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Cooperation between German Municipalities and Science in Urban Development - an Investigation from a Municipal Perspective

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ABSTRACT

Global and local societal challenges require alliances of important societal actors. This study focuses on the cooperative relationships between municipalities and universities in Germany, which can be assigned to two different societal systems and have different objectives, restrictions and institutional anchors. A gap in the research is how municipalities assess this cooperation in the first place. The research questions refer to the added value of this cooperation for the municipalities, to its influence on political decisions, and to the framework conditions under which the findings and structures of this cooperation can become established in the municipality - limited to topics of urban development. Two levels are considered: the cooperation of municipalities and science as institutions in urban development issues, and the cooperation in research, where both partners jointly search for findings that are subsequently implemented in municipal practice. The study area is four neighboring cities in the Ruhr region, a region that used to be dominated by heavy industry and whose universities were not founded until the 1960s. The research method is based primarily on qualitative approaches due to the open research questions. Apart from documentary analysis semi-structured interviews are conducted with members of local government and local politics. The analysis is based on a coding system. Initial results show that cooperative relationships have developed in all four cities, but that they are established in very different ways. The process of developing mutual understanding for each other and creating joint projects for the benefit of the municipality is far from complete.

Keywords: alliances, knowledge based urban development, social subsystems, third mission, transdisciplinary research

ABSTRAK

Tantangan masyarakat global dan lokal membutuhkan aliansi aktor-aktor masyarakat yang penting. Penelitian ini berfokus pada hubungan kerja sama antara pemerintah kota dan universitas di Jerman, yang dapat diklasifikasikan ke dalam dua sistem masyarakat yang berbeda dan memiliki tujuan, batasan, dan jangkar kelembagaan yang berbeda. Kesenjangan dalam penelitian ini adalah bagaimana pemerintah kota menilai kerja sama ini sejak awal. Pertanyaan penelitian mengacu pada nilai tambah dari kerja sama ini bagi pemerintah kota, pengaruhnya terhadap keputusan politik, dan kondisi kerangka kerja di mana temuan dan struktur kerja sama ini dapat dibentuk di kota - terbatas pada topik pembangunan perkotaan. Ada dua tingkat yang dipertimbangkan: kerjasama antara pemerintah kota dan ilmu pengetahuan sebagai institusi dalam isu-isu pembangunan perkotaan, dan kerjasama dalam penelitian, di mana kedua mitra bersama-sama mencari temuan-temuan yang kemudian diimplementasikan dalam praktik perkotaan. Wilayah penelitian adalah empat kota yang saling bertetangga di wilayah Ruhr, sebuah wilayah yang dulunya didominasi oleh industri berat dan universitasnya baru didirikan pada tahun 1960-an. Metode penelitian ini terutama didasarkan pada pendekatan kualitatif karena pertanyaan penelitian yang bersifat terbuka. Selain analisis dokumen, wawancara semi-terstruktur juga dilakukan dengan anggota pemerintah daerah dan politisi lokal. Analisis ini didasarkan pada sistem pengkodean. Hasil awal menunjukkan bahwa hubungan kerja sama telah berkembang di keempat kota, namun hubungan tersebut dibangun dengan cara yang sangat berbeda. Proses membangun saling pengertian satu sama lain dan menciptakan proyek bersama untuk kepentingan kotamadya masih jauh dari selesai.

Kata kunci: aliansi, pembangunan kota berbasis pengetahuan, subsistem sosial, misi ketiga, penelitian transdisipliner

1. INTRODUCTION

The challenges of Western societies - not only in Germany - the so-called wicked problems (Ebert, Göb 2019: 6), cause a high degree of complexity, uncertainty, ambiguity and non-simultaneity (Fuhr 2019: 191) and call for changes of perspective and innovative solutions. For example, the change in climate and demographic composition, digitalization and migration, and the loss of power of established organizations, be they parties, churches, sports clubs, or trade unions, can no longer be managed in conventional organizational structures and without the interaction of different social stakeholders. No social group, not even the state, will be able to cope with these challenges alone in the long term. What is needed are alliances that can be forged between a wide variety of organizations - between companies and (semi-)governmental organizations, between NGOs and social institutions, between universities and associations, or a combination of all of them. Regional alliances are also needed, as the challenges do not end at the borders of districts, nor at those of utilities or chambers of commerce.

One of these alliances is examined in more detail in this dissertation at the Ruhr-Universität Bochum in Germany: the interaction between the state and science, their different ways of working and implementation time horizons, the role of science in political decisions and their implementation in administrations. The focus is on cooperation with science at the lowest level of government: the municipality, where universities and scientific institutes are located.

The importance of cooperation between cities and science has grown continuously in Germany since the late 1990s, especially in the context of regional economic development and the profiling of university locations in the competition for companies, skilled workers and other knowledge potential. "Universities and cities are closely linked. Cities provide the context in which a university can operate successfully. Conversely, universities, especially in the knowledge society, are decisive location factors in the global and national competition between cities" (Marquardt 2019: 108). The task of universities is, on the one hand, to conduct excellent research and teaching and to play an active role in international knowledge networks. On the other hand, they are to "attract companies, scientists, and talented students, and to develop and expand knowledge and technology through graduates, spin-offs, and other forms of knowledge and technology transfer" (Röllinghoff 2013: 4).

This impact of universities on urban society beyond the actual tasks of a university - teaching and research - is referred to as "third mission". Third mission activities take place at the boundary between the university organization and its social environment. This includes

technology transfer and innovation tasks; traditional continuing education and innovative forms such as civic or children's universities; (research) cooperation with companies, but also other civil-society actors, as well as scientific services (Würmseer 2016: 24). University members come out of the ivory tower and become approachable experts who make the knowledge of the scientific community fruitful for the needs of the local environment (Fröhlich 2021: 66).

Knowledge is the second keyword here, which also provides the link to urban development issues in the context of so-called Knowledge Based Urban Development (KBUD). Here, knowledge or science is conceptualized as a growth factor for cities and regions and it is shown how knowledge resources can be activated and effectively used for urban development (Moritz 2016: 48). Yigitcaniar (2018: 9) sees four main aspects of KBUD: economic, socio-cultural (individual and collective development of knowledge), spatial-urban, and institutional (governance aspect).

1.1 Levels of cooperation and research questions

The focus of KBUD and thus also the cooperation between municipalities and universities is predominantly in the economic field, which is considered a success factor for the innovative capacity and thus competitiveness of municipalities and regions (Yigitcaniar 2008: 1). Locations with a high density of knowledge producers, such as universities, research institutions, knowledge-intensive manufacturing industries, knowledge-based services, consulting firms, venture capitalists or civil society actors, are more successful (Tata 2004: 29) in attracting and retaining talent and skilled workers, in transferring knowledge from universities to companies, and in developing fields of competence and initiating start-ups.

The present work focuses on the spatial dimension of knowledge, on the urban framework that gives space to networks, interactions, knowledge production, etc. space (Mecklenbrauck 2018: 1213 et seq.). It focuses on spatial challenges, on design and experimental spaces of city administrations that can be addressed in cooperation with scientific institutions. Studies on the cooperation between science and municipalities have elaborated on the "convergence" of the two partners, the institutionalization of their cooperation in city administrations, the strategic concepts (master or action plans), the forms and, in some cases, the added value of this cooperation (e.g., Tata 2004; Lisowski et al. 2011; Gerhard and Marquardt 2021).

These spatial challenges are considered from two perspectives:

- The **first** is the so-called **institutional cooperation**, of which it is said in the German-language literature that there has been a lack of integrated university and urban development so far (Ziegenbein 2019: 130), that the partnership of university and city is not necessarily harmony-borne, but actually exhibits conflict-laden interests (Siebel 2019), e.g. competition over land and spatial development claims (Erl 2021: 26). Here, we are dealing with cooperative relationships in which, from the municipal side, the administrative leadership - from the mayor to the clerks in the planning or environmental office - act as cooperation partners. At the respective universities, the individual chairs play only a subordinate role. On the university side, the rectorate or the university administration are on board and work with the municipal administrations on practical urban planning problems, such as the expansion or relocation of the university campus - partly in the context of the transformation of areas formerly used for industrial or military purposes -, transport connections, e.g. between the city and the university, student housing, etc. The university administration is also involved in the planning process. The spatial, urban integration of science and urban society is considered the leitmotif for urbanity here; ideally, the "city becomes a campus" (Tata 2014: 7).
- The **second** perspective is much better presented in the international literature, because it is an original task of universities: **research** and the monitoring and advising of urban projects by students and academics - combined with student theses, doctorates, new content for teaching and publications. As far as research is concerned, one speaks here of *transdisciplinarity*, the opening of science to lifeworld problem situations, the explicitly normative treatment of the respective topics (Parodi et al. 2016: 16). This transdisciplinary research involves the so-called *practice partners*, such as municipalities, to which the research results are ultimately also directed and which have the expertise and competencies for their implementation. This requires both the scientific community and the practice partners to be ready for open processes with the "unexpected," for the development of new attitudes, for the ability to reflect and learn (Nevens et. al. 2013: 118), and on the municipal side also the necessary human and financial resources. The content of this transdisciplinary collaboration often concerns transformative research that investigates societal changes and works towards societal transformation, such as for new forms of mobility or in climate change (Delfia, Di Giulio 2018a: 11, WBGU 2011: 23, Withykombe- Keeler et al. 2018). The preferred method here is the so-called real laboratories, a transdisciplinary research

facility to conduct sustainability experiments and initiate transformation processes in a spatially delimited social context (Parodi et al. 2016: 16).

> „An urban living lab is an experimental approach to tackle complex urban issues. Labs involve a wide range of stakeholders and offers opportunities and a platform to develop ideas and solutions in everyday settings. Here, stakeholders are deeply and actively involved from the early stages of the project, and the research is by its design open for surprises and learning that originates from the stakeholders involved" (Wrangsten 2022:9).

Both in institutional collaboration and in research collaboration, two systems collide with the staff from the city administration, respectively local politics, and the representatives of the universities, who have different goals and interests, different ideas of time, logics of action, and risk cultures (Gonser et al.: 2019). Especially when it comes to research collaboration, academia has thoroughly examined and reflected on its own role in transdisciplinary and transformative approaches (Defila, Di Giulio 2018: 2019). A *research gap* exists where the municipal perspective on this collaboration is concerned: collaboration with academia can offer added value to municipalities; however, due to a lack of opportunities and resources to integrate the research project into routine activities, as well as due to different cultures of elaboration and exploitation, there may be friction, thus delaying active problem solving and possibly leading to the failure of joint activities.

To enable municipalities to make (even) better use of this alliance, the study focuses on the expectations, openness to change processes and the associated scope for experimentation, as well as the institutional and political restrictions of municipal actors and - in order to do justice to the spatial manifestation of this cooperation - on urban development processes.

The following questions are examined in detail:

- Does the alliance with science help municipalities to better meet the societal challenge of urban development?
- Do the municipalities recognize an added value in the cooperation and can they use it sustainably?
- From a municipal perspective, what influence does science have on political decisions and their implementation in local government? What role is attributed to it?
- Under which conditions and in which areas does cooperation with science become an integral part of municipal action in urban development?

1.2.1 The Municipal and University Systems in German

a) Municipality

Germany is a decentralized federal system. It consists of 16 federal states (Länder), which in turn are subdivided into district-free cities and districts (figure1).

Figure 1. Germany with its 16 federal states

The municipalities belong to the three main levels of administration, but under constitutional law they are part of the Länder and are therefore subject to their right of supervision and instruction. At the same time, they are responsible for implementing central government decisions. They have organizational, personnel, financial, planning and statutory sovereignty in their municipal area. They are responsible for providing services of general interest to the population and have the closest contact with the citizenry of all local authorities (Bogumil; Holtkamp 2013: 8,9). The budgets of the municipalities are approved by an additional administrative level that lies between municipalities and states.

Many municipal tasks are not performed by the core administration itself, but are outsourced to so-called Eigenbetriebe, which have their own budgets but are not legally independent, or to municipal enterprises in which the municipality is the majority or sole owner. These include local energy suppliers, transport companies, and often also waste disposal,

business development or city marketing. The overall structure of the core administration and municipal companies is also referred to as the "city group".

The city administration is controlled and steered by the council of the respective municipality, the local parliament, which is elected every five years in most German states. In contrast to the head of government of the Federal Republic of Germany and the minister-presidents of the federal states, the (lord) mayors of the cities and municipalities are elected directly. The council members have the task of advising the administration on all matters within the scope of local self-government and making decisions, including approving the budget (Förster et.al. 2021: 17). Although one speaks of municipal parliaments in Germany, the councils are part of the executive and not the legislative branch, as they do not have a legislative function. In contrast to Indonesia, local politicians - with the exception of mayors - work on an honorary basis: they receive only an expense allowance for their work in the council.

Bureaucratic administrative action in the municipality means: specialization, hierarchy and, in particular, being bound by rules and laws (Heinrichs, Schuster 2019: 205). In addition, there are complex and lengthy decision-making and voting processes, as well as the pressure to act and justify oneself to the local parliament. Local politics itself acts in the rhythm of its electoral period; its steering factors are power, influence and political will to shape things. Thus, one can speak of two subsystems within the municipality that pursue different interests: The administration has legal constraints and clearly delimited areas of responsibility, while politics depends on the electorate and the acceptance of individual measures in different political camps (Bauriedl, Held 2021: 34). The restrictions of both subsystems are often an obstacle for the municipality to dare experiments for innovative solutions of complex problems, such as those required by climate change or the use of renewable energies.

Due to the complexity of municipal tasks, more and more specialist expertise is required in municipal administrations. This leads to a trend - also observed in other European countries - "toward strengthening the executive side of political leadership rather than the representative one" (Budd, Sancino 2016: 142). The limit of voluntary local politics, i.e. the representative side of local government, has been reached, especially in large cities, due to the information or knowledge advantage of the administration. In many areas, politics only reacts to the administration's descriptions of the facts and agrees to most administrative draft resolutions (Bogumil, Holtkamp 2013: 41, 169; Heyen, Libbe 2018: 19), which leads to local politics feeling excluded and even disempowered by the administration (v. Kodolitsch 2000: 205).

For these reasons, when considering the relationship between the municipality and scientific institutions, it is essential to include both the perspective of the administration and that of politics from the municipal side.

b) University

As of October 2022, there are currently 423 higher education institutions in Germany, 108 of which are universities, with a total of 2.9 million students. What is striking in Germany, compared to the USA or even Indonesia, is the low proportion of private universities in Germany, at around 27%. Of the 108 universities, just 21 are private, while 86 of the 211 universities of applied sciences are private (Statistisches Bundesamt 2023). Almost all large and important universities in Germany are state-run. Some of them have a long history: the universities of Heidelberg and Cologne, for example, were founded as early as the 14th century and have "grown into" central areas of their cities over the centuries (Ziegenbein 2009: 128). After World War II in 1945, a number of new universities were founded - especially in the state of North Rhine-Westphalia, which is of particular importance for this study, since it is limited to North Rhine-Westphalia and primarily to the cooperation of the municipalities studied with state universities. These universities are mostly located outside the city on their own campus area.

Figure 2. The University of Duisburg-Essen, one of the youngest German universities

At the national level, the so-called higher education framework act regulates higher education in the Federal Republic of Germany (Bundesministerium der Justiz 2019: 7). Among other things, it considers the most important tasks of higher education institutions to be:

- Cultivation and development of the sciences and the arts through research, teaching, study and continuing education
- Preparation for professional activities
- promotion of young scientists and artists
- Promotion of knowledge and technology transfer

In addition, there is the aforementioned social mission of the universities, the third mission, which, especially in the case of universities, is often at odds with their national orientation, to obtain the coveted title of "university of excellence," i.e., to be at the top in terms of research and international competitiveness in Germany.

The Higher Education Framework Act serves as a framework for the higher education laws of the Länder, since all cultural and scientific matters, and thus also higher education institutions, are matters for the Länder. The state provides the universities with the funds to carry out their tasks in the form of grants for current operations and investments in accordance with the state budget. A state-owned real estate company (BLB), which owns most of the state's land and buildings, handles all matters relating to the universities' planning and construction (blb.nrw.de 2023). Although the administrations of the universities each have their own department for construction matters and building management, the universities themselves are severely limited in their room for maneuver - e.g., if they need additional space - because they are dependent on the state's real estate operation. The state governments make the specifications and thus determine the "fate" of the individual universities. "At the municipal level, higher education policy does not take place in the formal, legislative sense" (Fröhlich 2021: 70, 71).

Ultimately, therefore, the university, like the municipality, also consists of two systems: One is the faculties with their chairs, which are responsible for research and teaching. The other is the university administration, which must provide services for academics and students and optimize the organizational, financial and structural conditions for research and teaching.

c) Municipalities and universities

The guiding ideas and fundamental interests of municipalities and universities move between the provision of services of general interest by municipalities for the local population, around the managing of local emergencies, as in the case of natural disasters or the Corona pandemic, and the striving of universities for international excellence and a good place in the competition for lucrative research funds. There is no institution that coordinates the "living together" of a municipality and the universities located on its territory, and there is no steering

authority on the part of the municipality vis-à-vis the university (Ziegenbein 2009: 130). What remains is the planning sovereignty of the municipality. This means, to stay with the example of a university's desire to expand, that for the construction of new university buildings - even on land owned by the state - there must be a municipal development plan that regulates the type and extent of use, construction methods and other matters.

In the communication between the university administration, the state-owned real estate company on the one hand, and the municipal planners on the other, this can certainly lead to conflicts over urban planning and architectural issues. And the assumption that in a traditional university - as can be seen in the example of Heidelberg - cooperation with the municipality has been well established for centuries cannot be verified, since it is precisely here that there have been longstanding disputes about planning developments. Here urban sociologist Walter Siebel writes:

> "The partnership of university and city is often portrayed, and with good reason, as the soul mate of science and urbanity. But the high tone in which this beautiful song is sung makes it easy to forget that it involves tangible and by no means conflict-free interests. The city expects the university to provide highly qualified jobs, civilized citizens, good study opportunities, tax revenue and an enrichment of cultural life. Heidelberg gets all of this in abundance. But all of this does not come for free... Science needs the largest possible, flexibly usable, well-developed land reserves for its very specific requirements, without planning constraints. This can conflict with the principles of orderly urban development" (Siebel 2019).

The trump card that the municipality can play against the university is therefore its planning sovereignty. As described by Siebel, the university also has a very special trump card for asserting its interests vis-à-vis the municipality: the location factor. For a city, the presence of a university means an improved image, an increase in population, cultural life, impulses for the housing market, economic consequences, and so on.

However, where formal mutual control competence is lacking, self-organized, voluntary cooperative relationships remain at the informal level, for which there are no legal requirements. On the one hand, these are determined by constraints, and on the other hand, they depend on people and sympathies (Ziegenbein 2009: 130), which can develop - intentionally or by chance - between a university rector and a mayor or between a professor and his former employee who is now working on a strategic project in the planning office.

So municipalities have set up their own university officers or council committees to deal specifically with matters relating to scientific institutions. In some cities, there is a regular exchange between the university management and the top administration. The topic of campus

development is discussed intensively in coordinated exchange rounds between all partners involved, and last but not least, project partnerships are formed on urban development policy projects in which academics collect the necessary data and advise and support city staff. All joint research projects, i.e. cooperation in the real laboratories and other third-party funded projects, are also voluntary. Here, at most, the restriction applies that funding agencies make the provision of their funds to science dependent on the involvement of practice partners, in particular municipal partners, so that scientists do not always engage in cooperation with municipal partners entirely voluntarily (Ellwein 2021: 30).

2. METHODOLOGY

The questions formulated under 1.1 aim to investigate the role of science in strategies, decisions and projects relevant to urban development policy and to work out where the insights and partnerships gained from this are manifested in a sustainable way in municipal work. The following assumptions are made:

- In the absence of a coordinating body between the two institutions, the success of the cooperation depends on voluntary collaborations, which on the one hand can launch jointly developed (innovative) projects, and on the other hand have to negotiate the different interests with regard to urban development policy goals (land claims, transport links, etc.).
- Thus, the cooperation between the municipality and the scientific community varies from city to city.
- It can be assumed that local politics plays only a subordinate role in the cooperation between municipality and science.
- For municipalities, cooperation with science in research often competes with other tasks and is an add-on. Municipal experimental playgrounds are limited.

The research field is municipalities. Due to the mostly voluntary cooperation with universities, municipalities vary in their strategies and organization of this cooperation. For this reason, this research takes place in four municipalities, which are described in more detail below.

2.1 The Study Area

The four cities under study are Bochum, Dortmund, Duisburg and Essen. They are all located in North Rhine-Westphalia, Germany's largest state with approximately 18.1 million inhabitants, and also in the Ruhr region, which is Germany's largest agglomeration and the fifth largest in Europe with more than 5 million inhabitants in an area of 4,435 km² (nrw/statistik). The Ruhr region consists of four districts and 11 independent cities. Coal mining and steel

production have dominated this industrial region for many decades. A former German emperor said that the Ruhr region had to host neither students nor soldiers, and thus no universities or barracks. The Ruhr region, he said, was the domain of the working class, and a connection with the intellectual elite could generate revolutionary potential. Today, the Ruhr region has the densest university landscape in Europe (Lauer, Wilkesmann 2020) . With the beginning of the decline of coal mining and steel production, which started in the 1960s, the region had to renew itself from the ground up. In this context, not only were new economic sectors created, especially in the service sector, but the expansion of colleges and universities was also pushed forward.

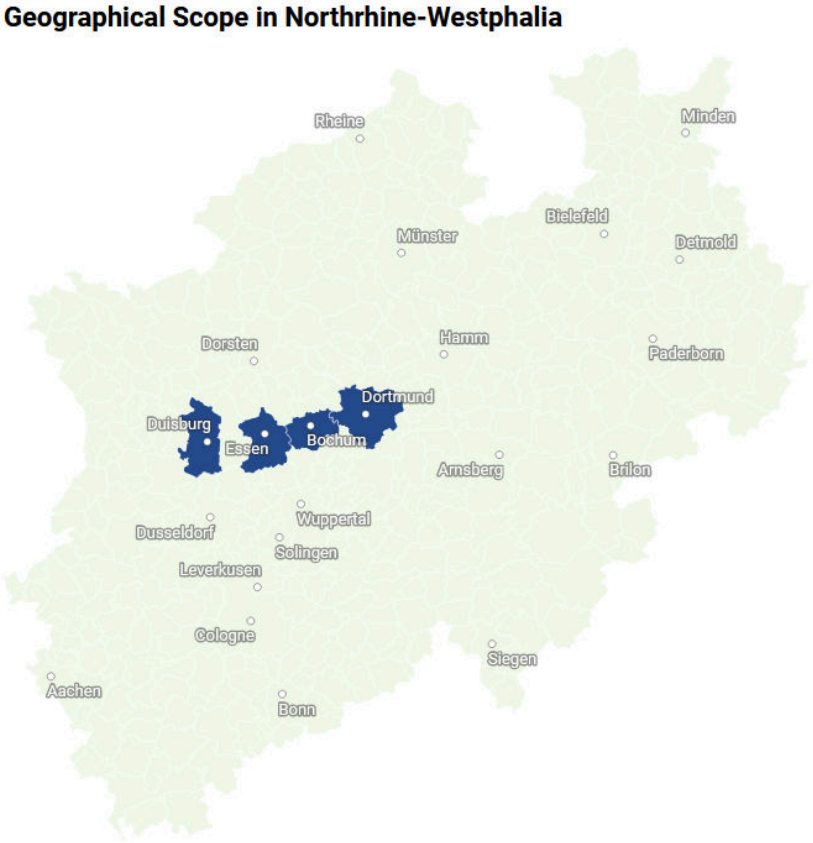

Figure 3. The Study Area

The four cities studied are the most populous in the Ruhr region and are all home to a university. The Ruhr-Universität Bochum (RUB) was founded in 1962, the University of Dortmund in 1968; in 2007 it was renamed Technische Universität Dortmund (TU). The University of Duisburg-Essen (UDE, Uni DuE) was created on January 1, 2003, through the merger of the Gerhard Mercator University of Duisburg and the University of Essen (both founded in 1972; Hilkmann 2017:39). In 2007, the three universities merged to form an alliance,

the "Universitätsallianz Ruhr" (UAR), which is seen as an important driver of regional cooperation in the Ruhr region with its many cities (Kraas et al. 2016: 282).

In addition to the universities, there is also a university of applied sciences in Bochum and Dortmund, and a number of other public and private universities in all four cities, e.g. a university of health in Bochum or the Folkwang University of the Künste with its headquarters in Essen and branches in the other three cities.

Table 1. The cities studied by population size and proportion of students.

City	**Bochum**	**Dortmund**	**Duisburg**	**Essen**
population	363.441	586.852	495.152	579.432
number of students	57.126	52.947	18.000	35.277
Share of students in total population	15,7%	9,0%	4%	6,1%

Source: studis-online.de

The figures in Table 1 show that some Ruhr cities have caught up. Dortmund, for example, has roughly the same proportion of students as the traditional university city of Cologne with its population of around 1 million. The figures for Bochum, the smallest of the four cities studied, are now almost comparable with Münster, a classic university city in North Rhine-Westphalia with a population of around 318,00 and a student share of 19% (studies online.de).

What the four cities have in common is that they are home to new universities whose campuses are located outside the city centers. A spatial integration of the university did not take place for a long time. This ultimately led to a lack of social integration: The local population found it difficult to accept the existence of this new institution, and for many years the city politicians and local elite leaders in Dortmund, for example, were afraid of contact, and the university itself did not feel part of the city (Tata 2004: 157,159). Although some of the universities in the Ruhr region have existed for fifty years and have achieved high student numbers, no academic milieus or student character have yet emerged. Thus, one can hardly find neighborhoods with typical student life in the four cities (Hilkmann 2017:45).

The four cities, however, differ in other respects: Duisburg still produces steel, and the city is currently on its way to becoming a "hydrogen location" and to becoming climate-neutral

by using hydrogen as an energy source in metal production. At the same time, Duisburg with Europe's largest inland port, is a logistics center. Dortmund can score points not only for its internationally renowned soccer club but also for its successful economic structural transformation. The technology center located next to the university is the nucleus of one of the largest technology parks in Europe. Essen, on the other hand, is home to both the headquarters of well-known major companies and also to the Zollverein Coal Mine Industrial Complex, Germany's best-known architectural legacy of coal mining. Coal used to be mined at Zollverein, now it is home to a museum, the aforementioned University of the Arts, event locations and several companies.

Figure 4. Zollverein coal mine in Essen

In Bochum, the structural change from coal and steel to other economic sectors had to go through several rounds. For example, a large automobile plant was located on a former mining site for about 40 years, which became a wasteland for a second time after its closure and is now being developed into a location for university and other research institutes as well as technology-oriented companies. The largest university city of the four study areas was perhaps the earliest to understand the importance of *knowledge* for future-oriented urban development – for *knowledge based urban development.*

2.2 Methodological approach

The theoretical part of this dissertation deals with the following topics

- the systems of municipality and university as well as their subsystems, especially the relationship between local politics and administration
- the societal demands on modern urban development with special regard to the concept of knowledge-based urban development and the innovation alliances between science and practice
- the development of institutional cooperation between municipalities and universities to meet the spatial challenges of the knowledge society to urban development - underlined with case studies
- the cooperation in research, especially with the discourse on the role of research in answering real-world questions and the support of municipalities in doing so.

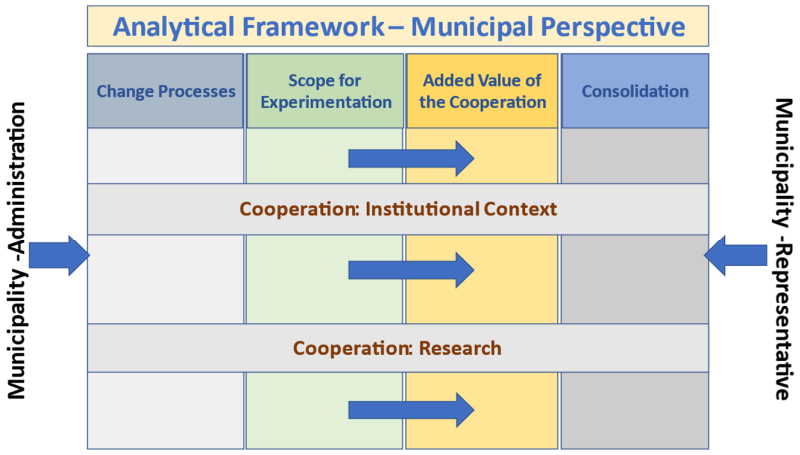

Figure 5. *Analytical framework*

Although there is a large body of literature, especially on the role of research in cooperation with practice partners, there is no theoretical basis for cooperation between the two institutions. An explorative approach based on open questions rather than on hypotheses to be verified is recommended. In the empirical analysis, methods of document analysis as well as qualitative research approaches are predominantly used.

The empirical part of the study consists of several components:

- Inventory of the joint activities of the municipalities and science in Bochum, Dortmund, Duisburg, Essen (exploratory and informational interviews, document analysis).

- Evaluation of the concepts, master plans, etc. of the municipalities as well as the university (location) development plans regarding the type and significance of cooperation (document analysis).
- Semi-structured qualitative interviews (approx. 25) with members of the local governments on different hierarchical levels as well as with a representative of the local politics under the following questions:
  - Is the cooperation prescribed or a voluntary association?
  - Are the local actors "ready" for cooperation with science in urban development? Where is this cooperation located in the municipality? Are there fixed structures? Has the city council signed off on them?
  - How do municipalities assess their scope for innovation and experimentation? Can science support them positively in this?
  - Is added value recognized? Which municipal actors recognize this added value? Under which framework conditions? In which forms of cooperation?
  - Which results, products of this cooperation are "further processed" in the municipality? In which form? Who are the most important actors?
  - Type of change processes. Where do (minds and) structures change? Where does sustainability emerge?
- After the evaluation of the interviews with the municipalities: four control interviews with selected representatives of the universities, who are confronted with the results of the investigation from the four cities. (Semi-structured qualitative interviews or expert interviews).

All interviews are recorded with smartphone and tablet and textualized with the help of a transcription program. After completion of the text, a memo is created for each interview, which reflects and comments on the most important impressions and statements from the interview. The analysis of the data is done according to a coding system developed with the help of MAXQDA, a software program that helps to organize, code and categorize documents. Thereby, the coding process takes place in a deductive-inductive interplay (Morgenstern-Einenkel 2022). The deductive codes are applied to the material from theory and from the analysis framework and the interview guide developed from it.

Example*: The interviewee recognizes an added value in the cooperation with the university.*

The inductive codes can be derived from the material. They represent the new, unknown, which should answer the research question (Morgenstern-Einenkel 2022).

Example: *The interviewee sees the added value of the collaboration in a joint urban strategy development.*

The final evaluation and interpretation of the data is done manually.

The result is a topic-oriented systematization and condensation of the contents, which is based on category formation, and provides answers to the research questions. It also includes a comparison of the four cities studied. A complete theory formation cannot be derived from this, but existing theory building blocks can be supplemented.

3. RESULTS

At present, the document analysis and the interviews in the municipalities have been completed. Since the evaluation is still in process, no final results can be presented yet. However, initial tendencies - which have not yet been conclusively verified - have already emerged.

3.1 Document analysis

The document analysis has shown that the existence of studies on the regional economic impact of the universities, as well as inventories, strategy papers or plans for cooperation between municipalities and universities, varies in the four cities. The plans mentioned for the municipalities are exclusively those that refer to the cooperation with the universities in general; plans for individual projects are not included here. The development plans of the universities were examined to determine whether they contain sections on the social responsibility of the university, the so-called "third mission", and whether cooperation with the city plays a role in this.

Table 2. Plans of the municipalities and the universities

City	**Bochum**	**Dortmund**	**Duisburg**	**Essen**
Existence of a regional economic analysis of local universities	Yes (2012)	Yes (2013)	no	no
Municipal inventories and strategy plans	Masterplan University City II (2014)	Master Plan Science 1 (2013) Evaluation Masterplan 1 (2018)	Duisburg University Portal (website, currently offline)	Action Plan Science City Essen (2018)

	Science City Framework Concept (2014) UniverCity Compass (2018) Inventory of city-university cooperations (2023, not published)	Master Plan Science 2 (2021) Science meets city (student project, 2019)		
University development plans	Ruhr University (2020-2025) University of Applied Sciences (2023-2028)	TU Dortmund (2022-2026) University of Applied Sciences (2020-2025)	Universität Duisburg-Essen: 2016-2020 New plan to be published shortly	

Source: own survey

Without going into depth, table 2 clearly shows that the cities of Bochum and Dortmund have addressed the interaction with the universities much more intensively with several master and framework plans than was the case, for example, in Duisburg, where the research priorities and social projects of the university that were significant for the city were described in detail on a municipal portal; however, this website is currently offline.

The university development plans describe its social mission in very general terms. For example, the University of Duisburg-Essen, which is located in two cities, sees this more regionally and thus its task in maintaining and expanding regional networking with communities and partners in politics, business and society (Universität Duisburg Essen 2015: 12). In the case of the TU Dortmund University, it is interesting to note that the university development plan until 2022 explicitly refers to the good cooperative relationships with the city administration and the city society in the creation of the Masterplan Science, but this is no longer mentioned in the new edition 2023-2028 (Technische Universität Dortmund 2018 and 2022). In its plan, the University of Bochum (Ruhr-Universität Bochum 2020: 14) refers to the importance of the UniverCity network, which has already existed since 2009 and in which the city of Bochum and the local Chamber of Industry and Commerce are represented in addition to the Bochum universities (Tata, Loewen 2018: 8).

3.2 Interviews in the municipalities

In 2023, a total of 22 qualitative interviews were conducted with members of the core administration and from the "Group City" as well as four interviews with a local politician in each of the four cities. Table 3 provides an overview of the interviews in the individual municipalities as well as the participating offices and municipal companies.

In Dortmund, scheduling the interviews, which lasted about an hour, was easiest due to personal contacts, in Duisburg the most difficult. There, it turned out that many activities, which in the other cities were handled by the core administration, have been transferred to municipal companies due to the tight municipal budget situation. This also applies to cooperation with universities. This explains the lower number of interviews with the core administration. The four politicians came from four different parties; three represented a local government party in the city parliament, one an opposition party.

Table 3. Overview of the number of interviews and the origin of the interviewees in the municipalities

City	**Bochum**		**Dortmund**		**Duisburg**		**Essen**	
Core administration	4	Office of the Lord Mayor, Planning department, planning office, Health department	5	Office of the Lord Mayor (3), planning department, planning office	3	Planning department, Treasury, Staff Office Economy	4	Planning department, planning office, office für urban renewal, "Green Capital" office (in the Environmental Department)
Municipal enterprises	1	City marketing	1	Economic Development Agency	3	Duisburg Business & Innovation, Duisburg Transport Company, municipal housing association	1	Economic Development Agency
Local politicians	1	Social democratic party (SPD)	1	Green Party	1	Die LINKE (the Left)	1	Conservative Party (CDU)
total	6		7		6		7	

Source: own survey

The following general findings have been made so far:

- Regardless of how cooperation with the university is assessed in general, there is a minimum consensus in all four cities: The universities are seen as an important location factor that brings additional image benefits for the city.
- The spatial separation of downtown and campus and the lack of student life in the cities are generally viewed negatively. In the meantime, projects or project plans exist in all cities to "bring the university into the city center".
- The pathways to good collaboration vary widely:
  - There are "forced marriages" both in institutional cooperation and in research projects: the planning sovereignty of the municipalities forces the universities to cooperate, e.g. in campus development. At the same time, funding bodies such as the state, the national

government or the European Union make their financial support of municipal projects dependent on accompanying scientific research.

- In these "forced marriages", however, understanding for each other can grow in the course of cooperation, and a voluntary relationship can develop.

- The same applies to cooperation in research, where the municipality initially sees itself as a supplier of data and networks, but emancipates itself in the cooperation and develops into an equal partner.

- The self-confidence of the members of the administration with regard to the universities varies greatly: It ranges from respect for science - "I'm just a small planner" - to: "Administration consists of so many scientists, you can't learn anything new from science there".
- The relationship between honorary local politicians and local universities is not considered to be particularly intensive. There are exceptions where politicians themselves have a scientific background and may also have worked at the university. Only a few interviewees would like to see a more active role for local politics beyond decision-making power in their respective committees and Parliaments.

Initial findings on the four cities:

- Bochum and Dortmund have largely internalized the importance of working with universities. The interview partners refer to structures and strategies, such as UniverCity in Bochum or the Dortmund Master Plan Science. They establish cross-references between individual projects and know where there is still a need to improve.
- The action plan "Science City Essen", which was created by the Essen Economic Development Agency, is not mentioned by the interviewees from the other offices. It is obviously not a unifying factor.
- In Duisburg, a common strategic orientation for cooperation between the municipality and the university is not apparent.
- Regardless of the respective strategic orientation, there are individual projects in all cities in which cooperation with local universities has been practiced - in some cases for decades - and is firmly anchored structurally.
- Good examples of this are the cooperation between the Office for Urban Renewal in the city of Essen and the local university in the area of neighborhood development, as well as the Health Office in Bochum: Here, an office that tends to rank lower in the administrative

hierarchy has strategically repositioned itself through cooperation with the university of health and gained a reputation in local government.

4. CONCLUSIONS

The cooperation of universities with their respective city administrations was not "natural" even in traditional university cities, but intensified only in the 1990s in the course of the development of technology centers, start-up policies and the urgent need for new space for university expansion. The universities in the four Ruhr cities studied, which were founded in the 1960s, have followed these developments more or less in parallel. At the same time, however, they still had to fight for recognition in their respective urban societies, which made the process of rapprochement even more difficult. How cooperation develops ultimately always depends on individuals. This can be mayors and university rectors, but also administrators of municipal offices who work with scientists and sometimes also students from the university on individual projects in neighborhoods, on traffic problems or on climate protection.

Cooperation can only generate added value where the "forced marriage" is abandoned, understanding is developed for the different objectives and restrictions, and ultimately the two sides operate at eye level.

The increasing proportion of academics in the city administrations, some of whom have also worked at the university, facilitates the establishment of structures and informal relationships in which people can quickly pick up the phone when they need information or advice.

The spatial and social integration of the universities into the inner cities of the four study areas has begun, but represents one of the greatest challenges for the coming decades. What is needed here is space and the courage to experiment and the innovative power of clever minds on both sides.

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