

INFLUENCE OF HIGHER EDUCATION AND SCIENCE ON PHYSICAL STRUCTURE OF THE CITY OF BRNO

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Abstract

The paper deals with dislocation of universities and their infrastructural equipment on the territory of Brno. It observes interactions of the mentioned activities with public transport, concentration of students and their impact on the urban life. Universities, faculty hospitals, libraries and similar facilities are among the largest employees in the region. They are of a big importance for the formation of new metropolitan functions in the open European space. They create the potential of the knowledge economy, high-tech productions and services of the highest level. They form also an impulse for building of the infrastructure which goes with university and scientific functions directly or indirectly. Eighty thousands of university students bring an intensive activity first of all to the inner city. The development of university and research functions is the best possibility how to emphasize the place of Brno on the map of Europe. On the other hand, these modern functions are developed on the territory of the city with the medieval core and valuable urban structure and the spirit of them shall be kept.

Streszczenie

Tematem artykułu jest rozmieszczenie uniwersytetów i ich infrastruktury na terenie Brna. Można dostrzec wzajemne oddziaływanie powyższych elementów na strukturę publicznego transportu, koncentrację studentów i ich wpływ na życie w mieście. Uniwersytety, kliniki uniwersyteckie, biblioteki i podobne usługi są największymi ośrodkami tworzącymi miejsca pracy w tym regionie. Mają duże znaczenie w kształtowaniu nowych, stołecznych funkcji w otwartej europejskiej przestrzeni. Tworzą potencjał wiedzy ekonomicznej, gospodarczej, produkcji high-tech. i usług na najwyższym poziomie. Naukowe funkcje jakie spełniają uniwersytety dają impuls, w sposób bezpośredni lub pośredni, dla budowy i rozwoju infrastruktury w mieście. Osiemdziesiąt tysięcy studentów mocno i intensywnie aktywizuje, przede wszystkim, centrum miasta. Rozwój uniwersytetu i jego funkcji badawczych przyczynia się do wzrostu znaczenia Brna na mapie Europy. Z drugiej strony, te nowoczesne funkcje rozwijają się, na terenie miasta ze średniowiecznym założeniem i wartościową strukturą urbanistyczną, która jest zachowana i będzie utrzymana w tym samym duchu wraz z rozwojem aglomeracji.

Keywords: University; Research & development; Inner city; Physical structure; Brno.

1. INTRODUCTION

Post-industrial city can be characterized as based on research in new technologies, prospering service sector, and high-tech manufacturing. It is a city drawing on resources, such as information, knowledge, and creativity (Richard 2006). Of essence is also the tran-

sition from production image to knowledge city (Jensen 2005).

With the opening of the borders, European post-industrial cities lost most of their industrial functions and became exposed to global competition. Under such conditions, these cities search for their position

and identity within the European network of cities. The concentration of scientific and research institutions in to European metropolises was demonstrated by Matthiessen, Schwarz and Find (2006). However, higher education, science, and research in combination with latest technologies can present a very promising function and suitable specialization even for second-rank cities which do not count among urban centres of prime European significance (Méndez, Palomares, Michelini 2007).

In a similar fashion, Brno, once among the most important Czechoslovak industrial centres, tends to head in a new direction. The necessary potential derives from the expansion of higher education launched after the foundation of Czechoslovakia in 1918 together with centuries-old commercial traditions of the city and convenient location with regards to transport. The city, as well as the South Moravia Region, promotes the advancement of scientific and research base which, quantity-wise, ranks second in the Czech Republic after Prague, yet Brno greatly surpasses the capital in terms of university students per thousand inhabitants.

The aforementioned functions reflect in the physical structure and everyday life of the city, too. Similar connection has been implied by Duarte (2007) on the example of Barcelona. University buildings and campuses belong to structures of highest mass, dispose of own infrastructure, and they are characterized by ensuing activities. Public transport lines are directed to them and their location within the structure of big cities is sometimes conceived of as a problem of open spaces (Porta, Crucitti and Latora 2008).

This paper's objective is the assessment of a long-term impact of higher education and scientific activities on the physical structure of the City of Brno and their relationships to other circumstances. Physical structure means in Geography the morphological spatial structure of the city but also physical conditions of individual objects. Streets, buildings and grounds are the basic elements of the physical structure. More difficult structures are created from these elements: street network, blocks etc. The studies were elaborated within the scope of Volkswagen Foundation project "Social and spatial consequences of demographic changes in East Central European cities" No. II/81150.

2. IMPORTANCE OF THE UNIVERSITY AND SCIENTIFIC FUNCTIONS FOR THE CITY OF BRNO

Prior to the foundation of Czechoslovakia in 1918, the only Brno university was the Brno University of Technology, established in 1899. Another institution was the German Technical College. In 1918, the Veterinary University was founded followed by the 1919 establishment of Masaryk University (MU) and the University of Agriculture, the first such institution in Central Europe at that time. Janáček Academy of Music and Performing Arts was opened in 1947 followed in 1951 by the Military Technical Academy.

Albeit some signs of transition to a post-industrial city surfaced prior to 1989, the abolition of centrally planned economy led to a quick downturn in the importance of Brno's industrial function. The city correctly set out towards supporting development of scientific and university functions. The move in this direction has been accompanied by synergic effects resulting from growth in congress tourism, transport, branches of industry directly related to research, trade, and consumption. Science and research markedly promote international cooperation and shape of the new city image.

At present, Brno has one state university – the University of Defence five public universities – Masaryk University, Brno University of Technology, Mendel University of Agriculture and Forestry, University of Veterinary and Pharmaceutical Sciences, Janáček Academy of Music and Performing Arts, and several private colleges. Brno is the second most important research centre of the Academy of Sciences of the Czech Republic (ASCR). Seven institutes and fourteen branches of institutes are located in the city's territory which have their seats in other cities. These institutes closely collaborate with local universities and several of them are situated in the vicinity of their grounds.

University campuses and buildings, Academy of Sciences institutes buildings, but also teaching hospitals, university dormitories, libraries, and other facilities often rank among the most dominant features of the individual city districts in terms of urbanism as well architecture. Some of them are based in old palaces adapted to modern requirements located on the fringes of the city's medieval heart, other structures form part of their respective campuses. Numerous faculties however still operate in individual buildings separated from other university infra-

structure. The last 15 years have nevertheless witnessed considerable construction of new buildings. The majority of older buildings have been reconstructed and refurbished. Intense construction is still under way.

3. STUDENTS AS A SIGNIFICANT CONSTITUENT OF THE BRNO POPULATION

University students constitute a remarkably distinct element in the Brno population not only due to their number but also owing to the peculiarity of their social structure. Although majority of them have their permanent residence outside the city's territory, their presence inflates the actual number of Brno inhabitants undoubtedly to above 400 thousand. They affect the occupancy rate of the housing resources, household structure, and services – either directly designed for them (university dormitories and canteens) or general services (cultural, entertainment-related, catering, and other activities). It can be assumed that students form a relatively large share in the Brno night and downtown lives. The number of foreign students is slowly growing which is an enrichment to the diversity of the city's population.

The university grounds are among spaces of highest movement rate of persons. Their connection to the system of public transport constitutes an essential part of the city's transport services. The location of important university departments at the perimeter of the city core serves as an intense enlivenment to this space. It can be assumed that without students these locations would be much less frequented. Therefore some concerns exist as to whether the construction of a new campus will not adversely affect the life of the city centre.

4. SPATIAL DISTRIBUTION OF THE UNIVERSITY AND SCIENTIFIC ACTIVITIES IN THE TERRITORY OF BRNO

The core of the first university campus in the territory of Brno was formed by three buildings of the Czech University of Technology from 1907 (Fig. 1) along with a subsequently constructed chemical pavilion (1914). The campus was erected at the then northern edge of Brno between Veverčí and Žabovřesky quarters. After 1918, Masaryk University together with the botanical garden (founded in 1922) became based at the former almshouse of the emperor Franz Joseph likewise located at these university grounds. Ensued the construction of the Law Faculty



Figure 1.
The first building of Brno University of technology (now Faculty of Civil Engineering) built up in 1907



Figure 2.
Faculty of Law (building from 1932)

in 1932 (Fig. 2) and of the Land Military Command building which nowadays houses the University of Defence. Further east, along the Chodská Street, used to be cavalry barracks on the premises of which we can today find the University of Veterinary and Pharmaceutical Sciences. Students used to be accommodated at the Kaunic hall of residence (built in 1923). In the wake of WW2, another building was constructed for the Military Technical Academy and the grounds were complemented by other two hall of residence buildings. The Academy of Sciences premises along Veverčí Street were constructed at a later date. Further construction continued in the eastern direction and included the research institutes at Botanická Street. The most recently constructed building is the University and Scientific Library dated 2004.

This first university campus in Brno does not purely consist of university grounds. It additionally includes other secondary schools, health-care facilities, administration and residential buildings. At present, it is situated on the fringes of the inner city at the

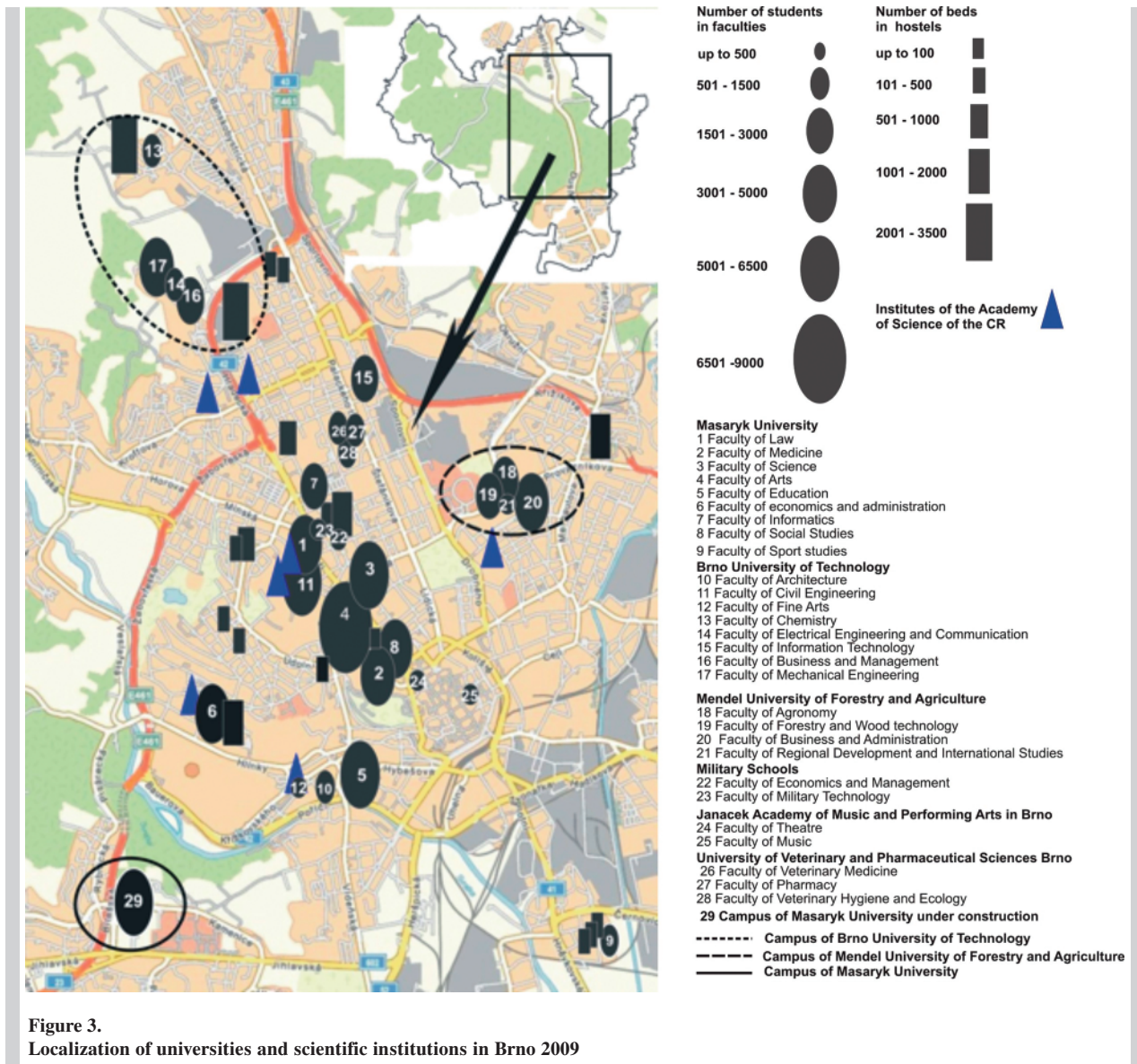


Figure 3. Localization of universities and scientific institutions in Brno 2009

intersection of the radial roads with the second ring road. It is accessible by means of tram transport leading into the city centre as well as two tangential and three radial trolleybus lines pass in its vicinity.

The basis of the University of Agriculture campus in Černá Pole quarter (Fig. 4) is a monumental classicist building of the former Land Institute for the Blind from 1919. In 1923, the construction of the University of Forestry building ensued. Generously designed premises in a dominant location provided sufficient space for later constructions. Transport accessibility is secured by way of trams from the downtown. Two tangential trolleybus lines link the grounds with the halls of residence and several housing estates provid-

ing accommodation for the students.

The core of the Pod Palackého Vrchem campus of the University of Technology in Královo Pole quarter (Fig. 5) were the university dormitories. Construction of several university buildings followed including the tallest civil structure in the city – the Faculty of Mechanical Engineering. The Czech Technological Park is also located on the premises. Two important ASCR institutes are situated nearby. The campus lies within reach of two tram lines that provide good accessibility of the city centre, bus and railway stations, and of the university library. One public transport bus line terminates at the campus grounds.

Masaryk University campus in Bohunice quarter,



Figure 4.
Faculty of Agronomy of the Mendel University of Agriculture and Forestry a monumental classicist building of the former Land Institute for the Blind dated 1919



Figure 7.
Faculty of Social Sciences of Masaryk University on the fringe of the city core. Building from the year 1910



Figure 5.
Part of Campus of the Brno Technological University “Pod Palackého vrchem” in Královo Pole quarter



Figure 8.
The Chancellor’s Office of Masaryk University at the fringe of the city core. The building in the New Renaissance style was built up in 1871-73



Figure 6.
Masaryk University campus in Bohunice quarter, neighbouring on the Faculty Hospital premises, is the most recent and currently still under construction



Figure 9.
Faculty of Economics and Administration of Masaryk University complex

neighbouring on the Faculty Hospital premises, is the most recent and currently still under construction (Fig. 6). The campus also houses the Land Archives building. The entire grounds have an optimum accessibility to the motorway and they dispose of a Campus Square shopping district. Transport services to the area now include 9 bus and trolleybus lines to be further complemented by the extension of an existing tram line from Bohunice/Starý Lískovec housing estate.

Some universities and scientific institutes – mixed with buildings designed for other purposes – are concentrated at the north-eastern edge of the city core. These include the buildings of the Faculty of Social Sciences of MU (Fig. 7), Janáček Academy of Music and Performing Arts, and monumental palaces housing the rectorates (Fig. 8) of the two biggest universities – Masaryk University and the University of Technology. Universities, Faculty Hospital, and scientific institutes occupy several isolated locations in the city, too.

Probably the most significant premises of the Academy of Sciences are located in the space delimited by the Veverí and Žižkova Streets. The purpose-built Institute of Psychology AS CR, Institute of Analytical Chemistry AS CR, Institute of Physics of Materials AS CR, and the branches of the AS CR Institutes of Ethnology, History, Mathematics, Art History, Animal Physiology and Genetics are also situated in this area. The second such premises is the area along the Královopolská Street which is the seat of the AS CR Institutes of Archaeology, Biophysics, and Scientific Instruments. The premises closely adjoin the University of Technology campus in which a branch of the Institute of Thermomechanics AS CR is located.

Of lower density are the uptown grounds in Květná Street of Pisárky quarter with the AS CR Institute of Vertebrate Biology and branches of the Institutes of Botany and Czech Literature. These grounds adjoin the MU Faculty of Economics and Administration complex and the university halls of residence (Fig. 9). The second branch of the Institute of Botany AS CR and the Institute of Systems Biology and Ecology AS CR are situated in Poříčí Street near the Faculty of Architecture and Faculty of Fine Arts of the Brno University of Technology and the MU Faculty of Education. A branch of the Institute of Experimental Medicine AS CR became part of the constructed campus in Bohunice. The branch of the AS CR Institute of Contemporary History and Masaryk Institute and Archives has its seat in Jana Uhra

Street, not far from the MU Faculty of Arts. Finally the branch of the Institute of Geonics is housed by a villa in Černá Pole quarter close to Mendel University of Agriculture and Forestry. As we could see, practically all of the institutes or their branches of AS CR in Brno and their seats directly in the university campuses or in their close vicinity and thus supplement their intellectual background.

A series of departmental research institutes used to be located in Brno as well. The majority of institutes associated with industry were abolished after 1990. Several central authorities research institutes became nevertheless preserved. To mention just a few, it is the Institute for Spatial Development of the Ministry for Regional Development of the CR in Jakubské Square, the branch of the Institute of Agricultural Economics and Information of the Ministry of Agriculture of the CR, or the branch of the Silva Tarouca Research Institute for Landscape and Ornamental Gardening of the Ministry of the Environment of the CR. Even though this represents only a fragment of the past potential, these institutes complement the structure of science in Brno. Nonetheless, similarly to private universities, their presence in the urban physical structure is not very strong.

5. LIBRARIES AND ARCHIVES IN THE CITY OF BRNO

Moravian Library in Brno ranks second in terms of significance in the Czech Republic. Its new building, adjoining the Veverí/Kounicova university and academic premises, in Kounicova Street was put into operation in 2001. It complies with modern requirements for librarian information science and boasts around 4 million volumes. The largest municipal library in Moravia is Jiří Mahen Library. It is based in the refurbished Schraffenbach palace in the city centre and counts 35 branches. Its collection amounts to “mere” 800 thousand volumes, yet its readership surpasses that of the Moravian Library.

Notable library bookstock is held by universities, colleges, and scientific institutes. The third largest library in Brno is the library of Mendel University of Agriculture and Forestry with 396 thousand volumes followed in close pursuit by the University of Technology library numbering 324 thousand titles. The University of Defence library counts 305 thousand volumes, the University of Veterinary and Pharmaceutical Sciences 124 thousand, and the Janáček Academy of Music and Performing Arts

counts 90 thousand volumes. All in all, these “smaller” university libraries dispose of one and a quarter million volumes. The total number of titles in all of the mentioned libraries is then in excess of 6 million. This number does not take into account other libraries of scientific institutes, secondary schools, etc.

Moravian Land Archives establishment occurred in 1839 and was initiated by the Moravian estates. In terms of its significance in the Czech context, it ranks second. Its most valuable collection set is the land registry of nobility and free towns documenting property rights between 1348 and 1642. In 2008, the new archives building was inaugurated which adjoins the Bohunice campus under construction. The archives shelves 60 kilometres of library materials, out of which 20 km are now deposited on the Bohunice premises.

5. CONCLUSION

Universities are now among the principal employers in the region. Other activities may be associated with this function, such as development of advanced production technologies, acceleration of congress tourism, and, to a certain degree, the trade fair function. These activities promote expansion of services in the broadest sense of the word but they, as well as transport, are naturally very infrastructure-intensive and their construction and renovation in turn affect other activities. By way of knowledge economy, the city becomes more democratic and less dependant on short-term political decisions.

Development grounded on knowledge economy establishes new principles of regionalization (Zientara 2008). Modern universities and scientific institutes require extensive premises, laboratories, and other infrastructure. Catering, lodging, sports, and cultural facilities become still more common which is also one of the reasons why university campuses are built. In a historic Central European city such as Brno, campus construction presents a very complex issue since it must respect the urban physical structure that is the result of centuries of development. Central European conditions do not favour greenfield land construction of complex premises outside urban territories. The incorporation into the genius loci of the historical locations is preferred. Roughly 70 thousand university students have a strong influence on the city's life and form part of its cultural and social level.

It would be therefore appropriated to continue in

increasing the density of the existing premises and complementing them by other facilities, while taking into account the urban infrastructure and its historic heritage. Considering that in the majority of cases state and public institutions are concerned, the buildings are not to such an extent subject to market requirements and can become notable spatial dominant features not only due to their mass but also thanks to their architectural form.

Universities are not only significant regional employers, they also concentrate a much higher number of “customers” – students. All logistical issues ensuing from the above stated numbers need be addressed. It is a big challenge for the city which, if successfully resolved, can become a distinct aspect of competitiveness in the Central European space regardless of general globalizing tendencies.

University grounds are presently (except for the currently constructed Bohunice campus) well accessible from the bus and railway stations as well as from the city centre. Emphasis on public transport is further underlined by the fact that practically all university and scientific institutes grounds in the inner city lack sufficient parking options.

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