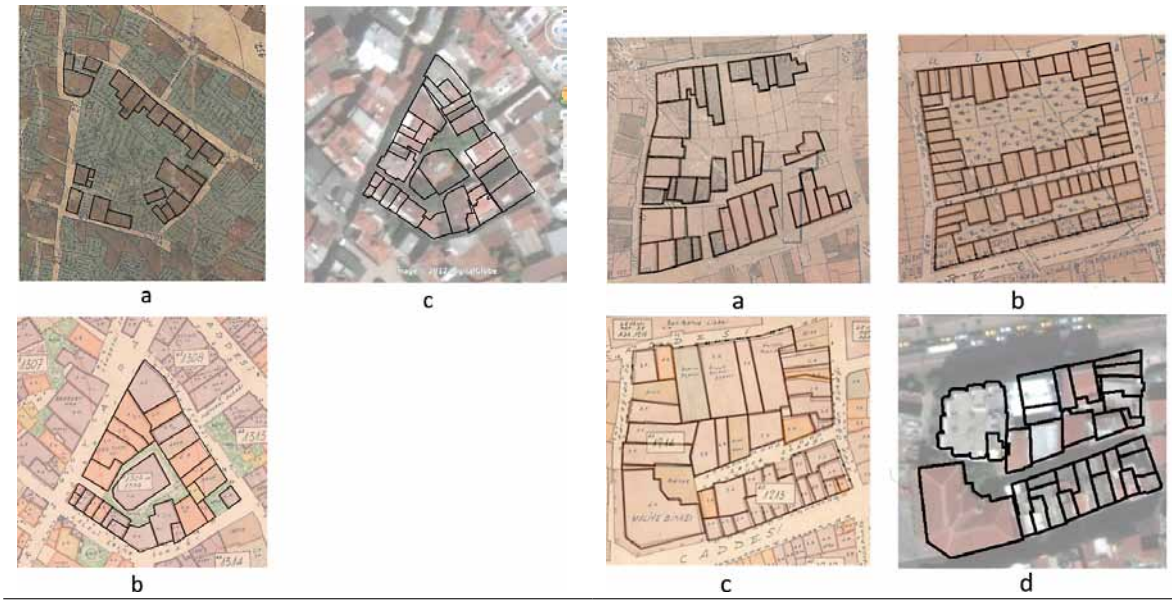
Here, the development after the destruction of the old city walls and the following morphological change of the block are given.

The assumption of changing period of Palazzo Beltrani's structure.

The morphology of the urban block is influenced by the change of Palazzo Beltrani.

Figure 7b **Examples of the filling stages of urban blocks**

Galata



In Galata, analysis of morphological changes of an urban block with the help of maps.

a – Morphology of an urban block, selected from D'Ostoya's map of 1858–1860.
b – Morphology of an urban block, selected from Suat Nirven's map of 1948.
c – Morphology of an urban block, selected from today's cadastral plan.

In Galata, analysis of morphological changes of an urban block with the help of maps.

a – Morphology of an urban block, selected from D'Ostoya's map of 1858–1860.
b – A proposed change of an urban block, selected from Huber's map of 1887–1891.
c – Morphology of an urban block, selected from Suat Nirven's map of 1948.
d – Morphology of an urban block, selected from today's cadastral plan.

Figure 7c **Examples of division of urban block**

Trani

In Trani, a proposed city planning belonging to the year of 1888.

In 1888's draft plan, a road which was parallel to Via Beltrani street, was proposed to open in order to connect piazza del Municipio to the newly built region. In addition, interconnection of Piazza Teatro and Piazza S. Francesco squares by dividing the urban block which was present between the squares, was proposed. However, the 1888's plan was not applied.

Galata

In Galata, analysis of morphological changes of an urban block with the help of maps.

a – Morphology of an urban block, selected from D'Ostoya's map of 1858–1860.
b – A proposed change of an urban block, selected from Huber's map of 1887–1891.
c – Morphology of an urban block, selected from Suat Nirven's map of 1948.
d – Morphology of an urban block, selected from today's cadastral plan.

Fig. 7a, b, c. A comparison of the morphological changes/suggestions for changes of urban blocks (morphogenesis) (prepared by the author in accordance with Carlone *et al.* 1981; Strappa *et al.* 2003; Strappa *et al.* 2006)

trations of Ottoman (such as Voyvodalık) was there and the Genoese kept their semi-autonomous status until 1682. Along with Galata's other streets and roads, Voyvoda Street also maintained its narrow structure until the 1880's. During this period, the road was expanded due to the installation of a tram line. With this expansion work, the front-facades of some buildings including Palazzo del *Comune* were demolished (Altan 2007).

In a part of Trani's draft urban regulation plan of 1888, the connection of Piazza Teatro square to Piazza S.Francesco square by a road through the urban block was envisaged. However, the plan was not applied. This type of urban design project was also considered for Galata. In the Project of 1866, it was planned to connect Sishane square to the Galata Tower square. However, it was not put into practice, probably due to the expropriation of some buildings outside the walls of the old Galata. The other reason for the plan not being applied was the topography of the square. The base of the Galata Tower was supported by a part of the walls and there was a steep slope outside the walls, which was the reason not to demolish them (Ardaman 2007) (Fig. 8).

In 1929, the next city regulation plan of Trani was comprising the expansion inside the railway border because of the increase of construction towards Bari. This plan only shows abstract innovations of urban tissue that not happened yet and does not touch on the issues (for example: not binding the old and new tissues). In this design, a radial road was arranged at the east end of Via Vittorio Emanuele Street without any polarization (Strappa *et al*. 2003) (Fig. 9). Because of suitable topography, the radial road lines were applied to the road system of newly developing tissue of Trani. These radial lines reach Andria and Corato cities in macro-scale and are found unsuccessful since they are planned without any polarization in micro- scale. In addition, these road lines effect newly formed urban blocks and force them to be triangular form rather than functional rectangular form.

In Galata, after the Pera fire of 1870, the grid plan was broadly applied to the urban regulations. Application of the grid plan system to Galata and expansion of Galata towards Pera overlapped with the application of the grid plan system to a newly developed area of Trani. Here in Galata, some projects based on a radial system were developed with the influence of Haussman's Paris project which was applied in the west from time to time. One of these projects (shown in Fig. 10) is the plan of Pera after the 1870 fire. This project was designed for steep sloped areas

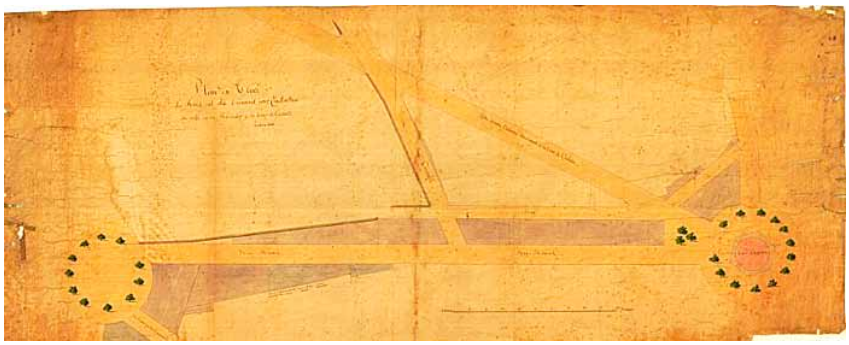


Fig. 8. A proposed road's project of 1866. The Project was to connect the square of Galata Tower to Sishane square (Courtesy of Istanbul Metropolitan Municipality Ataturk Kitapligi)

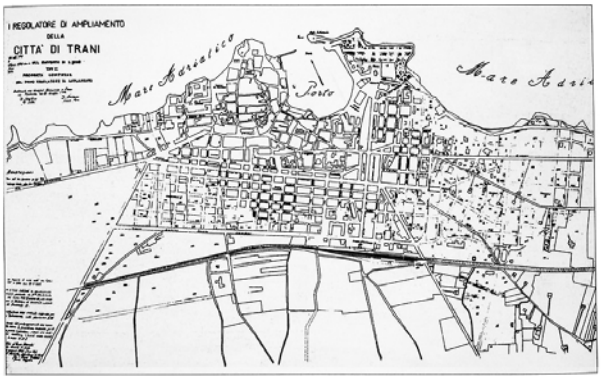


Fig. 9. The city regulation plan of Trani in 1929 (Strappa *et al.* 2003)

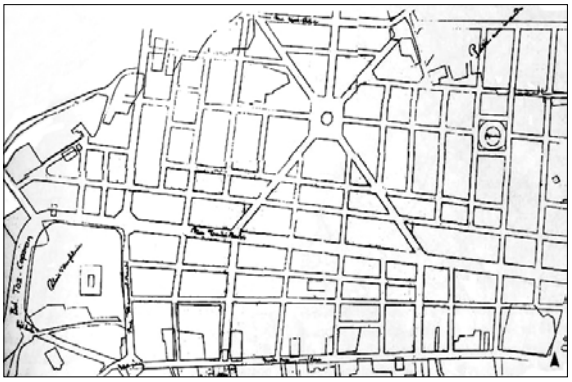


Fig. 10. After the fire of 1870, the radial regulation plan of Pera which was not applied (Celik 1998)

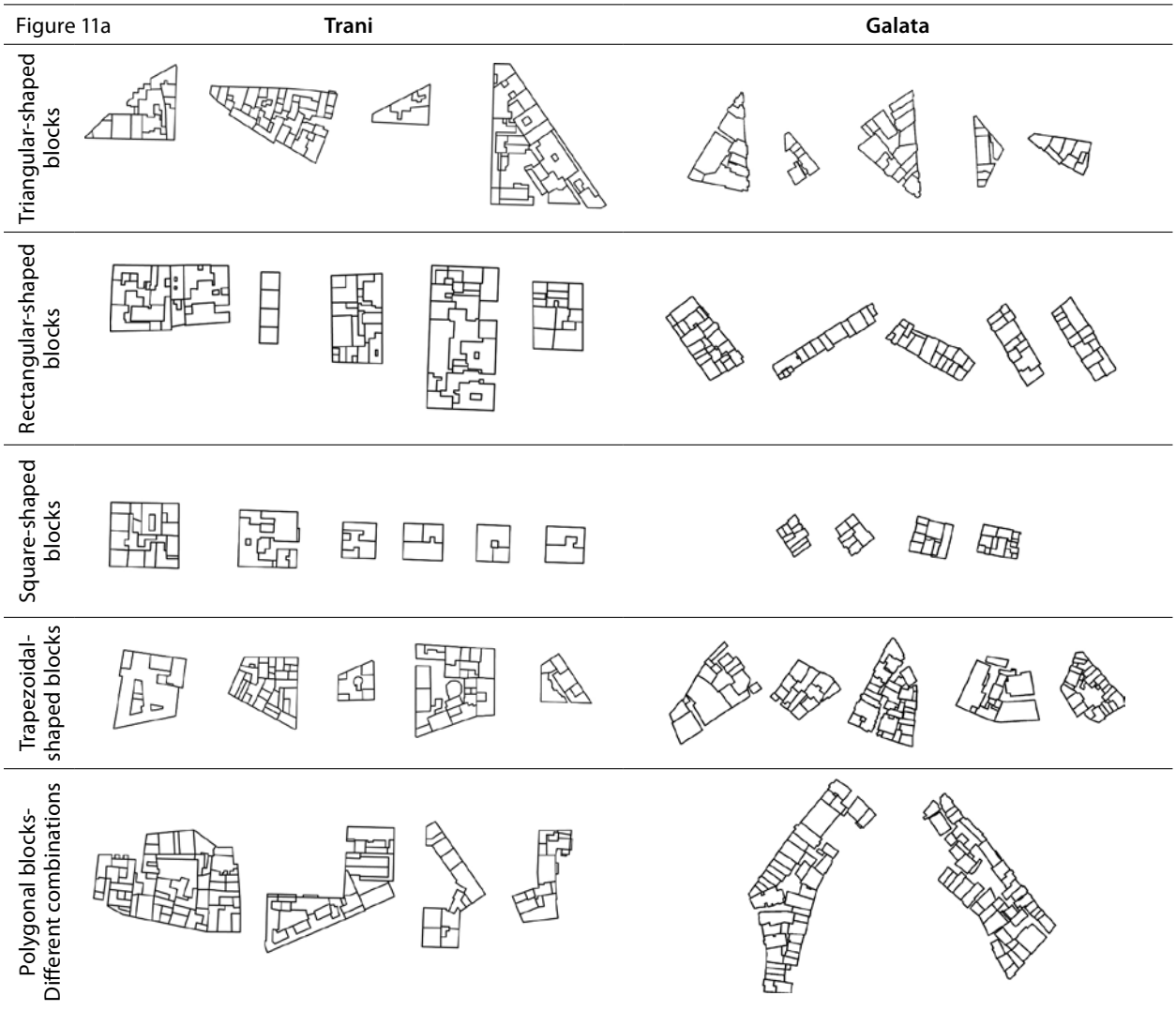
but was not impelmented due to resistance from local residents, who objected to the loss of more lands from the property owners, close to the center point. In Istanbul, on looking at the common characteristics of the radial plans, other than topographic problems, it may be seen that the applications are not based on a particular rule and many streets are randomly connected to the central point. In addition, the central point lacking specific characteristics such as the square is the reason the applied radial systems have failed (Ardaman 2007). Although the radial plan of Galata is not applied, its application without any specific polarization could create negative consequences.

Comparison of the macro-scale changes and their effects on the urban blocks morphology

In urban blocks, morphologic changes develop piece by piece according to time and space aspects. Macro-scale factors such as comprehensive renovation, natural disaster, demolition after war, road system change and micro-scale factors such as constructions of buildings, addition to existing buildings, changes of parcel size affect the morphological change of urban blocks.

The morphology of urban blocks in Galata has undergone many changes since the past. The reasons for the great changes of the blocks in the region are comprehensive regulations and natural disasters such as fire. The destruction and reconstruction of many buildings have also changed the blocks structurally. Apart from these, the regulations for the introduction of new transportation systems has affected the morphology of the blocks. In Trani, the closure of roads that are present in the ancient region and the destruction of the city walls were anticipated to happen centuries ago. Trani grows outwards and does not have changes as a consequence of being new.

As seen in Figure 11a, b morphological forms of urban blocks in Galata and Trani were compared. When this comparison is done, special buildings that affect the blocks, as mentioned by Caniggia and Maffei (Caniggia, Maffei 2001), and a single building that



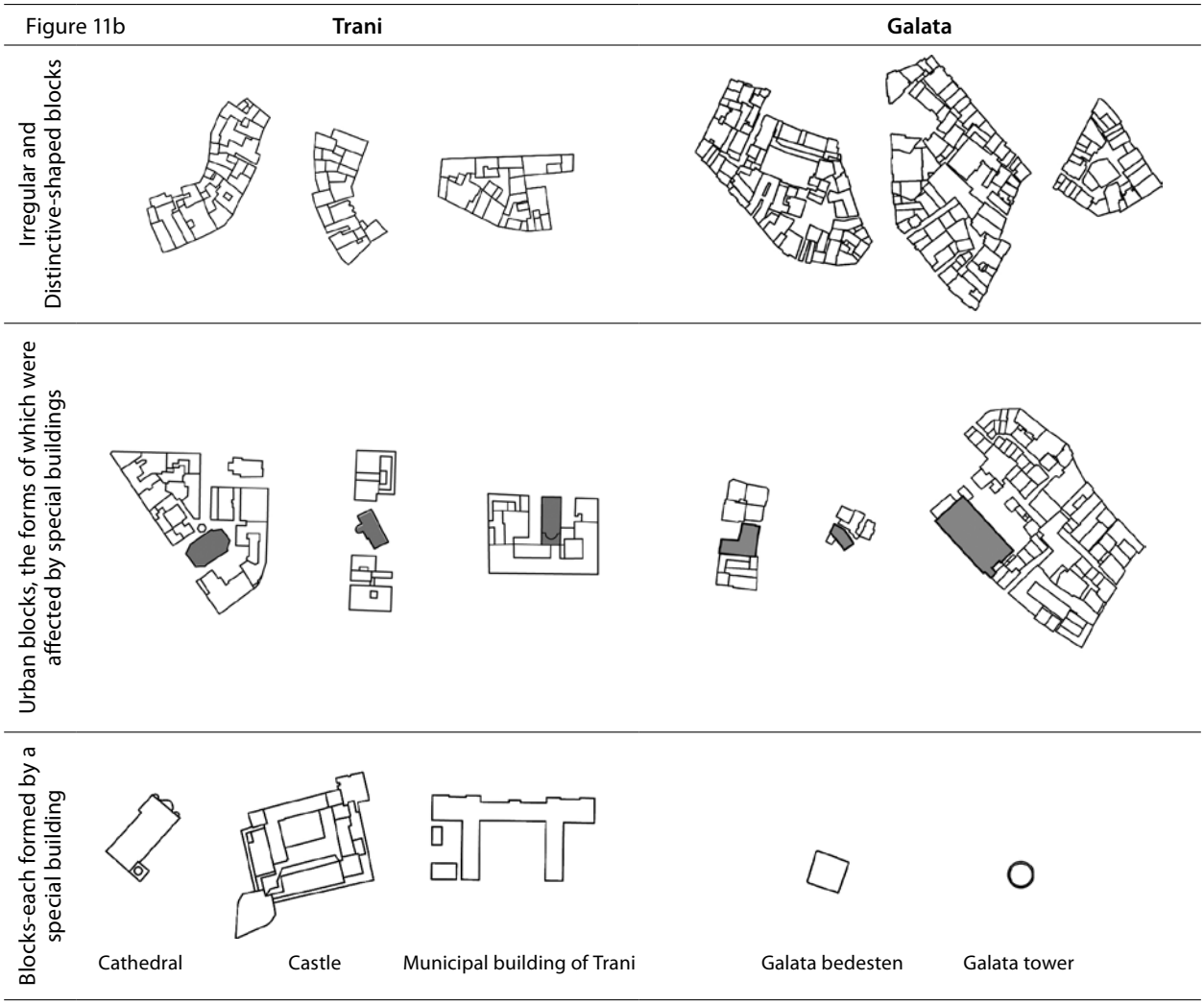


Fig. 11a, b. A comparison of morphological forms of urban blocks (drawn by the author in accordance with the Municipality's maps (Courtesy of Istanbul Metropolitan Municipality and Trani Municipality))

constitutes a block, as mentioned by Penarai (Panerai *et al.* 2004), are included among the study categories. In Figure 7a, b, c the morphological changes, proposals for the changes, the filling and division of urban blocks in Galata and Trani are exemplified. Except for the ancient region, urban blocks are rectangular or triangular in the developing areas of Trani. In a part of this region, triangular blocks are formed because of the presence of main axes towards Andrea and Corato settlements. With the rectangular urban blocks, it was attempted to create a more regular and functional grid planned settlement.

According to Scott (1998), the city's legibility can be achieved with a grid plan. To do this, the city must have unity, proportionality, repeatability, permeability and perspectivity. All of these features are available in the grid plan. Unity means that all urban blocks are in the same form and direction. Permeability means that the buildings should be regular and their addresses should be easily found. Scott indicates that there is no order in the historical cities and roads, which cut each other at varied angles. Legibility of this type of organic texture is specific to the inhabitants of the region and for a foreigner who visits the region for the first time, this is a complex situation.

In Trani, the sizes of urban blocks in the grid planned region (developed outside the ancient region) are proportional to each other. However, the sizes of urban blocks in the ancient region vary. Additionally, urban blocks of the ancient region show geometric variety and the majority of them are in a rectangular arrangement. The first city walls and the roads leading to the gates have a great effect on the development of these urban blocks. The constructed buildings along the axes, which were developed towards the direction of the gates, formed triangular urban blocks.

Urban blocks of Jewish area, which were developed outside the first walls of the ancient region, differ from the other urban blocks. The Jewish blocks consist of many buildings in a certain region and occupy a small

surface area. This situation, which can also be seen in the other cities, is a common feature of Ghetto settlements. The other example in an ancient region is that each block has its own special building. These special buildings (homogeneously dispersed) are religious buildings and are called Palazzo. Special buildings have a great effect on the formation and development of the urban blocks.

It is thought that the ancient region of Trani with its grid system carries the traces of the roman castrum road system and has Roman *forum*. It is also thought that the urban block of the region, which presently contains S. Martino Church, used to function as a *forum* and now filled with buildings. Additionally, it is considered that the grid plan of the roman castrum plan has changed with time, being transformed into the present state of organic tissue. Thus, it cannot be denied that the urban blocks in the region are time-dependent (Strappa *et al*. 2006).

In the ancient period, the Jewish settlement developed outside the city walls (but very close to the walls). As seen in Figure 7a, a part of the selected urban block was the outside region of the city walls during the ancient period and was a Jewish settlement. Today, after the demolition of the walls, the area was likely filled with buildings. In this case, the area of the block was increased and the shape of the block was changed from rectangular to curvilinear. If Carlone's assumption (Carlone *et al*. 1981), which can be proven by the location of S.Martino Church, is considered, there was another road parallel to Via Beltrani. Hence, it can be seen that the selected block experienced another change. According to the road route, shown in Figure 7a, it can be understood that today's urban block was not intact in previous times. As Strappa has indicated (Strappa *et al.* 2006), an example of the morphological change of urban blocks, is the assumption of a morphological change of the block between Via Fra Diego Alvarez and Via Romito. Here, the morphological change in the block, along with the development of the area after the destruction of the old city walls, can be seen (Fig. 7a). Urban blocks in the ancient regions did not have major morphological changes until the present day. The 1888's draft plan of Trani, which aims to connect the poles and to continue the axis and therefore divide urban blocks, was not applied. Consequently, the ancient regions were protected.

The urban blocks in Galata have been affected by many formations and regulations in the region over the course of time. The region has several urban block types which contain organic and grid tissues. Beside triangular and trapezoidal blocks in the organic tissue, grid system plan applications in the region directly affected urban blocks and formed rectangular blocks. It is thought that this type of blocks which are the result of a grid system, positively affect the legibility of the city. In Galata, the majority of the special buildings are religious buildings and are present in most of the urban blocks. These special buildings effect the formation of the geometrical shape of the blocks. The morphology of an urban block can be affected by the axis that meets a special building. It can also be affected by the shape and size of the other parcels, which depend on the location of special building.

In Trani, special buildings have survived over the years and continue to survive. However, some synagogues were converted into the churches in Trani, while some churches were converted into the mosques in Galata. For example, S.Anna and S.Maria Scolanova Churches were synagogues in 13th century (Strappa *et al*. 2003). The Jerusalem Post (an internet newspaper) reported that S.Maria Scolanova Church, which has not been used as a church for the past 50 years, was converted into the synagogue 500 years later (Zivotofsky, Greenspan 2006). The urban blocks are greatly affected by this type of changes, because these special structures (with their altered functions) lead to the dissociation of the urban blocks depending on the socio-cultural situation. For example, in front of the buildings which are mosques, the formation of leisure spaces (squares in the west) begins. This greatly affects the urban blocks.

After the conquest, Islamic elements in Galata had an important place in the urban tissue. San Paolo Domenico (the largest church in Galata) was converted into an Arap Mosque by Fatih Sultan Mehmet (Karaca 1995). Azapkapı Sokullu Kulliye (complex of buildings adjacent to a mosque), Tophane Kilic Ali Pasha Kulliye, Tophane Findikli Molla Celebi Kulliye and Besiktas Sinan Pasha Kulliye are the important Islamic special buildings in the region (Akin 1998). During the Sultan IV. Murat period (1623–1640), Saint Antonius Church in Galata was converted into a mosque (Karaca 1995). Inalcik indicates (1994) that Kemankes Mustafa Pasha Mosque was built in the place of San Antonius Church and Yeni Mosque was built in the place of the burned San Francesco Church in 1697. If we go further back in history, we see similar changes. In 569, II. Justin converted a synagogue into a church in the Christian community of Byzantine Constantinople (Besalel 1999).

In Istanbul, the plannings and constructions after the fires were carried out on the basis of a pre-existing order until the 1840s. After 1840, the design of the city was changed because of the desire for modernization. Hence, different planning arrangements were applied after the fires (Celik 1998). When the maps of Istanbul (drawn in the second half of the 19th century and the

20th century) are examined, organic urban tissue and the grid planned urban tisssue are found together. The regions based on the grid planned system are mainly in the burned side of the city. The works for modernization were intensified in these areas and efforts made to apply the projects (Kuban 2004).

Urban blocks are formed according to the road system which is the most permanent element of the urban tissue. With the conversion to the grid plan system in a region, urban blocks change. Blocks and parcels are either affected to some extent or reformed (those previously destroyed).

In Fig. 7b, the morphological variation of a selected urban block is discussed. Although this block (selected from D'Ostoya's map of 1858–1860) has a rectangular morphology, it contains a dead-end street. In Huber's proposed map of 1887–1891, this dead-end street splits the block with a vertical angle and a new block is formed. Additionally, in the map, rectangular blocks appear with sharper lines and conversion to grid type tissue is observed. In today's tissue, the dead-end street of the selected block is enlarged towards its own route and comes to a position where it splits the block into two parts. If we examine the morphological development of this urban block on a structural scale, it is clear that the parcels in D'Ostoya's map are larger than in Huber's map and therefore, the volume of a single block is larger. In addition, the change of parcel's size in Huber's map was proposed and the inner space of urban block was created inside the block.

Comparison of the socio-cultural tissues and their effects on urban morphology

In Trani and Galata, many cultures lived together at certain periods of time. In Galata, many rights were granted to minorities under the Ottoman rule. It is a fact that non-Muslims and Muslims lived together. Although this is less common today, some examples still exist. In Trani, Jewish minorities lived together with Christians until the 16th century. In contrast to the ghetto settlements of other regions of Italy, Jews were integrated with the regional social life and lived in mutual contact in Trani. A combination of cultural similarity and living together of various ethnic groups has given diversity to the region in both the social and architectural senses. These groups were integrated into the city, but they lived within their own ethnic groups in certain areas in the urban tissue.

In 15th century's Galata, the settlements differ physically. For example, the tissue of Italian settlement was a grid system whereas the tissue of Greek, Armenian and Jewish settlements was organic (Kuban 2004). When we look at the tissue of Trani, the Giudecca settlement, which developed outside the supposed *roman castrum* tissue, had an organic tissue. These different settlements can differentiate themselves from their regions and show different characteristics in the architectural sense.

In general, the activities of ethnic groups in Galata and Trani overlap with each other. In both regions, Jews who were involved in the trading activities settled in the port cities. In Trani, Jews had successful trade-activities until their expulsion. In Galata, the Jews lived in the Italian settlement and had an important place in the Ottoman trade. With the geographical location between the eastern and the western halves of the Mediterranean Sea, southern Italy has been the meeting point of many traditions. The region became a settlement place of many immigrants and minorities. Jews appeared in southern Italy in the 9th century. Trani has provided an intensive cultural interaction interface through the influence of Muslims and Christians who came from Spain, Byzantium and North Africa (Miller *et al.* 2010).

Jewish regions (Giudecche) had common urban features throughout their history. However, each region rejects the concept of the Mediterranean model and develops its own way. Each region developed its own unique characteristics depending on the legacy of the architecture from former residents. This inherited history still remains in many areas and is assessed in accordance with observations, measurements and written sources. In Trani, the Jewish region with very well preserved streets, houses and synagogues take us back to the 10th and 15th centuries. Although some changes have occurred over time, the urban tissue of the region has been preserved up to the present time (Miller *et al.* 2010). The gates provided entry to both ends of the Jewish region. The gate at the south end is still visible, but the other gate at the north end can be inferred by the fact that the street narrows there. The region was near to the port where the Jewish commercial activity took place. After the 10th century, the absence of walls around Giudecca is significant. In addition, the streets of Giudecca extended to the rest of the tissue of the city without discontinuation. Jewish and Christian populations were living side by side and there were continuous interactions with each other in the port, shops and streets. Christians were going to the Jewish region and were making mutual exchanges. This past is recorded in the place names. For example, 'Via del Cambio': exchange street was a small street, which continued to the port and was a working place for Jewish moneychangers. Shops and stores in the area specialized in textiles, coloring and the ale of luxury clothes. Additionally, in Trani, Jews spoke

among themselves and with Christian neighbors in Italian. Although the Giudecca settlement was a different area, it was integrated with the rest of the city. In south Italian cities such as Trani, people lived in ways that were better than would be allowed by their ghetto status. To have different people living in the same area created greater opportunities for mutual exchange and lent more social integration. Sources indicate that Jews in Trani had a specific legal status and were included in the social capital. Besides economic roles, Jews were participating in public life, paying taxes and giving donations. During the period of Roman Emperor Frederick II (1197–1250), the minorities were taken under protection and given many rights. However, in the early 16th century, south Italy was ruled by Catholic Ferdinand and Jews in Trani were asked to leave the area. In 1510, an inquisition trial was established in Naples and Ferdinand ordered all Jews to leave the area. However, Jews who obtained protection or were rich, remained in the region. Therefore, the order was not fully implemented. When 5th Charles took power over the region, this period did not last long and all Jews left there in 1541 (Miller *et al*. 2010).

During the Byzantine period, Galata was a trade colony of Genoese and a large proportion of the population were western traders. After the conquest of Istanbul, non-Muslims had their own quarters, the same as Muslims had in the region, and the balance of population changed periodically (Oncel 2010). Eyice indicated (1969) that in Galata, 535 Muslim houses, 592 Greek houses, 62 Armenian houses and 332 Frank houses were reported in a document dated 1476. Non-Muslims in the region began to settle to the North towards Pera. According to the research, 35% of the population was Muslim in Galata in 1478. If this data is correct, it might be concluded that European identity after the conquest was quickly overwhelmed by Islamization. In the absence of population censuses, and with the limitations of the surveys, it is not possible to test this hypothesis further against reliable population estimates. However, there are some further indicators such as the number and distribution of places of worships. In an islamic city, a mosque between the districts brings a Muslim settlement with it. In this context, the locations of religious buildings such as mosques and churches give a clue about the ethnic composition of Galata. Accordingly, at the beginning of the 18th century, almost half of the population appears to be Muslim in Galata (Fig. 12) (Eldem 1993). Non-Muslims obtained social equality with Tanzimat reform in 1839 and the Islahat reform in 1856. In addition, when the Levantines gained their rights, they brought Galata to an important place in world trade. Sailors and tradesmen were settled

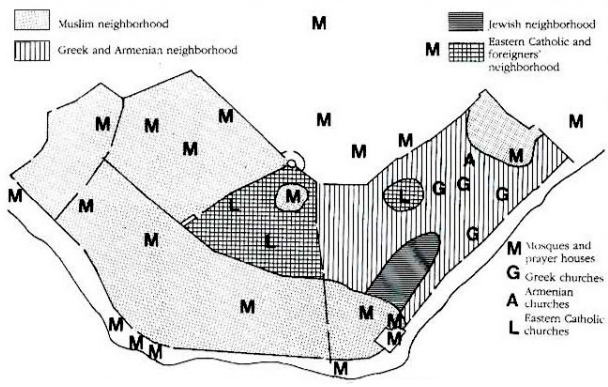


Fig. 12. In Galata, ethnic areas according to the religious buildings. M – Mosques and worship places; G – Greek churches; A – Armenian churches; L – Eastern Catholic Churches (Eldem 1993)

in the region and trading, banks, insurance companies, shipping agents were established (Turker 2000). In 1955, a sudden drop in the population in Beyoglu occurred. In the 1960s, the minority population continued to decrease in the region. Many Jews immigrated to Israel and many Greeks went to Greece in the period 1960–1962. The remaining Jews in Galata moved to Sisli-Osmanbey following the migration of Greeks from there. The buildings which were abandoned by Jews in Galata, began to be occupied by a population with a different culture, immigrating to urban areas and so the social tissue changed rapidly (Ardaman 1996). During the Byzantine period, Jews were placed in Galata by II. Theodosius. Apart from these local Jews, Fatih Sultan Mehmet accepted many Jews after the conquest of Istanbul in 1453 and placed them in Istanbul (Besalel 1999). In particular, thousands of Jews who were expelled from Spain in 1492, were accepted by Ottoman Empire. In 1475, Jews were expelled from some Italian cities (Besalel 2000). Physician Yakup, who served for II. Murat and for his son Fatih Sultan Mehmet, was born in Italy. Gerson Ben Moshe who began to publishing in Istanbul in 1526, was also born in Italy in 1438 (Besalel 1999). These two names provide evidence that Italian Jews migrated to Istanbul during this time-period. The surnames of Italian origin-Turkish Jews are known to be city-based, inducing the surname Trani (Besalel 1999). Until 14th Century, the vast majority of Europeans did not have a permanent surname. When the second identification became necessary, a name which was one's job, geographical location, father's job or a name reflecting personal character, was given. Although these names were not permanent, the second identification was constant due to a person maintaining the same occupation (Scott 1998). Therefore, the surname Trani suggests that Italian Jews immigrated from Trani to the Ottoman Empire during their expulsion from the Italian cities.

Conclusions

Many common urban issues have been found in Trani and Galata in terms of macro-scale morphogenesis. The European cities usually have the same kind of urban-morphological-variation issues. It seems that Muslim or multi-ethnic cities sometimes have the same issues in common with European cities. For example, with the effect of Hausmannization, it has been attempted to impose some urban regulations in Muslim communities. However, such urban regulations are not, in some cases, suitable in Muslim or multi-ethnic cities, on account of the structure of their urban morphology.

In general, most of the urban morphological changes are the same in two regions. However, we can say that there were great affects of the European city regulations to the multi-etnic region of Galata, because of Ottoman's interest in western cultures and regulations at that time. Galata was chosen as an application area. We can also see the western approaches to the Galata region not just for building types and styles but also urban strategies; for example, attemtps to make a square to Sishane with a radial plan. However, this wasn't an appropriate solution for a city such as Istanbul, because of its topography. In Trani, as in the west, this type of radial plan applications were done by antinodal location of special buildings, but such strategy is not seen in Galata, here the streets are preferred to be connected to the squares randomly.

Galata, despite being a part of Istanbul, has different urban growth features from Istanbul. The region, as Trani, the most important commercial buffer point at the Adriatic coast, shows a western urban growth. This type of growth started when Ottoman Empire decided to be westernized and Galata was chosen as the first region for the urban applications.

In this study, work has been carried out using historical maps, because, urban morphology involves the examination of the forms of cities. Although, methods of quantitative analysis were employed in the study, we concluded that axiological issues such as radial urban formation in European culture, Hausmannization logic, segregation of Jewish settlements and cultural values were effective in the urban morphogenesis process.

This article explains the intermingling between the urban form and culture as well as the contextualisation of 'global' cultural influences on local regulations and urban development applications together with related constructive or destructive effects of urban coexistence.

The history of cities is a fundamental part of their future, and from which we can still learn. Articles of this kind will further assist the assessment of the reason-outcome relationship of presently envisaged urban projects and to understand the effect on urban morphology.

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