Location of University Buildings in the Space of Medium European Cities and Szczecin

Magdalena Zych¹, Marek Woloszyn¹

¹ West Pomeranian University of Technology in Szczecin. Department of Housing, Technical and Ecological Basics of Architecture at the Faculty of Civil Engineering and Architecture.

archmark@wp.pl

Abstract. Higher education in many cities is the dominant function. Universities are often characteristic city elements with a specific layout, climate and tradition. The purpose of the article is to identify and discuss how to locate the academic buildings in a city space. The analyzed objects are European medium-sized cities with academic traditions, in which there are min. two universities. What are the types of locations of academic buildings and what does it mean?

1. Introduction

In recent years, the function of higher education in many European cities has become dominant. Cities, where the major production or transport centers collapsed, now base their vision of the future on the development of universities. Universities play an important role in the future of Europe, which is changing into a knowledge-based society [1, p. 8]. The idea of the university is constantly present in Europe since antiquity, through the Middle Ages up to the present day, inspiring to establish new institutions. Observing history, universities in times of danger or war often became impulses to rebuild the culture and life of the nation [2, p. 16]. Universities, through their teaching and didactic function, have a significant impact on the development of cities and regions. Because of their role and scientific disciplines, they are included in social institutions. Their mission, for decades, is to serve the public [3, p. 26]. The strong need for education causes a rapid increase in the number of university buildings. Departments were located in accidental buildings, because of their price, size or availability of an object [4, p. 28]. As a result, was created a network of university buildings distracted around the city, which cause problems with communication between departments, with inter-departmental cooperation and identification with the academic environment.

Considerations regarding "urban sprawl" usually focused on the housing function and the problem of "urban bedrooms" that “stretch” the city without any control. It is possible to make a consideration not only in the context of the entire city, but also of the leading urban functions. The area of university buildings can be compared to housing estates. Both these functions often need similar area, access to communication and services. So why are the housing functions very often organized in housing estates while the academic function is spread all over the city? Is the synergy of the university possible in the common space of the city and how does it affect their functioning?
The aim of the research presented in the article is to identify and discuss methods of locating academic buildings in the space of medium European cities. The article is based on literature, digital map data and urban analysis. The analysis objects are European medium-sized cities with academic traditions.

2. Characteristics of analyzed towns
To observe the most frequently repeated urban patterns, European cities with a population of 300-500 thousand in which there are more than two university buildings were analyzed. Buildings with an academic function, belonging to both public and private schools, were taken into account. Five cities were selected for analysis: Szczecin (Poland), Mannheim (Germany), Dublin (Ireland), Edinburgh (Great Britain), Kaunas (Lithuania) and two campus universities located in Kiel (Germany) and Birmingham (United Britain).

The analysis allowed distinguishing four layouts of academic buildings: dispersed, semi-open, compact and campus. The dispersed system is created by buildings distracted in a city, where buildings of one higher education institution are located at a considerable distance from each other. The semi-open system consists of university buildings partly focused on a relatively small area and partially dispersed in the city. The compact system is characterized by the concentration of buildings in one area which is a public part of the city. The campus was called a compact arrangement of buildings separated from the city, available or not available to residents (Table 1). The article presents and discusses the characteristic examples of each of the cited systems.

In larger and smaller cities, where the academic function is leading, the percentage of the number of students in relation to the residents of the city is significant. In Mannheim, which has 307,997 inhabitants, the number of students reaches almost 60,000, which means almost 20% of the population. One fifth of inhabitants require the same specific function that they use every day. In Szczecin, it is over 12%.

| Characteristics of the analyzed cities | Szczecin | Mannheim | Dublin | Edinburgh | Kaunas | Kiel | Birmingham |
|---------------------------------------|---------|----------|--------|-----------|--------|------|------------|
| Population                            | 403 274 (2017) | 307 997 (2017) | 554 554 (2016) | 464 990 (2016) | 288 466 (2018) | 247 943 (2017) | 1137100 (2017) |
| Area [km2]                            | 301 (2017) | 145 (2017) | 115 (2013) | 262 (2016) | 157 (2017) | 118,65 (2017) | 598,9 (2017) |
| No. of universities (public)          | 6       | 7        | 9       | 4         | 6      | campus | campus     |
| No. of university buildings           | 47      | 13       | 17      | 15        | 26     | campus | compact    |
| Layout of buildings                   | disperse | semi-open | compact | disperse | disperse | campus | compact    |

In the 1998 New Athens Charter, the idea of the Compact Town is postulated. It is noted that in future European cities an important role in the development of urban space will have not only residents, but also people commuting regularly or periodically and arriving for a longer or shorter stay [5]. Every year, a significant number of students, but also lecturers and researchers come to such cities and take an active part in the life of society. Interest and opinions about university also have an impact on the development and image of the school against the other European ones. Currently, it is even a competition of academic cities.
3. Layout of universities in selected cities

From the city structure or an earlier settlement, it is possible to select a zone with a specific concentration of buildings. It is their location and mutual relations that create the structure of the environment. Such concentration can be achieved by arranging elements to form a cluster, a row, a circle, or a combination of these systems [6, p. 75-78]. Unlike settlements or villages, a city with all its elements and a multitude of functions is too complex to describe them with only one scheme. Therefore, these basic arrangements: a compact, a row or a circle should be interpreted as elements of the city's composition [6, p.80]. The contemporary cities of Eastern Europe are developing rather chaotically, without projects of larger areas. The creation of a campus or a university district connected with the city's structure may become an impulse for urban planning. Universities can often be called 'cities in the city'. It is influenced by their size, the area they occupy and the number of people they engage. These huge structures should cooperate with each other but also with the rest of the city and its inhabitants. Christian Norberg-Schulz writes: Creating architectural space means, therefore, integrating the intended life form with the environment [6, p. 39]. The proximity of various universities should not focus on the competition but give stimulus to cooperation. The exchange of knowledge and skills between different specialties is an impulse for more creative and comprehensive thinking and acting.

Table 2 analyzes the location of university buildings in terms of the proximity of selected academic functions. The obtained results allow determining the degree of the distraction of buildings and the functionality of current urban layouts.

Table 3 shows the availability of the city's main functions from academic facilities. The results show tendencies to locate university facilities in the city center and the accessibility of communication functions.

**Table 2. Analysis of the neighborhood of the academic function**

| Analysis of the neighborhood of the academic function (distance of ~ 1 km) | Szczecin | Mannheim | Dublin | Edinburgh | Kaunas | Kiel | Birmingham |
|---|---|---|---|---|---|---|---|
| University buildings | | | | | | | |
| Neighborhood of buildings / complexes of the same university | 21 (44,68%) | 5 (38,46%) | 4 (23,53%) | 6 (40%) | 13 (50%) | - | - |
| The neighborhood of buildings / complexes of another university | 34 (72,34%) | 3 (23,08%) | 13 (76,47%) | 0 (0%) | 6 (23,08%) | NO | NO |
| The proximity of the rectorate to the buildings of the same university | 10 (21,28%) | 10 (76,92%) | 10 (58,82%) | 5 (33,33%) | 10 (38,46%) | YES | YES |
| The proximity of the main library to the buildings of the same university | 8 (17,02%) | 10 (76,92%) | 10 (58,82%) | 5 (33,33%) | 10 (38,46%) | YES | YES |
| The proximity of the dorms to the buildings of the same university | 8 (17,02%) | 2 (15,38%) | 5 (29,41%) | 7 (46,67%) | 10 (38,46%) | YES | YES |
Table 3. Analysis of the availability of major city functions from university buildings / complexes

| Main city functions                        | Szczecin       | Mannheim  | Dublin     | Edinburgh | Kaunas | Kiel | Birmingham |
|--------------------------------------------|----------------|-----------|------------|-----------|--------|------|------------|
| City center                                | 21(44.68%)     | 10(76.92%)| 15(88.24%) | 7(46.67%) | 18(69.23%) NO | NO  |            |
| Shopping center                            | 6(12.77%)      | 4(30.77%) | 10(58.82%) | 7(46.67%) | 5(19.23%) NO | YES |            |
| Hospital                                   | 13(27.66%)     | 4(30.77%) | 7(41.18%)  | 7(46.67%) | 6(23.08%) YES | YES |            |
| Park/ green area/ square                   | 21(44.68%)     | 8(61.54%) | 16(94.12%) | 10(66.67%) | 23(88.46%) YES | YES |            |
| Sports equipment (pitch, swimming pool, sports hall, gym, etc.) | 28(59.57%) | 4(30.77%) | 16(94.12%) | 10(66.67%) | 14(53.85%) YES | YES |            |
| Bus / tram stop                            | 41(100%)       | 11(84.62%)| 17(100%)   | 15(100%)  | 26(100%) YES | YES |            |
| Train / bus station                        | 3(6.38%)       | 2(15.38%) | 16(94.12%) | 0(0%)     | 6(23.08%) YES | YES |            |

3.1 Szczecin - analysis of the placement of academic buildings

Szczecin is an example of a dispersed system (Figure 1). Despite the large potential to create cohesive campuses and attempts to locate university buildings at a short distance from one another, it was not possible to create multi-functional, working academic space for development and work. This is due to the lack of a single vision for the spatial integration of the university, at the same time, the university’s dispersion deepens. Of course, urban development is not enough to start inter-university cooperation, but it is the environment that encourages and intensifies integration. Over 70% of all academic buildings are located near another building with this function. This means that it would be possible to create strong urban and student-friendly units. The obstacle may be the fact that most of the neighboring buildings belong to another function. Only less than 45% of university buildings are adjacent to the building of the same university (it is not necessarily a building of the same faculty). The result is a considerable distance to the rectorate or main library, whose lack of availability discourages the use of its resources (Table 2). Almost 50% of the buildings are located near the city center, which is an unquestionable advantage, especially for students who do not know Szczecin. 44.68% of buildings have direct access to urban green areas and 59.57% to sports facilities. These objects, unfortunately, do not belong to the university and are not easily available (Table 3). The university should be flexible and follow the changing teaching system, approach to studying and developing the technology. Distracting university areas and poor access to them causes a decrease in interest in studying. Each university should be a characteristic, easy to locate space in a city.
3.2 Mannheim and Dublin
Mannheim (area 145 km2) and Dublin (area 115 km2) are cities of similar area, a similar number of universities (M - 7, D - 9), and a similar number of university buildings (M - 13, D - 17). However, they differ in the way in which these buildings are dispersed in the city's area. Mannheim represents a semi-compact system (Figure 3), while Dublin is compact (Figure 2). These systems have many common features, but in the final use of space, they differ significantly.
Mannheim is a city in which the buildings of the same universities are located relatively close to each other. This is beneficial due to the proximity of the rectorate, library or dormitories. However, it is difficult to cooperate what very often is the driving force of development. An important advantage is the location of the universities in the city center, close to the basic municipal functions (Table 2 and 3).

Dublin is a very good example of a compact system where academic buildings were located in a specific area of the city, but this area is not separated. Almost 80% of all university buildings are located near other functions (Table 2). More than half of them have direct access to the rectorate or library. 88.24% of the buildings are located in the city center, from where they have direct access to all functions and attractions of the city, but also to green areas or sports facilities (Table 3).

Locating most academic buildings in one area allows creating semi-public spaces, green spaces or squares between them that could serve not only students but also residents of the city. Such spaces encourage leaving the building, allow making friends and strengthen the sense of community. They are also ideal places to study together and to organize all kinds of student events and shows.

3.3 Edinburgh and Kaunas
Universities located in Edinburgh and Kaunas illustrate the dispersed system (Figure 4, 5). As in Szczecin, the spreading of buildings in the greater part of the city is noticeable. Great distance between buildings of the same university is obvious. In both cities, there are no urban complexes that would consist of buildings of different universities. In contrast to Szczecin, where it would be possible to integrate several universities in one area, in both Edinburgh and Kaunas it is almost impossible. Results of such dispersion are the lack of easy access to basic academic functions and lack of academic community integration.
3.4 Birmingham and Kiel

The last type of university buildings are campuses - compact urban layouts, separated from the city, open or closed for residents. University campuses, apart from many other urban projects, could form a city [7, p. 156]. Academic space is a public area and connects the "world of students" with the city's society. The public space of the campus is defined as that to which all citizens can have access. However, it may be limited in terms of purpose and access time, ex. internal courtyards may be available in limited hours, while larger outdoor space is available for everyone and at any time [8, p. 8-10]. The direct neighborhood of different faculties is also the mobility of teachers. It helps to build relationships with the environment, not only the closest one, and contributes to the development of the "spiral of knowledge". Here, the phenomenon of synergy occurs, and determines the advantage and competitiveness of an academic center [9, p. 27].

Figure 4. Colleges in Edinburgh

Figure 5. Colleges in Kaunas

Figure 6. College in Birmingham

Figure 7. College in Kiel
The campus of the University of Birmingham (Figure 6) is the 14th best university in the United Kingdom and one of the best in the world. The school is constantly developing, not only in terms of science, but also in terms of architecture. School follows trends and challenges of the modern world, e.g. introducing the idea of sustainable development. On the campus, there are numerous laboratories, institutes and other functions available for students and residents, e.g.: museum, art galleries, concert hall, research library, botanical garden, sports clubs and even own railway line [10].

The second example is the campus of the Christian Albrecht University in Kiel (Germany) (Figure 7). On the campus, there are carried out research in the area of health, environment and culture. The school offers about 1990 study programs. In addition to classic fields of study, there are also modern ones. Through multidisciplinary thinking, independent of short-term trends, the student community works for the public good. The University is not just an island separate from the city. On the contrary, it works for the benefit of society and wants to be the engine of regional and international development [11].

Both cities with their campuses prove that the proximity and availability of all functions allow for better management of the structure and activity of the university, which is also used by the cities.

4. University - availability of the main city functions
Analyses show that there is a need to locate universities closer to city centers than on their peripheries. Such a location has a positive effect on the aspect of the availability but also on the communication issue. In the Eastern Europe, only a few years ago, most of the students commuted to the university by public transport. Today, the main ways of transport are cars, which need a place in the city and near the campuses. Choosing a car is not surprising, considering not only comfort issues, but also the necessity of moving during classes. Sometimes, students have classes in two or even three different locations, often in different parts of the city. Despite the fact that all cities provide good access by public transport to any building, the basic ways of transport are still cars (Table 3). The density of academic building excludes the use of a car during the day. University buildings should be located in pedestrian access at a distance of max 1 km (15 min on foot) and with an access to the public transport and city bikes.

In the USA, the City of Learning (COL) strategy has been developed. It is a strategy combining education with city planning. Its basic principles include: searching for the synergy of the university and the city; moving away from too large schools that separate from the local community; retrieval of old buildings to reduce the costs of university development; cooperation of education with business or introduction of teaching space to various buildings [8, p. 12].

5. Conclusions
Modern university buildings do not have to be as extensive as in the past. Instead of extensive auditoriums, more needed are multifunctional and interdisciplinary design rooms or laboratories. Such spaces can be transformed according to the changes in teaching programs and constantly evolving requirements of students. First of all, such spaces can be used by various faculties. The shared public space of the campus, seminar room or library enhances the sense of unity. The synergy of academic functions strengthens individuals in a diverse community. Separated academic spaces in the city allow for greater integration of the academic community and strengthen the feeling of being the host of this space. This causes more initiative and inventiveness in the student life. Academic teachers could easier create interdisciplinary teams, which is beneficial for the level of science. As K. Wejchert wrote in the book "Elements of urban composition": The space surrounding man should be a specific work of art, because it can influence his mental state, giving him peace, joy, and provoking its comprehensive development [12, p. 21]. The analyses have proven the superiority of compact locations (and even campuses) over the dispersed ones. Cities and universities where a distributed system is found must focus their efforts on changing this state.
References

[1] K. Denek, „Uniwersytet. Między tradycją a wyzwaniami współczesności i przyszłości”, Edukacja Humanistyczna nr 1 (28), p. 8, 2013.

[2] P. Górski, „Idea uniwersytetu w kulturze, kultura w idei uniwersytetu”, Nauka i szkolnictwo wyższe, nr 1/37/2011, Research Center for Science Policy and Higher Education, p. 16, 2011.

[3] J. Woźnicki, „Uczelnie akademickie jako instytucje życia publicznego”, in: Boguski J., in: „Uniwersytetu tradycyjnego do uniwersytetu przyszłości, Nauka i Szkolnictwo Wyższe”, nr 1/33/2009, p. 26, 2009.

[4] R. Pilch, Thesis „Współczesne tendencje w lokalizacji kampusów akademickich w małych i średnich miastach”, Poznan, p. 28, 2017.

[5] European Council of Town Planners, „Nowa Karta Ateńska 2003. Vision of cities XXI w.”, Lizbona, 2003 (in Polish).

[6] C. Norberg-Schulz, „Bycie, przestrzeń i architektura”, Ed. Murator, p. 75, Warszawa 2000.

[7] M. Stangel, „Kształtowanie współczesnych obszarów miejskich w kontekście zrównoważonego rozwoju”, Gliwice 2013, Ed. Silesian University of Technology, ISBN 978-83-7880-140-5, p. 156, 2013.

[8] M. Bryx, „Rewitalizacja przestrzeni akademickiej”, Problems of urban development, nr 10/1, pp. 8-12, 2013 (in Polish).

[9] J. Boguski, „Od uniwersytetu tradycyjnego do uniwersytetu przyszłości”, Science and Higher Education, nr 1/33/2009, pp. 27, 2009.

[10] M. Wołoszyn, „Lokalizacja funkcji akademickich w Szczecinie – rozproszyć czy skupić?”, Przestrzeń i forma, str. 156-158, 2011.

[11] University of Birmingham, The global university at the heart of an ambitious city. [Online] 2019 [Accessed 28. 01. 2019] Available at: <https://www.birmingham.ac.uk>.

[12] K. Wejchert, „Elementy kompozycji urbanistycznej”, Warsaw1984, Ed. Arcade, ISBN 83-213-3151-3, pp. 21, 1984 (in Polish).