WHAT IS PARTHENON'S HEIGHT? RESEARCH OF THE ENVIRONMENTAL PARAMETERS FOR THE CONSTRUCTION OF TOWERS IN THE METROPOLITAN AREA OF ATHENS BASED ON THE RECENT CHANGE OF LONDON'S SKYLINE

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ABSTRACT

The construction of tall buildings is in universal prosperity, due to continuous urbanisation and global competitiveness, and is already real in many European cities. The new generation of towers is designed with bioclimatic criteria, in line with sustainable design standards. However, the tall buildings affect the cities' skyline and environment, creating environmental, social and cultural problems. The image of the city of London has changed radically during the last two decades due to the construction boom. The paper is the result of a literature review on the subject of tall buildings and their integration in the city that focuses equally on classic literature and on the current international discussion organised around the four pillars of sustainability, but also focuses on case studies of "green" tall buildings. It criticises the decision for the construction of towers in the new Metropolitan Pole of Hellinikon and Agios Kosmas, based on what we have been taught from the recent change of London's traditional skyline. The research concludes with the opportunities and challenges of the project.

KEYWORDS

Environmental design; Landmarks; Skyscraper; Tall buildings; Traditional skyline.

1. INTRODUCTION

The paper studies the subject of tall buildings and their environmental integration in large cities, putting emphasis on the decision for the development of towers in The Hellinikon (sic) (Metropolitan Pole of Hellinikon and Agios Kosmas). This potential is gauged against the international experience gained from the recent radical change in London's traditional skyline.

The research embarks with the evaluation of the planning policy framework for the construction of towers within the metropolitan area of Athens based on London's recent experience. The evaluation focuses on the investigation of the environmental parameters of each city's policy framework for the construction of tall buildings and on the results of their integration in the city of London, in regards to their environmental response and the city's urban evolution. It concentrates on the natural and urban environment, bringing at the centre of attention the dynamic of tall buildings and their relationship with unique landmarks and monuments that dominate the skyline of the cities for centuries.

The research presents the comparative study

of the two cities, which during the last years develop planning policy frameworks that allow the construction of tall buildings in their urban grid. In London's case this imprints in the radical and constant creation of new towers not only in the two big economic clusters (City, Canary Wharf), but also in other boroughs[1]. In Athens, the construction of towers was allowed only recently in the redevelopment of the former political airport of Hellinikon[2]. The recent policies change the previously restrictive frameworks for the construction of tall buildings in both cities, which aimed at the preservation of their traditional skyline and the protection of monuments such as the Parthenon and St Paul's Cathedral.

The research investigates environmental, social and cultural issues that emerge during the planning process and those that arise during and after the construction of the tall buildings[3]. It studies and denotes possible opportunities and challenges that arise from permissions for the construction of tall buildings in the metropolitan area of Athens.

The research is based on a bibliographical review of classic literature in regards to the appearance and evolution of the skyscraper in the cities, and is also informed by the current international discussion on the sustainability of tall buildings. It discusses design guidelines and trends and their adoption in different cities of the world, followed by cases studies for the design characteristics of towers that incorporate environmental concerns/issues in their design process. Focusing on the two cities, initially through the historical recursion of the establishment and evolution of each one as to their urban design, architecture and urban environment, and further on to the social and planning policy frameworks that led to the construction of the first towers, the paper ends with the evaluation of the recent decision for Athens's towering Hellinikon.

2. TALL BUILDINGS

2.1 Historic evolution

Height has always fascinated human beings, for symbolic and practical reasons. Tall structures symbolised the power and prestige of a society, initially having religious and sometimes defensive character. The first tall historic monuments of the recent past appear in the cities on the second half of the 19th century, a time at which the great technological progress also permits the construction of private commercial tall buildings for the first time. In the first decades of the 20th century architects around the world study the relationship of the natural and built environment. The skyscraper becomes a building type that is seen to benefit cities in relation to freeing up valuable space. This brings forth suggestions for new spatial layouts of tall buildings with commercial but also residential use, flanked by vast green open spaces. Furthermore, in the course of early studies of the skyscraper's typology, architects and engineers research its environmental response [4].

Political instability of the next decades halts the dynamic of tall buildings that had started to develop. The new social conditions after WWII and a new wave of urbanization renew the interest in this building type. The factors that trigger the construction of tall buildings are: the massive urbanization, the surplus value created on the land value, the globalization and global competition, the symbolism and the human ambition and egoism [5].

2.2 Sustainable skyscrapers

The energy crisis of 1970s leads to the redefinition of the skyscraper, with the orists of the time questioning its impact on human psychology, in society, in the city and the environment.

Opinions of the time stress the skyscraper's adverse impact on: the human psychology due to homogenizing effects [6], the fact that they are non- ecological and show neglect for the symbolisms that their height carries with regard to monuments[7], the creation of urban pathogenesis due to the overloading they

create to urban nodes[8], the environmental impact to the surrounding area, the aesthetic pollution of the cities' skylines, the annulment of social senses like the neighbourhood, and the danger from structural mistakes or physical destructions[9].

The Brundtland Committee in 1987 defined sustainability as the "development that meets the needs of the present without compromising the ability of future generations to meet their own needs", and it is formed by four pillars: environment, society, economy and culture[10]. The skyscraper has an impact on all four.

The Malaysian architect Ken Yeang, having introduced the term "eco- skyscraper" is a pioneer in the theory and application of sustainability in tall buildings. He states that the skyscraper will keep appearing in our cities due to the continuous urbanization and suggests that architects have to find ways to address the environmental impacts they create. His basic theory includes the "bio-integration" and "eco-mimesis", i.e. the design process that imitates the ecosystems. The most characteristic example of his theory is EDITT Tower in Singapore, which is a "green skyscraper" prototype, with integrated PV and grey water irrigated, vertical gardens formed by local vegetation that protect the building from the sun and contribute in its cooling. While contributing to the formation of the place's unique visual identity, the gardens also extend street life in the upper parts of the building, further integrating it into the collective urban space [11].

Nowadays, many tall buildings are promoted as sustainable examples, not all of which are equally successful; they may nevertheless show the way that environmental design should move towards. London's prestigious recent additions, the Gherkin, by Foster and Partners, the Shard, by Renzo Piano, and the Walkie Talkie, by Rafael Vinoly Architects all profess to be examples of sustainable skyscraper design.

3. LONDON'S PARADIGM

London expanded after the Great Fire in the 17th century, when the city started forming its identity as the capital of a global empire. Its symbols were developed during important periods of its history and were preserved as such until the appearance of the new economic centres, when skyscrapers were added to its traditional skyline.

The image of the city has changed greatly during the last two decades. The strict planning policy framework was inverted by the decision for the creation of the Canary Wharf business centre, in a former brownfield, outside the city centre. This was followed by a series of changes which reinstated bodies that were in favour of tall buildings, triggering a construction boom of skyscrapers that is still on-going. UNESCO's concerns on the impact of tall buildings in the city's skyline and its consideration to include London's World Heritage Sites in the list of site "in danger" [12] did not actually manage to slow down the construction boom, but managed to change the planning policy and the bodies that have to be consulted, focusing more on the image of the city by adding more protected views of St Paul's Cathedral, as well as adding specific environmental parameters for obtaining planning permission.

The planning authority in the UK lies with each Local Authority. There nevertheless exist policies that have national application. The two London's boroughs with the biggest number of tall buildings currently have planning policies in place that integrate the aforementioned environmental parameters and structural changes to the application process. However, there also exist policies of wider application permitting the construction of tall buildings even in boroughs that do not currently have relevant local policies in place, ending up in permitting the construction of tall buildings that do not meet all the criteria of environmental design. Alas, even in the areas that the policies are present, there are examples of tall buildings that follow all the regulations but still do not contribute to the

city's dynamic visual experience [1].

4. ATHENS'S FUTURE

Athens's history has always been around the Acropolis. Since the city became the capital of Greece in early 19th century, its spatial evolution has always preceded the formation of an adequate planning policy and Local Plans. Today's image has been greatly compromised by the excessive urbanisation over the years, which has turned it to an unsustainable city. The only elements that prevail from the continuous building mass are the physical outbursts that have been saved from construction, and the few tall buildings constructed during the 1970s. The planning reform of the 2010s reintroduces the issue of the tall buildings in the city, with the decision for the redevelopment of the former airport of Hellinikon. The initial plans included the construction of two towers, which would act as landmarks, without however defining what is considered as a tall building and what the maximum height would be [2].

The addition of four more towers, based on the latest plans, the decision a maximum height of 200m and the locations of the towers in the area, as well as the decision for the construction of more tall buildings of maximum height of 50m came to fruition during the final agreement stages for the particulars of the development [13]. The reasons for these changes and decisions were not specified and no studies, on the relationship of the new vertical elements to the existing historic and natural landmarks of the city and to its natural skyline, were put forward to their defence. In relation to the towers themselves, the environmental parameters that have been set are in line with general bioclimatic design and sustainability criteria; however, they don't set specific targets, leaving the environmental design of the buildings in the hands of the developer rather than the architect. Thus far, the design of the first twin skyscrapers, which has been put forward by the developers, does not fuel optimism as to the inclusion of such environmental - or even aesthetic for the matter - concerns and considerations.

5. TRANSCRIBING THE PARADIGM

The international discussion and the case studies show that it is possible to overturn the image of the "non- ecological" [11] skyscraper into sustainable buildings. If they are designed in line with the bioclimatic design principles/criteria and their setting in the city is chosen carefully, such buildings can be integrated in the urban environment and form new hubs of city life. The state and the planning policy framework of each country play an important role for the success or the failure of these buildings.

The development of the Metropolitan Pole of Hellinikon and Agios Kosmas is a project with certain characteristics and boundaries. The design of the buildings and the open spaces should respond to the project as a whole, to the surrounding area and to the city, as due to its size it affects the whole metropolitan area. Regarding its integration in the city, the project falls within the category of the off- centre integration. For its implementation, a series of laws and decisions there has been published, for the definition of the general requirements (land uses, volume and footprint of the buildings, heights, general arrangement) and the Complete Development Plan with more specific technical requirements and the method of implementation of the development.

The project could be seen to respond to the environmental pillar of sustainability, as it promotes density with a mixture of uses, dense infrastructure and the reuse of a formerly neglected space. From a social aspect, the new park aims to be inclusive, i.e. open to all, and attract different social groups; on the other hand, the "high-end" character of the residential, touristic and business-use towers are addressed to people and businesses of a high economic profile. This could lead to social inequalities, isolation, and loss of basic social sense. Furthermore there lurks the possible loss of local references which could have further social impacts. Ultimately, the position

of the metropolitan park, in heart of the plot, reduces its visibility and emphasizes the new towers, undermining the "openness" of the park and the historic value of the area.

Economically, the development of the tall buildings makes the investment feasible, however it is possible that the investment could have been feasible with less building and more open space. Such developments always entail the risk of being vacant for a long time. The towers with touristic and residential use do not contribute to the dense city standards, as they are addressed only to a specific audience.

Finally, from a cultural standpoint, the distance of the development area from the city centre, the topography of the area and the difference in character between the city centre and the redeveloped area work towards the integration of the project in Athens without creating competitiveness between the Parthenon and the skyscrapers. However, the visual power of the towers is likely to overshadow the historic character of the site. The original proposal for two towers instead of six could have worked better in terms of creating new landmarks and refer to the site's history.

In relation to London's paradigm, the project can be compared to Canary Wharf economic centre, which was created in a former "brownfield", outside the traditional city centre, and had specific development characteristics that were permitted for his development only. The theme of the two projects has some differences, as Canary Wharf was created as an international economic centre and triggered the creation of a new residential area, whereas the Metropolitan Pole of Hellinikon is a mix-use development, but it also aims to be an international economic and touristic pole. Based on London's experience, the paradigm of the new off- centre cluster, which was backed by other infrastructure (DLR, City airport), was successful and its integration to the city was smooth, as the new place formed its identity quickly and there wasn't an adverse interference with the city's tradition skyline, due to the distance from the traditional city centre. Furthermore, the choice of its location in a former brownfield led to no substantial impact on the surrounding area, and the integration of some of the historic docks in the development was successful. However, the decision for the increase of building heights in London did not stop to this development. Canary Wharf's creation brought a series of changes in the planning law, resulting in permitting the construction of tall buildings in other areas of the city a few years later, this time inside its traditional centre. And, as opposed to the development of an area where it is intended from the beginning to build tall buildings and there is the chance to design from scratch and factor in all parameters for the tall buildings to be successfully planned, the construction of tall buildings inside the traditional urban grid is very problematic, as usually the space is not adequate for buildings of this size not to impact on their surroundings, and also for the people to have the space to look and recognise them. In addition, inside the traditional centres there are landmarks and monuments that will compete with tall buildings or even get overshadowed due to their proximity to them, creating phenomena like the loss of historic identity, placelessness and confusion of the people in relation to their basic reference points. These characteristics are recognised on the redeveloped City of London.

In the case of the Metropolitan Pole of Hellinikon, the large plot, the setting of the towers (except for those that are proposed to be along Vouliagmenis Avenue) and the distance of the plot from the city centre meet many requirements that alleviate substantial impacts on the city. Nevertheless, there exist concerns over the relationship between the tall buildings themselves from an environmental, aesthetical and social aspect, as well as to the loss of the historic character of the redeveloped area due to the new land uses, the general design and the impact of the "shorter" buildings of 50m on the boundary of the development, as the current policy framework does not set certain targets and parameters on the above.

These concerns can be dealt with through subsequent design phases and through the formation of an adequate overseeing body that will grant permission for construction. The biggest concern, however, is the possibility that this project will trigger the construction of other similar developments in Athens, which will not only bring up issues of internal design and impact on the city, but also threaten traditional views of the city, such as the view of the Parthenon. This can harm the city's historic symbols and cause a radical change of its image and its identity. Moreover, the environmental impact of this scenario will be strong, as Athens's urban grid comprises from narrow streets and small plots, meaning that any new building of such scale in the heart of the city may not be able to be supported and could cause insurmountable problems in the surrounding area, which, combined with the lack of green spaces, can deteriorate further the environmental state of the capital.

6. CONCLUSIONS

The skyscraper will continue to appear in our cities. The experience from the built examples around the world show the way that these "non-ecological" [11] buildings can become sustainable, following bioclimatic design principles while combining thoughtful selection of their location inside the cities, buildings that can be well integrated in the urban environment and form new hubs of life.

The development of the Metropolitan Pole of Hellinikon and Agios Kosmas has the potential to be a sustainable project.

Its success depends on the clarification of all the parameters on the environmental response and the aesthetics of the tall buildings in relation to the project as a whole, the image of the city, its traditional symbols and the Athenian landscape, as well as on the re-evaluation of the some points on the location of the towers in the area.

The project should trigger the formation of new mechanisms for checks and balances of building heights and monuments' protection, for the control of possible future similar developments early on. The current Greek policy framework for the environmental design of buildings should be updated with regards to the new typology as. Furthermore, the policy framework for monuments should be pre-emptively updated for the protection of monuments, so as to include parameters for tall buildings. The above will be a first step for future-proofing the city's environment and heritage. The international experience has proved that the creation of projects that contain tall buildings outside the city centres is usually followed by new similar projects inside the city centres, having severe environmental and social impact in already burdened environments.

Athens is just another example of a historic city in a race to keep up with the new economic world standards. Rebuilding cities with skyscrapers is a modern phaenomenon. There are more cities around Europe that follow London's construction boom and change of their images, where historic monuments are threatened, usually resulting in the loss of valuable historic fabric.

The cities are live organisms that keep evolving, along with everything else. Change is something that comes naturally, however, if not properly planned, it can cause significant harm to complex historic cities. The past has plently of examples where unplanned change has compromised the natural and built environment of urban areas.

The research can confirm a knowledge gap in the detailed examination of best cases amongst different cities on the integration of very high density in the form of towers. Such research and networking could allow experience and ideas to be shared with regards to the future of our cities and the best way of moving to the next phase, with full intention of it being a sustainable one.

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