Making the publicness of public spaces visible: from space syntax to the star model of public space

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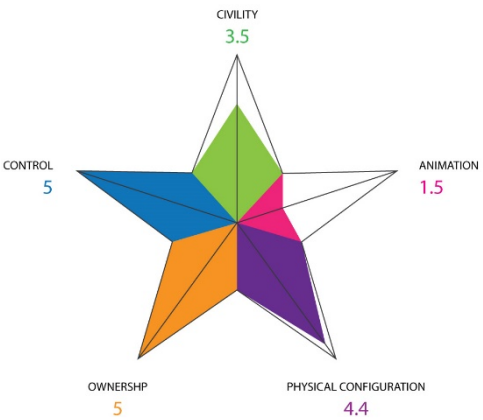
Abstract In an urban world greatly concerned with sustainable development, building more socially cohesive, environmentally friendly and economic competitive cities is a key prerequisite. Through their multiple functions and various roles, public spaces are central to achieving urban sustainability. However, public space is neither an uncontested nor an uncontroversial arena. Indeed debates on the "politics of space" continue to capture academic and public attention (see Mitchell, 2003; Kohn, 2004) raising important questions of social justice, such as: "Who makes and controls public space?" and "Who benefits from the development of new public space in the context of restructuring the city?" Reflecting these concerns, public space has become the subject of a growing academic literature from the full range of social sciences and humanities. One of the main difficulties of public space research is that a large amount of studies are descriptive and based mainly on qualitative research. A notable exception is Hillier's Space Syntax theory, which has provided a theory of space and an analytic technique to model and measure the performance of cities' spatial structure. Although highly innovative, the work of the space syntax team has focused on quantifying and illustrating only one key element of a public space's publicness: accessibility. In order to understand publicness, other crucial elements that make a space public need to be integrated in the analysis. The Star Model developed by Varna (2011) in the PhD thesis is so far the first method of its kind that measures and illustrates publicness as objectively and holistically as possible.
This paper presents this new method of measuring and illustrating publicness, integrating space syntax and applying it on three public places from the city of Turku, in Finland

Fig. 1 An example of Star Model



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Introduction

Public spaces are part of our daily lives. They are the pavements we walk or cycle to work or to school, the parks where we go to relax and re-connect with nature, the playgrounds where we take our children, and the squares where we meet our friends. Urban public space has become a central feature in the development of contemporary cities, which are struggling to create an image of 'friendliness', 'smartness' and 'quality of life' in order to attract flows of capital, tourists and new residents, and to prevent the loss of inhabitants and businesses. For the past half a century, since the publication of the two famous writings, William H Whyte's *Securing Open Space for Urban America: Conservation Easements* (1959) and Jane Jacobs' *The Death and Life of Great American Cities* (1961), a rich and multidisciplinary literature on public space has flourished. Urban design, planning and architecture focus on the spatial characteristics of public places; sociology and anthropology concentrate on public space as being the stage where the rituals and festivities of a community are carried on; geographers debate issues such as 'sense of place' and 'placelesness' while philosophers and political theorists discuss it as the space of civil freedom, fragile in the face of current trends of privatization and increased surveillance. What is common for most of these writings is that no matter the disciplinary field or the stance they take on analysing public space, many times they have a descriptive and subjective perspective. There is rarely a pragmatic approach, greatly needed in our experience by many types of practitioners to understand why certain public places fail and others succeed. Therefore we have set out in this paper to present a new way of conceptualising publicness, as a multi-disciplinary, quantifiable entity and a new way of graphically representing it. This is based on the Star Model of Publicness (Varna, 2011) and the space syntax approach developed by Hillier and Hanson in the *Social Logic of Space* (1984) and Hillier's *Space is the Machine* (1996).

Why model public space?

The philosophy which guides us in this research is that the build environment should be designed and built based on the various publics' needs (Fraser, 1990) and not according to individual grand visions of what a city should be. We strongly believe that public places are essential for the wellbeing of all urban inhabitants but unfortunately they do not receive enough attention today in the process of real estate development. There is a large gap between research and practice concerning the quality of urban design, often due to the key decision makers' tight schedules and quantitative approach to the creation of the build environment, driven by issues such as budgets, quantity and cost of materials employed, investment vs. revenue ratios, workforce cost and availability and so forth. We considered that a more pragmatic approach towards measuring public space could help bridge this gap and a quick, informed and straightforward visual representation of a public place's publicness would give decision makers a much more solid base for understanding where and why a public place fails (or succeeds). Therefore improvements can be aimed where they are needed. Our endeavour is also aimed for more rigorous public space studies as the Star Model can help in creating more meaningful comparisons among places. However, before presenting our approach, the previous attempts that have influenced this study should be acknowledged.

Previous attempts of modelling public space

So far there have been three original notable studies where public places have been analysed from a pragmatic point of view. Each of them has tried to measure different aspects of a place's publicness while also attempting to represent the results visually. The Dutch authors Van Melik et al. (2007) looked at two regimes of public space management occurring today: the over control of public places which they called "secured public space" and the general trend of Disneyfication of space, which they labelled "themed public space". During the same year, 2007, two authors from the USA, Jeremy Nemeth and Stephen Schmidt also looked at the management aspect of public space and attempted to create a "methodology for measuring the security of publicly accessible

spaces" (Nemeth & Schmidt, 2007). Their work has advanced Van Melik et al.'s research due to including the dimensions of "design" and "use" creates a more holistic image of public space. Also in 2007, a third model was proposed by UK's CABE (The Commission for Architecture and the Built Environment); this was an independent advisory body on design, sadly closed in 2012. This was called the *Spaceshaper* and was defined as "a practical toolkit that could be used by everyone (i.e. a local authority, a local community activist or a professional person or body) to measure the quality of a public place before investing time and money in improving it" (CABE, 2007: 4). Although its encounter has inspired confidence in the necessity and value of the present endeavour, the model proposed by CABE was considered fairly subjective. The *Spaceshaper* tool measures the quality of public space based on the perceptions of a certain group of users and some of the categories against which these perceptions are measured are intrinsically subjective (i.e. "You", "Community" and "Other People").

The Star Model of Publicness

The Star Model of publicness was created starting from these three attempts and based on a rigorous review of the available public space literature. The two-year study of scholarly works from different disciplines (such as Geography, Planning, Urban Design, Philosophy, Anthropology, Sociology, Cultural Studies and such) led to the understanding that five key strands appear as crucial for giving a public place, its quality of publicness: ownership, physical configuration, animation, control and civility. More, it was realised that they each range from high to low publicness as summarised in Tab. 1. It needs to be kept in mind though that each public place has a subjective dimension, as a public space can be public to one person and not public to another. Based on this conceptualisation, indicators, joined by descriptors, were found for each meta-theme. It was decided that the five meta-themes would be best placed on a Star Diagram (Fig. 2) as cobweb diagrams can give different images depending on how the elements to be measured are ordered. After careful deliberation and many trial and error attempts, in this first stage, it was decided on nineteen indicators (Fig. 2).

More public	META-THEME	Less public
Publicly owned space, public use	OWNERSHIP	Privately owned space, public use
Well-connected/located within the movement system, strong visual connection to external public realm beyond space; without obvious entrances and thresholds; a wide range of supports for a wide range of activities	PHYSICAL CONFIGURATION	Poorly connected/located within the movement system, poor visual connection with external public realm; with explicit entrances and thresholds; narrow range of supports resulting in a limited potential for activities
A large and diverse public engaged in a variety of activities	ANIMATION	Dead public space: few people engaged in few activities
Free use and a comforting police presence	CONTROL	Overt and oppressive control presence - human and electronic surveillance
Cared-for; well-kempt; inviting	CIVILITY	Untidy, vandalised, uninviting

Tab. 1 Descriptors of 'more public' and 'less public' for each meta-dimension

These were rated on a scale from 1 to 5 as it was considered that a scale with three values was too superficial to capture all 'shades' of publicness and a scale with more than five values would be complicating the model too much. It is aimed to develop the model further in the future and it is expected that some indicators will fail the testing while others might be created and added.

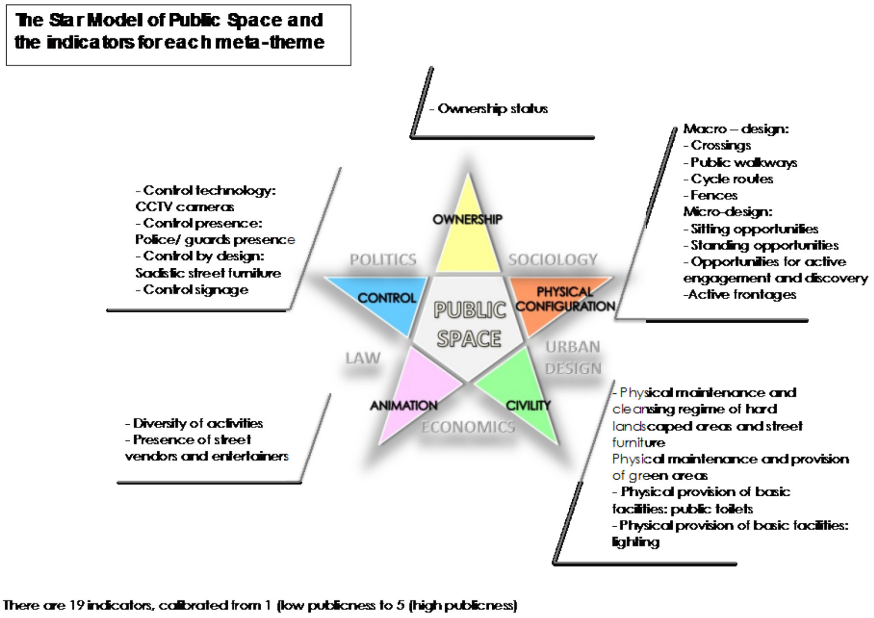

Fig. 2 The Star Model of Public Space and the indicators for each meta-theme

The model was based on two main pillars: simplicity and ease of use so that anyone with a basic interest and understanding of a public place can take an observational approach to the site and measure its publicness. One of the main reasons for this is to bridge the users/producers gap. Although often consultation is undertaken in the development of an area, users often do not have the knowledge or the specific technical language ability to express their needs and wishes; therefore their opinions and desires are lost and the result is that often public places are underused, forgotten or completely alien to the local users' needs. As a result, the first version of the model has very simple to measure indicators for macro-design, in other words, to express the accessibility and centrality of an area. This paper presents a second stage in developing the Star Model by joining it with the Space Syntax theory and modelling techniques.

Principles of Space Syntax

In the attempt to find measurable indicators for each of the five meta-themes of publicness, it was understood that a crucial aspect related to a space's publicness is its accessibility. Great progress has been made in understanding and measuring spatial and cognitive accessibility, during the 1980s and 1990s, through the work of Hillier and Hanson and their University College of London team. This has become universally known as space syntax theory and it is based on the fundamental proposition that there is a direct relation between social patterns and urban morphology (Hillier and Hanson, 1984). The theory has developed towards a computer-aided technique to assess accessibility of spatial layouts (Hillier, 1996), enabling scholars to give a spatial representation to studies of social behaviours. Void space is modelled onto linear ('axial') and areal ('convex') components, either in outdoor or indoor urban environments. The axial lines

can be concisely described as the longest straight lines that can be drawn in space, while convex spaces are as such that no line between any two points within the space crosses the perimeter (Klarqvist, 1993).

When Jane Jacobs explores "The conditions for city diversity" (Jacobs, 1961), she begins by observing social behaviours related with different urban spatial configurations and then reports the relevant activity happening in those spaces. By relating observation and experience of place with the size of New York's city blocks, Jacobs is actually dealing with some characteristic of spatial configuration, which later will be measured with the Space Syntax theory, namely Control, Integration and Choice. Control is the degree to which a space controls access to its immediate neighbouring spaces taking into account the number of alternative connections that each of these neighbouring spaces has. Integration describes the degree of cognitive accessibility, or in other words, how easy it is to reach a certain space. Choice describes the degree of centrality, that is the concentration of shortest paths passing by the axial lines (Klarqvist, 1993; Hillier, 1996). Thirty years later, Jacobs' work, based on the personal experience of the city, has been given a scientific base through Space Syntax's quantitative approach. Following the same direction, we strive here to give a new direction to public space studies, which so far have been mainly descriptive; this is meant as a more pragmatic and visually illustrative approach to conceptualising the publicness of public space.

Modelling public space – the practical approach

Based on the Star Model of Publicness and on the Space Syntax, we will illustrate our approach with the case study of Turku, in SW Finland, a city of 180,225 inhabitants. The city has a history of political stability and relative wealth and historically it has been the first capital of Finland and the place for its first University. During 2012, a study of three of its squares was undertaken: Vanha Suurtori, the old medieval market place of the city, Vähätori, a new square created in the 2000s and Varvintori, built in the 1990s when the city's regeneration started on the banks of its river. They are all located on the waterfront of the River Aura, which has overcome its legacy of being an industrial sewer and a 'no go area', becoming in the past decades the most used and attractive public space in the city.

As mentioned above, in the first stage of creating the Star Model, the accessibility and permeability of the site were measured in a fairly straightforward but not very precise way, using four indicators: Crossings, Public walkways, Cycle routes and Fences. For the first three, the rating 5 is awarded for their presence in all four cardinal directions, 4 for three cardinal directions, 2 for one cardinal direction and 1 for their missing. Regarding fences, the ideal situation and therefore rating 5 is considered when these are missing as they can block the view and the physical access of pedestrians who might want to explore a certain public place. Lower ratings are given according to the type and extent of the fencing. However, in practice, these four indicators proved fairly hard to assess because the observer needs to use a certain amount of subjectivity; him or her has to decide if a common street crossing over a very busy highway can indeed be considered accessible enough or if there is no cycle sign, can, for example a gravel path be considered a cycle route? After making the necessary decisions, the ratings for the three squares in Turku regarding Physical Configuration were obtained (see Tab. 2 and Tab. 3). In order to provide a better measure of the accessibility of a public place, these four indicators were replaced with a space syntax type of analysis. This differs from other graph-based theories as distances are considered in syntactic steps – or turns. Current available topological information of open space is represented as road centrelines, meaning an Axial Map has to be drawn manually, needing a large amount of time and involving subjective decisions. Carvalho & Batty gave a rigorous definition of axial lines demonstrating how they can be constructed as ridges in isovist fields (Carvalho & Batty, 2003).

	Vanha Suurtori	*Vähätori*	*Varvintori*
Crossings	4	5	4
Public walkways	3	5	3
Cycle routes	3	5	3
Fences	5	5	5
Macro-design (Mean)	3.75	5	3.75
Micro-design	1.5	3.75	2.25
Physical Configuration	2.6	4.4	3

Tab. 2 The value of the indicators for Physical configuration for the three case study squares as measured through the Star Model

	Vanha Suurtori	*Vähätori*	*Varvintori*
Choice	3.5	3	1
Integration	4	3	2
Depth	3.5	3	1
Control	2.5	2.5	1
Macro-design (Mean)	3.4	2.9	1.3
Micro-design	1.5	3.75	2.25
Physical configuration	2.45	3.3	1.8

Tab. 3 The value of the indicators for Physical configuration for the three case study squares as measured through the Space Syntax

An alternative method of computing accessibility without carrying out the work of drawing an Axial Map, was presented by Alasdair Turner (Turner, 2007), who shows the possibility of measuring angular segment analysis on street centrelines as alternative to traditional Space Syntax analysis. Although there are several alternative methods of automatically constructing axial lines, for the scope and time frame of this study, it was decided that the most optimal variant was to grasp the accessibility of Turku by drawing the axial map manually. Once the Space Syntax analysis for the entire area of Turku city was performed, it was possible to assess the degree of accessibility of each square with a Kernel density analysis based on the Space Syntax output data. By using this method it is possible to take the linear information of the axial lines and compare it with the aerial topologies of the three squares in Turku. As the Star Model is built on a scale of values running from one to five, also the results of the Kernel density analysis were reclassified from one to five in order to make it congruent with the model's way of calculating the other indicators.

Conclusions

In trying to represent mathematically and visually the publicness of public space (Fig. 3), many obstacles had to be overcome. Although a first, acceptable result is presented here, there are still many issues open for discussion, testing and improvement. Looking at the strengths of the Star Model, it is notable that on a conceptual level, it brings together for the first time, different aspects of the publicness of public space. The Star Diagram offers not only a method to compare and contrast different public places but also a one-glance illustration of a public place. Presenting this during the development process (instead of lengthy reports from different perspectives) would help to overcome delays. Also, it would function as an audit method, leading to a higher level of clarity regarding where the greatest need for investment is. Therefore, those in charge of a project can assess in a quick and informed way where publicness fails so that interventions can be made towards the right areas. In addition by bringing together the different dimensions of publicness, the model draws attention on the high dependency of the success of a public place on the cooperation of different agencies and experts (e.g. the owners, the planners, the designers, the maintenance agency, the police etc.). Moreover, by offering a standard for public places, the model functions as a decision support tool. In this respect, the different actors in the development process can strive to create not just a public place, but successful places that manage to gather and integrate different individuals and 'publics'.

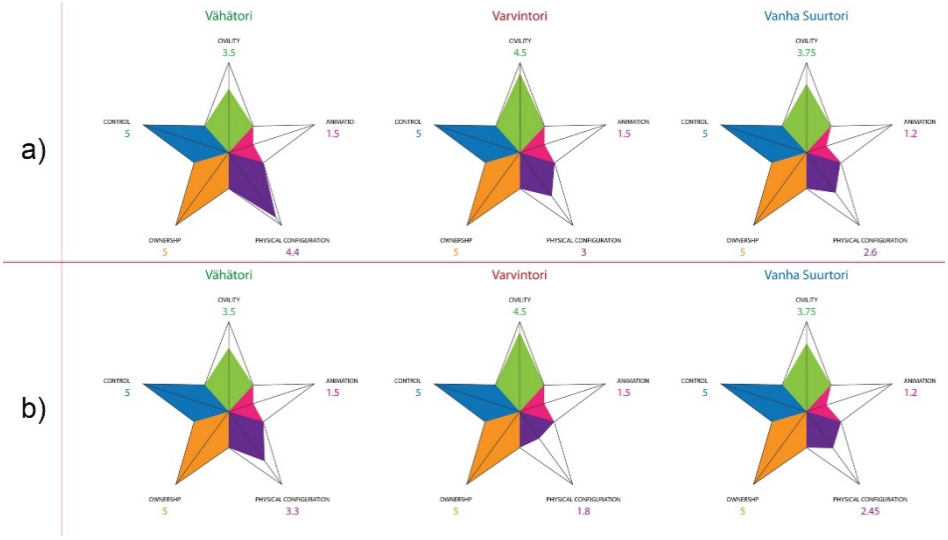

Fig. 3 Star Model for each square: a) Classical Star Model approach. b) Star Model with the use of Space Syntax

Weaknesses of the Star Model include its standardization of public places, removing the fact that each public place has its own identity and atmosphere and therefore the model should be used with a certain degree of common sense. Like any other model, it *represents* but never *reflects* reality. A second weakness would be related to its including a certain degree of subjectivity from the part of the researcher in selecting and defining the meta-themes, the indicators, the measurement range and their illustration; although it was attempted to create a model as objective as possible, public places lie between the social and the physical world and as such there will always be a certain degree of ambiguity in defining them. So far he model has only been tested in Glasgow, Scotland (Varna, 2011) and Turku, Finland (Varna, 2013). Already this has raised several issues. Among them, one can mention the importance of the weather for the success of a public place, especially in Nordic climates such as in Scotland and Finland, which is not in any way captured by the model. This raises the question of what would happen when comparing a

public place from Southern and Northern Europe, for example? Moreover, from the first stage of the research in Finland, it became obvious that the indicators for macro-design were not very easy to use. The introduction of Space Syntax in the Physical Configuration component of the Star Model, made it possible to assess the degree of accessibility of these features, not just their presence and location. Thus, this paper presents only the first step towards the integration of Space Syntax theory within the Star Model. As this methodology is currently a work in progress, only local measures have been used to study accessibility of public space, as we made the decision to consider the scale of influence of those places to be local. More studies have to be undertaken in order to observe what accessibility really measures and weather Space Syntax alone is sufficient or if the Multiple Centrality Assessment based on street network is needed to support the Star Model (see the study by Porta, Crucitti and Latora, 2008). Once more testing will be done with the Star Model, Space Syntax and both of them correlated and this methodology will be established, it will be possible to study correlations of the Star Model with spatial accessibility and infrastructure network centrality.

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