

# Assessment of Public Space Efficiency in Relation to Spatial Development in Amman: Exploring Indicators to Sustainable Models of Future City Life

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Received: February 21, 2016    Accepted: March 13, 2016    Online Published: May 30, 2016

doi:10.5539/jsd.v9n3p104

URL: <http://dx.doi.org/10.5539/jsd.v9n3p104>

## Abstract

In the scene of the urban transformation processes taking place in the world nowadays, it is crucial to verify the need for sustainable change in public space in Amman. The paper aims at capturing the demands of public space in regards to the socio economic urban life in Amman. It also investigates the role of public space from the perception of the local communities and tries to find the relation between public space and the other vital layers that constitute the urban public life whether social, economic or urban regeneration. Key dimensions and success factors of best practices in Dortmund, Germany are investigated in order to shed the light on potential strategic thinking in dealing with problems in Amman. As a result, defined characters of magnets and anchor nodes in Amman were specified to make the city more readable and accessible.

**Keywords:** Amman, Dortmund, integrated development, public space, sustainable development

## 1. Introduction

In the scene of the urban transformation processes taking place in the world nowadays, it is crucial to verify the need for sustainable change in public space in Amman. Key dimensions and success factors of best practices in Dortmund and Germany will be investigated in order to shed the light on potential strategic thinking in dealing with problems in Amman.

The paper will survey the prevailing gaps and misconceptions of public space in Amman. It will also try to navigate ways to sustainable city development through the development of public city life and the encouragement of economic vitality within public space networks as highlighted by Gehl "Documenting city life an important instrument of city development" (Gehl, 2010:16).

### *1.1 Aims and Objectives of the Research*

Objectives of the research are summarized in capturing the demands of public space in regards to the socio economic urban life in Amman, the role of public space from the perception of the local communities, finding the relation between public space and the other vital layers that constitute the urban public life whether social, economic or urban regeneration. The main outcome will be the determination of critical indicators that contribute to the articulation of a public space network that meets the integrated development of the city of Amman on all levels through crystallizing the measures, trends and challenges in the setting.

The research will also come up with new urban typologies of public space in Amman that require integrated investigation on multidimensional levels to enable a better life in the city.

### *1.2 Context and Setting*

#### 1.2.1 Rationale of the Case Studies

The functions of public spaces incorporate many aspects and land use prerequisites. Those are land use aptitude, privatization, commercialization, image representative, traffic, security, and control. Those different factors

though have individually failed bringing life into public spaces, which became evident through many perspectives and studies. However, they can have a flourishing force when they play as integrative parts of the urban fabric. They should embody all favours to bring about the image of the city. At the same time, they are allowed to be privatized and in competence with each other to fulfil the economic layer to which planning is always attached (Reicher, 2009). According to Nasution, the quality of life is positively affected by the privatisation of public open spaces especially in the developing countries that generally lack public open space in both quantity and quality (Nasution & Zahrah, 2012).

Observing the development of public spaces in Dortmund the selected case studies in this paper, it seems evident that the post war age had a continuity calibration of the industrial age. Many concepts like individualism and materialism had signposted the societal norms in the city. The church and the religious objects had accordingly less influence and stayed as tradition that characterized the spaces with no real impact on the lives of people.

Furthermore, through pluralism, the old unified structure of the city has also been replaced. As a result, the city life went into two clefts. This became obvious on the social level, where people got differentiated according to their jobs that eventually were presented as a social status for some groups causing discrepancy and segregation of those groups from others (Cai, 1999: 239). On the spatial level, the city was divided into north and south axis and therewith the community. The four most important public spaces in Dortmund according to Cai were the Reinoldikirche plaza, the Friedens Plaza, the Hansa Plaza and the old market. Those were always seen as the main players in the public life in the city and although they also are differentiated in their importance and their link to the mobility networks, as an overall image, they are all located on the “better side of the city”, the south axis in which the other axis and its community has been therewith stamped to be less important.

These aspects of space transformation trigger various questions on the city and metropolitan area levels. They impulse the need to search strategic constructs to new urbanity and the production of new urban spaces in the context of reshaping cities by private and public-sector actors (Blotevogel et al., 2008). In addition to this, it is no longer appropriate to conduct the discourse on new urbanity in metropolitan regions solely in a Eurocentric fashion; it is vital also to include the development of urbanity and the production of new urban spaces in non-European metropolitan cities and areas. This is essential to create the degree of distance and the multiplicity of perspectives which are required for any critical appraisal of normative concepts of urbanity (Blotevogel et al., 2008).

In Amman, the situation is not very different although the cultural aspects of an Arabic tissue are far away from the European states. Amman research in public space has tried moreover to come up with a clear state of the image of the city. It has been tried in various ways to reach a level of unifying an identity of Amman on the different levels. Still this has not been very successful regarding the public space. According to Gehl, Amman is one of the most important centres of trade and commerce in the Middle East. However, since the 1970's the city centre has lost much of its role as the central business district. The public arena in Amman has suffered from the continuous segregation the more it was dragged into globalization. The social groups have become into two extreme poles that divided the city into two parts; west and east Amman. The historical eastern part including the old city centre demonstrates the first societal group and the western part with fast growing new urban and suburban areas is the second level of mentality in the city. This east-west division runs along architectural, mental and economic lines (Gehl, 2005). Public spaces and urban nodes have experienced a strategic change in the last 20 years. The target was always to develop Amman and revitalize the old setting in the city. It was documented that the city's urban and social history and heritage has started to attract the attention of the emerging “urban creative class” and this has been represented through studies, projects, and the rehabilitation and adaptive reuse of that urban heritage into contemporary cultural and other usages including some that are related to consumerism and entertainment (Daher, 2014: 58). These centers have yet and in some cases, resulted in more attraction of middle upper classes and more exclusion of other social groups.

### 1.2.2 Dortmund and Amman

Usually, centres of cities in Europe were articulated around market places and town halls. These features have formed the multifunctionality the cores of cities needed as a vital space. This model of public space and city order has started to get changed through the socio economic developments and restructuring in the cities. Societies and cities have in this sense become more heterogeneous and the urban lifestyles have become more fragmented (Blotevogel, et al 2008). To this concern, new models of evaluation of public spaces are gaining more importance. Hence, different undertakings concerning integrated levels of behaviour should be considered. Accordingly, this research perceives this change as a potential and tries to establish evaluation criteria based on cross-cultural analysis seeing problems caused by differentiated socio-cultural settings that may better explain

the phenomena of a failure or success of a public space and therewith, the proper strategies of dealing with spaces.

Further, as described by Kent, „culture structures behaviour in terms of the use of space and that the use of space structures cultural material in terms of the built environment” (Kent 1993: 5). To understand the setting and the misconceptions of a certain approach towards public spaces, similar circumstances in a different cultural background can be investigated. In this regard, examples from Dortmund, Germany as a developed setting with potential best practices will be analyzed. Dimensions that tackle similar problems of the setting in Amman will have the focus specially topics related to social disparities, and segregation of social groups in the urban context.

Figure 1 below illustrates the comparison framework upon which the paper is based. The best practices in Dortmund that are driving forces of the main network of vital public spaces will be investigated in accordance with the major gaps resulting from Amman setting and that will be highlighted in section 4.1. The impact on the society will be considered as the key dimensions of investigation in this regard. As a result, adaptation of workable strategies will be then defined and recommended to be used in anchor nodes in Amman for a better orientation in a nodal network of public spaces from an integrated perspective. This in turn, will further spill over the effect to a more spatial physical broader network.

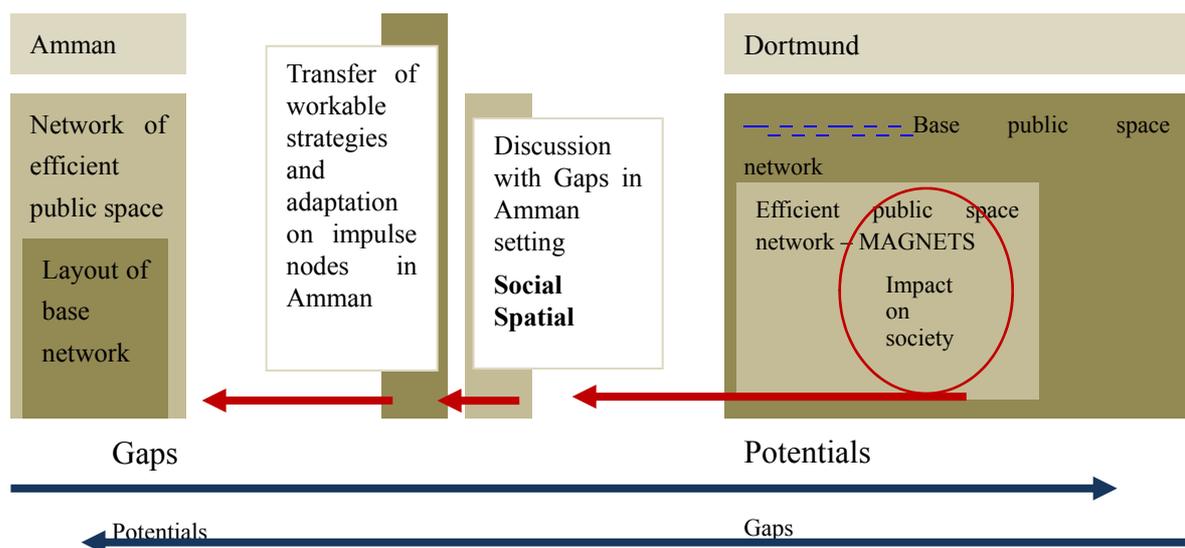


Figure 1. Diagram to describe the comparative model on which the paper is based

## 2. Literature Review

### 2.1 Meaning of Public Space: Spatial vs. Social

While observing the urban transformations that are in direct link to globalization, the needs and land use patterns in the recently developed centres go in direct change and transformation as well. These acquire new conditions and new prerequisites for planning. The provision of more attractive urban spaces and sometimes the development of older spaces into more attractive ones is mostly perceived as the core question and need of bigger cities and agglomerative areas and therewith, the central debate in planning (see Bodenschatz, 2005).

This process incorporates certain overlaps between growth patterns on one hand, and shrinking processes in the agglomerations on the other. Agglomerations in this context are also influenced by many factors and forces such as the preservations of bigger parts of the city that are rather suburbanized and targeted for the middle class communities. Another force that has a distinctive impact within the urban transformation process is the newly built and established centres and districts that are remote from the historical core of the cities. Many other forces like the inclusion of certain social groups in existing urbanized areas are contributing to the constant change and transformations of agglomerations and metropolitan cities.

Public spaces in turn, have to fulfil the multitude dimensional needs of the space users. Locally led public space

improvements foster community pride and create spaces people feel safe and confident using. If spaces provide what local people want, they will be better used and offer a far better return on investment (CABE, 2010). Additionally, an efficient public space should be inclusive and act as a melting point for all social groups including the marginal, the forgotten, the silent (Badshah, 1996), and undesirable social minorities as informal street vendors, street people and different ability people like women, children, elderly, and others marginalized in the community. Generally, the interest in broader built environment and its influence on the sense of community is gaining momentum nowadays as studies have proven that perceived quality of neighbourhood public open spaces and the shopping amenities have positive and significant association with sense of community (J. Francis et al., 2012). Looking at the German experience, development of public space got off the ground in many approaches (Landry, 2008). For example, to overcome the physical segregation of the multi-centric former industrial Ruhr region, the problematic infrastructural system on the A 40, as the main highway, was suddenly transformed from just a transportation spine into a boulevard of the Cultural activities. Therewith, the perception and the function was shifted from abstract space to a space of individual dynamic appropriation. This was realised within an interdisciplinary dialog with artists, urban planners, architects, writers, and scientists.

Thus, the term public space needs a certain systematic differential scope that is just and overwhelms its multidimensional image and accommodates the different users' needs and interests (Carr et al., 1992). Public spaces are the backbone of cities and they possess over an essential role that brings about the city differentiation and makes cities readable. The image of the city can only be set through them and through the life they bring about (Kuklinski, 2003: 44). According to Selle, the aspects of public space in its multidimensional meaning can be researched as cultural aspects, social aspects, ecological aspects, political aspects and economic ones (Selle, 2001).

## *2.2 Typologies of Public Spaces*

Research on typologies of public space is wide and multifaceted. This research aims at defining certain faces of typologies that target the frequency of visiting a public space on one side, and the spatial layout of typologies in cities around the world on the other.

Studies on visiting green and public space can be categorized in three groups. The one concerning the use of one specific space that people target, the second targeting regional and national scale parks, whereas, the third targets the spaces around the home zones that can be easily accessible in daily life (Schipperijn et al., 2010). Carr also defines this, open, publicly accessible places (Carr et al., 1992). Other studies have suggested that distance to public space and specifically parks with no physical barrier like a main road, is the driving force in visiting public space in many cultures. However, other studies see the potential in the size of the public space and the degree of presence of facilities are what make a difference in visiting public spaces (Gils-Corti et al., 2005).

According to Stanley et al (2012), public space can be spatially categorized in a trans-disciplinary manner. On the one level, it can be categorized according to form, streets, plazas, recreational space, parks, and gardens. On the other level, it should also encompass the classification of scale, city scale, intermediate scale and residence scale.

## *2.3 Assessment and Efficiency of Public Spaces*

According to Bell et al (2007), factors influencing the efficiency of public space are: policy priorities of governments like social inclusion, public concern like crime and safety, economic values and movement between the spaces. In contradiction to that, some social scientists have focused on class based exclusion as public spaces cannot be conceived outside the social generalization of private space and its full development as a product of modern capitalist society (Smith, 2006, in Stanley et al., 2012: 1091).

Vitality in urban public space considers the possession of capacity to offer choices for social activities and entails enabling public spaces to be a safe destination to visitors, which makes spaces more attractive (Jalaladdini & Oktay, 2012). In addition, spaces should be socially accessible and correspondent to the needs and values of communities targeting them. The sense of place is always socially constructed, and a fundamental element in the social construction of place is the existential imperative element for people to define themselves in relation to the material world (Knox 2011 in El Husseiny & Kesseiba, 2012: 791). Also according to Knox (2011 in El Husseiny and Kesseiba, 2012), public spaces are both structured and structuring. In this sense, one should be careful in the determination of the needed indicators to public space network that results in better models of city life as they can influence the activity of people around them as well as be influenced by the values and behaviours of people around.

### 3. Methods

The methodology adopted in this paper is to research and understand the strategies linked to face and resolve urban problems of connectivity, economic drawback and eventual potential for development as well as urban approaches in linking communities and social groups that are segregated within the social structure of Amman. Case study analysis and highlighting best solutions to similar cases from Dortmund, Germany will be carried out to unleash the steps these challenges are faced and bridged. Two case studies will be investigated in Dortmund regarding the impact they can have in relation to the needed approaches of certain socio economic problems in Amman. The first one, the Phoenix Lake project will be investigated and analysed to reveal the impact it had on the economic life in a city district called Hoerde. The new commercial mixed use complex around a lake that was formerly an industrial area adjacent to a lower income community, the type of economic lift up it caused will be researched. The second project, the Emscher River Revitalization, will be analysed to shed the light over regional undertakings that have the potential in linking communities of differentiated status along one set of interventions.

On the other hand, expert interviews were conducted in order to shed the light on gaps and problems affecting the decision of these development projects. Challenges and obstacles as well as achievements on the governmental levels were targeted in the interviews to seek ways of efficient implementation of future approaches in Amman.

As a validation method, space-syntax is a theory and a methodology of urban analysis developed by Hillier and Hanson at the school of Architecture and Planning at the University College London in the late 1970s. Space-syntax methodology relates directly to space and investigates society-space relation through analysing the physical and spatial ordering of buildings, "social objects", as a reflection of the ordering of relation between people of different societies (Hillier & Hanson, 2005). Thus, according to their assertion, analysing and interpreting spatial qualities of artefacts would reveal the social rules that regulate the interface among people. Using this method, the urban system can be read in relation to key spatial syntactic relation system such as properties of symmetry-asymmetry, distribution, connectivity, integration, global and local control, (Hillier & Hanson, 2005; Hillier, 1996). The analysis of these attributes is based on the use of a computer software program (Depth-map) that is developed also by Hillier and Hanson (1984) at the Space Syntax laboratory of University College London. This method will be used as to validate some findings especially the connectivity degree of the public spaces so as to test the impact of these projects in the reality after they are carried out and implemented.

### 4. Analysis and Synthesis of Results

#### 4.1 Contextualizing Potential Indicators: Relevant Values to Case Studies, Dortmund and Amman

Although in previous studies, public spaces have certain defined roles and duties towards the communities; this research sheds the light on different intangible needs of communities that are more likely concerning future city and urban life development. Defined and tangible roles of public space can be that of fulfilling the needs of the communities in finding green open spaces from a health point of view. Others confine with the provision of playgrounds, gardens, and sport facilities in the neighbourhoods, where some countries and some neighbourhoods have to fight for such a basic right (Bonilla, 2013). Yet, the above discussion concludes certain indicators and driving factors for the activation and efficiency of public space. Economic vitality, social inclusion and social integration, safety factors and proper effective networking should be met and enhanced to enable efficient use of public spaces. Moreover, public spaces should be working well with the urban tissue in the city and should be a vital inseparable part of this tissue in order to ensure an everyday life that corresponds to the basic needs of the communities living around them.

However, the discussion in Amman setting has more of many types of scarcity in public space development. On the one hand, it basically enjoys the provision of public spaces on the level of the neighbourhoods, yet not in a sufficient manner, not in quantity nor in quality. It also encompasses developments of bits and pieces of street developments towards public space, and regeneration processes for certain areas to revitalize the public sphere that has been lost for quite a time. On the other hand, this undertaking, although appreciated by the different users and stakeholders, unfortunately does not contribute vastly to the integrated urban development of the whole city.

Amman setting lacks the effective network where people can mingle and the different uses targeting all social groups can blend within the urban tissue of Amman. Public spaces on their different typologies are articulated, yet, not socially integrated to the setting. Main problems occurring in the public space field of activities in Amman are social exclusion in areas of certain interventions. The increasing segregation of the different social groups in the public space, although articulated in different geographic locations and the misunderstanding of

economic vitality through the overdone recreational facilities such as restaurants and cafes hinder development from taking place and therewith, hinder social inclusion and integration from happening.

How can these be working in a setting and how such factors can be moulded in projects to maximize the benefit they are planned are sketched in the following two examples in the city of Dortmund.

#### *4.2 Analysis of Public Spaces as Best Practices in Dortmund*

##### 4.2.1 Emscher River Revitalization

The first German example to be sketched in this paper is the Emscher River revitalization project. Although this multifaceted project spans the entire Ruhr Region and causes various economic, environmental and spatial impacts, the focus here is on its effects concerning new public open space and new social integration in the area of Dortmund city.

##### **Background**

Over a century ago industrialization shaped the land of the Ruhr-Region. “Spatial structures were subordinated to heavy industry and coal mining or were created by them. The landscape was exploited on a large scale and industrially reshaped. Its central location meant that the River Emscher and its tributaries had been reduced to functioning as a central, open sewer. For 100 years, the name of Emscher was synonymous with the ecological, aesthetic and social abuse of a river landscape.” (Fachgebiet STB 2008: 8) With decline of the regional mining, with traditional heavy industry giving way to the services and high-tech industries, the idea was born to reconstruct the landscape and a master plan was developed to renaturalize River Emscher. More than a clean-up was needed. Along an 80-kilometre stretch in the middle of Europe’s biggest conurbation and an investment volume of about 4.5 billion Euros the Emscher conversion is not only one of Europe’s biggest infrastructure projects it also means, that a conscious shaping of the whole region was initiated. Within a project period of several decades the wastewater will be channeled through closed conduits and the river will be step by step re-converted into natural waterways. Besides the positive impacts on environment and effects for the regional economy, massive improvements for neighboring residential areas are achieved, as odor emissions and barrier effects are drastically reduced and consequently new patterns and functions of public open space are created (Website EmscherGenossenschaft, 2014).

##### **Development approach**

Converting a river system this size is a project extending across several generations and involves far more than turning former open areas used to absorb water in the event of flooding into attractive recreation areas. Its goal is to upgrade the Emscher region decisively through projects extending well beyond the river. The kick-start for the project was the International Building Exhibition under the title Emscher Park (Website IBA Emscherpark). With the “Emscher Future” master plan the water management organization (EmscherGenossenschaft) created a plan that has been developed in continuous dialogue with neighboring cities and districts, with industry and business, the relevant government authorities and many other organizations and institutions. The Emscher conversion offers the chance of a century to revitalize a neglected river area while at the same time giving the entire region from East to West a new face. The projects undertaken in Emscher Park in the Ruhr area have ecological considerations to the urban development of that region, while accompanying art installations and periodical festivals in other cities aim at creating a new regional identity, civic pride and social integration. Directly connected to the Emscher core area is the integration area. Here the master plan contributes with ideas for developing open and urban spaces, in developing design typologies for example, but also for linking the New Emscher with its direct environment. It is characteristic of the integration area that the upcoming tasks here will be tackled in collaboration with regional planning partners (Website EmscherGenossenschaft, 2014).



Figure 2. Emscher renaturation project

Source: Website Emschergenossenschaft, 2014

### Impacts

Impacts of the project are as diverse and complex as the underlying master plan. Besides the immense environmental and economical benefits for the Emscher core area and integration area, here the social and spatial impacts should be pointed out: One of the biggest achievement in this regard is the new orientation of buildings and housing areas – where previously regulated and developed with their back to the river, it is now oriented towards it. River Emscher turned into a green spine and a new backbone of regional development. In line with that an increase in property values and quality of life was achieved as well as an overall new perception, use and function of public open spaces.

#### 4.2.2 Phoenix Lake Development

The second German case being presented in this paper is the Phoenix Lake development project in Dortmund-Hörde. Although being part of the New Emscher project sketched above, it functions here as an example how newly created public open space, embedded in a concept of mixed use, can be used to upgrade an urban area in need of improved commercial, residential and visiting conditions.

### Background

Where now on about 24 hectares Dortmund's biggest recreational lake can be found, there used to be a place of heavy steel production for the last 160 years. Massive structural change in the region brought the end of the steel era also in Dortmund-Hörde. When the steel plant was closed down in 2001 the plant site became one of the region's many industrial wastelands (website Emschergenossenschaft, 2014). Just five kilometers from the city centre and in the middle of the neighborhood Dortmund-Hörde the wasteland meant a huge challenge and potential for the city's development planners. For the first time in generations, an area that used to be fenced and only accessible to the limited group of employees and workers became visible and accessible to the public again. After demolition of the buildings and remediation of contaminated sites the planning process was started, aiming at the revitalization and reintegration of the site into the urban fabric. Besides the spatial dimension of the problem, the municipality was seeking for development strategies that were suitable for counterbalancing the structural problems caused by the disappearance of one of Dortmund's major economic sectors.



Figure 3. Brownfield and Masterplan Phoenix in the context of Dortmund-Hörde neighborhood

Source: Website Phoenix Dortmund, 2014



### Development approach

The development approach wants to attract new investment by developing Dortmund's hard and soft locational factors for growing sectors in the fields of information and telecommunication, logistics, as well as nano- and micro systems technologies. At the same time the overall quality of life needs to be increased to be not only attractive to new businesses but to (new) residents likewise. To master this large-scale and long-term development project, the planning department chose a governance approach that was based on an intense public-private partnership model including representatives of chambers, unions, Thyssen Krupp Steel Company, business promotion agency, supported by McKinsey consulting company (Frank, Greiwe, 2012: 576). With joint expertise a Master plan (incl. development strategy and implementation scheme) was developed.

Today Phoenix Lake is an attractive area for leisure activities, but also for waterside living and working, generating economic and socio-cultural impulses for the neighboring quarters and the city. On Phoenix-West the regional development corporation (Landesentwicklungsgesellschaft) is building a multifunctional center for innovative companies; on Phoenix-East the Phoenix Lake Development Company is building attractive housing and premises for companies offering services around the new artificial lake (see map above). The lake's northern and eastern banks by contrast retain their original natural character, serving mainly for recreational purposes. Next to the Phoenix Lake a small harbor forms the heart of the newly created public space, complemented by restaurants and cafés, various businesses and recreational facilities, with a focus on leisure activities on the lake's south banks (Website EmscherGenossenschaft, 2014).



Figure 4. Public space and its functions around Phoenix Lake

### Impacts and success factors

The new land-use plan and underlying development strategy wanted to revitalize and upgrade the old industrial site into a vibrant new neighborhood. The project was unique in its approach but some success factors can nevertheless be identified (based on interview Kelzenberg, Dortmund Planning Department, 29.9.2014):

- **Long term vision and pro-active planning:** The project idea and a first vision for a potential reuse was born long before the industrial land became a Brownfield area. This enabled planners to react immediately when the steel plant was shut down – and to present an alternative to the usual parceling and selling of the best plots to investors. This was especially crucial as the site is huge, close to the city centre and embedded in the existing urban fabric and as such holds considerable potential as pilot project concerning city development. Thus, the vision for reusing the site was ambitious. Aiming high was the only chance to create a project with the high impact wanted. This was supported by a clear top-down decision by the political decision makers, which set the framework for all further steps.
- **Integrated planning:** It was realized that the project needed to fulfill various roles: Creating new jobs, enhancing the image of Dortmund, creating new housing and leisure time options while being an integrated part of the urban fabric, not an island, alien to the rest of the city. Therefore special attention was given to the functional and spatial linkages. Studies revealed that in former times there used to be a natural lake – by creating an artificial lake on the old industrial site it was possible to connect to the place's history. The new urban structures with the new boulevard, plazas (with its cafes, restaurants and shops) were directly linked to the center of Hörde. The new housing areas in the eastern part of the site are embedded in green structures – these new structures also relate to the original landscape and river Emscher that was forgotten during the industrial era of the site. Besides being part of the green open space concept, various roads and paths connect the site with the rest of the city. Additionally all buildings and public space components have to satisfy high aesthetic and functional demands and different types of space have been used consciously to create different feelings of space for the various user groups.

All in all the impacts of the project are positive. Some critical voices claim that the development triggers gentrification processes but the successful urban upgrading with positive, economic, environmental, spatial-aesthetic impacts not only on the direct neighborhood but also for the whole city seems to justify this.

To measure the added value of Phoenix Lake Project on the city connectivity and integration, Space Syntax was applied twice, one before and one after the urban development that is implemented in Hoerde and produced new forms of urban spaces that created a new center in Dortmund city and included pedestrianisation of more than two third of project area.

The Depth-map software is used in this paper to produce analytical drawings of the Hoerde before and after the Phoenix Lake development project. The produced axial maps are drawing maps that are used to represent the open space as a continuous system with the surrounding structure. The idea of a “fewest lines” axial map was first introduced in Hillier and Hanson's book *Social Logic of Space* as some minimal set of the abstracted fewest and longest lines that cover some set of the “fattest convex spaces” in terms of their area perimeter ratio (Hillier & Hanson, 1984: 17). In the *Social Logic of Space*, the basic idea of the axial maps was presented as a method

for abstracting the spatial drawings and for reducing the complex continuous spatial network of cities into a set of meaningful lines that could be subjected to analysis. At that time, no particular social meaning was attributed to the axial map in Hillier and Hanson's work, rather it was suggested as a technique for rendering the complexity of the urban fabric in a simplified fewest lines map (Desyllas & Duxbury, 2001).

The presented axial maps in this paper were produced through using different spatial analysis computer programs. In order to obtain reliable measures and to prevent the edge effect, a wide surrounding area to the project was considered. The first step in this process was to have a digital map of the urban morphology of street networks of Phoenix Lake and the surrounding roads networks of Hoerde district and their direct and indirect connecting streets to Dortmund city center. The urban layout was manually updated and modified using AutoCAD software. The second step was to prepare the hand-drawn "fewest lines" in Dxf format to represent the street network as a system of single lines. To this end, it should be noted that this step includes interpretive drawings of the researcher to create the right geometrical connection between the public space and its surroundings. The third step is to import the Dxf fewest lines map into the UCL Depth-map program. At this stage, the axial map resulted from the Dxf fewest lines are operational for measuring the connectivity for each line. Depth-map software offers a wide range of analysis orders; however, in this paper the analysis is limited to measure a few spatial attributes of connectivity and integration.



Figure 5. Axial map before analysis

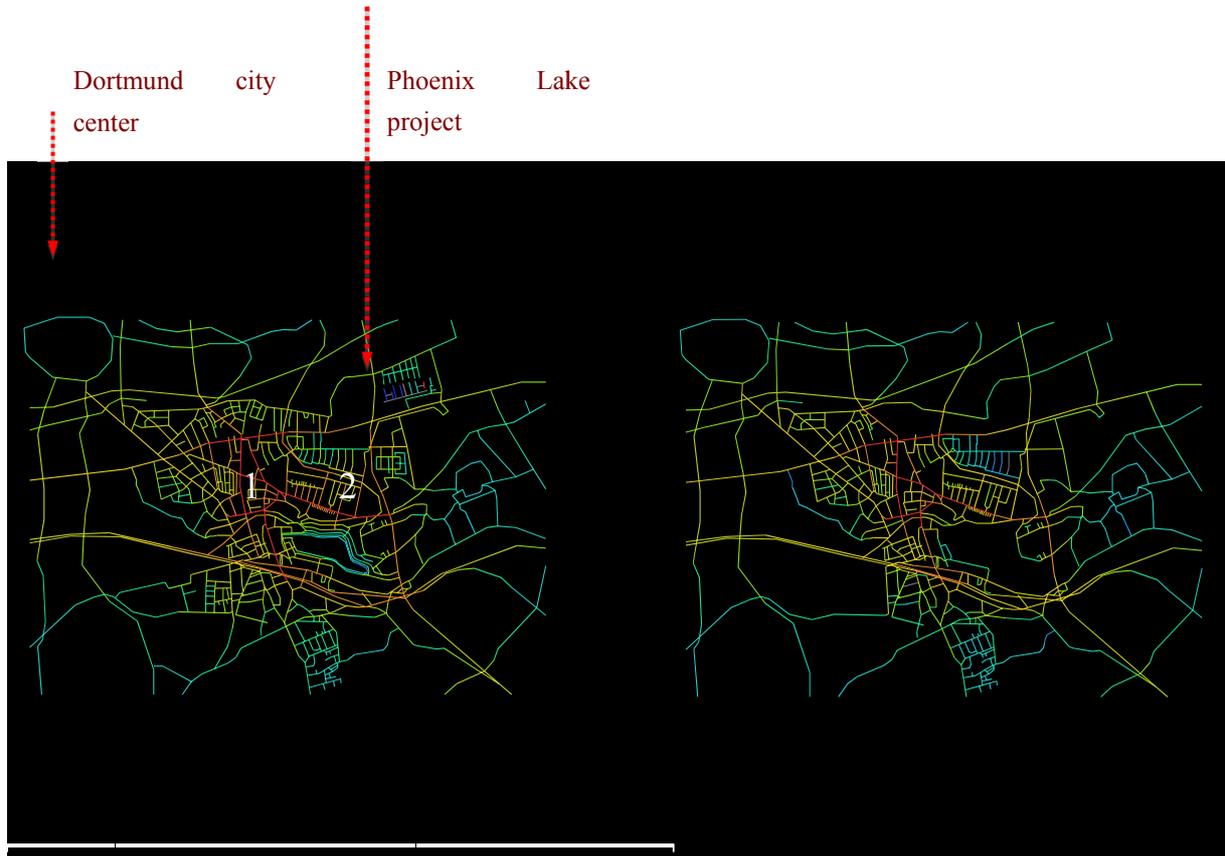


Figure 6. (A) SS spatial accessibility analysis before the implementation of Phoenix Lake project in 2010 (Radius: whole system); (B) SS analysis after Phoenix Lake project

- 1) The recent development of Phoenix Lake and Hoerde centre has increased the global integration value of Hoerde centre. This has been achieved through the pedestrianization of the street connecting the Phoenix Lake to the historic centre of Hoerde.
- 2) In the integration map of Figure 6, it is illustrated that the most connected and integrated lines are the ones connected to the Phoenix Lake project that involve mixed land use development of residential, intersegment
- 3) The less integrated axes are located on the east part of the project where there is an increment of slope of an artificial hill resulted from the former industrial activities of coal mining and steel production at that site. The highway 236 located behind the hill adds to the segregation of the surrounding area.

## 5. Conclusion

Certain indicators can be drafted from the above discussion on the best practices in Dortmund. These can be seen in relevance to the development aspects needed in the setting of Amman. Economic vitality and development, social integration and approaching a connected network and accessible nodes in the city are seen as the main resulting indicators enabling development in Amman.

Economic vitality represents the first indicator in this discussion. Public spaces have to generate an impact of economic vitality in order to be able to function well in settings. As seen in the best practices in Dortmund and as investigated in the setting in Amman, spaces in Amman were designed with multiple urban design elements. They were furnished properly with all types of cafes and restaurants and shops. Yet, economically, they were still not seen to develop vastly. The cases related to the economic vitality in the best practices, like in Phoenix Lake, had the factors of inhabiting the development with multi types of jobs in addition to recreational facilities and leisure activities. Spaces should fulfil roles of creating new jobs and new housing areas attached to the

original urban fabric where, the old can blend in with the new. Spaces in this sense will motivate and attract all types of people and activities, whether permanent or temporal. They will also bring in a new hub that can be used in a complementary way to the existing environment.

Social constructs targeting social inclusion and social integration are aspects that Amman setting has suffered from for quite a while. Development of public spaces in Amman, as already described in the discussion above, has had many difficulties and problems with social groups' discrepancies. In relevance to the best practices in Dortmund and particularly the Emscher River Revitalisation project, projects on regional levels that spanned areas of differentiated social status groups can have the impact on reshuffling the distribution of the different groups of residents on one side, and enable the area to revisit its public space front on the other. It also can bring about a more stable and balanced typologies as all will benefit from the same development corridor. Also, this linear type of development with regional span allows people using it from all over the place through passing it and using its facilities. This kind of additional users also brings in the integrated environment in an indirect way. Amman, as described in the previous discussion, has big areas introverted to their communities, although have the potential of mingling societies. Strong physical elements like streets emphasize those divisions and create the cutting elements that prevent communities from sharing spaces. Once developments are allocated to such areas of greater divisions, a potential of rereading the spaces can take place and instead of giving their backs to neighbouring communities around those main streets, residential areas can redirect their life to these spaces and societies can start interacting with neighbouring societies. In this sense, public spaces even if not on a regional level, but on an urban scale can enable their setting and start facing each other and using the same anchor nodes if strategically positioned.

A third aspect and indicator is seen as enormously important in developing and raising the efficiency of public spaces in Amman is creating and developing potential magnets in the city. Networking the public spaces and accessing them are a main factor in their functionality. Public spaces in Amman are on one side dispersed without a defined pattern of growth. On the other side, they lack the integrated development, as they are spaces for the sake of having a green spot in a certain district. Yet, they are not connected and combined with other land uses and urban layers such as transportation hubs or commercial areas in the districts that are important to the development of the space and community around it. On a macro level, in order to be able to read the city through their backbone and skeleton of main integrated public spaces and urban anchor nodes, some sort of greater urban ring of magnets can be developed.

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