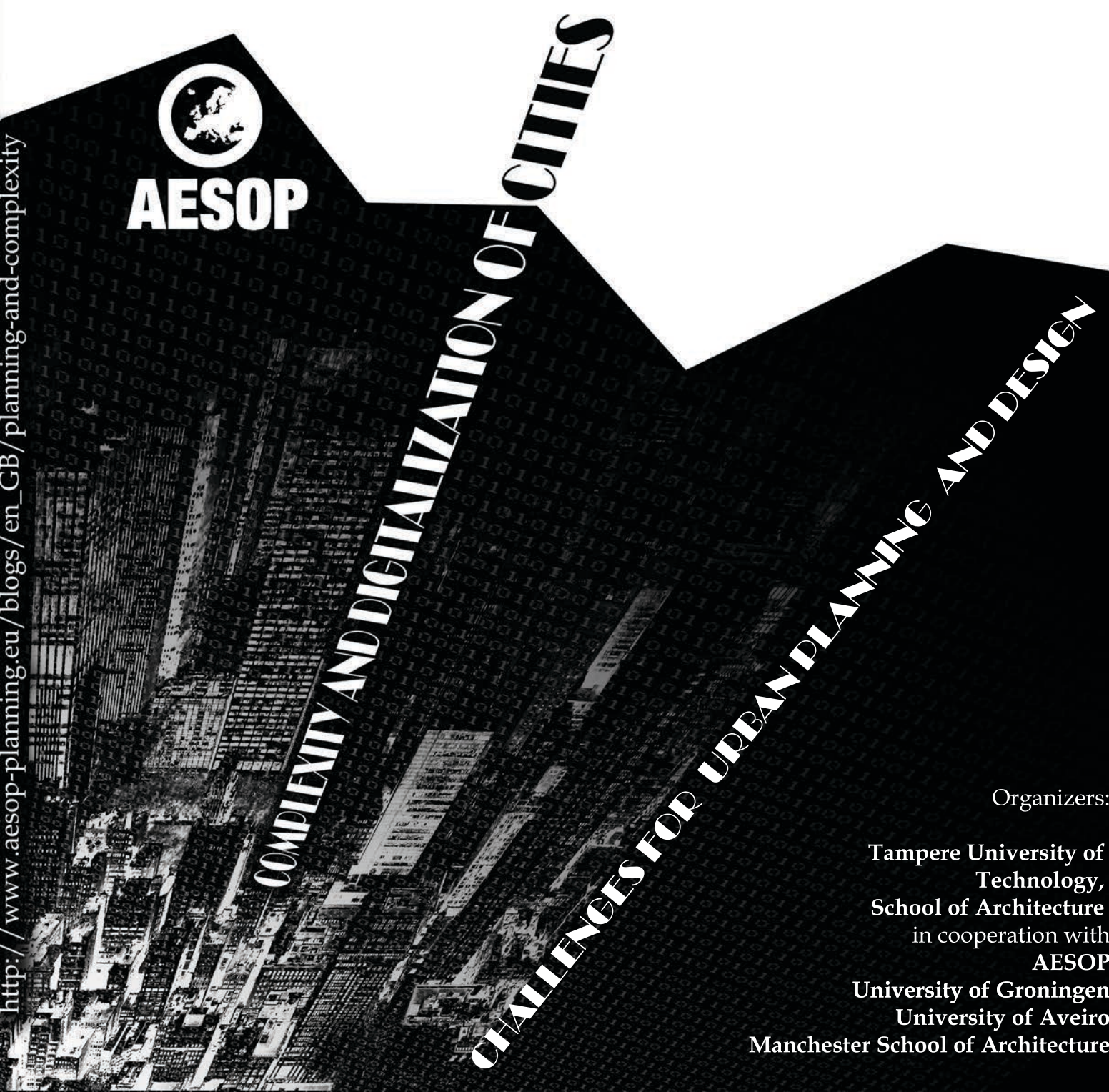


Complexity and Digitalization of Cities -
Challenges for Urban Planning and Design

January 15-16, 2015, in Tampere, Finland

**BOOK
OF
ABSTRACTS**

Partanen, Jenni (ed.)



http://www.aesop-planning.eu/blogs/en_GB/planning-and-complexity

Organizers:

Tampere University of
Technology,
School of Architecture
in cooperation with
AESOP

University of Groningen
University of Aveiro
Manchester School of Architecture

Jenni Partanen (ed.)

BOOK OF ABSTRACTS

13th AESOP Complexity and Planning Thematic Group Meeting

**COMPLEXITY and DIGITALISATION OF CITIES –
CHALLENGES FOR URBAN PLANNING AND DESIGN**

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COMPLEXITY AND DIGITALIZATION OF CITIES – CHALLENGES FOR URBAN PLANNING AND DESIGN

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Welcome to the **Complexity and Digitalization of Cities – Challenges for Urban Planning and Design!** Organized by AESOP since 2005, the group meeting invites together scientists working around various issues in planning theory and practice in the light of non-linearity, resilience, adaptivity, complexity, complexity thinking and complex adaptive systems. This time 17 abstracts and papers from scholars across the world were accepted. The abstracts of these high quality works around complexity and planning are collected into this booklet.

Cities are facing enormous changes due to the digital revolution. Information networks and flows influence significantly the way cities are used, our ability to analyze them, and the ways of organizing planning and decision making processes. The digital city is increasingly dominating the physical city, affecting the emergence and expansion of social networks, (re)defining how public space is used and changing our capability to navigate in the urban maze. Meanwhile, the technological revolution is providing us with expanding capacity to trace, compare and reflect on citizens' activities. New devices and applications allow both professionals and lay people to capture, share and create information, enriching and expanding our understanding of the city. Furthermore, the digitalization of cities provides us opportunities to reorganize planning processes to enable bottom-up processes. Where open source, 'wiki-planning' and serious gaming meet with guerilla urbanism and top down "smart cities" concepts, new governance landscapes may arise. Cities respond to this emerging new information, innovations, and their physical and institutional impact at the faster and faster rate. Consequently, feedback loops in the city evolution are shortened and we are challenged to constantly rebuild our understanding of it.

Complex theories assume systems to constantly transform bottom up in response to their dynamic environment, producing continuous evolution as a result of alternation of non-linear, chaotic and linear, steady states, making the system extremely hard to predict. Along with the emerging digitalization of cities, we appear to be approaching a less predictable state - more information is produced than we can process, which is interacting in a horizontal rather than a hierarchical way, producing unexpected, disproportional outcomes. This expanding complexity of cities, uncertainty and imperfect knowledge makes the call for complexity inspired planning approaches even more current: methods for steering are nonetheless necessary in the city. Complexity theories of cities offer concepts and ideas for enhancing our understanding of digital/spatial cities.

The aim of the meeting was to invite all complexity scholars across the disciplines to contribute on the conference themes concerning encountering evolution and empirically based methods and tools accounting for evolutionary nature of the city, taking into account the actual complexity of the city, not only the complicatedness; operational models for increasing complexity and transitions – philosophical, theoretical, analytical and institutional/governance models which help to understand, guide and support the self-organization and non-linear change in the city; enriching complexity by reflecting back from urban practices to theories of complex, adaptive systems in cities; and crises as an opportunity.

In January 15th and 16th, researchers and practitioners in architecture, urban design and planning, social sciences, and other fields related to spatial studies explore these questions. The papers are organized in sessions covering themes such as Urban evolution: rules, patterns and codes in complex cities; Complexity and planning 1: comprehensive reviews; Virtual cities meet corporeal urban space: interconnected digital/physical webs; Virtual platforms in planning - digitalization and new methods of participation; and Complexity and planning 2: computerized urban design tools and applications.

The Organizers

The Keynote:

Itzhak Benenson is Professor in the Department of Geography, Tel-Aviv University, Israel, and is the head of the Geosimulation and Spatial Analysis Lab. He has a background in mathematics and ecological modeling. Recently he has been working on the field of urban spatial simulation including agent based models and social simulation of residential segregation. Beyond that, his research interests range from socio-complexity to urban fringe dynamics. Prof. Benenson is the author of over 40 scientific articles and a book Geosimulation – automata-based modeling of urban phenomena and Advanced Geosimulation Models.

A SIMULATION MODEL BASED UPON LAND OWNERSHIP PATTERN: THE CASE OF ISTANBUL

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ABSTRACT

A sustainable way of urban living is not yet realized. One of major problems of today in global scale is fast growing cities which exploit and consume natural resources around beyond any measure just for growing for the sake of growing in several cases by neglecting ecological and economical sustainability. Unintegrated housing areas hosting different social class and income levels around metropolitan areas are triggering social discrimination and conflicts. Beyond superficial observations, permanent solutions for these complex problems is only possible by reliable researches. In practice, many estimations based upon observations are far of reflecting real dynamics of growth. However, a major investment or an urban project which is located according to a single criterion may easily affects growth directions and trends of a city negatively.

The paper is based on an ongoing research project in a fast growing suburb of İstanbul. Population of case study area is increased almost 17 % between 2008 and 2011. The major goal and target of the project is to develop a dynamic simulation model of cellular automata to predict urban growth through transformations in land ownership and land use pattern for the years of 2025 and 2050 by dynamics of land plots and land ownership. Land ownership pattern is one of major inputs to affect urban growth and is adopted here as the primary variable along others such as distance, land use and size of the area for to understand dynamics like physical size, speed of growth, growth direction.

EVOLUTIONARY THEORY OF URBAN CHANGE

Pablo COQUILLAT

ABSTRACT

After several decades of work about evolutionary theories applied with great success in topics like economic theory, anthropology, technology and of course, biology, it is possible to observe the presence of evolutionary elements in the urban realm. The fundamental difference between existing urban theories, that wrongly consider the city as 'living metabolisms' or 'organisms' instead of complex systems, is the verification of continuity between microphenomena that give rise to set of rules –formal or informal- and constitute urban objects, and their superior macro scale. Similarly as microevolutionary events in biology refers mainly to how is produced and transmitted the genetic information at a cellular scale, is observed at urban level the presence of an evolutionarily information system transmitted through 'building blocks' socially constructed. These can be either about regulations and official disposals –top-down- or by bottom-up transmission of popular knowledge. All of them constitute the informational level of urban scale, that we call microubanism. At this level can be observed evolutionary behavioral patterns in the development of urban technics, what is to say that maintains coherence at historic level, replication and diffusion of the technics. At the same time, we can identify the graphic form which resulted from the emergence, growth and stasis or substitution of the technic development as a sigmoidal curve ('S'), the same way as it is observed in the organic realm.

Furthermore, macroevolutionary theory in biology deals with species' matters, geographic location –niches-, and emergence, change and substitution of some species by others. On this basis, we propose to revise urban objects –building typologies and urban structures- that allows their phylogenetic reconstruction and, at the same time allows to understand the fundamental reasons by which some urban species survive and are perpetuated, and others perish in the evolutionary struggle. This is the macroubanistic scale. The natural selection mechanism is here conjugated with cultural selection forces, similarly to how is considered in Dual Inheritance Theories. The urban form is therefore consequence of two simultaneous process of micro- and macrouban evolution.

VIRTUAL COMMUNITIES AND PATTERNS OF SOCIAL INTERACTIONS IN 'TECH CITY'

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ABSTRACT

The impact of social media and Web 2.0 on socioeconomic behaviour in the physical space of the built environment had recently become a matter of intense debate in social sciences and human geography. This paper examines the relationship between the configurations of urban space from the perspective of 'space syntax' theory by Hillier and Hanson (1984)¹ and the configurations of social networks in Twitter, whilst focusing on the technology start-up cluster in 'Tech City' London. Where there has been arguments made for a strong correlation between twitter ties in businesses and physical distance, this research is focused on the borough scale aiming to outline a relationship between the configurations of streets and the virtual and socioeconomic attributes of start-up businesses. The paper reports a moderate relationship between indices of centrality in twitter network and its correspondent measure in street networks. In addition, the research yields global and temporal patterns of relationships with land uses and land values. The paper concludes by reflecting on how the configurations of twitter Tech-City community are present in the physical medium, where short and long links define the local and global part-whole relationship between Tech-City and other communities.

¹ Hillier, B. and Hanson, J. (1984). *The Social Logic of Space*. 1st edition Cambridge [Cambridgeshire]: Cambridge University Press.

Game Mechanics for Civic Participation in Digitized Cities

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ABSTRACT

The digitization of society not only made it possible for authorities to involve citizens in policy making - via social media, real-time monitoring, etc. -, but at the same time increased the demand from these citizens for more direct participation. Both authorities and citizens see participation as an instrument to reach a well-defined objective. In the case of a municipality, for instance, this may be generating public support for a new policy or the avoidance of juridical complaints and thus the shortening of a building process. This instrumental approach to participation is miles away from its true objective, namely to emancipate people, irrespective of personal ambitions (Arnstein, 1969). Emancipation requires that acts of civic participation are accompanied by processes of interpretation, reflection, and contextualization, or, in short, by civic learning. Gordon & Baldwin-Philippi (2014) discuss two requirements for civic learning: namely critical reflection and lateral trust. Critical reflection refers to the ability to map key actors, to analyse key dynamics, to understand the concerns of involved actors, etc. Lateral trust refers to the trust between citizens and/or local community groups. This is opposed to vertical trust, which refers to the trust of citizens in (local) authorities. The two authors argue that games are excellent platforms to support civic learning, under such conditions.

A difficulty in this respect is that developing a good game is time-consuming and thus costly. Considering that civic learning is a long-term process, typically addressing a multitude of issues and involving multiple audiences, it is clear that such a process requires a series of games, making it virtually impossible for one organization to cope with. The paper therefore proposes to no longer reason in terms of complete games, but rather in terms of game mechanics. These are methods to steer the interaction of players within and with the game world (Sicart, 2008). Think of rules and actions supporting actions such as searching, collecting, bargaining, cooperating, creating, etc. The challenge is then no longer to develop a full game addressing a given spatial issue, but rather to develop re-usable mini-games addressing single features of civic learning. These mini-games can then be combined into a 'full' game as the participatory process evolves.

The purpose of this paper is to list and describe a number of game mechanics relevant to civic learning and to touch upon a series of challenges related to the 'organic' use of such mechanics along a participatory process.

References:

Arnstein, S.R. (1969) A ladder of citizen participation. Journal of the American Institute of Planners. 35. p.216-224.

Gordon, E. and Baldwin-Philippi, J. (2014) Playful Civic Learning: Enabling Reflection and Lateral Trust in Game-based Public Participation, International Journal of Communication, 8, pp. 759–786.

Sicart, M. (2008) Defining Game Mechanics. The international journal of computer game research, 8(2).

Keywords: Civic learning, game mechanics,

PHYSICAL AND SOCIAL PLANNING: BRIDGING THE NETWORKS

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ABSTRACT

Planning, being a transversal discipline, has “absorbed” concepts and knowledge from a diversity of fields, which in turn has enriched the set of methodologies that gives it support. This characteristic also builds and consolidates the need for planning theory to guide action. The need to reflect and rethink on the complexity of the urban space has highlighted the spatial structural role of the various existing physical networks. At the same time, the importance of the social networks in urban planning – either in the planning process or in its implementation - is now clearly an object of study by itself. However, the articulation of these two groups of networks, although recognized as essential, has not been properly explored, both in methodological and in applied terms.

This paper contributes to fill this gap in two ways:

- by presenting and analyzing a case study where the bridging of physical and social planning was successfully designed and implemented.
- by reflecting on the methodological challenges of this integration, fueled by an overview of the actual scientific production on the use of network analysis in urban areas.

Finally, the paper explores the opportunities for future research in the bridging of physical and social planning through the lens of complexity theory.

PLANNING SPONTANEOUS PATTERNS

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ABSTRACT

During the last two decades the paradigm shift has moved the focus of urban planning towards the urban process and its emergent properties instead of prescribed optimal solutions. However there is much to do within the planning systems improve its capability to manage the new operational environment of continuously changing and complex urban structures.

The paper discusses about spontaneous nature of urban development and the inadequacy of current planning methodologies to cope with this spontaneity in the context of urban retail system. A dynamic urban retail model will be referred as a case study. The model aspires to integrate approaches of urban morphology and network city theory to agent based modeling techniques in order to increase understanding of cumulative effects of individual interactions. The focus of the model is on spatial and typological distribution of retail activity in urban environments. The ABM methodology implies a new level of heterogeneity compared to traditional modeling methodologies which creates new possibilities to understand bottom-up processes of urban development.

New planning instruments should be able to reveal causal relations and boundary conditions that can lead to system phase transitions. Modelling tools can work as useful instruments in discussions between private and public sectors in planning processes and particularly in situations where tensions exist between different interest groups.

As conclusion the paper discusses about the inconsistency not only between current planning methodologies and the evolutive nature of urban development but also between current planning methodologies and the aims of planning itself that require dynamic properties of the environment such as generating new economic activities and new jobs. The limitations of models, their ability (or inability) to make predictions and changes needed in planning methodologies are discussed as well.

Keywords: agent-based modelling, urban retail system, network city theory, processual planning

NEW SONGDO CITY: A CASE STUDY IN COMPLEXITY THINKING AND UBIQUITOUS URBAN DESIGN

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ABSTRACT

A new urban form has emerged amid the perfect storm of global crises: climate change, energy transition, demographic shifts (growth, aging, and urbanization), food and water insecurity, pandemics, economic stress, and ecological degradation. Known as “eco-cities,” “smart cities,” or “ubiquitous cities,” this urban form is characterized by deployments of computer technologies that promise enhanced efficiencies within the urban metabolism. This paper presents South Korea’s New Songdo City as a case study in ubiquitous design by asking if it constitutes an opportunity within the crises of the perfect storm for an emergent, resilient urbanism. A key player in building New Songdo City is Cisco Systems. The project is an important strategic transition for Cisco Systems as its move from internet “plumbing” (routers) to whole systems design. An emergent property within global capitalism, ubiquitous urban design is a driving force in reproducing markets, technology, and investment. The emergent property, however, is nested within Gale International’s (the developer) top-down, Haussmann-like approach to urban planning. It has a high modernist, linear approach to urban design that attempts to impose order on the oscillating environment of global crises. Core to the resulting tension between bottom-up and top-down approaches, is how ubiquitous design increases efficiency within modernity’s late conservation phase, and how it drives the system into a deeper state of overshoot that threatens to tip into a hard collapse. As we build more of these cities, we need to question if they are the proper strategy for weathering the perfect storm.

COMPLEX ADAPTIVE SPATIAL SYSTEMS FOR URBAN DESIGN

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ABSTRACT

In an era dominated by digital, big-data-driven enquiry, it has been claimed that data-driven science will lead to more holistic and extensive models and theories of entire complex systems rather than elements of them.

Meanwhile, in relation to cities, it has been argued that urban design has so far not developed sufficient consciousness of adaptability, and also that design and complexity have little available shared research resource.

In this context, urban design theory and practice can be enriched by considering characteristics of complex adaptive systems, related to designed environments at multiple scales. This paper seeks to develop the new concept of complex adaptive spatial systems, and illustrate a case study example, within a spatial complexity frame. The aim is to describe changing configurational patterns of urban centres, as an illustration of the potential for adaptation and evolution towards elements or components of complex adaptive spatial systems in areas, neighbourhoods, centres, public spaces, and buildings. This description can be assisted by temporal, graphical and syntactical urban analysis methods, as demonstrated here. These approaches can lead to extensions of complexity theory, and have application across the spatial sciences, but especially in spatial planning and urban analysis, design, and practice. In proposing an empirically based mix of research methods and sources, a triangulation of data is achieved, to provide a digital and real evidence base in response to recent change in certain urban areas. Dublin, Ireland is the case study city, with a report on one subunit location informing the enquiry.

Keywords: urban design, complex adaptive spatial systems, temporal methods, graphical methods, syntactical methods, centres

COMPLEXITY: EPISTEMOLOGICAL REVIEW

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ABSTRACT

Today in the science of complex cities methods are often borrowed from natural sciences to study complex phenomena in cities, in many cases using computer aided methods. However, the universality of such methods have been criticized, claiming that social systems (such as cities) are much more complicated than systems in physics or chemistry. Computer models' capability to represent the reality (if an objective one exists) has been questioned as well: Due to the inherent complex inter-linkages in urban systems, models as simplifications may provide only partial (irrelevant) knowledge, or be incapable of producing knowledge about anything else but themselves.

In the first part of the paper, epistemologically fundamental premises behind the correspondences between systems and representations are explored based on relevant literature, especially in the case of computer simulations. First of all, complexity thinking provides new insights for a novel relational and dynamic epistemological standpoint that combines aspects from relative, social scientific thinking and objective, natural-scientific orientation, enabling a dynamic knowledge formation process in which the computer aided methods are in essential role. Furthermore, an applied *scientific realism* –perspective is nested with above dual complexity epistemology, casting light on how a model which is built based on above knowledge formation can represent reality via a concept of *universal singularity*, enabling 1) correspondence between theories through (and only through) overlapping trajectories in the space of possibilities (*behavioral isomorphism*), with noteworthy serious limitations to correspondence, and 2) how simulations can represent mentioned subjective-objective reality (sufficiency of partial correspondence).

In the second part I briefly introduce a categorization of such singularities based on well-known studies in CA, and a model representing reality through such singularities. In the end limitations and implications of this philosophy are discussed.

COMPLEXITY THEORY IN THE MINDS OF PLANNING ACADEMICS: AN EXPLORATORY VIEW

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ABSTRACT

Complexity is a broad term that has been used in the recent past in a myriad of areas of human knowledge to illustrate their scale and complex nature. Complexity theory is an intellectually attractive knowledge formulation that has its potential as a new approach to many of these areas, especially in the social sciences. Cities, urban areas, urban systems, whatever one may call them, are large systems made out of subsystems, that are increasingly more complicated and complex in their very nature, both spatially and temporally, especially from a human perspective. Spatial planning, as a broad area of knowledge that is in the intersection of social and applied natural sciences, dealing with complex systems that integrate natural and man-made features has seen terms like complexity, complex, complicated, collaborative, among so many others, having an increasingly widespread use in the planning discourses all over the world. This paper will present initial results and exploratory findings about the incorporation of complexity theory and concepts in the mind-set and discourse of planning academics, using the specific cohort at the University of Manchester, in a pilot survey that aims to explore the depth to which complexity theory is being considered as a new toolkit to understand complex urban phenomena of different types.

EXPLORING A PATTERN BASED DESIGN TOOL TO INCREASE THE RESILIENCE OF RETAIL IN DIGITALISED CITIES: CONCEPTUAL GUIDELINES

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ABSTRACT

The aim of this paper is to investigate how complex systems approach and digitalisation can help us develop resilient retail networks. My claim is that partly due to an idealised view of the behaviour of the retail system as a hierarchical system, our normative planning strategies are inefficient in steering retail towards more diverse future trajectories. What they fail to see is that retail networks are complex dynamic systems - in the evolution of which we can recognise emergence, path dependence, phase transitions and unpredictability - and that retail and urban systems are profoundly nested. Therefore, rather than focussing on retail units, infrastructure or agents' behaviour separately, we would need to trace their spatial and behavioural interlinkages and (re)organisation in a recursive and adaptive interaction. We would have to focus on the bundles, lock-ins and patterns, that is, factors which together create a self-supporting cycle that sustains the viability of retail in different urban settings. In this paper I set out to explore a heuristic tool, "a pattern language of retail" - in the spirit of Christopher Alexander's seminal work. In this study patterns are distinguishable aggregations of types, uses, relations and meanings. I will focus on the behaviour and characteristics of retailers, consumers and spatial networks and the mutually reinforcing and co-evolving mechanisms between them. I will also suggest how digital tools (that e.g. allow customisation) can contribute to the emergence of diversity and new typologies. As a result of this study I will outline systemic urban design guidelines, which will lay the basis for an empiric network analysis to follow in the next phase of the study.

HOW DIGITAL TECHNOLOGIES CAN SUPPORT AN ADAPTIVE APPROACH TO PLANNING

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ABSTRACT

The development trajectories of cities include a wide variety of uncertainties that challenge urban planners in designing effective interventions. In response, ideas and concepts derived from complexity science are being explored in planning literature to find enhanced ways of dealing with these uncertainties. Complexity science urges a dynamic, time-sensitive understanding of cities. From a complexity perspective urban development trajectories are considered to be shaped by a changeable mix of drivers for change, producing both foreseen and unforeseen transformations. Therefore guiding urban transformation along a predefined path towards a fixed desired future can be considered to be ineffective and instead more adaptive planning strategies are requested. In this paper we suggest these strategies should focus on creating conditions that support a city's own capacity to adapt to changing circumstances. We explore what these conditions may comprise after which we investigate how three dimensions of the digitalization of cities can support planners in generating these conditions; big data, networking coalitions and open source planning. As such, this paper presents a research agenda on a digi-driven adaptive approach to urban planning.

UNFOLDING THE STORY: INFORMAL COMMUNITIES THRIVING BY SELF-ORGANIZATION THROUGHOUT THE EGYPTIAN REVOLUTION

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ABSTRACT

In this paper, we will attempt to unfold the role of informality in the social, political and spatial transformations associated with the recent Egyptian emancipatory movements. In that respect, we will explore the interdependency between informality and creativity within communities of Cairo. We are mainly concerned with informality as a collective political platform constituted of a spontaneous coming together at critical moments. This consequence has a strong relationship with new entities that came to action in social movements lately. These entities are the interplay between a physical world represented in symbolic public spaces, and a virtual world represented in the social media and online tools. This interplay resulted in spontaneous patterns and networks that have emerged from the bottom-up in a self-organized fashion. Along the process of this emergence, the collectives have gone through several phases of transition, through which they formed a group of creative social rules of behaviour to regulate their collective actions in critical moments. This behaviour was happening in a dynamic process of co-evolution between the physical and the virtual, shaping a new type of public sphere, which eventually resulted in a temporal stability out of a condition of revolution or chaos. This process in a later phase developed from the initial condition of self-organization to a form of self-regulated and self-managed environment. We suggest that this environment was nothing but an institutionalized outcome which was based mainly on the physical-virtual interplay. Considering this outcome we explore potential forms of governance in a world to come: A world that is highly dynamic, highly complex and rather anonymous. We assume these associate with new roles of spatial planning, with a shift in focus from functionality to identity. If our assumption is correct it will affect the planner's position within a co-evolving urban-virtual environment.

Keywords: Creativity, Future Governance, Self-organization, Social Movements, Social Media

PARTICIPATION, GOVERNANCE & RESILIENCE IN THE AGE OF BIG DATA

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ABSTRACT

This paper examines the development of future planning methodologies (ongoing research) in the age of 'big data' with emphasis on how new digital platforms can lead to greater citizen participation and motivate structural alterations to urban governance. The aim of the research is to find new ICT based tools to enable urban transformation towards equitable and resilient cities using a co-productive top-down and bottom-up approach. The primary aim of the new digital platforms will be to examine possibilities for discourse and decision-making rather than simply dissemination. The framework based on complex adaptive systems uses theories from the complexity sciences to incorporate changes over time, clear distinctions between positive and negative feedback loops, and ecological resilience theory incorporating the non-metaphoric study of cities as evolutionary systems. Prototypes of new participatory digital tools for immanent urban regeneration in Manchester, undertaken as part of a new masters (CPU: Complexity, Planning & Urbanism) at the Manchester School of Architecture in co-operation with the East Manchester Regeneration body, will be examined with regard to their potential to affect spatial change. Possibilities for greater stakeholder participation in the co-design of future cities will be set against the structural change required to organisational frameworks in planning related governance and e-governance. By combining 'gamification', original ICT development and CAS, the research aims to move to experimentation with level 4 systems in planning. New digital App's, tools and portals will be aimed at ICT enabled capacities for multi-stakeholder participation, longitudinal data capture and analysis, and development of future scenarios for discussion.

Keywords: Future Planning, Big Data, Digital Platforms, Resilience, Complex Adaptive System, Co-production

PARTICIPATORY PROCESSES AND DIGITAL PLATFORMS – TOWARDS A MORE EFFECTIVE WAY TO DEAL WITH CITIES' COMPLEXITY

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ABSTRACT

The increasing development of information technologies opened new opportunities for planning in terms of data collection, storage and management. Planners have access to more (and more in time) information which became a center piece of planning.

On the other hand, the access to information in planning contexts became a way to build citizenship and democracy through more inclusive participatory processes. Information flows became central in planning processes and very important in dealing with cities' complexity.

Digitalization of cities allows planners and decision-makers to have access to more information; it allows citizens an easier access to decision-making processes. This two-way process leads us to a main question: how does the increase of participation through digitalization improves the quality of planning processes and cities?

Looking at more than two decades of participatory budgeting in which digitalization was used to narrow the contact between citizens and governments we will focus on how digital tools contributed to shape cities as complex adaptive systems and also as complex adaptive hierarchical systems.

In order to discuss it we will focus on the Brazilian experience in using digital tools to involve and promote more inclusive decision-making processes. Using this as case study we intend to discuss the role of digital tools in dealing with complex contexts, in particular focusing on how digital tools contribute to bridge different hierarchical levels.

DIGITALIZATION OF CITIES FROM SEMIOTIC COEVOLUTIONARY PERSPECTIVE

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ABSTRACT

Graham and Marvin (2001, p.383) suggest that 'fast-developing electronic technologies and surveillance systems threaten to provide silent, invisible and pervasive networks with unprecedented potential for exclusion'. In contrast to Graham and Marvin's view, Mitchell suggests a potentially fruitful and mutually beneficial collaboration between the physical and virtual worlds.

There are both negative and positive outcomes of ICTs evolution. Walters (2011, p.215) points out that 'one of the roles of physical, place-based planning and urban design is to capitalize on the positives and offset as many negatives as possible by means of determined, activist and design-based public policies'.

In the face of these propositions, this study aims to interpret digitalization of cities from the perspective of semiotic coevolution. It examines the impacts of fast-developing changes due to the digital revolution on the physical city and social networks in two different contexts. To do so, it focuses on case examples of Amsterdam and İstanbul.

NON-LINEAR ADAPTIVE LIGHTING CONTROL - METHODS FOR DESIGNING AND CONTROLLING NON- LINEAR ADAPTIVE LIGHTING USING NETWORK- BASED AGENTS

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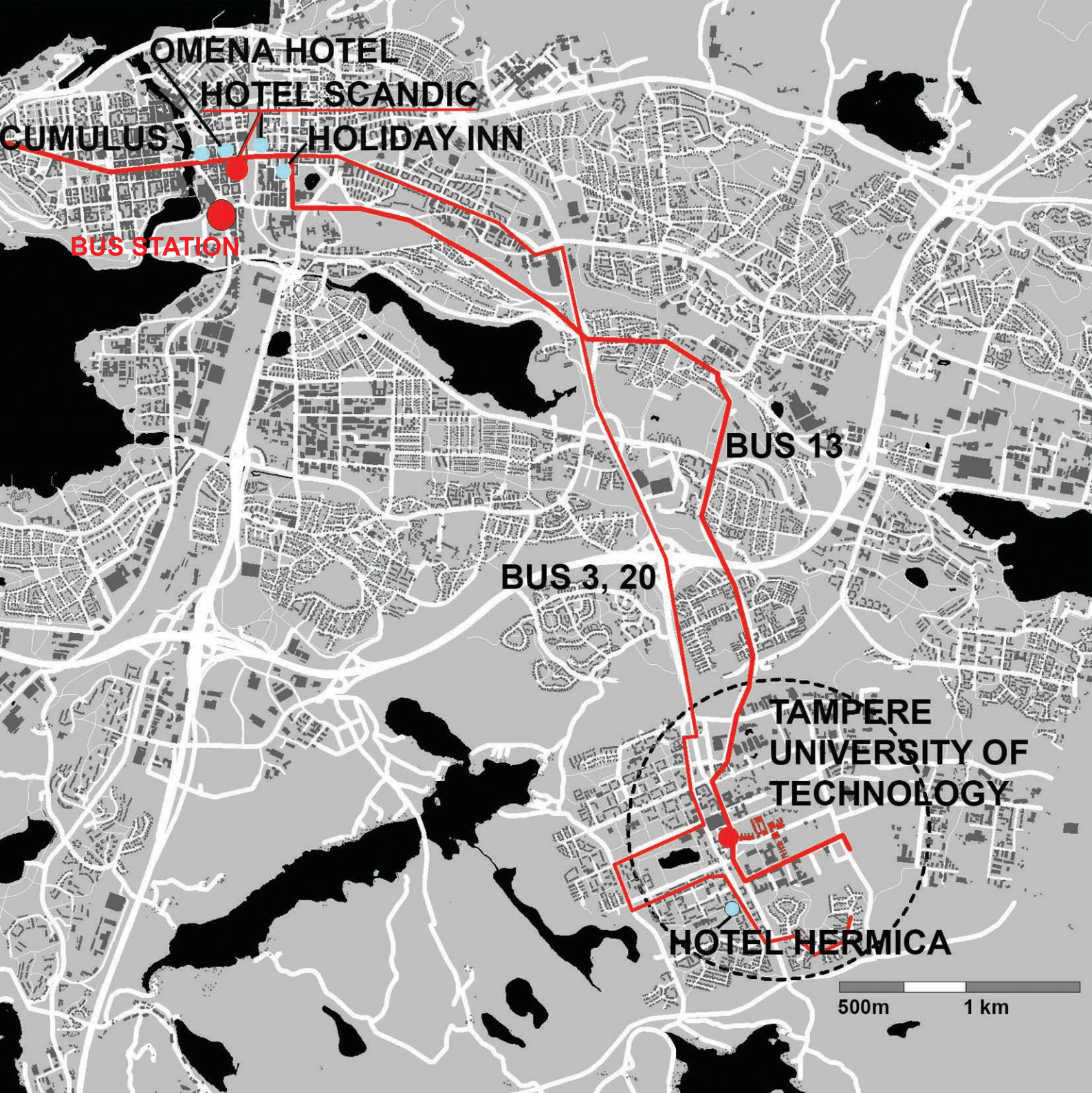
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ABSTRACT

The city is in a continuous state of change with regard to its users, flows, activities as well as its natural cycle of light and other environmental conditions. In this dynamic and complex environment, lighting is traditionally considered as a static element. The rapid development of lighting technology, especially the introduction of LED and the integration of information technology into our everyday environments, have opened up new opportunities for lighting design. Lighting solutions can adapt to the changes of the city and interact with its inhabitants via sensing technology. New design and control methods are needed to handle the complex process with multiple changing parameters and to create intelligent and adaptive lighting solutions that reflect the emergent behaviour of natural light and other natural phenomena.

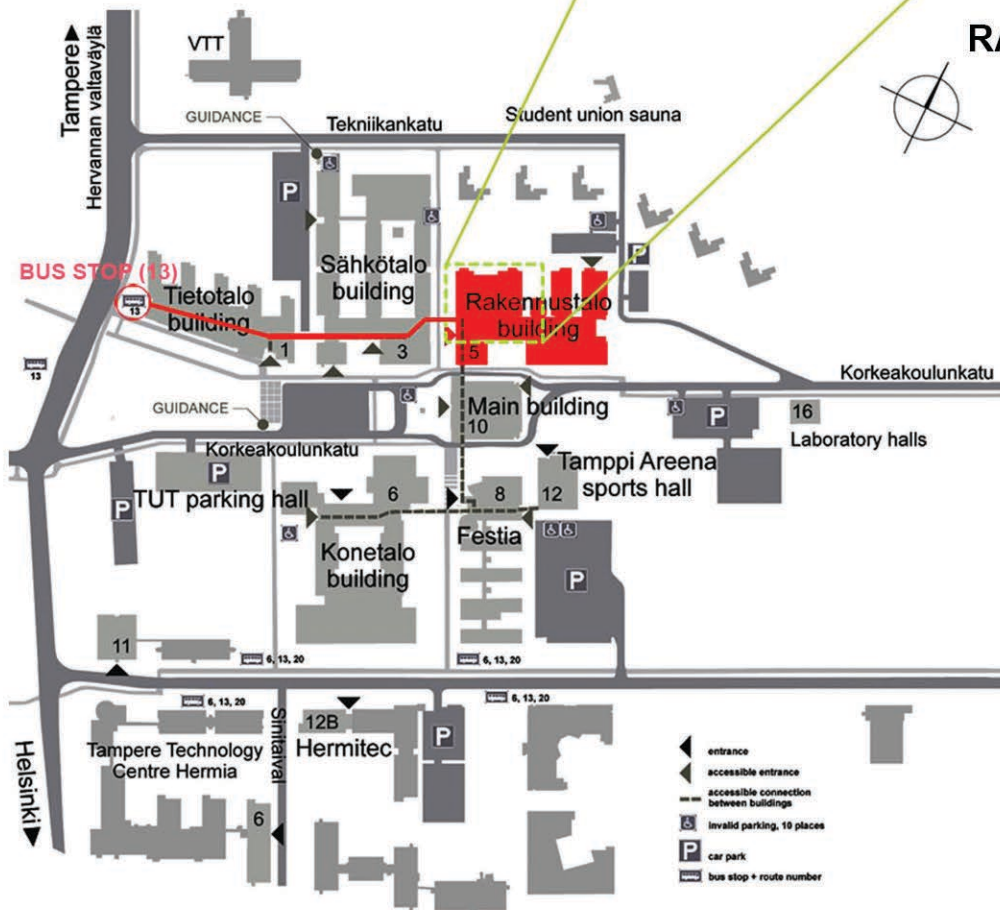
The proposed paper describes a developed novel design framework called *VirtuAUL*, which is based on the employment of network-based agents: designer controls and guides flows of information entities, or agents in a virtually defined network, where lights and sensors act as the network nodes. The agents' movement within the network topology is inherently dynamic and non-linear, and they create emergent patterns of light that are constantly changing. Information is conveyed from the real-world to the virtual through sensors, and lights reveal the composition of the virtual system. The *VirtuAUL* design tool enables easy design exploration of the non-linear adaptive system through the creation of the network topology and the manipulation of the different agent parameters. The *VirtuAUL* has been tested in two real-world lighting demos: an urban park and a clothing department of a retail store



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