

THE NORDIC NETWORK OF URBAN MORPHOLOGY (NNUM) - URBAN FORM RESEARCH IN SCANDINAVIA

ABSTRACT

Urban morphology is defined as research program propounding methods and tools for the analysis and design of cities. The Nordic Network of Urban Morphology (NNUM) was established in 2006 to help promotion and diffusion of urban morphology both nationally in Sweden and across the Scandinavian countries. The morphological research in Scandinavia follows three research traditions: spatial analyses, typo-morphology and Space Syntax. There is a century long research tradition associated with geographical analyses of cities and regional science in Sweden, Finland and Denmark, typo-morphology in Sweden and vibrant Space Syntax groups in Sweden and Norway linking to individual researchers spread across Scandinavia. This paper maps scholars and groups at universities that follow and mix these traditions. It reviews the latest morphological research in Scandinavia and it also reflects on the future of morphological research in Scandinavia viewed in relation to the way in which Scandinavian cities fits into the worldwide pattern of urban development and dominating planning paradigms. In Scandinavian countries tradition collides with modernism and functionalism, but history have never been totally set aside. They tend to perpetually mix.

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Urban morphology is an interdisciplinary research field, which addresses the city as artefact and spatial form. The city is apprehended as the accumulation, integration and aggregation of human actions, as they take shape on the ground and organise the urban fabric. Urban morphologists study the evolution of cities from their formative years to their current shape. Morphological analyses are based on the main elements of the built environment: buildings, blocks, streets and open spaces (places, parks, waterfronts, etc.). These elements are considered as organisms, dynamic and closely interrelated. Buildings, streets and open spaces are the materialization of intentions, ideas and decisions; they are shaped, used, managed and transformed through time. At the ISUF fourth conference held in Prato, Italy, members of the ISUF's board acknowledged the absence or the weak representation of the Nordic countries. The idea of a "Nordic Network of Urban Morphology" (NNUM) was raised and discussed in a small group including individuals from Finland and Sweden.

NNUM was established in 2006 to help connect research projects in urban morphology and individual researchers and groups, both nationally in Sweden and across the Scandinavian countries. The idea of a Network was put forward as a Nordic organisation for the promotion and diffusion of urban morphology, which is defined as research program propounding methods and tools for the analysis and design of cities. There is a century long urban research tradition in Scandinavia associated with regional science in Sweden, Finland and Denmark, typology in Sweden and vibrant Space Syntax groups in Sweden and Norway linking to individual researchers spread across Scandinavia. However, in Scandinavian countries use of urban morphology in academic education and as a method of analysing cities is quite limited. Planning research in Scandinavia has been focusing on planning theory and dominated by critical planning process approaches (inspired by Foucauldian discourse analysis and qualitative methodologies, e.g. Bengt Flyvbjerg's research).¹ In the last decade, a placemaking paradigm² is rising drawing inspirations from Danish architect Jan Gehl, but also from Jane Jacobs. The morphological research in Scandinavia follows three traditions: spatial analyses, typology and Space Syntax. This viewpoint maps a genealogy of scholars and groups at universities that follow and mix these traditions.

THE MORPHOLOGICAL TRADITIONS

The tradition of spatial analyses (regional science, spatial interaction, urban analytics, city science, evidence-based planning or spatial planning can also be used) started in the beginning of the 20th century.

Regional science and urban analytics, spatial analyses and planning

The Geographical Institute at Stockholm's University (SU) under professor Hans Ahlmann, made extensive geographical studies of Stockholm's region³ that gave rise to Swedish regional science at SU, KTH Royal Institute of

Technology and Lund University. Torsten Hägerstrand diagrammatised the link between space and time and was world leading geographers in regional science. Fölke Snickars, Lars-Göran Mattson and Anders Karlström continued this spatial interaction tradition at KTH while Stockholm Region continuously executes regional analyses⁴ (the full text in Swedish and English summary of the regional plan RUF5 2050).⁵ Vania Ceccato, a PhD student of Fölke Snickars, is the head of the Urban & Community Safety Research Group at KTH Royal Institute of Technology and the coordinator of the Safeplaces network working on the relationship between the environment and safety using Geographic Information Systems (GIS) and spatial statistical methods on the geography of crime and fear in urban and rural environments and transit safety, the impact of crime on housing markets and safety governance. Anders Wästfelt also works with spatial analyses of agriculture in Swedish regions at SU inspired by geographical studies.

Similar branch of geographical research and regional science in Denmark created the famous Finger plan, which was the result of deeper spatial analysis of Copenhagen and its region. There is also cooperation on crime and safety research that also links to Bill Hillier in the UK. Bo Grønlund is a lector emeritus in Copenhagen, Denmark, who works with spatial analyses and crime preventive design and is part of the Safeplaces network. Sofie Kirt Strandbygaard, a PhD student supervised by Bo Grønlund, have been also following on safety research in the Safeplaces network from a TOD point of view,⁶ but also touching on typomorphological research and being involved in ISUF.

In Finland urban morphology research started in early 2000s. At Tampere University of Technology, a research group led by Prof Terttu Pakarinen developed and applied spatial analyses (GIS), spatial network studies, urban simulation, and Space Syntax, including researchers e.g. Anssi Joutsiniemi (currently professor of modelling etc.) and Sanna Iltanen who both later moved to Aalto, and Jenni Partanen currently working as a research professor on spatial analytics and modelling in TalTech (still also visiting scholar in Tampere University of Technology) The group had strong connections to Mike Batty's group at Centre for Advanced Spatial Analysis (CASA) at University College London (UCL). In Aalto, professor Marketta Kyttä leads a spatial analyses research hub stressing psychological aspects, well-being and health in urban space, and developing ground-breaking "softGIS" and participatory GIS methodology. A spatial planning and regional science research at Aalto University executed by Dominic Stead (who shares the time between TU Delft and Aalto University). Currently spatial analytics and modelling are established areas of urban research in Finland, and they have been widely applied in practical urban and regional development.

Norway has a large group of researchers on planning that focus on the regional scale and urban density (density has been dominating Scandinavian spatial planning). At NTNU (Norwegian University of Science and Technology)

Tore Sager has published a lot on the communicative planning influenced by Habermas. Yet another well-known scholar in planning is professor Tor Merdalen. Jørgen and Roar Amdam from the University College Volda has published a lot in participating in planning. Norwegian University of Life Sciences (NMBU) has long traditions in planning research and education. Professor Emeritus Sigmund Asmervik has published some work on rhetoric's in planning, whereas professor Emeritus August Røstnes has published a lot about land use planning, land use administration and property and ownerships. Professor Petter Næss has done research on density and transport that is closest to the spatial planning and regional science traditions in Denmark and Finland. Deviating from the planning researchers, professor Carl Otto Ellefsen and Dag Tvilde applied morphological analyses in Bergen, Tromsø, and Trondheim in the 1990's. Professor Akkelies van Nes from Western Norway University of Applied Sciences introduced the use of Space syntax in Norway around 2000. Since then, she has contributed to develop the method further, such as developing the urban micro scale tools,⁷ theory development⁸ and to combine space syntax with Spacematrix and degree of land use mixture.⁹ Claudia Yamu at OsloMet also researches urban modelling and fractals coordinating with Space Syntax research and Mike Batty's CASA.

Typo-morphological and historic-geographical approaches

There are differences in proliferation of historic-geographical and typo-morphological approaches across Scandinavian countries. Swedish typo-morphology has a long tradition.¹⁰ Many architects, planners, architectural and urban historians, and geographers have created urban models of typical cities and typologies of buildings, streets, spaces between buildings and neighbourhoods. The geographers started the Swedish regional planning and typo-morphology tradition in the beginning of the 20th century by classifying neighbourhoods and cities. Inspired by the French, German, British and American schools of geography and sociology (particularly the Chicago school), the city was defined geographically as “agglomeration of neighbourhoods clearly differentiated by their character/type” (“bebyggelseagglomeration med tydlig inre differentiering” in Swedish).¹¹ Gregor Paulsson in cooperation with the architectural historian Elias Cornell and a group of scholars, students and professionals published a two volumes book titled Swedish city¹² (or Svensk stad) describing the development of Swedish cities and urban lifestyles. Greger Paulsson introduced the Weber's concept of “idealtyp”¹³ as (theoretical model) abstractions (Figure 1).

The Swedish geographer Lennart Améen, can be considered as the seminal instigator of an urban typology from geographical perspective, which is close to the Conzenian urban morphology. Améen's work from the 1960s, especially *Stadsbebyggelse och domänstruktur* from 1964 (Figure 2), is a study in the typology of the Swedish cities based on the land subdivision and land use, which supports his classification of cities in different classes.

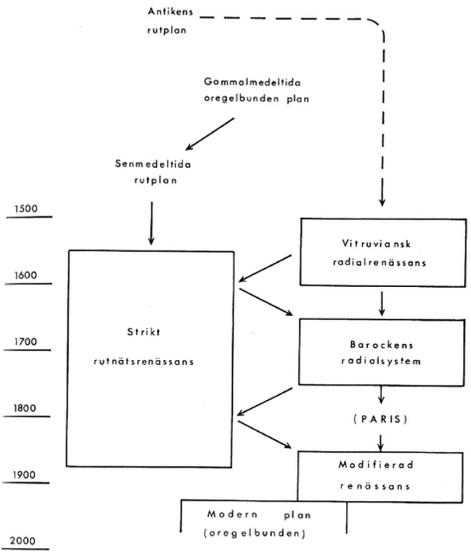
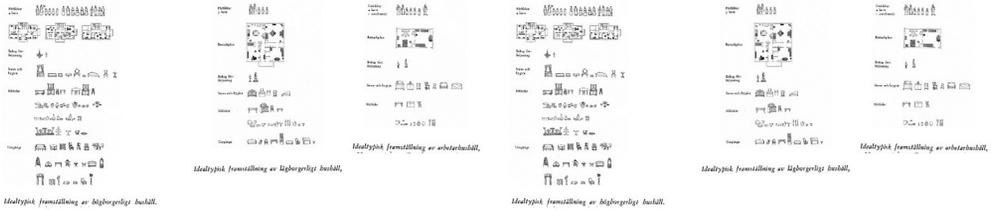


Fig. 3. Modell av den förindustriella staden.

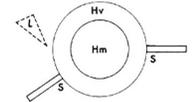


Fig. 4. Modell av stadens utveckling under industrialismen fram till 1930.

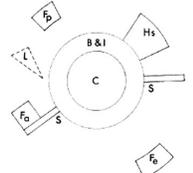
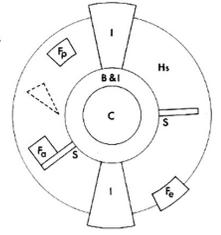


Fig. 5. Modell av stadens utveckling efter 1930.

- I fig. 3—5 använda beteckningar:
 Hm = Handelsmannazon
 Hv = Hantverkarzon
 S = Småfolksstråk
 L = Landeri
 C = City
 B&I = Bostads- och Industrizon
 F_A = Arbetarförstad
 F_P = Patricierförstad
 F_E = Egnaheimsförstad
 Hs = Hyreshuszon
 I = Industrizon



UP: Fig. 1. A section of an ideal-typical Swedish city with ideal-typical houses and social classes (high and low bourgeoisie and working class) with ideal-typical floor plans, furniture and cutlery

DOWN: Fig. 2. Historical epochs in Swedish urbanization (source Ameén, 1964, p. 43) and a hypothetical urban model of a Swedish city (ibid, p.47)

Even if Améen didn't attract followers, which could have developed and promoted his ideas, urban morphology attracted interests among the Swedish architects and planners in the mid of the 70s especially through the Italian conservation programme for the historic centre of Bologna. But, as the Swedish architects of the time were busy with the development of new suburbs, the interest for the Bologna programme and its urban morphological principals was momentary. Linn used the term "bebyggelsemönster" (translated as "pattern of settlements") to describe a typical spatial structure in a formation of city. The spatial structure starts with a typical building, but the pattern includes relationships of the building with the surrounding spaces (Figure 3). The surrounding spaces include public streets and semi-private courtyards (such as the inner garden in a typical "storgårdkvarter"). The typical building can stand alone; it can create an open or enclosed city block assembly or can be part of a neighborhood with similar or different city blocks. Linn particularly emphasizes the relational structure between the elements of patterns (the typical building and surrounding spaces). Additionally, the pattern is recognized and experienced as spatial structure of elements (the typical building and its relations). These experiential qualities of the pattern as relational symbolism are more important than the geometry of the physical space.¹⁴

The emergence of urban morphology as a field of research can be dated to the end of the 1980s and beginning of the 1990s. Its establishment in the schools of architecture as individual research programme or research projects was soon linked to the work of urban morphologists in Europe and North America. These research projects or expressed interest in urban morphology were represented in Sweden by Johan Rådberg from the school of architecture in Lund, but now deceased; Gunilla Jivén from the school of architecture of Chalmers University of Technology; Abdellah Abarkan from the Swedish School of Planning at the Belkine Institute of Technology; In Norway the field of research is represented by Halina Dunin-Woyseth from the Oslo School of Architecture and in Finland by Terttu Pakarinen from the school of architecture of the Tampere University of Technology. The SAVE method developed in Denmark by the Ministry of Environment (through Plansstyrelsen: Building and Town Conservation) and under the leadership of Gregers Allgreen-Ussing, is based on the classification of buildings in different typologies. The method has its fundamental ground in the Italian building typology, especially the Bologna conservation plan of the 1970s. The SAVE method was developed for conservation purposes, and aiming to identify and classify the historical and cultural values in the built environment of the Danish cities. The method, which was developed in the late 1980s, has been implemented in other European countries, especially in the Baltic region.

The Swedish morphological research in the late 1980s aimed not only to contribute to urban history, but also to understand and guide urban planning and design practices. Terms such as, "typområde"¹⁵ ("typical places", "place types" or even "area types" by Carl-Johan Engström), "stadstyper" ("urban types" by Johan Rådberg),¹⁶ "stadskaraktär" ("urban character") by SSBK

(Stockholms Stadsbyggnadskontoret or Stockholm's Planning Office)¹⁷ were used to describe types of neighbourhoods and city blocks (as configurations of buildings). Since the 1980s, typologies have been developed according to building types and architecture styles specific for historical periods,¹⁸ planning and development paradigms,¹⁹ and industrialization epochs.²⁰ Todor Stojanovski and Sofie Kirt Strandbygaard have been executing typo-morphological studies of station areas and Transit-Oriented Developments (TODs) in Sweden and Denmark. Figure 4. shows a map of the comprehensive development plan for Stockholm. It presents "stadskaraktärer" ("urban characters") on the left side and street types on the bottom. The urban characters served as background and inspiration to preserve the morphological character of these neighborhoods as a part of densification effort with infill developments.

Meta Berghauer-Pont following upon the work on Uno Åhren²¹ and Johan Rådberg²² developed a Spacematrix model²³ combining typo-morphology and spatial analysis. In contrast to the previous Swedish typo-morphological research and neighborhood typologies, Berghauer-Pont proposes generic urban typology that it based on standard morphological elements in English and urban form variables (e.g. building heights, FSIs, OSIs). An urban type as "low-rise buildings" can translate to several Swedish neighborhoods with houses e.g. "villastäder" or "neighborhoods with villas" that designate late 19th and early 20th century neighborhoods with small houses or "småhusområde" or "neighborhoods with small houses" that will refer to late 20th century neighborhoods with small houses that were oriented to the automobile (the term "suburban sprawl" can also be used). As general model, Spacematrix model has been widely accepted in morphological research and used to analyze cities.²⁴

Urban typo-morphological research and education is executed by Abdallah Abarkam, former associate professor at KTH and now professor of spatial planning at BTH Blekinge Institute of Technology, Lars Marcus, a professor at KTH Royal Institute of Technology in Stockholm first and now at Chalmers University of Technology (CTH). Jennie Sjöholm also has a course in urban morphology at Luleå University of Technology. Most of educational activities of the NNUM is to promote urban morphology in teaching at the Blekinge Institute of Technology (BTH), the department of Spatial Planning, that specializes in urban design (or planarkitektur in Swedish and in contrast to the other planning programs in Sweden that emphasize critical planning process approaches). In the bachelor program a set of 3 courses distributed along the program's three years are offered to students, starting from a basic/introductory course on the concepts and convention of urban planning and urban design, followed by a course on the composition of the ground plan (urban typologies, urban fabric and urban morphology), and finally a course on the complexity of urban form, in which students test with different urban complexities related to planning, mobility, environment, climate change and urban form. In the master's "urban planning" students deepen their knowledge and experience in urban morphology in a course called "Structures" and which gives a training

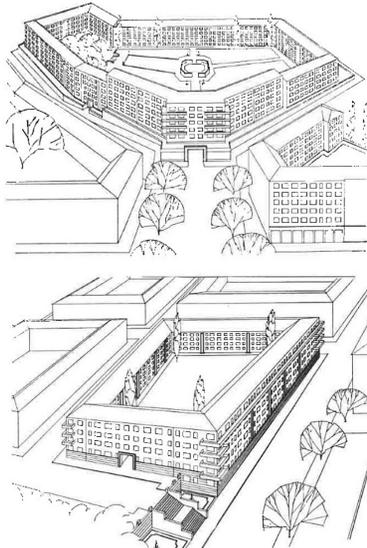
in a holistic understanding of urban structures and how they interact and/or integrate the parts to the whole. The course intends to deepen and strengthen the student's knowledge and experience of the urban morphology.

In Denmark, the typo-morphological tradition is present, but without discussions on type or typology. The Ph.D. Passengers' fear of crime at train stations: the influence of the built environment is however a resent typological analysis of the train stations' catchment area in the Copenhagen Regional area referring to the academic typological tradition²⁵ The urban typologies are compared to passengers' perception of safety in order to measure the influence of the built environment. Danish building preservation and urban planning refers to building- and settlement structures and their analysis resembles Swedish practice, however the terms typology or typo-morphology are not present. The Danish Bydelsatlas 91-96 is a detailed typological walk-through of Danish building culture and urban districts.²⁶ Danish architectural planning practice focuses on spatial analysis and user experiences and have no academic tradition for morphology or the use of Space Syntax.

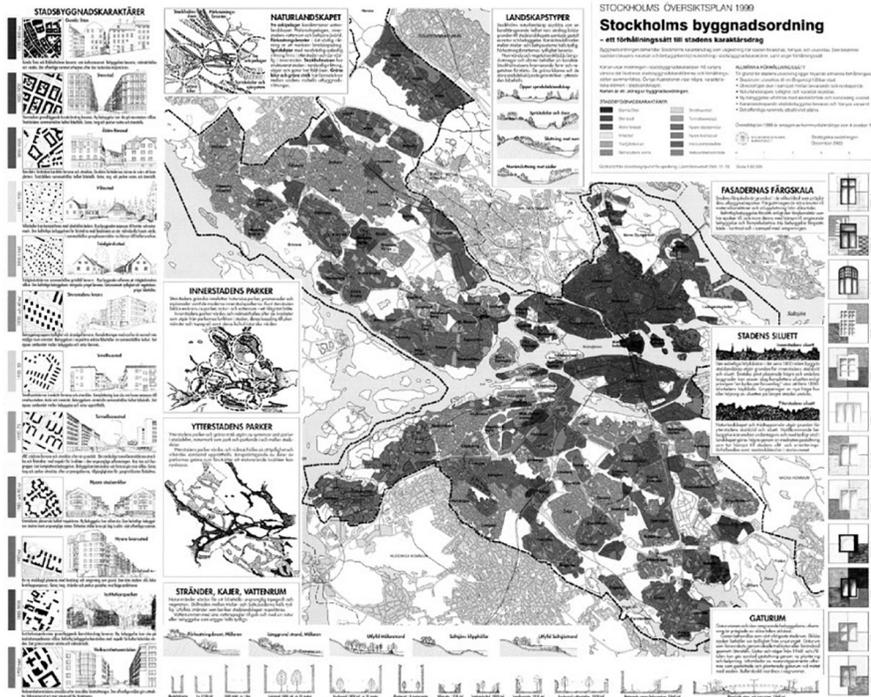
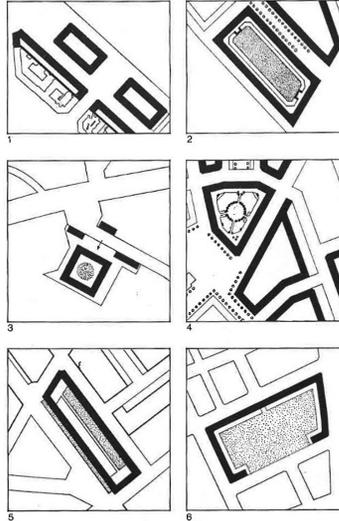
Space Syntax

In the end, there are two Space Syntax groups in Sweden and Norway. Lars Marcus led SMOG (Spatial Morphology Group) at KTH Royal Institute of Technology that coordinated Space Syntax research with Alexander Ståhle who heads the planning consultancy Spacescape AB. The Spatial Morphology Group migrated at Chalmers University of Technology (CTH) and it is the largest morphological group in Scandinavia intertwining research on typo-morphology and urban analytics with Space Syntax (including remaining sprouts at KTH where Ann Legeby's group continues within the Space Syntax research tradition). SMOG coordinates with ISUF though Meta Berghauser Pont, the research who uses spatial morphology and urban analytics (Spacematrix analysis, Figure 4 and Figure 5) to define neighbourhood typologies and link to typo-morphological approaches and research on urban density.²⁷

Professor Akkelies van Nes also leads a space syntax group at Western Norway University of Applied Sciences (HVL) Høgskulen på Vestlandet. Claudia Yamu is professor of Urban Analytics at OsloMet—Oslo Metropolitan University who is also aligned to the Space Syntax groups. At the NTNU in Trondheim, Professor Bendik Manum is also using space syntax in his research. Otherwise, the research tradition on built environment in Norway has a strong place phenomenological approach based on professor Christian Norberg-Schulz' work. Professor Thomas Thiis Evensen and Anne Marie Vagsten' work built upon Norberg-Schulz' place phenomenological work. Influenced by the Italian morphological research tradition is the work of professor Carl Otto Ellefsen and Dag Tvilde, who wrote a book entitled *Realistisk Byanalyse*. Most place analyses manuals in Norway have a strongly place phenomenological approach with some aspects taken from the morphological tradition based on Ellefsen and Tvilde's work.



København.
Storkvarter från 1920-talet.
1:5000.
Grosshofblöcke aus den
1920'er Jahren.
1. Struensegade
2. Hornbækhus
3. Vaih. Thomsens allé
4. Borups allé
5. Grønnegården
6. Ved Classens have.



UP: Fig. 3. Björn Linn sees the building as leitmotif in the “bebyggelsemönster” (translated as “pattern of settlements”) of typical “storgårdskvarter” or “enclosed urban block with a large courtyard/inner garden” translated in English. The building on a scale of a city block creates variations shown as perspective, cases in Stockholm on the left and on the city plan, illustrating cases in Copenhagen on the right.

DOWN: Fig. 4. The map of Stockholm including neighborhood types or “stads-karakterer” (“urban characters”) on the left and street types in the bottom corner

NNUM'S STRATEGIES AND CHALLENGES

Scandinavian cities fit into the worldwide pattern of urban development and dominating planning paradigms (critical approaches and placemaking). In Scandinavian countries tradition collides with modernism and functionalism, but history have never been totally set aside. There is always place for historical research put in functionalist context. These tendencies have perpetually mixed in creative research and design and will continue mixing.

The main purpose of establishing NNUM is to constitute an organised and representative body for the promotion, coordination, development and diffusion on the Nordic urban morphology. The research in urban morphology, which is still performed in individual research projects, needs to be coordinated in order to increase exchanges between researchers and develop a common theoretical ground to focus the Nordic city in its historical development and its future extension. This viewpoint aims to loosely map groups and researchers across Scandinavia to inspire collaboration. NNUMs will continue networking, supporting and facilitating research, teaching and learning on urban morphology as an interdisciplinary field seeking to raise their scoops, theories, methodologies and founding on a Nordic and international level.

Another main strategy of the network focuses the interconnection between research and teaching activities in the undergraduate levels. The Nordic researcher and teaching staff, which apply morphological concepts and tools of analysis in their design studios, or in a theoretical context, are expected to found a working party, which focuses teaching in urban morphology. In order to increase exchange between disciplines, local or regional traditions, and to disseminate achievements from teaching in urban morphology, the working party is expected to be interdisciplinary and nationally representative.

Urban morphology is also of interest to architecture and planning professions, and to housing developers. In this context, the performance and diffusion of research with practice oriented urban morphology as its core subject, will be carried out by a working party. Both researchers and practitioners witness of a gap that disconnects their works and obstruct the exchangeability of their knowledge and experience. The mission of the working party is to find ways of bridging this gap, to make the research founding available and comprehensible to practitioners and establish canals for a constructive dialogue with the practicing architects and planners.

Urban morphology has been criticised for its traditional focus on the historical urban centres, which limited its theoretical frame and models of analysis to the historical buildings and their immediate surroundings. New urban forms are generally not considered, because of the insufficiency of the morphological theory and its tools of analysis. Urban morphologists take this critic seriously and strive to expand their field of research by considering the whole city. The

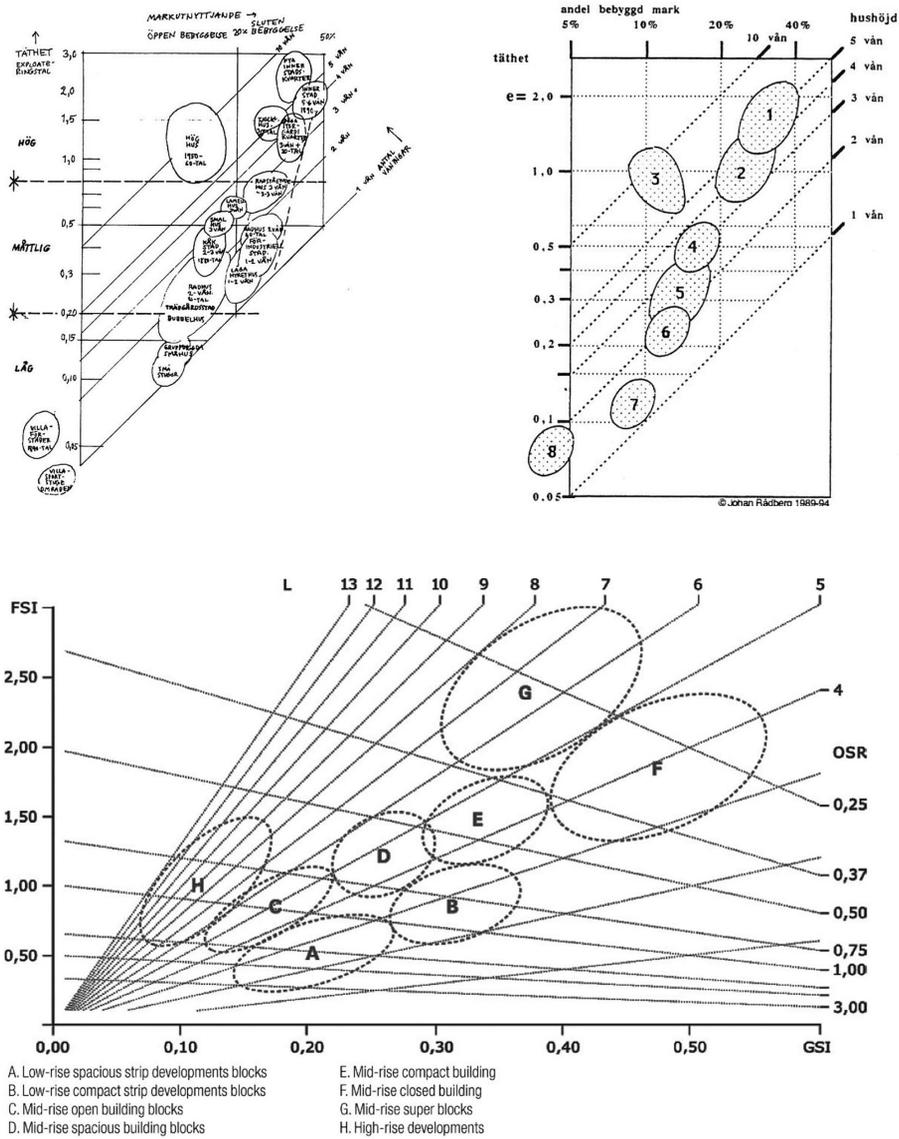
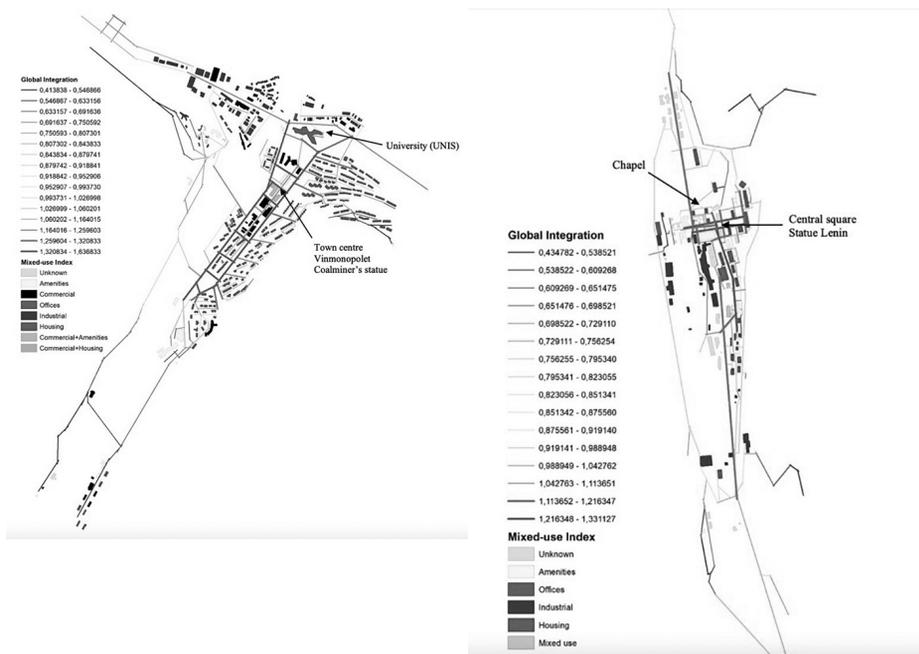
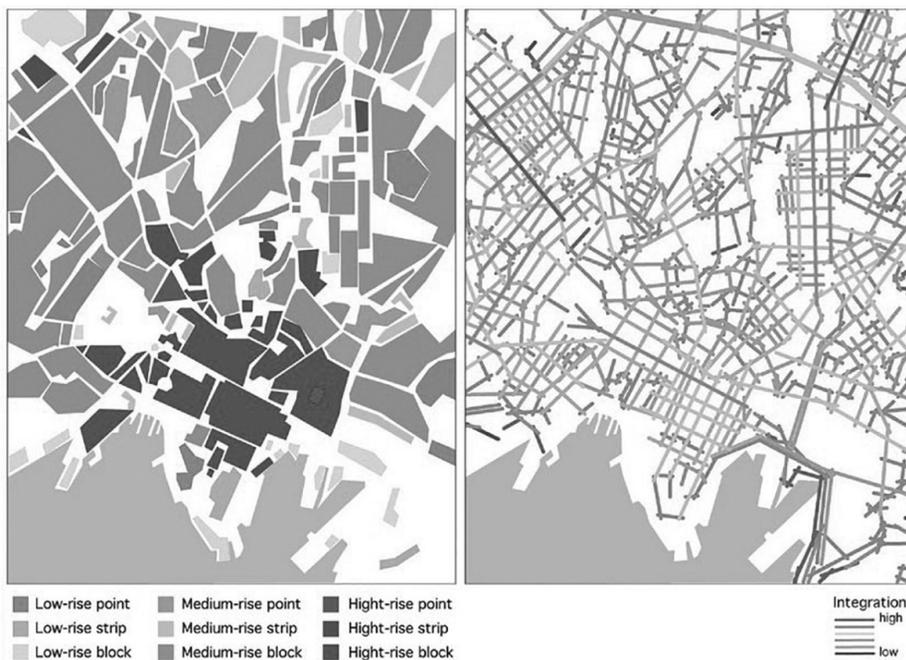


Fig. 5. Johan Rådberg's hypothesis about density: urban types emerged under specific planning doctrines are consistent in terms of density, Floor Space Indexes (FSI) and building heights (up left and right) and Spacematrix on the bottom.



UP: Fig. 6. Oslo's historic centre from 2000 investigated by Spacematrix analysis on the left and space syntax analysis of local integration on the right (from the handbook).

DOWN: Fig. 7. Space syntax analyses with the location of functions of the arctic towns Loneyarbyen (left) and Barentsburg (right) (de Koning & van Nes, 2019).

expanded field of research, and especially the awareness about modernity and modern urban fabric, has been the most attractive area of research under these last twenty years. However, despite the efforts that have been made in this area of research, urban morphology must consider this new orientation as its fundamental task. NNUM strives to make this new area of research as its main priority, and emphasise this orientation in its activities.

NOTES

1. E. Perrault, A. Lebisch, C. Uittenbogaard, M. Andersson, M.L. Skuncke, M. Segerström, P. Petra Svensson Gleisner and P. Pärtel-Peeter. "Placemaking in the Nordics," *Future Place Leadership*, LINK arkitektur and Stiftelsen Tryggare Sverige, 2020.
2. Bent Flyvbjerg, "Five misunderstandings about case-study research," *Qualitative inquiry* 12, no. 2 (2006): 219-245.
3. William William-Olsson, *Stockholms framtida utveckling: Bilaga: huvuddragen av Stockholms geografiska utveckling 1850-1930 : bilaga (1937)* (Stockholm: LiberFörlag , 1984); William William-Olsson, "Stockholm: Its structure and development," *Geographical Review* 30, no. 3 (1940): 420-438.
4. RUFSS 2050 Regional Utvecklingsplan för Stockholmsregionen: http://rufs.se/globalassets/h.-publikationer/2018/rufs2050_webb.pdf
5. *RUFSS 2050 Regional Development Plan for the Stockholm Region* (English summary): http://rufs.se/globalassets/m.-in-english/kortversion_eng_webb.pdf
6. Sofie Kirt Strandbygaard, "*Passengers' fear of crime at train stations: the influence of the built environment*," (PhD diss., Technical University of Denmark, Department of Civil Engineering ,2019).
7. Van Nes, Akkelies, and Manuel López. "Macro and micro scale spatial variables and the distribution of residential burglaries and theft from cars: an investigation of space and crime in the Dutch cities of Alkmaar and Gouda." *The Journal of Space Syntax* 1, no. 2 (2010): 314
8. Van Nes, Akkelies, and Claudia Yamu. "Exploring challenges in space syntax theory building: The use of positivist and hermeneutic explanatory models." *Sustainability* 12, no. 17 (2020): 7133.
9. Akkelies Van Nes, Meta Berghauser Pont and Bardia Mashhoodi, "Combination of Space syntax with spacematrix and the mixed use index: The Rotterdam South test case." in *8th International Space Syntax Symposium, Santiago de Chile, Jan. 3-6, 2012*. PUC (Santiago, Chili, 2012); Yu Ye and Akkelies Van Nes, "Quantitative tools in urban morphology: Combining space syntax, spacematrix and mixed-use index in a GIS framework," *Urban morphology* 18, no. 2 (2014): 97-118.
10. Abdellah Abarkan, "The study of urban form in Sweden," *Urban Morphology* 13, no. 2 (2009): 121-127; Abdellah Abarkan, "Typo-morfologi: Metoden och dess tillämpning på bebyggelsesmönster," *The Nordic Journal of Architectural Research* 13, no. 1-2 (2013); Todor Stojanovski, "Swedish Typo-Morphology–Morphological Conceptualizations and Implication for Urban Design," *ICONARP International Journal of Architecture and Planning* 7 (2019): 135-157.
11. Hans W. Ahlmann, ed., *Ekonomisk-geografisk undersökning av nutida Stockholm med förorter D. 1 Stockholms inre differentiering* (Stockholm: Geografiska institutet vid Stockholms högskola, 1934).
12. Greger Paulsson, *Svensk stad I-III* (Liv och stil i svenska städer under 1800-talet) (Stockholm: Albert Bonniers förlag, 1950).
13. Max Weber, "Objectivity" in social science and social policy," *The methodology of the social sciences* (1949[1904]): 49-112.
14. Björn Linn, *Storgårdskvarteret: ett bebyggelsemönsters bakgrund och karaktär* (Stockholm: Statens institut för byggnadsforskning, 1974); Björn Linn, "Bebyggelsemönstret som analysmodell," in *Perspektiv på planering*, ed., T. Hall (Uppsala: HSNR, 1991).
15. Carl-Johan Engström, Ann Lindqvist, Eva Lagbo and Gustaf Landahl, *Svensk tätort* (Stockholm: Svenskakommunförbundet, 1988).

16. Johan Rådberg, *Doktrin och täthet i svenskt stadsbyggande 1875-1975* (Stockholm: Statens råd för byggnadsforskning, 1988); Johan Rådberg and Anders Friberg, *Svenska stadstyper: historik, exempel, klassificering* (Stockholm: Kungliga Tekniska högskolan, 1996).
17. SSBK (Stockholms Stadsbyggnadskontoret). “*Stockholms byggnadsordning.*” Stockholm: SBK SSBK. “*Stockholms byggnadsordning.*” Stockholm: SBK, (2020). <https://vaxer.stockholm/globalassets/tema/byggnadsordningen/stockholms-byggnadsordning.pdf>
18. C. Björk, P. Kallstenius and L. Reppen, *Så byggdes husen 1880-2000: arkitektur, konstruktion och material i våra flerbostadshus under 120 år (5th edition)* (Stockholm: Formas, 2003 [1983]); C. Björk, L. Reppen and L. Nordling, *Så byggdes villan: svensk villaarkitektur från 1890 till 2010* (Stockholm: Formas, 2009); C. Björk, L. Nordling and L. Reppen, *Så byggdes staden. (5th updated edition)* (Stockholm: Svensk Byggtjänst, 2018 [2000]).
19. Björn Linn, *Storgårdskvarteret: ett bebyggelsemönsters bakgrund och karaktär* (Stockholm: Statens institut för byggnadsforskning, 1974); Björn Linn, “Bebyggelsemönstret som analysmodell,” in *Perspektiv på planering*, ed. T. Hall (Uppsala: HSFR, 1991); Johna Rådberg, *Doktrin och täthet i svenskt stadsbyggande 1875-1975* (Stockholm: Statens råd för byggnadsforskning, 1988); Johan Rådberg and Anders Friberg, *Svenska stadstyper: historik, exempel, klassificering* (Stockholm: Kungliga Tekniska högskolan, 1996).
20. Max Weber, ““Objectivity” in social science and social policy,” *The methodology of the social sciences* (1949[1904]): 49-112.
21. Uno Åhrén, “Elementar stadsbyggnadsteknik,” *Byggmästaren*, 8 (1928): 129-33.
22. Johan Rådberg, *Doktrin och täthet i svenskt stadsbyggande 1875-1975* (Stockholm: Statens råd för byggnadsforskning, 1988).
23. M. Y. Berghauser-Pont and P. Haupt, *Spacematrix: space, density and urban form* (Rotterdam: NAi Publishers, 2010); M. Y. Berghauser-Pont and P. Haupt, “The Spacemate: density and the typomorphology of the urban fabric,” *Nordisk Arkitekturforskning (Nordic Journal of Architectural Research)* 4 (2005): 55-68.
24. Yu Ye and Akkelies Van Nes, “Quantitative tools in urban morphology: Combining space syntax, spacematrix and mixed-use index in a GIS framework,” *Urban morphology* 18, no. 2 (2014): 97-118; Evgeniya Bobkova, Lars Marcus, Meta Berghauser Pont, Ioanna Stavroulaki and David Bolin, “Structure of plot systems and economic activity in cities: Linking plot types to retail and food services in London, Amsterdam and Stockholm,” *Urban Science* 3, no. 3 (2019): 66; Evgeniya Bobkova, Meta Berghauser Pont and Lars Marcus, “Towards analytical typologies of plot systems: Quantitative profile of five European cities,” *Environment and Planning B: Urban Analytics and City Science* 48, no. 4 (2021): 604-620.
25. Sofie Strandbygaard, Kirt, “*Passengers' fear of crime at train stations: the influence of the built environment*” (PhD diss., Technical University of Denmark, Department of Civil Engineering, 2019).
26. See: https://kk.sites.itera.dk/apps/kk_pub2/?mode=detalje&id=1330
27. Johan Rådberg, *Doktrin och täthet i svenskt stadsbyggande 1875-1975* (Stockholm: Statens råd för byggnadsforskning, 1988); Johan Rådberg and Anders Friberg, *Svenska stadstyper: historik, exempel, klassificering* (Stockholm: Kungliga Tekniska högskolan, 1996).

BIBLIOGRAPHY

- Améen, L. *Stadsbebyggelse och domänstruktur: svensk stadsutveckling i relation till ägoförhållanden och administrativa gränser*. Lund: Carl Bloms Boktryckeri, 1964.
- De Koning, R. and A. Van Nes. "How two diverging ideologies impact the location of functions in relation to spatial integration in arctic settlements space syntax analyses of settlements closest to the North Pole." In *Proceedings of the 12th international space syntax symposium, 8-13. Beijing, China, 2019*.
- Ellefsen, Karl Otto and Dag Tvilde. *Realistisk byanalyse*. Trondheim-NTH: Arkitektavdelingen, 1990.
- Norberg-Schulz, Christian. "*Genius loci: paysage, ambiance, architecture*." Editions Mardaga, 1997.
- Van Nes, Akkelies, and Claudia Yamu. "Introduction to space syntax in urban studies." In Springer Nature, 2021. <https://link.springer.com/book/10.1007/978-3-030-59140-3>
- MSBK (Malmö Stadsbyggnadskontoret). "*Översiktsplan för Malmö 2000*." Malmö: MSBK (2001).
- SSBK. "ÖP99. Översiktsplan 99." Stockholm: SBK (2000).
- Rådberg, Johan. *Attraktiva kvarterstyper: en undersökning av bebyggelse, befolkning och attraktivitet i Stockholm Söderort*. Stockholm: Kungliga Tekniska högskolan, 2000.
- Rådberg, Johan, and Rolf Johansson. *Stadstyp och kvalitet*. Stockholm: Kungliga Tekniska högskolan, 1997.

NORDIJSKA MREŽA URBANE MORFOLOGIJE (NNUM) - ISTRAŽIVANJE URBANE FORME U SKANDINAVIJI

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Urbana morfologija se definiše kao istraživačka oblast koji predlaže metode i alate za analizu i projektovanje gradova. Nordijska mreža urbane morfologije (NNUM) je osnovana 2006. godine kako bi doprinela promociji i širenju urbane morfologije kako na nacionalnom nivou u Švedskoj tako i u ostalim skandinavskim zemaljama. Morfološka istraživanja u Skandinaviji prate tri istraživačke tradicije: prostornu analizu, tipomorfologiju i prostornu sintaksu (space syntax). Postoji vekovna istraživačka tradicija povezana sa geografskim analizama gradova i regionalne nauke u Švedskoj, Finskoj i Danskoj, tipomorfologijom u Švedskoj i aktivnim space syntax grupama u Švedskoj i Norveškoj koje se povezuju sa pojedinačnim istraživačima širom Skandinavije. Ovaj rad mapira naučnike i grupe na univerzitetima koji slede i integrišu ove tradicije. U radu se razmatraju najnovija morfološka istraživanja u Skandinaviji i takođe se reflektuje na budućnost morfoloških istraživanja u Skandinaviji posmatrano u odnosu na način na koji se skandinavski gradovi uklapaju u svetski obrazac urbanog razvoja i dominantne paradigme planiranja. U skandinavskim zemljama tradicija se sukobljava sa modernizmom i funkcionalizmom, ali istorija nikada nije bila potpuno ostavljena po strani. Oni imaju tendenciju da se neprestano mešaju.

KLJUČNE REČI: URBANA MORFOLOGIJA; URBANA FORMA; SKANDINAVIJA; ISTRAŽIVAČKA MREŽA,
MORFOLOŠKE ŠKOLE