The role of the atrium in modern architectural icons

1. Introduction

The SADD graduation studio is aiming at designing the environmental Council for United Nations (shorted as “UNEC” in the following text) in Manhattan, New York City. The plot is located to the north of existing United Nations Headquarters, a complex designed by Le Corbusier and Oscar Niemeyer. The primary idea was to design relatively isolate and extreme monumental buildings. As a sixth member, UNEC has also the great symbolic and geographical significance.

However, UNEC, which is initiated to be the home-base for the worldwide coordination of sustainable measurements, has a different born nature from the existing UN complex. Sustainable developments and measurements are being concerned and taken all over the world in all sorts and kinds from all aspects. Thus the performance of UNEC would probably have a more immediate influence on its surrounding and the public daily life, compared with other UN organs.

For me, the most important meaning of the UNEC is: first, a link of the public concern and political organization, which would not only serve the employees and delegates, but also show a welcome to the public at the same time, and further generate interaction between different user groups; second, an icon of sustainability, which needs to express leading climate performance. An atrium, which architecturally and technically functions as a sharing focus of exterior and various interior spaces, is a suitable strategy to realize the meaning.

In this paper, I would like to research how the atrium affects the overall performance of an iconic building, namely the role of the atrium, which will help develop the design of my graduation project in SADD studio.

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2. The role of the atrium

“"The atrium is a very old idea. It has a 2000-year history as a grand entrance space, focal courtyard and sheltered semi-public area"." With the development of building technology, the atrium has turned on a modern envelope mainly composed of steel and glass, and reached higher and wider indoor space. Therefore, the modern atrium is able to exert greater impact. To explore the potential of its impact, I would like to research the role of the atrium from four main aspects: a) urban role, which is intended to link the building with public activities within its urban context; b) architectural role, which is aiming to express the iconic character of the building; c) spatial role, which serves to guide user flows and enhance interaction between different user groups; d) climate role, which plays a core role in the sustainable system.

2.1 Urban role

The whole studio did extensive research on the urban context of UNEC. As the most important city along the east coast of the US, New York has been fully influenced by the modern development, especially the Manhattan borough. It was once a disaster representative of many western cities. Towers went up in the sky, trying to be the landmarks in their context, while new buildings disregarded street lines at the same time. Opening public space became less and less. Fortunately, the situation didn’t become worse after the publication of a study from Cambridge University, which named “Land use and built form studies”. It is said that “street-following frontages could deliver space, sunlight and greenery”3. It indicated the beginning of the significant period for the atrium. After that the situation becomes better and better. New York’s 1916 zoning laws even allowed introducing the new amenity plazas to enhance public space. After exploring those urban strategies changes in history, we started to investigate the contemporary situation in New York. Figure1 shows the result we investigated of existing green / public spaces in Manhattan nowadays.

Fig1. Existing green / public spaces in Manhattan

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3 Cambridge University Press, Professor Sir Leslie Martin and Lionel March, April 1966
At present, atrium has become one of the most dynamic elements in the city. They can play many different roles in urban design: being the key point in the city structure, being the path between two important destinations, attracting people and enriching their movements inside, enhancing the quality of the urban public space.

For example, the atrium in Chemical Bank Building on Park Avenue, New York is really a splendid one. The building also has a glasshouse-style enclosed former draughty plaza at the bottom of its tower. It works very well in urban term. It should be mentioned as well that another atrium in Niagara Falls, New York also be a typical atrium, which has mixed ownership and styles of building in the neighborhood. The city in this case uses its civic role to enhance the public realm.

Those are the notions that I would like to achieve in my graduation project. The atrium in my design accommodates public function on the ground floor, which can attract public to enjoy the indoor space, as well as organize public activities in the plot.

2.2 Architectural role

UNEC is a UN building, not a normal office building. Therefore, in addition to using atrium as public realm, it is more crucial to use it to define its iconic character. Thanks to modern technology, a vast atrium envelope is possible. Further integrated with water, the huge transparent façade of the atrium can give an iconic impression to the public, as shown in the case of the Royal library in Copenhagen. Water, an iconic feature of Manhattan, has also been introduced to my design, to help highlight the iconic character of the atrium.

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5 Source: http://farm5.staticflickr.com/4143/4868563020_f9386ef68f_z.jpg
2.3 Spatial role

The architect can organize different areas along or through the atrium with different programs. By means of the atrium, the architect can control the activities within these areas in order to make the flows clear to all users. For example, the enormous Eaton Center in Toronto acts well. In the atrium inside, people can do shopping between offices and parking floors while reach the entrance to subway or outside within the area of galleria, at the same time, you can also take a seat and enjoy a cup of coffee if you like, in some amenity parts of the atrium.

In my design, the atrium will also be a circulation key point, which guides routings of different user groups while provides space for relaxing at different levels.

Since the existing Secretariat Building in UN Headquarters designed by Le Corbusier by is an international-style tower, officers who are working inside feel uncomfortable due to lack of communication with each other, especially the officers in different departments. In order to solve this problem in my design, I arrange the office programs along the atrium, to create visual and spatial connection between officers from different floors. The BBC Headquarter designed by David Chipperfield has such a special atrium, which connected different floors by huge steps in between. People can have a rest, chatting, having coffee on different height platforms. People also can go through the stages and reach the other part of the building easily. In this way, the meeting and communication opportunity is largely enhanced by the participation of the

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6 http://static.panoramio.com/photos/original/2378146.jpg
7 Reader, UN Headquarters, by Le Corbusier
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2.4 Climate role

Sustainable is one of the key concerns of the design for UNEC, a sustainable icon. Climate control plays a key role under the issue of sustainable. Atrium’s power in this area is always been mentioned by architects. As the climate varies, people prefer to enjoy their social lives in a space with shelter instead of the open outside. Then the type of building with roofing of spaces in between became more and more popular. And one study by Hastings and Ruberg of effects of adding glass canopies along the street can help to reduce the heat loss of the street by 57%. It means that this kind of element can shade the indoor space and store solar heat in summer, and heat the interior in winter. A good example for such performance is the Children’s Hospital of Philadelphia by Harbeson, Hough, Livingston, Larson.

Another possibility is to make use of electrochromic glass as the roof material of the atrium. The Dehority Hall of Ball State University gives a good example of the application of electrochromic glass. The sunglass-like property enabled architects to incorporate glass into the project while retaining the openness. In addition to sunshading, the electrochromic glass also has pretty good energy performance. According to Soladigm, the glass developer, “electrochromic windows can save as much as 25 percent on heating and cooling a building”.

In my design, I’d like to use my atrium to improve the indoor climate and reduce energy use so that UNEC can be a real sustainable icon.

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8 http://www.bdonline.co.uk/Pictures/web/t/u/i/BBC_ready.jpg
9 Progressive Architecture, April 1980, P. 114
11 http://sageglass.com/portfolio/ball-state-university/
3. Conclusion and reflection

From the discussions above, it is indicated that atrium is a suitable type of space in a modern architectural icon such as UNEC. And it will be very interesting to do some further research about the effect of atriums on materialization, construction and detail levels. Through this graduation design, I will try to create an interactive public space, which is capable of playing satisfying urban, architectural, spatial and climate roles. So far I have introduced a full height continuous vast atrium to my building, which is able to indicate its public function, express its iconicity, regulate user flows, link all programs at different vertical and horizontal positions, and control the climate performance. The design will be adjusted in future study and a balance among the four different roles of the atrium will be achieved.