Promoting Structural Change Through Knowledge-Based Urban Development? A Tale of Two Cities in the Ruhr

Matthias Kiese, Elena-Franziska Schlich & Moira Sasse
Institute of Geography • Urban and Regional Economics
RUHR-UNIVERSITÄT BOCHUM

The Ruhr

- Polycentric structure with 53 municipalities
- Former manufacturing heartland with legacy of coal mining and steel industry
- At 5.1 million inhabitants (06/2017), the Ruhr is Germany’s largest conurbation, comprising 6.2% of the national population.
- Dortmund is Germany’s 8th largest city, with 586,181 inhabitants in 2015.
- Bochum is Germany’s 16th largest city, with 364,742 inhabitants in 2015.

Data: RVR 2018; SIBA 2017, p. 30

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Spatial Cumulation of Employment Risks
- "Culture of unemployment" in some urban districts
- Skills deficits prevent transition to service sector
- Social polarisation and exclusion (Cf. Bogumil et al. 2012, p. 50)

Unemployment Rates, June 2018

Field Trip Sites
1) Science and Technology Campus, Dortmund
2) Phoenix West, Dortmund
   1) New Technology Park
   2) Old Blast Furnace with Skywalk
3) Lake Phoenix, Dortmund
4) Ruhr University & Health Campus, Bochum
5) Mark 51°7 (former Opel car plant)
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Sectoral Change: Decline of the “Dortmund Trinity”

- Coal mining
- Breweries
- Steelmaking

Image in the late 1990s
- Highly unionised
- Not future-oriented
- Persistently negative
- Internationally little known

(Küpper 2005, p. 627)

Early Responses to Structural Decline

The University of Dortmund was founded in 1968.

- Structural decline fostered coalition-building among local stakeholders ("Dortmund consensus")
  - City government
  - Chamber of commerce representing companies
  - Trade unions
  - Universities
Early Responses to Structural Decline

Technology Park: 280 high-tech manufacturing and knowledge intensive business firms with > 8,500 employees
Business incubator as nucleus: Technologiezentrum Dortmund (TZDO), *1985

Photos: Stadt Dortmund 2006, p. 6-8

Explicit Cluster Policy: The dortmund-project

- 2000: dortmund-project started with a vision to create 70,000 jobs within 10 years through focus industries
  - Software development and electronic commerce
  - Microsystems technology
  - Logistics
  - Later: Biomedical industry added
- Activities
  - industries
  - human capital
  - site development & revitalization
  ⇒ strategic urban planning (Ziesemer 2004)
Dortmund: Technology Parks and Competence Centers

Locations
- TPDO/ TZDO
- TP PHOENIX WEST

Competence Centers
- BioMedizinZentrum
- Center for production technology
- Center for micro and nanotechnology
- B1st Software-Factory Dortmund
- e-port-dortmund

Technology Park and Competence Centers: Timeline

1984 Development of TZDO

1988 Testlab for Electromagnetic Compatibility and Fraunhofer Institute for Software and Systems Engineering

1991 Development of TPDO

1992 Max Planck Institute of Molecular Physiology

1998 BioMedizinZentrum

2001 e-port Dortmund and B1st Software-Factory Dortmund

2002 Center for production technology

2005 Center for micro and nanotechnology, PHOENIX West

2008 LogistikCampus

2013
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Technology Centre (TZDO) and Park (TPDO)

- 350 technology-based firms with around 10,200 employees
- 43 hectares
- Incubator (TZDO) as nucleus (*1985, now ~ 120,000 m² floor space)


Dortmund: TU Campus and Technology Park (2017)

http://www.tzdo.de/de/tzdo/ueber-uns.htm [22.07.2018]
TPDO: Key Firms and Research Organisations

Companies
1. Boehringer Ingelheim microParts GmbH
2. Elmos Semiconductor AG
3. Vanderlande Industries Logistics Software GmbH
4. EMC-Test NRW GmbH

Research institutes
7. Max Planck Institute of Molecular Physiology (*1999)

Biotech Competence Centres on TPDO

BiomedizinZentrum (BMZ) & ProteomKompetenzZentrum (PKZ)

- 17,000 m² office and lab spaces for start-ups and young firms
- biomedicine, bioinformatics, bio-microstructure technology, proteomics
- Opened in 2002, successively expanded until 2011
- ERDF funding (EU & NRW)
Impacts on the Regional Economy (2013)

<table>
<thead>
<tr>
<th>TPDO/ TZDO</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional demand effects</td>
<td>&gt; 700 million €</td>
</tr>
<tr>
<td>Indirect employment effects</td>
<td>&gt; 9,100</td>
</tr>
<tr>
<td>- in the region of Dortmund</td>
<td>&gt; 2,500</td>
</tr>
<tr>
<td>Consumer demand of employees (&gt; 10.150)</td>
<td></td>
</tr>
<tr>
<td>Employees with academic degree</td>
<td>6600 (65.5%)</td>
</tr>
<tr>
<td>Income</td>
<td>&gt; 400 million €</td>
</tr>
<tr>
<td>Employment effect of consumption expenditures</td>
<td>1,400</td>
</tr>
<tr>
<td>Overall effects of TPDO/ TZDO</td>
<td></td>
</tr>
<tr>
<td>Total indirect employment effects</td>
<td>12,800</td>
</tr>
<tr>
<td>Local tax revenue from on economic activities on TPDO/ TZDO</td>
<td>39 million €</td>
</tr>
</tbody>
</table>

Data: [http://www.wirtschaftsforderung-dortmund.de/service/presse/pressedetailseite_10240.html](http://www.wirtschaftsforderung-dortmund.de/service/presse/pressedetailseite_10240.html) (25 July, 2018); Peters/Michels 2015; Peters/Michels 2016

Research Infrastructure in the Ruhr

- The Ruhr hosts only four of Germany’s 72 Fraunhofer Institutes for applied research, of which two are located in the TPDO.
- Only three of Germany’s 84 Max Planck Institutes for basic research are located in the Ruhr, one of them in the TPDO.
- The City of Jena has only 2% of the Ruhr’s population, but just as many MPIs!

Data: [https://www.mpg.de/institute_karte](https://www.mpg.de/institute_karte) (24 July, 2018)

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Performance of Focus Industries

- **Intermediate evaluation**: Until 2004, employment in the three focus industries grew by 6,640 including indirect effects (Dr. Heuser AG 2005, p. 12)
  - Original job growth target based on overly optimistic assumptions
  - New economy euphoria \( \Rightarrow \) overestimation of potential attraction of new firms and growth of start-ups (cf. Dufour-Bourru 2011)

<table>
<thead>
<tr>
<th>Firms</th>
<th>Employment</th>
<th>Emp./Firm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logistics</td>
<td>951</td>
<td>3.6%</td>
</tr>
<tr>
<td>IT</td>
<td>889</td>
<td>2.7%</td>
</tr>
<tr>
<td>MST</td>
<td>44</td>
<td>5.7%</td>
</tr>
<tr>
<td>Biotech</td>
<td>24</td>
<td>20.8%</td>
</tr>
<tr>
<td>Total</td>
<td>1,908</td>
<td>3.3%</td>
</tr>
</tbody>
</table>

Data: Stadt Dortmund 2015b, p. 8-18; own calculations
CAGR = compound annual growth rate
Start-up Contests “start2grow”

- 31 contests between 2001 and 2013
- 984 start-ups with 5,511 jobs as of end-2013
- 38.5% of these firms with 32.2% of the jobs have been founded in Dortmund ⇒ 1,772 jobs for the city (Stadt Dortmund 2014, p. 51)
- 643 were still active in 2011 ⇒ survival rate = 70.7%

Start-up Contests Improved Entrepreneurial Climate

Ranking of 439 German cities and counties by entrepreneurial activity

1) Newly formed firms, relocations and affiliates per 10,000 inhabitants
Stadt Dortmund 2009, p. 5
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dortmund-project: Assessment

<table>
<thead>
<tr>
<th>Achievements</th>
<th>Failures &amp; Unresolved Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>• <strong>Employment</strong> in focus industries increased by 6,640 until 2004</td>
<td>• Target of 70,000 new jobs was unrealisic (new economy euphoria) ⇒ potential of local ED efforts overestimated</td>
</tr>
<tr>
<td>• <strong>Catalyst</strong> in long-term and radical structural change, building on previous achievements (University, technology park, consensus)</td>
<td>• Unsuccessful ambitions to attract local firms, e.g. U.S. roadshows</td>
</tr>
<tr>
<td>• <strong>Marketing</strong> efforts helped raise Dortmund’s profile</td>
<td>• <strong>Unemployment</strong> still above average</td>
</tr>
<tr>
<td>• <strong>LED professionalization</strong> (esp. strategy &amp; specialist know-how in incubators and start-up contests) ⇒ attraction of EU and NRW funding, e.g. MST.factory</td>
<td>• High-tech industrialization aggravates social and spatial <strong>polarisation</strong> (south-north divide)</td>
</tr>
<tr>
<td>⇒ <strong>Organizational capacity</strong>! ↑</td>
<td>1) cf. van den Berg et al. (1997)</td>
</tr>
<tr>
<td>⇒ Inspiration for other regions and NRW government</td>
<td></td>
</tr>
</tbody>
</table>

1) cf. van den Berg et al. (1997)

Organizing Capacity of Regions

Performance

Leadership
Political support
Societal support
Spatioeconomic conditions

Vision and strategy

Strategic networks

Public sector ∩ Private sector
### Knowledge-intensive Entrepreneurship*, 2012-2016

**Share of all new firms**

- Urban-rural divide
- North-South divide
- Nuclei = Cities with technical universities, but none in the Ruhr

<table>
<thead>
<tr>
<th>County/City</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jena</td>
<td>16.3</td>
</tr>
<tr>
<td>Munich (City)</td>
<td>12.0</td>
</tr>
<tr>
<td>Cologne</td>
<td>9.6</td>
</tr>
<tr>
<td>Düsseldorf</td>
<td>7.5</td>
</tr>
<tr>
<td>Germany (2016)</td>
<td>7.1</td>
</tr>
<tr>
<td>Dortmund</td>
<td>6.4</td>
</tr>
<tr>
<td>Bochum</td>
<td>6.1</td>
</tr>
<tr>
<td>Duisburg</td>
<td>5.7</td>
</tr>
<tr>
<td>Essen</td>
<td>5.6</td>
</tr>
</tbody>
</table>

* High-tech industries & KIBS; Data & maps: Creditreform 2017

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### Field Trip Sites

1) Science and Technology Campus, Dortmund

2) **Phoenix West, Dortmund**

   1) New Technology Park
   2) Old Blast Furnace with Skywalk
   3) Lake Phoenix, Dortmund
   4) Ruhr University & Health Campus, Bochum
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**Blast Furnaces in Hörde (1860)**

[Image](https://upload.wikimedia.org/wikipedia/de/thumb/b/b0/Hochofenanlage_in_Hoerde_1860.JPG/1920px-Hochofenanlage_in_Hoerde_1860.JPG)

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**Phoenix-West: Timeline and Funding**

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1850</td>
<td>First blast furnace</td>
</tr>
<tr>
<td>1998</td>
<td>Closure of furnaces</td>
</tr>
<tr>
<td>2000</td>
<td>Urban planning concept</td>
</tr>
<tr>
<td>2001</td>
<td>Most land acquired by NRW government agency for redevelopment (now NRW.URBAN)</td>
</tr>
<tr>
<td>2002</td>
<td>Start of demolition and remediation</td>
</tr>
<tr>
<td>2005</td>
<td>Opening of MST.factory (second phase in 2007)</td>
</tr>
<tr>
<td>2008</td>
<td>Opening of Centre for Manufacturing Technology (ZIP)</td>
</tr>
<tr>
<td>2011</td>
<td>Opening of Skywalk</td>
</tr>
</tbody>
</table>

**Funding**

- 80 m € from EU (ERDF, 2000-2006)
- 19.6 m € from federal and state government (GRW)


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*Footnotes and references are not included in the natural text representation.*
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Masterplan Phoenix (2004)

Stadt Dortmund 2004, S. 4

Phoenix-West & Phoenixsee: Aerial View (2017)

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Phoenix-West: Aerial View (2017)

Competence Centres on Phoenix West

**MST.factory**
- 10,000 m² incubator for *micro technologies* with clean room facilities
- Built 2005/2007, > 50 m € in subsidies (ERDF, GRW)
- Dearth of start-ups reported lately (Stadt Dortmund 2016b)

**Zentrum für Produktions-technologie (*2008*)**
- 10,000 m² incubator for *manufacturing (process) technologies*
- modern machine facilities on rental basis
Field Trip Sites

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Phoenix-Ost: Iron and Steel Works (~1860)

- Closure of oxygen steel mill in April 2001
- Parts of the plant were transported to China and put back into service there.
- Buildings almost completely demolished in 2003 & 2004
- 2006-2011: Excavation of 2.7 million m³ & Flooding of Phoenix-See

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Hermannshütte Steel Mill in the 1970s

Phoenix-See Planning Sketch, 2006 (96 hectares)
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Phoenix-See Area Map

Phoenix-See Area Map

Phoenix-See: Aerial View (2017)

Phoenix-See: Aerial View (2017)
Phoenix-See: Key Figures

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>1,230 m</td>
</tr>
<tr>
<td>Width</td>
<td>310 m</td>
</tr>
<tr>
<td>Depth</td>
<td>max. 4.6 m, Ø 2.5 m</td>
</tr>
<tr>
<td>Area</td>
<td>ca. 24 hectares</td>
</tr>
<tr>
<td>Volume</td>
<td>600,000 m³</td>
</tr>
<tr>
<td>Functions</td>
<td>(~2,000 units)</td>
</tr>
<tr>
<td></td>
<td>Water retention (part of Emscher revitalisation; +39% capacity)</td>
</tr>
<tr>
<td>Costs</td>
<td>15 m € for land acquisition</td>
</tr>
<tr>
<td></td>
<td>230 m € for landscape transformation</td>
</tr>
<tr>
<td></td>
<td>- ca. 50% recovered from land sales</td>
</tr>
<tr>
<td></td>
<td>- ca. 70 m € government programmes</td>
</tr>
</tbody>
</table>

https://www.dortmund.de/de/struktur_und_kultur/phoenix_see_dortmund/der_phoenix_see/index.html [25 July, 2018]

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Phoenix-See: Residential & Business Development

- **Residential**: ca. 2,000 units
  - North/Northeast: up-market (semi-)detached houses
  - South: higher density, one 43-unit social housing project added in 2013
  - Southwest: Office building with penthouses on top floors
- **Business**: 121 Firms, 1,200 employees
  - 70% service sector & restaurants
  - 16% IT/media
  - one manufacturing firm


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Photo: Kiese, 19 July, 2018

Photo: Baumeister 2016

Photo: Kiese, 19 July, 2018
**Working Class & Nouveau Riche Collide on TV**

![Image](http://www.proxlauf.de/upload/68/1475620229_news_phoenixsee_giskes_news.jpg) [22 July, 2018]

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Phoenix-See – Engine of Gentrification

- Transformation of former working-class neighbourhood: Rising land prices & rents crowd out residents.
- “Direct clash of winners and losers of structural change” (Susanne Frank, urban & regional sociologist, TU Dortmund, cited by Kortmann 2012)
  - Residents complained of a lack of sleep by *drunks, police and a private security service* in continuous USG (Buske 2012; Kolle 2018).
  - But funds for reactivating the area linked to the *public accessibility of the lake*.
  - Project had been treated as an "island": "The fact that conflicts are emerging there is not surprising." (Ulla Greiwe, spatial planner, TU Dortmund)

Cf. Frank/Greiwe 2012
### Hörde: Working-Class Neighbourhood in Transition

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Hörde</th>
<th>Dortmund</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>24,108</td>
<td>596,575</td>
</tr>
<tr>
<td>Pop. Turnover*</td>
<td>19.0 %</td>
<td>7.0 %</td>
</tr>
<tr>
<td>Unemployment</td>
<td>16.2 %</td>
<td>12.3 %</td>
</tr>
<tr>
<td>SGB II Receivers**</td>
<td>21.1 %</td>
<td>14.4 %</td>
</tr>
</tbody>
</table>

*People moving in from and out to other parts of the city, divided by total population
**SGB II: Unemployment benefits and other social transfers

Data as of 31 December, 2015: Stadt Dortmund 2016a

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### Social Polarisation: Unemployment Rates (Dec 2013)

[Map showing unemployment rates across Dortmund]
Unemployment: The Gap is Widening

Change of unemployment rates by statistical district, 2000-2011*
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Data: https://www.dortmund.de/media/p/statistik_3/statistik/wirtschaft_1/06_12_Arbeitslosenquoten_Stadtbezirke.pdf (06.06.2015)

Unemployment by District, 2008-2013

Unemployment: The Gap is Widening

12 urban districts: changes correlate with base level (r = 0.64)
Unemployment: The Gap is Widening

Unemployment Rate 2000 (30.06.)

62 statistical districts: Changes correlate with base level (r = 0.58)

Data: https://www.dortmund.de/media/p/statistik_3/statistik/wirtschaft_1/06_12_Arbeitslosenquoten_Statistische_Bezirke.pdf
[06.06.2015]


- New growth core = continuation of cluster approach
- New jobs for the low-skilled
- New growth across space
⇒ Reintegration of
  - Economic competitiveness and social cohesion
  - Economic and labour market development

http://www.der-innovationsstandort.de/testnews/single-news/tx_testnews_tt_newsid=12888&cHash=74137ee3b696fb74b74497d3-31 [06.06.2016]

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Structural Change in Action: Steelworkers in the Streets of Bochum

22 September, 2017

Structural Change in Bochum: A Stylised View

Steam engine triggered start of industrial coal mining
Integrated complex of coal mining and steel industry
Attraction of exogenous manufacturing investments (e.g. Opel 1962-2014, Nokia 1993-2008)
Universities Networked knowledge-based economy (vision)

Agricultural and early mining city
City of coal & steel
Manufacturing city
Knowledge city

19th century
Until 1960s
1960s-2000s
21st century

50 Years of Universities in the Ruhr

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RUB Campus: Construction in the 1960s

- 1962 decision by NRW government to establish **first university in the Ruhr** in Bochum, which out-competed Dortmund in the site-selection process (cf. Stallmann 2004).
- Officially opened in 1965, the American-style campus is located **ca. 5 km south of the city centre**.
9 Universities in Bochum

<table>
<thead>
<tr>
<th>University</th>
<th>established</th>
<th>StaffA</th>
<th>StudentsB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ruhr-Universität Bochum</td>
<td>1962</td>
<td>5,650</td>
<td>43,051</td>
</tr>
<tr>
<td>Bochum Univ. of Applied Sciences</td>
<td>1971</td>
<td>475</td>
<td>7,008</td>
</tr>
<tr>
<td>Technische Hochschule Georg Agricola</td>
<td>1816</td>
<td>136</td>
<td>2,355</td>
</tr>
<tr>
<td>Protestant University of Applied Sciences</td>
<td>1971</td>
<td>111</td>
<td>2,329</td>
</tr>
<tr>
<td>EBZ Business School (Real Estate)</td>
<td>2008</td>
<td>30</td>
<td>982</td>
</tr>
<tr>
<td>Hochschule für Gesundheit (Health Care)</td>
<td>2009</td>
<td>116</td>
<td>932</td>
</tr>
<tr>
<td>FOM University of Applied Sciences for Economics and Management</td>
<td>n.a.</td>
<td>n.a.</td>
<td>251</td>
</tr>
<tr>
<td>Federal University for Public Administration (Part of social insurance faculty in Bochum)</td>
<td>1979</td>
<td>9</td>
<td>144</td>
</tr>
<tr>
<td>Folkwang Univ. of the Arts</td>
<td>1939C</td>
<td>20</td>
<td>97</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>6,547</td>
<td>57,149</td>
</tr>
</tbody>
</table>

A) Without external lecturers, last available figures; B) Winter Semester 2015/2016; Data: UniverCity Bochum 2017; Stahl 2015 and universities’ websites

RUB: Figures and Economic Impact

- **43.015 students** (2017/2018)
- **Staff ca. 5,700**
- **Budget 539 m €** (2016)
- **Direct & induced demand effects: 921 m €** (2010, all universities in BO)

**Largest employer** in Bochum

- **Attraction** of firms and highly-skilled labour
- **Potential for knowledge-based entrepreneurship**
- **Graduates = supply of human capital**
- **Knowledge-based business environment & image effects**
- **Demand effects**
RUB: Assessment of Regional Impacts

<table>
<thead>
<tr>
<th>Impact</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Building a regional knowledge base</td>
<td>• Absorption, production and dissemination of knowledge</td>
</tr>
<tr>
<td>2) Building regional pool of human capital</td>
<td>• Large graduate output, but exceeding regional demand ⇒ brain drain</td>
</tr>
<tr>
<td>3) Stimulating knowledge-based entrepreneurship</td>
<td>• Low entrepreneurial activity and poor climate in region &amp; universities</td>
</tr>
<tr>
<td></td>
<td>• Strong promotional efforts &amp; emerging start-up scene</td>
</tr>
<tr>
<td>4) Stimulating innovation in the regional economy</td>
<td>• Regional knowledge and technology transfer still limited (e.g., low absorptive capacity)</td>
</tr>
<tr>
<td>5) Improving regional identity &amp; image</td>
<td>• Bochum/the Ruhr still rarely associated with knowledge production</td>
</tr>
<tr>
<td>6) Improving demographic profile</td>
<td>• Bochum attracts students, but is less successful in retaining them after graduation</td>
</tr>
<tr>
<td>7) Stimulating creative milieus</td>
<td>• Still lagging behind other metropolitan areas</td>
</tr>
<tr>
<td>8) Providing cultural activities</td>
<td>• Regional provider/venue of culture and arts</td>
</tr>
</tbody>
</table>

Cf. Hilkmann 2017; Hohn 2017; UniverCity Bochum 2016

Internal Migration by Age, Bochum 2009-2012

Data: Bertelsmann Stiftung 2018
### "Science Scorecard": Quantitative Assessment

<table>
<thead>
<tr>
<th>Indicator</th>
<th>bottom</th>
<th>average</th>
<th>top</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Science</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universities and research organisations per 100,000 inhabitants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of non-university research organisations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of international students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third party funding per professor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third party funding from industry sources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Economy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of firms engaged in R&amp;D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creative economy start-up intensity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-tech startup intensity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of employment in R&amp;D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low unemployment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of employment in business services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP per employee</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D expenditure per R&amp;D staff</td>
<td></td>
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</tr>
</tbody>
</table>

- Compares Bochum to 12 other German university cities
- About **average in science**
- **Weak knowledge economy** limits regional knowledge and technology transfers

Cf. Staemmler/Tiefenbacher 2015

### "Science Scorecard": Stakeholder Interviews

<table>
<thead>
<tr>
<th>Indicator</th>
<th>bottom</th>
<th>average</th>
<th>top</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supportive political environment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public participation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Networks</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science-business</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science-society</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entrepreneurial culture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creative class</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Science</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology transfer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer from other fields</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer infrastructure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science communication, diverse media</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science communication, specific places</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Place marketing, national</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Place marketing, international</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Human capital</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Further education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diversity &amp; openness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family-friendliness</td>
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</tr>
</tbody>
</table>

- Contrasting most hard evidence, local **stakeholders are upbeat** about Bochum as a science city!
Local Network: UniverCity (*2009)  

- 12 organisations: City, universities, chamber of commerce  
- Objective: Developing and marketing/branding Bochum as a city of science and education

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Master Plan University-City

Stadt Bochum 2014, p. 26  
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Institute of Geography
Matthias Kiese, Elena-Franziska Schlich & Moira Sasse

TechnologieQuartier

- Small coal mine 1947-1959
- 1995-2002 developed as 12 ha site for technology-based firms
- Foci: ICT (esp. IT security), health & environmental services, engineering services


General Incubator: TechnologieZentrumRuhr

- Established 1989 on RUB campus
- 58 firms with ~600 staff (2016), 18,000 m² office & lab space
- Around 100 firms with 1,000 jobs “graduated” from TZR in 25 years

• Est. 2009 on RUB campus, opposite TZR
• ~5,200 m² office and lab spaces for young firms in life sciences and health services

Biomedical Incubator: BioMedizinZentrum

Health Campus and RUB, Aerial View (04/2018)
Bochum: Biomedical Incubator and Park

Biomedical Incubator for Start-ups:
Office and laboratory space for medical technologies, medicine, biochemical and biotechnology

BioMedizinPark: Computer simulation and status in 2011

Cf. Herrmann 2009
http://www.welt.de/multimedia/archive/00765/repo_bochum02a_DW_S_765972z.jpg,
http://www.welt.de/multimedia/archive/00765/repo_bochum02_DW_Tc_765966p.jpg [25.01.2017],
http://www.derwesten.de/d3img/475/664-20011732560273_543_Biomedizinpark-Bochum.jpg [15.06.2011]

“EU-illuminated Meadows” in Bochum

Photos: Kiese, 30.05.2012
From Biomedical Park to Health Campus South

- 2006 – City of Bochum attracted **ERDF funding** to develop a **5.5 hectare biomedical park** adjacent to the RUB campus.
- Concept: Attract external firms and “graduates” from the BioMedizinZentrum incubator focusing on **biomedical R&D**.
- **Failure to attract** this target group ⇒ still empty in 2011
- 2009 – state government decided to establish **health campus NRW** with a **new university (HSG)** in Bochum for ~200 m € (cf. Stadt Bochum 2008)
- 2012-2016 construction & opening of HSG
- Attraction of organisation providing **training for health professions**
- **Re-branding** as „Health Campus South“ (cf. Schwarzwald 2014),
- 2016 attraction of **medical IT service provider** Visus GmbH as first „graduate“ from the incubator (cf. Stahl 2016).
Context Effects: Neighbourhood Matters!

• Proximity of Dortmund
  – Backwash effects through first mover advantages and agglomeration effects (positive externalities)

• Strategic alternatives for Bochum
  – Regional Cooperation with complementary concepts (division of labour, functional specialisation)
  – Differentiation through novel/unique concepts, z.B. Worldfactory
  – Cooperative competition (Coopetition, Brandenburger/Nalebuff 2013)

Knowledge Infrastructures: Bochum vs. Dortmund

<table>
<thead>
<tr>
<th>Innovation Centres &amp; Technology Parks</th>
<th>Bochum</th>
<th>Dortmund</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technologiezentrum Ruhr (*1989, 16,500 m²)</td>
<td>TZDO (*1985, 103.395 m²)</td>
<td></td>
</tr>
<tr>
<td>Technologiequartier (*1995, 12 ha)</td>
<td>TPDO (*1985, 40 ha)</td>
<td></td>
</tr>
</tbody>
</table>

Case Study: Biomedical R&D

<table>
<thead>
<tr>
<th>Bochum</th>
<th>Dortmund</th>
</tr>
</thead>
<tbody>
<tr>
<td>BiomedizinZentrum Bochum (*2009, 5,200 m²)</td>
<td>BioMedizinZentrum Dortmund (BMZ I &amp; II: *2002/2005, 15,000 m²)</td>
</tr>
<tr>
<td>BiomedizinPark (*2006, 5,5 ha – now Gesundheitscampus Süd)</td>
<td></td>
</tr>
</tbody>
</table>
Field Trip Sites

1) Science and Technology Campus, Dortmund
2) Phoenix West, Dortmund
   1) New Technology Park
   2) Old Blast Furnace with Skywalk
3) Lake Phoenix, Dortmund
4) Ruhr University & Health Campus, Bochum
5) Mark 51°7 (former Opel car plant)

Opel I Site: Historical Transformation

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>14th century</td>
<td>Estimated beginnings of informal mining</td>
</tr>
<tr>
<td>1736</td>
<td>Start of Zeche Dannenbaum colliery</td>
</tr>
<tr>
<td>1859</td>
<td>Transition from tunnel to deep-shaft mining</td>
</tr>
<tr>
<td>1957</td>
<td>Beginning of coal crisis</td>
</tr>
<tr>
<td></td>
<td>Drivers: competition from imported coal &amp; substitution by oil &amp; gas</td>
</tr>
<tr>
<td>1958</td>
<td>Closure of Zeche Dannenbaum colliery, ~3,000 jobs lost</td>
</tr>
<tr>
<td>1960-1962</td>
<td>Construction of Opel car factory, 11,600 workers in 1964</td>
</tr>
<tr>
<td></td>
<td>Drivers: Burgeoning demand (&quot;economic miracle&quot;); availability of land,</td>
</tr>
<tr>
<td></td>
<td>infrastructure and workers)</td>
</tr>
<tr>
<td>1970</td>
<td>Peak employment at ~20,000</td>
</tr>
<tr>
<td></td>
<td>Then decline due to rationalisation/automation</td>
</tr>
<tr>
<td>2014</td>
<td>Opel car production ceased in December, ~3,000 jobs lost</td>
</tr>
<tr>
<td>2015</td>
<td>Site transferred to Bochum Perspektive 2022, a joint venture by the</td>
</tr>
<tr>
<td></td>
<td>City of Bochum (51%) and Opel (49%)</td>
</tr>
</tbody>
</table>
Accounting for Opel’s Withdrawal from Bochum

<table>
<thead>
<tr>
<th>Factors External to Bochum</th>
<th>Bochum-specific Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturated European car market with overcapacities</td>
<td>Aged facility and workforce</td>
</tr>
<tr>
<td>External control, parent GM preventing Opel from entering emerging markets outside Europe</td>
<td>Pure assembly plant</td>
</tr>
<tr>
<td>Opel’s poor image and brand management ⇒ persistent losses</td>
<td>Hard-nosed workers’ council (cf. Vauxhall in Ellesmere Port, UK)</td>
</tr>
<tr>
<td></td>
<td>Failure to establish a regional cluster of suppliers?!</td>
</tr>
</tbody>
</table>

Zeche Dannenbaum Colliery

https://www.bochum.de/C12571A3001D56CE/vwContent?syKey=W285KCSL775BOLDDE/3File/dannenbaum_01_02.jpg

https://www.bochum.de/C12571A3001D56CE/vwContent?syKey=W285KCSL775BOLDDE/3File/dannenbaum_01_02.jpg [25 July, 2018]
After a history of coalmining and half a century of automotive manufacturing, what will be the future for the Opel I site?
Promoting Structural Change through Knowledge-Based Urban Development? A Tale of Two Cities in the Ruhr

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Mark 51°7: Aerial View, April 2018

New DHL Parcel Distribution Centre

Opel Admin Bldg 'O-Werk'

https://img.waz.de/img/archiv-daten/crop213990243/8346626898-w940-cv3_2-qt5/hugo-182501176.jpg [04 June, 2018]

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Mark 51°7: Aerial View, April 2018

https://img.waz.de/img/archiv-daten/crop219900245/8399626896-w940-cv3_2-aq5/hugo-182499757.jpg

04 June, 2018

Opel I: Perspektive 2022’s Value Proposition


02 June, 2015
### Mark 51°7: Timeline and Governance Process

<table>
<thead>
<tr>
<th>Date</th>
<th>Step</th>
<th>Content/Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-01-30</td>
<td>Two local planning processes (Bebauungsplan) for Opel I &amp; II started</td>
<td>For Bochum-East</td>
</tr>
<tr>
<td>2013-07-11</td>
<td>Public hearing on integrated development concept for Bochum-East</td>
<td>Mayor: “Almost euphoric enthusiasm”</td>
</tr>
<tr>
<td>2013-06-29</td>
<td>Opel Workshop (City Council only)</td>
<td>Unanimous vote on position paper = consensus among political parties</td>
</tr>
<tr>
<td>2013-09-26</td>
<td>Resolution by City Council (“Bochumer Position”)</td>
<td>Positive atmosphere</td>
</tr>
<tr>
<td>2013-09-27/28</td>
<td>Opel Workshop (“Erste Werkstatt”) ~ 60 representatives of regional businesses, City Council, municipal administration, federal ministries, academia, and Opel</td>
<td>Two different speeds (short-/medium-term acquisitions) Taking stock of economic, legal and urban planning conditions</td>
</tr>
<tr>
<td>2013-10-24</td>
<td>Report on mining damages completed</td>
<td>Estimated costs of 12 million €</td>
</tr>
<tr>
<td>2014-01-17</td>
<td>Opel Workshop (“Zweite Werkstatt”) &gt; 80 representatives of regional businesses, City Council, municipal administration, federal ministries, academia, and Opel</td>
<td>Analysis (feasibility study) by NRW.URBAN Focus on creating manufacturing jobs at all skills levels No restrictions, except for large-scale retail</td>
</tr>
<tr>
<td>2014-01-30</td>
<td>City Council meeting</td>
<td>Resolution to form transformation company “Bochum Perspektive 2022” Budget of 6.2 million € Tasks: Purchase site, attract subsidies (little opposition)</td>
</tr>
<tr>
<td>2014-04-01</td>
<td>Deutsche Post DHL announces investment</td>
<td>DHL signs letter of intent with Opel</td>
</tr>
<tr>
<td>2016-01-29</td>
<td>DHL signs land sale contract for 14 hectares</td>
<td>Distribution center to be built from 2017, open in 2019</td>
</tr>
</tbody>
</table>

*) Workshop process (“Werkstattgespräche”) led by state-owned developer NRW.URBAN
Hohn/Zepp 2013, p. 1-3; MMMEH-NRW 2013, 2014; Stadt Bochum 2016 (own translation)

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Regional Land Use Plan: Commercial Sites in BO


“Bochumer Position”: Opel I Planning Sketch

Stadt Bochum 2014, p. 4
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“Bochumer Position”: Coarse Land Use Sketch

Stadt Bochum 2014, p. 4

https://www.bochum.de/C125708000076A311/ContentByUNID88/44C2BC46C12574A00E9C86B06E716B_Rahmenplan_V_I.pdf [02.06.2015]

Opel I: Urban Framework Plan (Variation I)
Opel I: Urban Framework Plan (Variation II - DHL)

Opel I: Appraisal (Nov 2013)

- Integrated approach and vision (storyline) still missing
- Need for consensus ⇒ pragmatism seems to overrule strategic vision
- Dimensions of integration
  - Stakeholders (polity, administration, business, academia, civil society)
  - Functions (e.g., R&D, education, knowledge transfer, manufacturing, services…)
  - Spatial and institutional scales (municipal, regional, state, federal, EU)

Cf. Hohn/Zepp 2013, p. 1-3 (own translation)
RUB: Tripolar Strategic Campus Development

Hohn 2017, p. 21

RUB announced to locate **new research centres** and **transfer activities** on Mark 51°7.

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A Tale of Two Cities…

Neighbouring Ruhr cities share **common traits**, but also exhibit **noticeable differences**:

<table>
<thead>
<tr>
<th>Dortmund</th>
<th>Bochum</th>
</tr>
</thead>
<tbody>
<tr>
<td>• From <strong>coal and steel</strong> city straight into the <strong>knowledge economy</strong></td>
<td>• Early transition from coal and steel to manufacturing city</td>
</tr>
<tr>
<td>• Hardship of structural change triggered <strong>consensual strategic vision</strong> from the 1980s, allowing the sustained acquisition of public funding (ERDF, GRW).</td>
<td>• Pragmatic approach (&quot;centipede&quot;) rather than strategic focus on clusters</td>
</tr>
<tr>
<td>• Move into high-tech provided <strong>first-mover</strong> and <strong>localisation advantages</strong> vis-à-vis regional competitors.</td>
<td>• Demise of large manufacturing firms (2008/2014) ⇒ city turns to universities as engines for economic development</td>
</tr>
<tr>
<td>• Transfer infrastructure (incubators) &gt; entrepreneurial potential</td>
<td>• Strong <strong>enthusiasm</strong> and <strong>effort</strong>, but <strong>knowledge economy</strong> (transfer, entrepreneurship) starting from <strong>low base</strong>.</td>
</tr>
<tr>
<td>• Widening <strong>socio-spatial disparities</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Competition > Co-operation**

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References (1/6)


References (2/6)


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References (4/6)


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References (5/6)


References (6/6)


