

ARCHITECTURAL DESIGN AS A RESULT OF SCIENTIFIC RESEARCH. NEW DEFINITION OF ARCHITECTURE

Agnieszka RUTECKA*

* Dr.; Faculty of Architecture, Wrocław University of Technology, Prusa Street 53/55, 50-370 Wrocław, Poland
E-mail address: agnieszka.rutecka@pwr.wroc.pl

Received: 15.01.2014; Revised: 20.02.2014; Accepted: 30.05.2014

Abstract

Changes in a way of designing, the need to rationalise it and to optimise its product have led to the creation of a new trend in architecture. Datascape architecture is assumed to be the architecture based on scientific research. The aim, in contrast to the traditional designing method, is not only a completed work construed as a building but also a theory accompanying its creation. Very often it does not go beyond the study, focusing on solving the problem rather than on the final product. The author describes the datascape method and its impact on the extension of the concept of architecture.

Streszczenie

Zmiany w sposobie projektowania, konieczność racjonalizacji i optymalizacji produktu doprowadziły do powstania nowego trendu w architekturze. Architektura datascape jest w swoim założeniu oparta na badaniu naukowym. Jej celem, w przeciwieństwie do tradycyjnej metody projektowania, jest nie tylko dzieło, jakim jest budynek, ale także teoria towarzysząca jej tworzeniu. Bardzo często nie wykracza poza badanie skupiając uwagę na rozwiązaniu problemu, nie zaś produkcie końcowym. Autorka opisuje metodę datascape i jej wpływ na rozszerzenie pojęcia architektury.

Keywords: Datascape architecture; Scientific research; MVRDV.

1. INTRODUCTION

Architecture is the most artistic technical discipline. Though an architectural design is based on analyses, it is first of all a product of the author's imagination, his knowledge, a picture of his earlier experiences and employed aesthetics. As opposed to designing of industrial shapes, architectural facilities are usually developed in one copy. Creation of subsequent, brighter and brighter versions, testing and optimisation of them are not opportune. Architecture is a collection of prototypes.

The scientific research in architecture is, in majority, based on erected facilities. The analysis of examples allows concluding for the future and creating new typologies. Studies at a stage of designing are often restricted to a form development – its optimisation towards external conditions, and the buildings of Foster & Partners design, such as an office block: 30 St

Mary Axe in London can be an example. Datascape designing method provides the new view on scientific research in architecture.

2. DATASCAPE ARCHITECTURE

The datascape method was developed in 1990s of the XX century as a response to the need of objectivisation of the architectural design and the option for increased rational evaluation. A design in its pre-summation was fully to satisfy the assumed conditions. According to the etymology of its name it had to be a direct representation of data, the "landscape" built of it. *Winy Maas*, one of the founders of the Dutch architectural group named *MVRDV*, and at the same time a creator of the method, writes about it: Under maximized circumstances, every demand, rule or logic is manifested in pure and unexpected forms that go beyond artistic intuition or known geometry and

replace it with “research”. Form becomes the result of such an extrapolation or assumption as a “datascape” of the demands behind it [1].

In the datascape method a role of an architect is not diminished, however its character is changed. A creator makes a decision in the course of research, determines the importance of particular parameters and the orientation of process course, as well as specifies features the obtained preliminary model is to be optimized to. But it has no impact on to the results of intermediate analyses. Owing to creator’s knowledge and experience he supervises the course of an experiment as designing is and makes a decision on the nature, and the form of a work, as well. The datascape method enables to consider the process of development of a design as an impartial scientific experiment, same as it appears in designing works relating to another disciplines of technical sciences. The knowledge gained in series of researches preceding development of a design, provides designing more conscious.

The datascape method attracts a great deal of comment and it arises contradictory emotions among reviewers of architecture. *Bart Lootsma*: These datascares show that architectural design in the traditional sense only plays a very limited role [2]. He also asserts that datascares appeared to provide a way to understand the development of the environment in the more general way [2]. However, *Aaron Betsky* perceives that precisely because MVRDV’s projects are both real and unreal, speculative and concrete, projects and projections, they have the ability to make such vague ideas into places we can experience [3].

As opposed, the negative opinion of *Jean Attali*, a doctor of philosophy dealing with architecture, tells to keep from unambiguous assessment of the effect. By *Attali*: The fictions imagined in the books of MVRDV lead to a Dreamland of statistical histograms and exponential projections, serving up, in polychrome cocktails, a concentrated and painless formula of the “bubble diagrams” so dear to old-time urban designer [4].

3. DESIGN – RESULT OF SCIENTIFIC RESEARCH

3.1. Theoretical designs and their practical applications

Theoretical designs gave the beginnings to datascape. The first designs developed by the architects from MVRDV studio considered maximization of floor area ratio (FAR) as a response to more and more common issue concerning “sprawl”. The referred research and realizations connected with it are presented in a book: FARMAX. Excursions on Density [5]. Then in 1998 the Metacity/Datatown designs was developed, engaged in the topic concerning town “capacity” and dependences that govern it [6]. The results in video installation form were provided in Stroom gallery in Hague. The design based on statistical data presented a town as a visualisation of the data. The Datatown, deprived of a form and dependencies, became the model for further research. The objective of the design, similarly as in later works of the MVRDV group, was not architecture as an object, but the analysis of mechanisms ruling urban reality. The model changed itself being influenced by twenty one scenarios. The analysis covered development of topography with regard to waste disposal and opportunities for use of the occurred landscape. It was determined how ways of generating electricity as well as changes in inhabitants’ diet impact the shape of a town.

Then, the design was a peculiar provocation. Nevertheless, as opposed, it became one of the first attempts to sort out the chaos of data relating to present-day towns. Despite very simple, synthetic model, the architects succeeded to present pictorially the changes in the urban tissue and the environment which are consequence of various decisions.

In 2004 the similar subject area of research work was undertaken by *BIG* – Danish architectural group. The design named Little Denmark was an attempt to analyze the chances to develop a complex of zero energy balance, and next a concept of such structure [7]. Unfortunately, while generalisation of phenomena in the Metacity/Datatown design magnified dependencies between parameters under examination, owing to which it was opportune to monitor them and to conclude, studies conducted as a part of Little Denmark project seems to bring nothing new. The proposed concept of building complex was based on simplified energy flow diagram and supplemented with specification of statistical data. The design covers the interesting issue, however, very cursorily, concentrating first of all on a final form.



Figure 1.
Pig City by MVRDV. Breeding tower seen from above

The issue covering self-sufficiency and waste recycling was already undertaken in 2000 by architects from *MVRDV* in the project named Pig City [8]. The reason for considering the topic was very large population of pigs in the Netherlands, the country which is the primary exporter of pork in the European Union. The other reason was a surface of area used directly or indirectly to breed the referred fatstock, increasing to ridiculous amount because of introduction of organic fodder. The project was based on earlier research performed by Meta Berghauser-Pont from Permeta Architecten from Amsterdam and conducted in cooperation with scientists involved in agricultural economy in LEI in the Wageningen University and Research Centre. It is composed of two parts. The first one, more important, forms a set of analyses and conclusions. The other one is a draft of architectural concept resulting from those analyses and conclusions (Fig. 1).

The performed analyses took into consideration both needs of animals of different age, and aspects of a breeder. The attention was paid to consumption of fodder and water, as well as a way for disposal of waste and their re-use in production process. It also considered of animal health and recreation. The presented concept is one of the opportune visualisations resulting from the performed analyses. However, alike as in the case of other theoretical researches, it is not an architectural design in traditional meaning, though it is covered by a definition of the datascape method. Quoting *Aaron Betsky*: What is new is not only that the process has replaced the goal, but also the notion that the project is not just defined by building, but can also be theoretical speculation or research endeavour [3].

Breeding towers aroused many controversies and became essential position in the social and political debate. They induced breeders and ecologists, as well as politicians responsible for agriculture and animal husbandry to express their opinion. In 2002 scientists from Wageningen University performed their own research gaining the identical results. The fundamental difference is, however, at a stage of architectural

concept. As opposed to Pig City breeding towers, they created a group of low buildings called Delta Park. City Pig project by MVRDV was continuation of the idea began in 2000 under the project named Pig City. A few other designing proposals were presented in it, and each of them satisfied assumptions resulting from the conclusions.

Pig City is a part of the greater realization: *The Why Factory* (T?F) is an international think-tank created by the architects from MVRDV studio in collaboration with academia of the Technical University in Delft. The objective of the organization are researches regarding the problems disclosing themselves in present-day towns. An example is AnarCity project showing the question of anarchy in the world affected with the crisis of authority. And, Austeria project concerns the problem connected with excessive consumption and way of its reducing without necessity to worsen the life standard of inhabitants [9].

The datascape research covers also very true threats. In Aftermath project developed in 2008 the architects from the Danish Jaja Architects group undertook the attempt to propose the operational plan in the face of natural disaster [10]. New York is on average every 80 years hit with hurricane of at least category three. The last one was in 1938. Taking into consideration the history of New Orleans, New York National Center for Crisis Management elaborated a fictional plot covering specification of the most exposed territories and determined the range and scale of potential damages caused directly by hurri-

cane activity and later effects of catastrophe (Fig. 2). In Aftermath project the architects took the question to create a temporary town purposed for victims of hurricane, which will be continuation of a structure occurred after a catastrophe, and at the same time, it enables to limit the reach of future catastrophes and will be signed in the green town policy. Aftermath is not only the plan of activity in the face of natural disaster caused by hurricane and flooding a part of the New York shoreline. The project attempts to include an unavoidable catastrophe into the capability to plan the future town.

The concerns undertaken by the architects in datascape method refer both to ordinary and distant issues, which would seem to be of science-fiction border. Deliberation covers the issue of overpopulation, malpractice of any area, changes in urban tissue necessary for organization within its range big events, for example sport ones, or procedure in crisis situation, as well as the need of a change of a town form while flying cars appear in common use. The tasks are carried out in collaboration with organizations responsible for the matter and with academia environment, as well. The architects try to approach every topic reliably, however, they are very open to criticism. The objective of new architecture is not merely a design, but first of all the substantive debate and the attempt to solve the problem optimally.

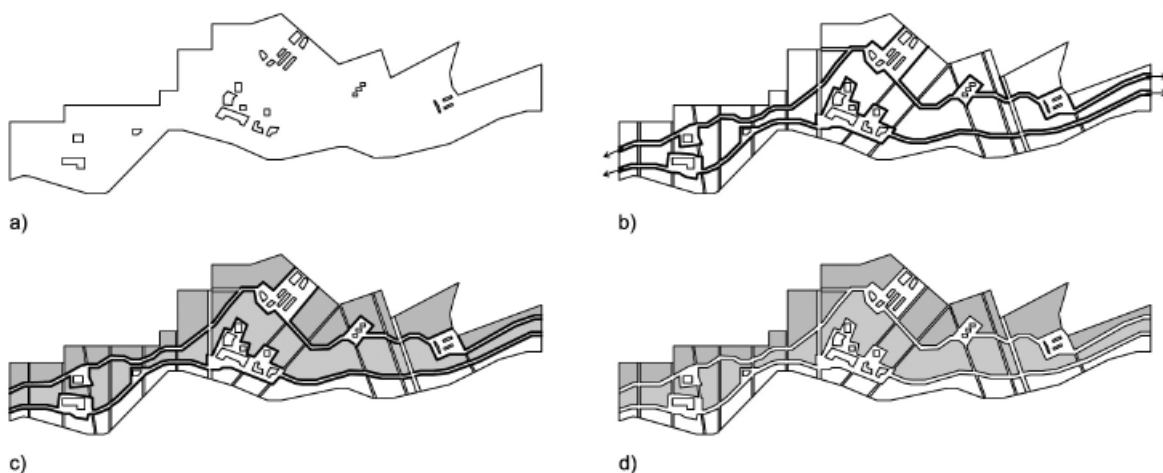


Figure 2.

Aftermath by Jaja Architects. The diagram shows the various stages of development of the concept, starting with the catastrophe to the final stage of green protective barrier: a) surviving buildings, b) Temporary City – temporary buildings along the connections between the survived buildings, c) Green Temporary City – 3 marshland belts, d) Green Barrier City – relocation of temporary inhabitants; beach promenade and forest boulevard

3.2. Realization designs

The datascape architecture covers also realization designs. The original form of WoZoCo block of flats for elderly population in Amsterdam, KBWW duplex house in Utrecht, or the Mountain terrace development in Copenhagen made of them facilities commonly known. Nevertheless majority of the buildings designed in compliance with the method does not distinguish them against background of the other ones. However, all of them represent popular Dutch pragmatism, which owing to the style prevailing over twenty years, can be found in any place of Europe. The facilities representing the datascape method stand out due to rational approach to the designing issue. The form is not the aim itself, but a measure to obtain the desired space properties, as well. In design description architects justify each design decision, often referring to the conclusions from theoretical designs and earlier realizations. According to *Winy Maas*, none of realization designs by *MVRDV* group could come into existence without earlier experiences at solving theoretical problems. Each one is the next step to more conscious designing. In WoZoCo design, arrangement of some apartments in suspended rectangular blocks on the northern façade resulted from previous research gained by architects on maximization of development density. Whereas, the direct inspiration for KBWW duplex house was a design of Berlin Voids multi-apartment house which was developed for 2nd edition of European architectural competition. Both buildings are connected with the way of interior space partition. Architects from already not existing *PLOT* studio, in description of the Mountain design in Copenhagen refer to significantly greater number of inspiration. The design constitutes of continuation of diploma thesis by Bjarke Ingels, the one of the studio founders. But, plans of apartments are variation of L-shaped homes in Helsingør by *Jørn Utzon*. The process of shaping the block itself was drawn from a group of VM apartment buildings also designed by the architects from *PLOT* group [7].

However, an experiment in architecture has essential defects. New designed details and solutions not verified earlier are getting on quickly. Façade materials undergo the time pressure. After a few years of operation, simple buildings delight with their form just architects, only.

4. CONCLUSION

Utilitarianism of the architecture requires the architecture to be subject to the rules of optimization, same as the other “products” of engineering solutions. Therefore, the design should not be merely aesthetic, functional and properly constructed, but also excellent terms of a certain key criterion, chosen by the creator. Therefore, the architecture more often takes advantage of the knowledge as a space for designing, and theoretical designs lay foundation for the realization ones. Questions that arise in the design process, form the basis for further research. But responses, though often surprising, lead to the conclusions which directly refer to reality.

The datascape method has extended the concept of architecture by theoretical designs, it means the developed research designs, the analyses provided to develop the architectural concept in traditional sense, as well as statistical reports, collections of conclusions, and even critical texts. They all may be a starting point for further researches. In subsequent design an architect takes the advantage of the previous conclusions and solutions creating more and more accomplished response to the assumed conditions, and thereby – better and better architecture. Research designs, undertaking often as of the present day abstract issues, give the beginning to quite real solutions. Each research and concept takes up a position in the network of evolutionary tree of architecture, having for their “forefathers” the designs inspired and the analyses on whose basis they were developed.

The methods is purposed to restrict intuitiveness in architectural designing. Owing to the researches earlier performed, an architect may know the consequences of various design decisions, and thus an architect is fully aware of designing. It results in the solutions which are very often devoid of traditional form, however, always reasonable.

ACKNOWLEDGEMENT

This work was performed with the financial support from the Polish Ministry of Science and Higher Education under grant no. N N527 234739.

REFERENCES

- [1] *Gausa M., Guallart V., Müller W., Soriano F., Porras F., Morales J.*; The Metapolis Dictionary of Advanced Architecture. Actar, 2003
- [2] *Lootsma B.*; What is (really) to be Done? Reading MVRDV, NAI Publishers, 2003, p.24-63
- [3] *Betsky A.*; MVRDV: The Matrix Project. Reading MVRDV, NAI Publishers, 2003, p.10-23
- [4] *Attali J.*; Vertical Labyrinths. Reading MVRDV, NAI Publishers, 2003, p.72-81
- [5] MVRDV; FARMAX. Excursions on Density. 010 Publishers, 2006
- [6] MVRDV; Metacity/Datatown. 010 Publishers, 1999
- [7] BIG; Yes is More. An Archicomic on Architectural Evolution. Taschen, 2011
- [8] MVRDV; KM3. Excursions on Capacities. Actar, 2005
- [9] www.thewhyfactory.com/ (1.04.2012)
- [10] <http://ja-ja.dk/#projects/aftermath> (1.04.2012)