Relationship between the Scale of the City and the Scale of Architecture

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Abstract. The concept of scale, order and proportion, practically "forever", accompanied human construction activity and even contributed to the definition of stages, epochs or architectural styles. Seeking the interconnected compositions between the object, its surroundings and the sensitivity of the recipient is still one of the basic issues connected with the work of architect and urbanist. Therefore, tracing the evolution of views and accomplishments with regard to paradoxically undefined today, but the commonly used concept of scale seems most appropriate.

1. Introduction - dualism of the scale

The cross-examination of the relationship between a city scale and architectural scale of buildings that form part of an urban team is one of the fundamental issues underlying the conduct of original, creative and well-thought-out design performance. The ability to operate scale has been a domain attributed to architecture and urban planning designers for centuries. The scale is not a uniquely defined term, but commonly used, usually intuitively and based on subjective judgment. In general, this is not a problem unless we consider the scale as a criterion for verifying the effects of building creativity. The absence of a clear definition of the scale in such cases proves to be a definite flaw. Therefore, the reference of the term of scale to the scale of an observer seems to be the most appropriate. To simplify, an adjustment of space to human needs refers essentially to two problem areas.

The first, considerations over modelling buildings and their environment was developed in relation to aesthetic human sensitivity. The second, more contemporary, extends the scale issues to human mental needs. Tracking of the development of the issues above provides some perspective on the current views on the creation of the building environment.

2. Architecture as geometrical aesthetics of proportions

In architecture, the method of shaping buildings based on proportions has had a long tradition. The question of proportions, as a way of organizing spatial reality, has already been known in art since ancient times as the relation of particular parts to the whole. Irrespective from its definition, a proportion is the mean by which a construction work may be divided to produce the effect of rhythm, harmony, balance, unity, and contrast. In this case, it is also possible to reverse the action combining the composition elements into a coherent whole.

The proportionate meant understandable, simple and good, and therefore considered ideal and beautiful. Forms occurring in nature were generally considered worthy of imitation. The figurative images of palm, papyrus or lotus shapes (figure 1), as well as human figures and zoomorphic accents
(figure 2), are inextricably associated with the ancient Middle East architecture. The aesthetic solutions were sought in this way constructing the monumental buildings in Mesopotamia, Persia and Egypt.

The continuation of the Middle East heritage can be fully observed in the ancient Greek architecture, the first of the ancient traditions to have been comprehensively identified. Significantly, the aesthetic sensitivity of the Greeks went hand in hand with the ability to describe it by means of the principles of Euclidean geometry. The ability of abstract modelling of forms, originating from the nature and wooden construction tradition, has allowed them to be transposed into a more durable stone material. The ability to operate a proportion resulted in the development of architecture and art in the classical period (V-IV, B.C.), both in the field of construction (figure 3) and in theory ("golden ratio", aesthetic canons and orders of architecture).

The Hellenic method of "beauty codification", recognized as a creative tool, has been an inspiration for the construction activities development for successive generations to this day. The assessment of the Greek achievements limited only to the admiration of the mathematically aestheticized maturity of the design problems solving is not complete in this case. At the same time, non-aesthetic aspects related to viewer mentality appeared too. The viewer perception resulting from natural inclination (human eye structure) to emphasize straight lines, now recognized as Zöllner’s and Herring’s optical illusions [1] was already deliberately corrected by the subtle deviations of some structure elements to "straighten" them horizontally and vertically. Moreover, the anthropomorphic features (Doric - male, Ionic and Corinthian - female and girls) were assigned to the architecture orders, and the structure composing was described by the multiplication or division of modules derived from the human figure dimension. The Greek anthropocentrism, not only in the material but also spiritual scale, has not been forgotten thanks to the Vitruvius’ message (1st century BC), and the concept of the man as the "measure of all things" could get revived a few centuries later.

**Figure 1.** Fragment of the Egyptian column with a stylized capital in the form of a lotus leaf, The Temple of Amon in Luxor, Egypt, XIII B.C. Source: author's archive

**Figure 2.** Capital of the column in the zoomorphic form (protoma) from the apadama of the palace in Persepolis, Persia, V B.C. Source: [2]

3. The human scale architecture

The issue of architecture proportions and their relations with a human happened to be postponed for many years. Although in this case, it would be more appropriate to say the matter above was simply forgotten. The beginning of the modern era had the issue actively reconsidered at last.
The "Vitruvian man" concept renewal, or rather anew-creation (da Vinci, 1490) was favoured by the Renaissance growing interest in ancient tradition humanism. On the other hand, the preserved legacy of ancient construction performance was the opportunity to recreate its aesthetic canons published in numerous treatises modelled on the work by Vitruvius (Alberti, Vignola and Palladio). However, the resurrection of classical traditions is only a return to art modelled on a flat proportion. It was the analysis of a created work in a perspective illusion that gave the opportunity to model in so far unknown conditions. The possibility of obtaining a perception similar to a prospective observer proved to be an incredibly useful tool for an architect. The first effects of the linear perspective principles application are known from Brunelleschi's works. Florence's Ospedale degli Innocenti or the Pazzi Chapel are still awe-inspiring with their lightness, harmony and logic of composition. (figure 4, 5). The buildings are not only the examples of proper handling of proportions, but also above all the skilful adaptation of the whole composition to the aesthetic sensitivity of the recipient.

The Brunelleschi's pioneering concept, however, had its limitations. This was due to the knowledge of the linear perspective only. Hence, his works are dominated by the need to create symmetrical planes and place major artistic accents on the building central axis. This does not change the fact that, for the first time, the creator went successfully beyond the rigid corset of a flat proportion and took into account...
the conscious presence and therefore, the scale of the future observer. Certainly, these were only humble beginnings. The majority of architecture structures were still perceived as separate and finite entities, and the creative process was dominated by the use of more or less complex systems of proportions.

4. Architecture in the urban scale: town planning
The wider interest in mutual relationships between architecture structures appeared in the Baroque period. The buildings began to be watched, not only from one but from many directions. It mainly concerned view axes which future works would be viewed from in reality. The observation method of architecture as a sequence of scenes and images, first designed and then viewed by the audience was introduced into designing.

Buildings were not created as individual structures, but rather as view perspectives as stage systems of which the buildings are parts. However, it was not about the construction of unified urban complexes without distinct individual features. On the contrary, the analysis of the selected fragment of the urban "scene" was used to deliberate introduction of a hierarchization of buildings among which the selected objects either dominated or were merely the background for others. This way of space organization satisfied the needs of the most active investors of the epoch: The Church and the state. Hence, the creative effort of architects focused mainly on the design of monumental and effective works aimed at emphasizing the prestige and adding up to the splendor of papacy and secular authority.

Paradoxically, the impulse for the development of the Baroque vision of the city were not some lofty ideas or aesthetic concepts created by architects but a realistic assessment of spatial and functional reality and the need to undertake regeneration actions, in this case for the falling Roman metropolis. The decision to put the chaotic buildings of the medieval old town in order initiated by Pope Sixtus V (1585-90) was definitely utilitarian (figure 6). However, it must be emphasized the visionary myth often attributed to Sixtus V. of deliberate introducing novelty composition solutions into urban planning is definitely an oversimplified message.

The foundation of the papal actions was not a creative statement, but a necessity to solve the current problems faced by the city and at the same time the headquarters of the church authorities. Apart from the prestige and sanitary issues\(^1\), the metropolitan administrator expressed clearly the utilitarian priorities. Numerous group of pilgrims coming into Rome were to follow clear circulation routes towards the main pilgrim basilicas (San Trinita dei Monti, Santa Maria Maggiore, San Giovanni in Lateran and di Santa Croce in Gerusalemme (the Holy Cross in Jerusalem)), thus avoiding getting lost in the alleys of the capital as it used to happen. The vertical elements set in front of temple facades were to add up to facilitating the spatial orientation; the Egyptian obelisks were commonly imported to the city even in the glory days of Imperium Romanum, the Roman Empire. Moreover, due to the large number of pilgrims gathering before the liturgy, there was a need for an adequate space free from buildings at the main church entrances. This much resulted in a new look at the problem of shaping urban space.

The necessity of introducing a new street regulation in Rome provided an opportunity for a clear display of the churches mentioned above. It also facilitated the identification of urban space from the passer by perspective and, most importantly, contributed to the development and future creation of the public space: the essence of the city. New squares of varied geometry were created (circle, oval and rectangle) with branching of streets most frequently in radial pattern (figure 7). The bodies of churches were exhibited in the building complexes (figure 8). They were superior to subordinated axial symmetry and urban interiors symmetry strengthened by placing various elements of development near the

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\(^1\) The need to restore the prestige and image of Rome as the Holy See was a direct result of the Council of Trent decisions taken in 1563 and connected to The Counter-Reformation, while the technical issues were imposed by the necessity to supply residential areas with water and drainage of sanitary sewage. For: Giedion S., Czas, przestrzeń, architektura, , Ed. PWN, Warszawa 1968, p. 114, [6]
temples. The decoration of the squares was often supplemented by the effective gardening designs, fountains (figure 9), pools, wells, monuments and stair.

Figure 6. The new plan of Rome - the course of the new street regulation introduced by Sixtus V (1585-90) is marked in black. Source: author's own work based on: [6]

Figure 7. Piazza del Popolo in Rome - an example of urban space order initiated by Sixtus V in 1589, the present oval shape of the square dates back to 1822, [8]

Figure 8. Piazza San Pietro in Rome, view towards St. Peter's Basilica - dominant landmark among the accompanying buildings (Colonnade by G. Bernini, design 1656), [9]

Figure 9. The Trevi Fountain in Rome - typical Baroque decor of public space, the fountain element located on the square is the stage design "pretending" façade of two independent buildings, N. Selvi. [10]

During the papal Baroque era, Roman structures were to arouse awe, admiration and be a testimony of the investor's prestige. Thus, they were supposed to be monumental and so they are. The intentional monumentalism, however, can be attributed to individual buildings and not the public space involved. The buildings at The Piazza del Popolo, Piazza Navona, Trinita dei Monti (Spanish Steps) or Piazza San Pietro are undoubtedly impressive and majestic.

However, there is no manifestation of spatial tyranny against the user. There is the correlation of horizontal dimensioning of squares (length and width) with its walls (height of buildings), pattern and floor planning, selection of divisions and details on elevations of buildings, positioning of vertical accents and the analysis of foreshortening and directions from which buildings would be viewed. All
these are simply selected elements of an architect's skills, which influenced the design decisions that made the work created subjectively acceptable to its user.

It does not matter that the church looked like a giant to the viewer standing in front of it, and the column base at the front elevation, of e.g.: St. Peter's Basilica equalled half his/her height. The dimensions of the buildings are secondary here. What seems to be primary here is the manner in which we tune with them. If the general outline of the structure (the figure) can be seen from a long distance, and coming closer to it, we can see smaller divisions on the elevation until we recognize the architectural detail placed on it, we are able to accept its exceptionally large cubic size limited only by the technical capacity of the epoch.2

There is a lot of matters for which architecture, especially Baroque, can be blamed. Theatricality and pompousness of aesthetic solutions, breaking with the classic canons of the Renaissance beautifulness and the multitude of forms present at the same time and space (horror vacui) are just few flaws of the Baroque works.

Without any doubt, you can agree with them, but not in the case of an attempt made to order urban space. Baroque builders can certainly be called urban planners who managed to balance the harmony between the architecture of a building and the fabric of the city. The urban structure, inviolable until then, turned out to be the fabric co-creating the architectural structure. Thus, a clear relation between the scale of the city and the scale of the architecture of building emerged.

The Rome-initiated idea of merging and composition arranging of cities found its followers quickly fully flourishing in consecutive centuries (17th-18th centuries). The Baroque practice of urban design was equally applicable to the already existing centres (Paris, Nancy, London and Warsaw) as well as for new developments (St. Petersburg, Karlsruhe and Washington). It is worth noticing the full dimension reached by residential architecture and their surroundings with its flagship palace work in Versailles, modelled on in Europe (e.g. Sanssouci in Potsdam, The Winter Palace in St. Petersburg). Baroque heritage was still present in the urban practice of the second half of the nineteenth century and in the beginning of the twentieth century.

Eclecticism was then the essence of views on architecture and urban planning. Being far from creative explorations, dominated both in theory (Sitte C., 1889) and in practice. The architect’s practice skills and tools in this case were very mechanical in nature, consisting of the combination of architecture styles with the building function. This was particularly evident in public buildings3. We cannot help thinking that the discussion how to design was reduced only to the utilitarian character of the building and the issue of developing a proper neostylization for it.

Eclecticism - historicism was the compulsory continuation of the traditional way of shaping cities. The Vienna’s Ringstrasse, the new Barcelona or Haussman's reconstruction of Paris are the flagship projects of the era. In European cities, the United States and other locations within the reach of the western civilization, new urban planning and monumental architectural works were strongly present, referring to great historical styles. European centers found this aesthetics a natural thing. However, eclecticism - historicism implemented in a culturally different environment appeared quite an original concept. The most unusual example seems to be the Amazonian city of Manaus with the Italian neo-renaissance opera house.

Apart from unquestionable achievements, especially in reference to multi-dwelling housing construction needs, common evils could not be avoided. The latter include, among other things, an

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2 Cf.: Mus A., Nowak P., Skala i symbolika współczesnej architektury, Zeszyty Naukowe UJ - Nauki humanistyczne, nr 7 (2/2013), Kraków 2013, p. 75, [11]
3 Designing the parliament building, Greek neoclassicism was recommended to be used as a reference to the Athenian democracy idea. Neo-Gothic, the expression of bourgeois pride, was the most appropriate for the town hall. Neo-Renaissance associated with the humanities was reserved for museums, opera, theaters and universities, and the stock exchange buildings were to have Venetian forms. See Koch W., Style w architekturze, Warszawa 1996, p. 416, [12]
uptown resident overcrowding, bad hygiene and sanitary conditions and a low building standard. Both the artistic stylistic of eclecticism, metaphorically defined as the "costume of the past centuries at the modern ball" and the lack of interest into basic needs of the human scale, the scale of the user of the existing housing complexes contributed to the reform movement at the end of the 19th century.

5. Birth of the new scale: modernism and its monuments
The change of the classical role of urban planning setting up a unity with the scale of the architecture work took place at the beginning of the last century. The dynamic civilization progress, initiated at the beginning of the twentieth century, not only changed our lives radically, but also reformed the construction performance. The widespread use of new technologies (ferroconcrete, steel and glass) were quickly used as a means to implement design plans. The free plan of the building, constructed with the reinforced concrete or steel frame and the use of curtain glazing walls and banded glazing windows facilitated the building forms simplification.

There was a claim for historical ornaments and decorations abandonment and the opportunity of flexible building creation led to the "function determines the form" statement. As a result, restraint in the detail use and similarity of aesthetic solutions resulted in the new building form unification on a global scale. Thus, it is no wonder this architecture trend was named "international style" (Johnson Ph., 1932). Functional priorities and formal purism have also influenced the solutions used in urban planning since the beginning of the 20th century. The most innovative and representative construction works were completed after the Second World War.

Recognized as the flagship projects of mature modernist town planning the urban complexes of Brasilia (Costa L. and Niemeyer, 1960) [13] and Chandigarh [14], are difficult to relate to the traditionally understood scale of the user. They rather represent an attempt to materialize the monumental and utopian visions of a modern city using innovative and previously unproven ideas in a large spatial dimension (figure 10,11).

Figure 10. Brasilia - Eixo Monumental, the government district part, built 1956-60. Source: [13]
Figure 11. Chandigarh – Palace of the Congregation, part of the Punjab government complex, India, 1952-61, currently used as a monument. Source: [14]

6. Modernism in architecture and urban planning: remarks
The modernist architects and urban planners’ achievements, once welcomed enthusiastically, receive unfavourable opinions nowadays. Main doubts concern the dehumanization of built-up space. The monotony of architectural forms, the building homogeneity and the lack of human factor in the public space are pointed out. The breaking of spatial ties with the historically built up environment, ignoring sensitivity and human perception needs became reality. The initial lofty postulates of the architectural avant-garde referring to the human scale and its relation to the buildings constructed were not reflected in the construction practice.
The revolutionary Bauhaus view of architecture as a field integrally linked to art, psychology, sociology, technology and nature turned out to be just a motto. On the other hand, the continuation of Vitruvian man's concept in Corbusier's new rendition remained just an elegant mental construct limited to the cubic capacity of the designed structure (figure 12, 13). Finally, the extremely negative summary of the achievements initiated by the "modern movement" was influenced by the subsequent universal unification of design solutions supported by the construction economy dictate, especially this residential architecture.

Figure 12. The Vitruvian Man (according to L. da Vinci) juxtaposed with Corbusier's Modulor - modernist reference to the concept of human as a measure of space. Source: [15]

Figure 13. The Unité d'Habitation, ("Cité Radieuse", "La Maison du Fada", "Mother of All Blocks") - inspiration for numerous housing estates implemented in the second half of the 20th century. Dimensioning of the building space based on the Modulor by Corbusier 1952. Source: [16]

For these considerations, it is important that modernism has increased the building size, and none of the contemporary styles so far has not been corrected this cardinal error. The historical principle practice of juxtaposing a structure with a particular spatial situation was abandoned.

The cultural sphere along with the traditional relationship of building unity and the scale of the city was left for many years. The "works" designed were to express the artistic aspirations of their creators and to delight the observer with the modern and unknown "uniqueness".

Moreover, the avant-garde assumption of an architect’s infallibility in design decisions and the appointment of him or her for an educator of new art recipients and a social life organizer was a mere doctrine. In this case, the modernist dictum was not much different from the simultaneously developing totalitarian architecture trends (the Third Reich and the USSR) and their derivatives (the Eastern Bloc countries socialist realism), and it was even co-creating them.

From an architect's point of view, modernism was not a negative phenomenon, but rather a noble one. The modernist desire to introduce a designer, as the creator of an accomplished structure, makes this occupation attractive and challenging. In non-aesthetic terms, modernist slogans remain up to date and have always been the starting point for reflections on contemporary architecture. It is about the issues of human personal development, human needs and social behaviours, as well as the issues of coexistence of the built environment with the landscape and nature and the use of technical progress in our everyday life ("the second aesthetics of Werkbund").
7. Postmodernism
The need to derive from the heritage of the past appeared in reaction to and opposition to the manifesto of modern architecture: modernism. The postmodern reconciliation with the fact that "everything was already there" in comparison with the previously proposed bland universalism found its place in the "creative" processing of historical heritage. Return to the tradition, as a method of structure design defined by citing or transforming previously known forms, was already present in the history of architecture. In this case, however, such activities contributed to discussing the quality of the urban environment and the presence of human in it. The abandonment of the purist aesthetics of modernism was particularly evident in urban planning. Urban space is shaped to appear chaotic and non-functional. The planned disorder of urban planning teams turns out, however, useful to meet the mental needs of the recipient. Spatial ‘chaos’ fosters accidental human encounters, tightens local social ties, improves site orientation, object function identification and a sense of security. Recognizing the advantages of the old towns found a wide expression both in theoretical works and in the design practice of the artists of the traditional trend meeting contemporary needs and images of the city (Krier L., The new urbanism, Cittàslow movement and "smart growth").

Opening up to the legacy of the historical urban planning achievements, manifested by the convention of operating the traditional elements of spatial composition (market, square, street, dominant landmark, etc.) has become the basis for reflection on the contemporary city and to discuss its shaping and reforming. This direction has been continued up to now and manifests itself in promoting the idea of rehabilitation of cities. The spectrum of actions taken comprises both degraded centres and downtown areas (Baltimore, Portland), post-industrial areas (London, Malmo, Hamburg) (figure 14) and completely new developments (Poundbury, Port Grimaud) (figure 15).

8. Conclusions - Scale - contemporary accounts
The polemic concerning the solutions for the construction of new towns and the development of existing ones was initiated by various researchers and creators. The source literature published in the past century is a continuous discussion on the image of urban space and its role in relation to human needs, on an individual scale, as well as a broader, social scale. Simultaneously, the issues related to cultural

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4 In addition to the consideration of urban issues in the field of traditional and modern (modernist) there were, among others: the E. Howard’s idea of urban garden, the concept of “organic” urban planning (B. Reichow, R. Schwarz), the visions of totalitarian regimes in Germany and the USSR or the postwar British guidelines of the New Towns Act 1946. For: Paszkowski Zb., Miasto idealne w perspektywie europejskiej i jego związki z urbanistyką współczesną, Universitas, Kraków 2011, p. 12, [19]
heritage, landscape, environment, demography, economics and technology are discussed. The clear polarization of views occurred at the moment of breaking with the historical vision of the city by the modern movement in architecture (Le Corbusier, CIAM). At the opposite extreme, the continuation of the idea of a traditional understanding of the city's structure and human role in it has developed in opposition to modernist postulates, and it is still valid.

8.1 Modernist trend - "architectural"

At present, modernist concepts seem to be reserved for prestigious public buildings connected with power, religion and art. The only doubt in the traditional conceptual assessment may be the scale of objects implemented that exceed the threshold of monumentality frequently leading to dissonance with the environment.

The scale or the complexity of a form built often results in a spatial conflict with the environment, which can be called 'a confrontation between architecture and traditional urban planning'. Individualism and independence of a new building from the context of the human. It is difficult, however, not to share the opinion that we deal, in this case, too, with a creative activity that creates the basis for the creation of something completely new, close to the idea of architecture as art.

Numerous controversial architectural interventions in the historical cities structure, with their initial disapproval at the time of their inception, became icons of architecture and modernity in later years.

The perfect example of this is the Eiffel Tower story. Once considered a product of arrogance, lack of taste and humility of the designer, later it was accepted even by the most conservative observers, and even blazed the trail for the later "shocking" Parisian structures (The Center of G. Pompidou, the Great Arch of La Defense and the Louvre Pyramid).

This action contributes to the individualization of cities, gives them originality and, therefore, attractiveness. The continuation of this idea is still alive and visible in contemporary productions. Contrary to the perception of ignorance of the scale of newly designed objects, contrasted aesthetically with the environment, it often turns out that the introduced architecture may turn out to be a phenomenon that focuses on the social imagination. Their originality and monumentalism become, for the existing spatial sequence or even of the entire urban complex, an expressive and recognizable symbol, landmark and thus an element of the "mental landscape" of the city (Lynch K.), which builds its uniqueness. Contemporary "controversial" elements of the landscape build the identity of the city and it is difficult to disagree with that. What is more, we are already accustomed to that and as recipients of architecture we expect spectacular structures (figure 16, 17).

![Figure 16. The Shard - currently the latest and highest symbol of London, arch. R. Piano, 2012. Source: [20]](image1)

![Figure 17. Singapore - new monumental symbol of the metropolis, Marina Bay Sands, Arch. M. Safdie, 2011. Source: [21]](image2)

8.2 Historical trend - "urbanistic"

The second view on scale of buildings is connected with the historical trend. The area of interest at present is mostly concerned with the subject of urban complexes planning, in opposition to the modernist
downtown and block of flats complexes. What is more, the "traditional", completed with current issues, approach to urban design has shaped the views on contemporary urban planning.

The prevailing judgement is commonly shared of the necessity of creating an urban environment in cohesion with the environment, respecting private and public space and values of the natural and cultural landscape using a variety of functional-spatial and technological-material solutions.

The building, integrated into the existing context, has to be a common entity with it. The idea of unity of architecture and town planning Seruga [22] and more recently including also the landscape, Kosiński, Zieliński [23] which is closer to the traditional concept of human scale is now reflected in housing estate implementations, rehabilitation processes of degraded areas, but also in supplementing urban public spaces (figure 18, 19).

Figure 18. The City Hall in Murcia - new buildings in the historic city center, view from the Card. C. Bellugia square, arch. R. Moneo. Source: [24]

Figure 19. The Card. C. Bellugia square in Murcia - general view. Source: [25]

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