Modelling optimal office location in sustainable urban environment – investors’ perspective and planning policy

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Agenda

1. Research goal and questions
2. Theory on office location and sustainable urban development
3. Research
   i. Planning policy in Poland
   ii. Qualitative research
   iii. Spatial analysis
4. Sustainable office locations in Cracow
5. Conclusion
Research goal

- Optimal and sustainable location of office buildings
- Investors’ decisions on office location
- Planning policies for sustainable urban development

Sustainable urban development
Research questions and rationale

Q1: What are required attributes of office location according to developers?

Q2: Do local zoning maps provide sites for office developments which are optimal for sustainable urban development?

Q3: Can optimal office location be also sustainable?

- Certification systems of green buildings, focus on building design, not its location and impact on local development

- Local governments are responsible for strategies of sustainable urban development and have the opportunity to use local zoning plans to control urban development
Theoretical debate on office location

i. Public transportation accessibility (centrality and connectivity)
   (Zięba & Głuszak, 2016; Adnan et al., 2015; Remøy & van der Vooit, 2014; Levy & Peterson, 2013; Rymarzak & Siemińska, 2012; Adnan et al., 2012; Leishman et al., 2012; Willigers & Van Wee, 2011; Rebelo, 2011; Manzato et al., 2011; Jennen & Brounen, 2009; Greenhalgh, 2008; Appel-Meulenbroek, 2008; Nappi-Choulet et al., 2007; Leishman et al., 2003; Archer & Smith, 2003; Hanssen, 1995);

ii. Proximity to employees, suppliers and customers
    (Remøy & van der Voodt, 2014; Dettwiler, 2008; Greenhalgh, 2008)

iii. Proximity to business services, positive externalities
    (Adnan et al., 2015; Remøy & van der Voodt, 2014; Adnan et al., 2012; Rebelo, 2011; Adnan & Daud, 2010; Jennen & Brounen, 2009; Mun & Hutchinson, 1995; Fagg, 1980; Leone & Struyk, 1976)

iv. Availability of amenities, facilities, local and urban services
    (Adnan et al., 2015; Remøy & van der Voodt, 2014; Adnan et al., 2012; Rebelo, 2011; Adnan & Daud, 2010; Din et al., 2001; Bollinger et al., 1998)

v. Prestige of location, status, symbolic meaning of a location, safety, quality of neighborhood, visibility
   (Harris, 2016; Adnan et al., 2015; Remøy & van der Voodt, 2014; Levy & Peterson, 2013; Rymarzak & Siemińska, 2012; Adnan et al., 2012; Rebelo, 2011; Appel-Meulenbroek, 2008; Greenhalgh, 2008; Kraetke, 1992;)

vi. Planning and fiscal tools and public investment
    (Aarhus, 2000; Tang et al., 2000; Ihlanfeldt & Raper, 1990;)

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Dimensions of sustainable urban development, in literature:

I. **Environmental** (Beatley, 2011; Steiner, 2011; Bulkeley, 2012; Solecki et. al 2013, Behling et al. 2015)

II. **Social** (Hayden 2002; Perlman & Sheehan 2007)

III. **Economic** (Shuman, 1998; Renner et. al. 2008)

IV. **Institutional** (Valentin & Spangenberg 2000; Evans et. al. 2013)

V. **Spatial**: sustainable urban form (Wiliams et. al. 2000), land use-transport systems (Spiekermann & Wegener 2004, Yigitcanlar 2010), spatial accessibility (Porta, 2006) or green space accessibility (Gupta et al. 2016, La Rosa 2014).

Spatial dimension of urban development results in creation of urban policy that affects optimal location of amenities, recreation areas, adequate public transport and citizen’s security (Keiner, 2004).
Sustainable, best office location and urban sustainability

**Sustainable office location**

- Access to clean transportation: public transportation, biking, walking
- Mixed-use areas, functional variety
- Dense, compact urban form
- Re-use of land (brownfield, infill investments)
- No negative impact on natural environment and local community

**Office location**

- Accessibility/connectivity (transport)
- Access to amenities and services
- Access for customers and employees
- Prestige and safety

**Sustainable urban development**

- Environmental
- Social
- Economic

Urban space
Planning policy in Poland

Land-use planning and building permits

- Framework studies
  - (1) decision of land development conditions
  - (2) location decision of a public purpose investment

- Local zoning plans

- Building permit

Framework studies: obligatory
Local zoning plans: facultative
By 2015, on the average, 37% of areas in cities were covered by local zoning plans; in metropolitan cities - 27%, in Cracow – 49% (2017)
Data and methods – qualitative

I. In-depth semi-structured interviews: investors’ opinion on office location

- January – March 2017
- 3 representatives of commercial developers in Cracow
- 21 buildings, 8 locations, 287 473 square meters i.e. 75% of available green certified office space in Cracow
- Buildings’ tenants mostly BPO services
- Green buildings: LEED and BREEAM certified buildings

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Locations of green offices in Cracow

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Interviews – summary of results

<table>
<thead>
<tr>
<th>Attributes of best office location in Cracow</th>
<th>Developers’ opinions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public transportation accessibility</td>
<td>Crucial. Most preferred: tram access, close to site stops, numerous tram lines</td>
</tr>
<tr>
<td>Sites covered by local zoning maps</td>
<td>Most preferred. Legal status another decisive factor</td>
</tr>
<tr>
<td>Availability of parking</td>
<td>Important only in city-fringe, suburban locations</td>
</tr>
<tr>
<td>Access to urban amenities and services</td>
<td>Important, not crucial, many facilities and services provided ‘on site’ by developers</td>
</tr>
<tr>
<td>Quality of area and prestige</td>
<td>of relative significance</td>
</tr>
<tr>
<td>Access to cycling network</td>
<td>of relative significance</td>
</tr>
<tr>
<td>Access to customers</td>
<td>Important in central locations and most prestigious projects</td>
</tr>
<tr>
<td>Costs and rents</td>
<td>Acceptable relations between costs of land-site and local rents</td>
</tr>
</tbody>
</table>

*Remark: Scarcity of undeveloped land for new projects in Cracow, to large extent determines location*
II. Spatial analysis

- 12 local zoning plans in Cracow analysis
  - Plans that allow for office development

- Methods: GIS environment

- Data:
  - Urban Atlas,
  - OpenStreetMap,
  - Spatial Plans (Spatial Planning Office)
Sustainable location criteria for office projects

Elaborated on the basis of literature and BREEAM International New Construction 2016 and LEED v4 for Building Design and Construction

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Description</th>
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<tbody>
<tr>
<td>1 Public transportation accessibility</td>
<td>distance to tram stops maximum 500 meters from project boundaries, number of tram lines at the stop minimum 3;</td>
</tr>
<tr>
<td>2 Access to active and clean modes of transportation – biking network</td>
<td>200 meters distance from project boundaries to public bicycle network;</td>
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<tr>
<td>3 Car parking capacity</td>
<td>more sustainable location if local zoning plan provides restrictions on maximum number (instead of minimum) of car parking spaces;</td>
</tr>
<tr>
<td>4 Mixed use</td>
<td>more sustainable sites are areas where various functions are present i.e. areas with direct and close access to diverse urban amenities and services</td>
</tr>
<tr>
<td>5 Brownfield sites</td>
<td>sites which were previously developed, e.g. industrial</td>
</tr>
</tbody>
</table>
Public transportation – tram (stops)
Cycling network in Cracow
Buffer zones according to criteria of access to public transportation and cycle paths
Urban Atlas – land cover
Mixed use: Land cover centroids
Mixed use in city statistical zones
Potentially sustainable locations (transport, mixed use, cycle paths)
Office functions in local zoning plans
Sustainable location, planning and green office locations
Conclusions

Office developers & investors & users are seeking for locations:
- Access to public transportation
- Access to urban amenities
- Prestige of location, quality of area

No major contradictions between urban sustainability and requirements of real estate market as for office location;

Certification systems (BREEAM and LEED) applied in Polish real estate market focus on building design and technology not on sustainability of its location;

Planning and local zoning maps are powerful tools to steer development and regulate urban development to become more sustainable – but they’re not applied according to their capacities in Cracow e.g. parking regulations, insufficient cycling infrastructure.

Not all required data for spatial analysis are available (e.g. land cover data are not so credible for mixed use index calculation)

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