EXPLORATIONS ON AN URBAN INTERVENTION MANAGMENT SYSTEM - A reflection on how to deal with urban complex systems and deliver dynamic change

MARTA ALEXANDRA GODINHO MIGUEL

Prof. Richard Laing
Dr. Quazi Mahtab Zaman

INTRODUCTION:

Concerns over how we plan and manage urban development have grown as a result of unpredictable and rapid conditional changes in postmodern cities. This chapter explores the shifting contexts of urban environments which change in an increasingly frequent and dynamic manner. These changes can be understood through the lens of real-time interactions between citizens, planning processes and designers, supported through the use of ICT. We argue for the recognition that urban change will happen in an unpredictable way, and that such interactions can be regarded as extremely valuable information to any urban manager. The approach suggested by the research concerns the scale of interventions in the building environment and the exploration of tools to facilitate public engagement and awareness of urban complexity.

Three debates emerge from these considerations. The first reflects on medias have generated a global culture which influences complex contextualised varieties (Cowen 2002) and standardised ideas of beauty (Stephens 2000). The second reflects on the emergence of new ways of experiencing the city including communication channels that contribute to urban formation and development (Laing et al 2009). The third explores the process of urban formation in relation to the human quality of life and appreciation of urban morphology (Marshall 2005). Today, we have modernism, post-modernism, classical - and all architectural styles in-between - but an argument can be made that global culture emerges from the flattening and standardization of diverse cultures by the media. Following this perspective, cultural expressions including architecture are also flattened. But are we really becoming the same? Is culture becoming flat? Is the standardization of building forms responding adequately to the way humans relate to their environment?

> Today, media influences the way we design and perceive our environment but it also changes human relations and therefore the way people use urban spaces. Modern social life emerges from the intersection between architectural forms, the urban environment, social relations and the media, being the media an environment of its own (Venturi 1966). In this intersection each domain influences another in a variety of ways, creating not only different perceptions of the environment but new dimensions of the city. (Augé 2008)

The process of urban formation and the related scale of building influence human perception of and adaptation to, the built environment. From the perspective of urban planning, one of the major lessons learned from Modernism involved the unpredictability of the future and the fact that people take time

to adjust to large-scale changes in their surroundings (Jacobs 1961; Jencks 1981; Coleman 1985; Panerai et al. 2004). Nothing is altering our current urban condition faster than the development and inclusion of new technologies and these, together with our experience of the misfortunes of top-down creationist approaches to the management of urban systems raise many questions as to how and whether we should design and plan our cities (Alfasi & Portugali 2004; Marshall 2009, 2012).

It is certain that the manner in which the public is able to interact and contribute with planning or urban areas can be supported through the use of ICT and that these tools will become more prevalent as we move forward. However, for them to be fully useful, the end results they seek and the methods they employ have to be based on an understanding of how we, as user–participants, currently understand participation and how our own creative and social engagement processes actually operate. Examples of how these methods support such interaction have been demonstrated in terms of public participation in planning and design multiple times (see, for example, Laing et al 2009).

The research reported in this chapter proposes a model to guide more informed public participations that does not foreground technology but does reveal some of the most significant human-centred issues and characteristics that the next generation of technological and social media participatory tools will need to understand. In addition, this chapter suggests that, whilst useful in terms of informing and guiding specific design processes, participatory design exercises cannot easily be applied to wider and less predictable urban contexts. Consequently, while we can use participation strategies and methodologies to support planned urban 'interventions', the interventions themselves should be regarded as being part of a dynamic system of urban change, part of which will be driven by occupants and communities whether they engage in traditional ways or through the various new forms of inclusivity offered by emerging technologies.

STRATEGIC INTERVENTION IN THE CITY:

Several researchers have considered dynamic ways to deal with the unpredictability of urban complex systems from a planning perspective (Friedman 1997; Marshall 2012; Portugali 2012), a similar number have focused on the issues of new medias and technologies. Nevertheless, this chapter draws references from human action rather than planning processes and frames *design* as one kind of human action and human actions as the building blocks of urban life, which hold a socio-cultural reality within them. It also defines these building blocks as short-term evolutionary steps that lead the way to long-term changes (Marshall 2009). A methodology is devised that gives a deeper meaning not only to design but to human actions themselves - transforming them into what this chapter defines as *strategic interventions*. This urban planning philosophy implies the nurturing of self-organizing strategies, which naturally emerge from everyday human actions in the city and which many new technologies seek to foster through the next wave of distanced interactions. It uses top-down *strategic interventions* as a tool to intentionally nudge urban development and improve human quality of life and suggests that this represents a base model that forthcoming digital models and tools need to understand.

Strategic interventions are human actions intentionally design to be utilized as a tool to nudge change and address urban problems within the modern complex urban environment. These interventions emerge from a deep understanding of a context rather than from mediated architectural solution. Complexity theory suggests that s*trategic interventions* are those that are made of the basic elements from which a complex system emerges and, therefore, have the capacity to change that system as a whole (Portugali 1997; Batty 1994; Portugali 2000; Batty 2005; Stedman 2006).

Strategic intervention can either originate from bottom-up or top-down actors or actions. Nevertheless, it is the responsibility of the top-down actors/actions to have an overview of the society and to manage

urban change adequately. Strategic interventions embrace characteristics of both top-down and bottom up approaches (Alexander 1966; Jacobs 1970; Marshall 2009; Lane 2009). They should be:

- Contextual.
- Preferably of a small scale and emergent from an awareness and respect of the complexity of a place; therefore, they should aim to disturb consolidated systems as little as possible (Marshall 2009).
- An expression of the common good (Ostrom 1990; Wilson 2011).
- Designed and applied to speed up or to change the path of development. Their intention is to break the emergent continuity of development when things are not going in the right direction and nudge urban change towards a sustainable path. (Lane et al., 2009).

Evolutionary theory suggests that *design* and *artificial selection* serve as a mediator between the user and the urban environment; they can be interpreted as both a form of adaptation (Wilson 2011) and a reproduction strategy (Marshall 2009). In light of this, the *design* is interpreted here as a tool for innovation (Verganti 2009) and as a short-term local action that can define longer term changes in the system (Loorbach 2007).

Strategic interventions in the building environment - the relevance of architecture in the urban planning process:

In line with Marshall (2009), this research considers buildings, plots and routes as the basic elements of the urban syntax, and therefore, as examples of strategic elements to manipulate urban form and character. The research also considers urban building blocks that Alexander (1977) describes as *patterns of space*. Patterns of space are the elements that translate human every day activities in the built environment. Examples of these elements could be a bus-stop, a bakery or a supermarket. Tthe basic elements of space syntax and Alexander's *patterns of space* can be used as tools to manipulate urban change as a whole. These elements can influence the way people move in the city and help to coordinate human social interactions (Bourdieu 1989). These changes will in turn influence the character of the people who use the city (Sassen 1999).

Lessons learned from Modernism discredited urban planning and shifted the focus towards the architectural object as a catalyst for urban change (Marshall 2009). Following this, fantastic and exuberant architectural design, nurtured in part by the media, have indeed brought dynamic change to places and improved quality of life. This chapter does not aim to debate the purpose of this kind of 'mediated architecture' and its apparent superficial understanding of the relevance of buildings in shaping human life. It focuses instead on the potential role of the kind of architecture that emerges from within a given context; the kind of architecture that emerges as a reaction to a contextual aim or need. Does the architecture that is a consequence of a deep understanding of the dynamic relations of different layers of complexity in a place reflect both the uniqueness of the problems present and their potential within a given context? Does that kind of architecture and design still have a role to play? Can one guide designers to reflect in such contextual complexities and give them the tools to combine a holistic understanding of spaces with aesthetics? If so, can these issues be embedded in strategies we use today and that we will use in an ever more mediated and technologically near future?

This chapter suggests that we cannot rigidly plan and design the future form of the city nor let it grow organically. We suggest the complexity and self-organizing character of complex systems as a strategy

to reflect on a new kind of urban planning and city design; one that would avoid standardizing and simplifying the urban form and uses design and architecture to guide, generate and maintain its functional complexity. The authors have designed an exploratory framework to explore ways to improve human awareness of the urban fabric as a complex and contextual system. In the future, such a framework could, and we suggest should, be available to all ICT users. It could be integrated in existing design software and eventually be used as a tool to facilitate urban planning processes.

RESEARCH APPROACH - the EIMS basic model

The research reported in this chapter led to the development of exploratory models to support professionals, including both designers and decision makers, to intervene in the city more adequately. They facilitate the design and selection of strategic interventions by guiding users to reflect on a series of complex relations between key intervention areas of urban systems. These areas are referred to here as *The Exploratory Intervention Management Systems* (EIMS). The EIMS is composed of two pragmatic models. The first model refers to an image of what a social/ urban system is at a given moment in time. The second adds dynamism to that view; it engages with notions of time and change. Both the EIMS models and the methodology to operate them emerge from the intersection of complexity theory, transition management (Loorbach 2007) and spatial planning (Roo and Rauws 2012).

The EIMS basic model is focused on the characterization of an urban complex system, along with the identification of the system's imbalances, the generation of an intention, and the exploration of strategies to act on the system. The EIMS basic model is characterized by the *system of focus* and the *system external* (Loorbach 2007). The *system of focus* is characterized by four intervention areas or the aspects of society on which one can intervene in order to improve the system or nudge the direction of urban development.
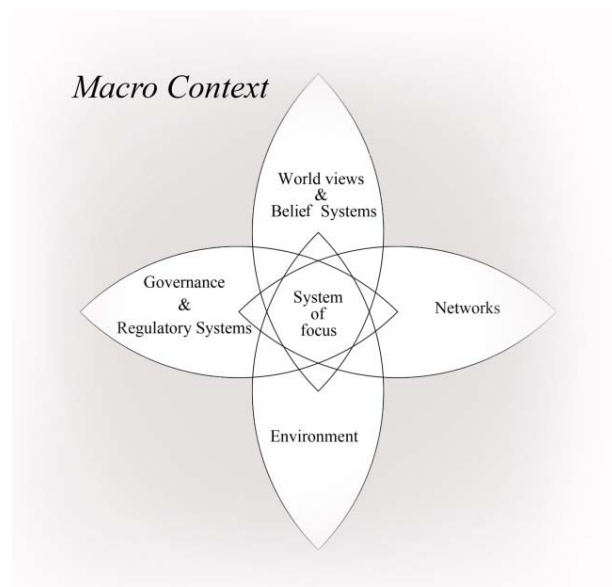

Figure 1: The EIMS basic model and its four intervention areas. It represents the four intervention areas which define the system of focus. It relates the system of focus with what is unknown about the system and its macro-context.

- World views and belief systems; religion and culture. This area represents the innate shared knowledge and memory. It is the lens through which one sees the world and judges what is right or wrong.
- Physical context or the natural and urban environment.
- Governance and regulatory systems; politics, economy and regulations. This area represents the system that allows us to exchange goods and services on a fair and ethical basis from the micro to macro scale (Ostrom 1990; Friedmann 2011).
- Communication and transportation networks. This area represents the networks that allow us to move and to exchange goods, ideas and knowledge.

All that lies around the four intervention areas is considered as the *systems external*. The external area of the model represents that condition which is not controllable, the unpredictable and the unknown. It also represents the macro-scale of the system in analyses (Loorbach 2007). The EIMS basic model defines interventions categorically by positioning them within the model's four areas of intervention and by relating them to specific subsystems. In other words, the model relates interventions to a specific time and place, to one another, to different hierarchical levels of social systems and to the system as a whole.
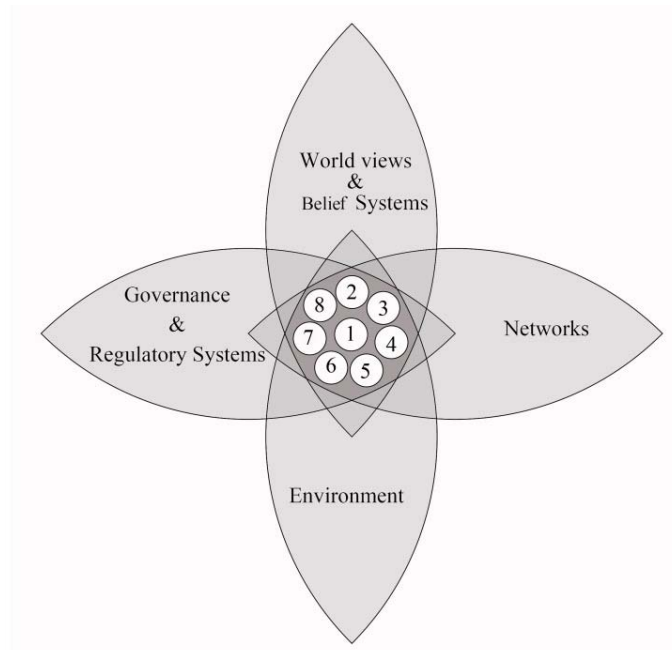

Figure 2: Relation between the heart of the system and its intervention areas (Hodgson 2011).

At the heart of the system is the intersection of all four intervention areas. The methodology used to characterize it is based on the *World System Model* and represents areas of focus relevant to human well-being (Hodgson 2011). Human well-being is contextual and fairly subjective, leading us to address the concept from the perspective of identifiable human needs. We use Hodgson's (2011) *World System Model* to identify the key human needs which will lead the user to define the system of study. These are: (1) health, (2) wealth, (3) food, (4) water, (5) security and sense of belonging, (6) shelter, (7) education and (8) energy.

In other words, the human needs represented in the heart of the model are used to:
a) Identify the problems of the system and relate those to other aspects of social organization.
b) Define the scale of the system in analysis or the group of individuals on which one aims to reflect.

This EIMS model is based on the notion of nested hierarchies. Each element of the system and the system as a whole are composed of smaller social groups whilst being part of a bigger one at the same time. The model can therefore be used to relate the system of analysis and intervention areas with both macro- and micro-levels of social organizations.
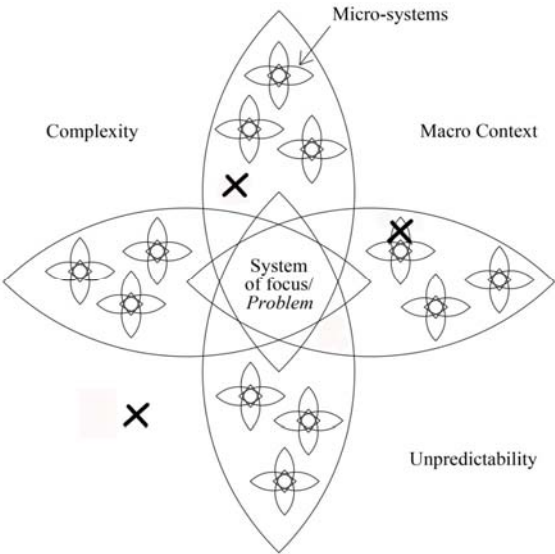

Figure 3: Relation between the heart of the system, intervention areas and different hierarchies of social organization. In addition, this image exemplifies how to define interventions within these three aspects of social organization.

Therefore, the EIMS basic model serves to define the social system available for study. It is used to define the needs and possible contributions of that system. This knowledge can be of key relevance to find a strategy to address a given problem and to formulate a vision or a common aim for the future (Loorbach 2007). The characterization of the system of focus in relation to the macro levels of the system might help to find the uniqueness of the system in relation to the whole. This can help define kinds of interventions which transform that uniqueness to a contribution that benefits the system as a whole.

The EIMS dynamic model:

The EIMS dynamic model introduces the notion of time and dynamic change to the basic model, confronting the users with the unpredictability of complex systems.
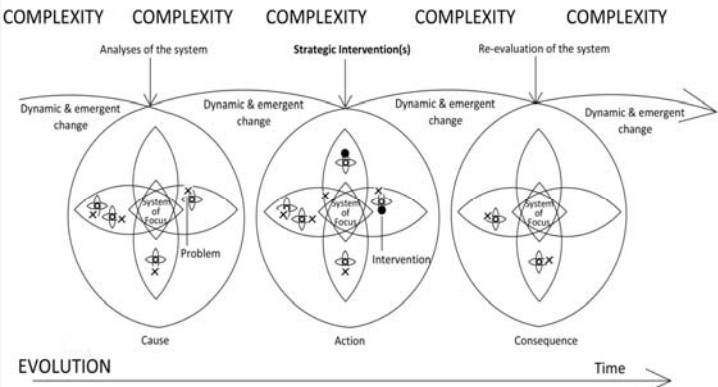

Figure 4: Relates the EIMS basic model with dynamic change. It places the operational phases of the models parallel to the process of urban and social change.

In the dynamic model, the word *complexity* refers to unpredictability. It is the domain where everything happens. *Evolution* refers to time and continuity and is represented as a background of the system. *Dynamic change* is related to the self-organization of the system. It relates to the process of natural change and to the new social realities that emerge from it. *Intervention* refers to a human action, a system of actions or a happening in relation to a specific context in a specific time.

In short, the EIMS dynamic model puts both the problems and the solutions of social systems in the contexts of complexity and uncertainty. It leads the user to engage with notions of time and the relationship between cause and unpredictable emergent effects. In combination, EIMS models were designed to influence awareness of the complexity of social systems and lead users to reflect on the responsibility implicit in each human action.

PILOT APPLICATION:

Figure 5: Union Terrace Gardens Aberdeen.

Selected case studies tested the acceptance of the design and management approach and the ability of the EIMS models to serve as a platform to support a multidisciplinary dialog on urban systems in both academic and professional situations. Studies one and two focused on the selection process of interventions and study three focused on *design* as a means to create more adequate interventions in the building environment. The research case study area was Aberdeen City Centre (Scotland), where studies one and two evolved around a public discussion related to the selection of interventions suggested in 2008 and 2009 (*Union Terrace Gardens*: *The City Square,* and, *Peacock Visual Arts' Centre*). The influence of technology and media in the perception and use of the models was tested by giving the participants different platforms to engage with the models, namely the university ODL platform, different projections of the models and print out versions. Finally, the comparison of different kinds of data led to improvements in the research exploratory tools, the EIMS models and consequently to readjust the research methodology (Sampson 2004; Cassell and Symon 2004).

Case study one

Study one tested the openness of decision makers to the use of small-scale interventions in the built environment, checking the applicability of the EIMS models as a selection tool. It also served to develop a deeper understanding of the dynamics in a real-life process of selection. Data was collected over a period of nine months of public and private discussions with key protagonists in the interventions suggested for the Union Terrace Gardens (UTG). To contextualize the role of media in the decision making process both the EIMS models and the research design proposal were presented as print out handmade drawings in opposition to the 3D renderings published in websites and blogs. During these discussions, notes were taken and semi-open interviews were conducted. Using Cullen's (1971) approach, sketches and notes were taken during several walks through Aberdeen city centre. Finally, information available on the Internet regarding the public discussion, especially reports published on the local press website, was systematically analysed.

Case study two

Study two tested the acceptance of the EIMS models in an academic context, the difficulties participants had in using them and the effectiveness of the models in guiding participants to a deeper evaluation and understanding of complex systems and their dynamics. Students participating in the workshop via the Internet were asked to apply the EIMS models in their urban context and to use the models to investigate in what way an intervention of their choice changed their living environment. In addition, data was collected from Internet discussions on the University ODL platform (Robert Gordon University).

Case study three

Study three focused on the role of architecture as a potential strategic intervention to nudge urban development and investigated how aware future architects (final year *Master of Architecture* students) were of the relations between the built environment, human condition (Arendt 1973) and human perception (Ponty 1962), and how deeply one influences the other (Wilson 2011). The study was also used to test the participants' awareness of the city as a complex open system (Portugali 2000). From the knowledge gained, we explored the extent to which EIMS models increased the students' urban and social awareness and how that shift in awareness influenced the participants' design process.

Summary of the studies' design		Study 1	Study 2	Study 3
Methodology	Qualitative research	*	*	*
	Case studies	*	*	*
Focus groups	People involved with the practice of urban planning	*		
	Academic environment		*	*
Intervention of focus: Strategic Interventions in the built environment.	Micro-intervention	*	*	
	Mid-scale intervention			*
	Macro-interventions	*	*	
Data Collection	Semi-open interviews	*		*
	Questionnaires		*	*
	Observation	*	*	*
	Document analysis	*		
	Analysis of information on the Internet	*		
	Sketches and notes	*	*	*
	Ethnography	*	*	*
Research context	Aberdeen city centre			*
	The Union Terrace Gardens – Aberdeen	*	*	
Research tools	**EIMS:** Exploratory Intervention Management System — Presented visually		*	*
	Described orally	*	*	*
	Operated by the participants		*	

Research tools

EIMS: Exploratory Intervention Management System

Aim: Improve the models and test their applicability as a tool to imagine, create and select interventions that can lead to a more sustainable and human friendlier urban environment.
Questions:
- Are the EIMS models applicable in real-life scenarios; in what way?
- Are they useful?
- What are their potentials and weaknesses?
- How can we improve them?

Table 1: Summary of the research studies' design.

	Research aims	Study 1	Study 2	Study 3
General	Develop a deeper understanding of the dynamics in the design process of interventions in the built environment.			*
	Develop a deeper understanding of the dynamics in a real-life process of selecting interventions in the built environment.	*		
	Develop a deeper understanding of Aberdeen's urban context and its built environment.	*		
	Develop a deeper understanding of the relations and dynamics between top-down and bottom-up forces in Aberdeen; Explore the influence individual participants and organisations have in the decision process and in the decision product.	*		
	Develop an exploratory theory for sustainable urban management. Gather contributions from the participants that might lead to new theoretical approaches.	*	*	*
	Explore the participants' general innate awareness of the city as a complex and unpredictable system.	*	*	*
	Test the awareness of the change an intervention in the building environment can bring to the overall character and dynamics of the city.	*	*	*
EIMS	Test potential of the models to self-educate users and stimulate people to think in complex systems from a holistic perspective.	*	*	*
	Test the capacity of the models to be used as a common language and as a framework to share information between all parties involved in the design and selection of interventions in the built environment.	*		
	Explore to what extent the models are able to help people to be aware of the unpredictable character of complex systems	*	*	*
	Test the applicability of the EIMS models as a framework or a selection tool; Test the capacity of the models to improve the selection process of interventions.	*	*	
	Test the applicability of the EIMS models as a framework or a design tool;			*

	Test the capacity of the models to improve the adequacy of design concepts, the quality of the design forms and the design process of interventions.			
	Test the clarity of the models and identify the difficulties participants would have in operating them.		*	
	Investigate if a more holistic awareness of urban complex systems influence or adds complexity to the design process and their design object.			*

Table 2: Relation between the research aims and the studies' explorations.

RESULTS AND OBSERVATIONS FROM THE APPLICATION

From a comparison of the findings which emerged from studies one and two, we can conclude that the EIMS models were generally well accepted by the research participants. The models were efficient in leading participants to engage with concepts of complex systems, unpredictability, dynamic change, nested hierarchies and others, and that triggered relevant discussions about the problems Aberdeen city is facing today. In addition, they helped participants to define their own intentions and to identify key urban problems. They were efficient in helping to describe the character and the current state of urban complex systems and they helped to identify relevant sub-systems. The models helped the participants to relate their action to micro and macro-levels of social organization, to different aspects of urban life and different intervention areas.

One key finding is the fact that the participants who had to use the models to make a visual representation of an urban system engaged with a deeper level of analysis than the participants who were asked to just use the model as a framework for thinking. The challenges encountered by the participants who operated the models were used to improve them as well as to clearly establish a methodology to operate them. From studies one and two, we concluded that top-down protagonists perceived big-scale mediated interventions to be more effective. In addition, some argued that the risks related to them were necessary and worth taking (Huxtable 1984). Within the current research, *The Union Terrace Gardens Friends'* organization defended most of the small scale interventions suggested by this study.

Study one demonstrated that the EIMS models were inappropriate to help with the selection of interventions. They did not help to establish a common strategy and cooperation between different groups of participants. And, moving forward, with newer models in the future, participants should be asked to actively operate the models, and the models should be introduced in the first stages of the selection process. Furthermore, the study showed that ideals and preconceptions are very difficult to change and that they play a key role in the decision making process (Koprowski 1983). Beliefs and personal convictions influenced both the participants' preferences and actions – issues that will be relevant whatever the digital, analogue or manual platform used. This study demonstrated that ideals and visions are indeed both based on emotional and rational perspectives of the world. Together, they shape decisions and therefore the interventions we make in the environment (Morse 2006); they become the intentions that shape human interventions.

Study one also indicated that common ideals and a vision induce human cooperation and self-organization. As in living systems, people and organizations self-organized within and across groups to form alliances to defend their common beliefs and intentions for the city (Greenleaf 1977; Morgan 1997; Knowles 2002; Sheard and Kakabadse 2007; Polzer and Kwan 2012)., Jaina (2004) argues that coalitions are formed not only because of similar world views and meaning systems as Duck (1994) proposes but also according to personal judgments of the competence needed to complete a given task. Interestingly, bottom-down participants formed alliances with organizations because they believed they were more capable of opposing unwanted top-down pressures in that manner – a dynamic witnessed through various social movements in recent years in which online social media has payed a fundamental role. The studies suggest that *image* and media do indeed play a role in the decision-making process – a finding in agreement with previous studies by the authors, which explored the use of ICT and visualisation with design participation (Conniff et al. 2010).

All participants, both from top-down and bottom-up perspectives defended their ideas around 3D images of the projects, as made available on the Internet and other media, but did not provide any other in-depth information of the projects themselves. This raises the question of whether the basis for the selection of interventions were the design features or the quality of the 3D images presented and the influence of the media in the decision making process – an issues of fundamental import if these particpatory exercises are to be carried out on digital platforms in the future. The fact that the system of interventions suggested by this research was presented in the form of sketch plans and sections and did not leave the meeting rooms, might have contributed to the fact that it was not considered seriously next to 3D visualisations broadcasted on other proposals (Daft and Lengel 1986; Suh and Lee 2005; Daugherty, Li and Biocca 2008; Landa et al. 2013).

The context within which discussion and debate take place has been observed in previous studies as being important to the progress of designs, and the interaction between participants. The use of ICT to facilitate such interaction, including across disciplines and areas of expertise is also vitally important, (Leon et al 2014). It is important to bring attention to the fact that media was not able to influence the general public emotional relation with the site. It misled the perception of space and therefore influenced the selection process. Nevertheless media did not influence most participants' expectations for the site.

Architecture students participating in study three suggested that the theoretical framework enabled them to relate their design projects to specific contexts and their problems. In addition, it helped them to be more aware of the human aspect of things (Rapoport 1977) rather than focusing exclusively on aesthetics and technical issues. This opens the door for the possible alignment between the mediated architecture focused on the image of the design object and the so called 'social architecture' focused on the understanding of the relationship between human life and the building environment.

CONCLUDING REMARKS:

Morse (2006) describes how emotional-self awareness provides a way to avoid the 'bounded awareness' phenomena, which causes people to ignore relevant information when making decisions (Bazerman and Chugh 2006). The EIMS models addresses such problems by encouraging participants to reflect on their emotions and justify what they consider to be a rational choice. They also helped

participants to formulate questions and look at problems from different perspective, significantly reducing the possibility of overlooking important information (Hammond, Keeney and Raiffa 2006). This conclusion encourages further explorations on how to adapt the EIMS models to ICT which, if current trends continue, will be the basis of the sites and platforms upon which similar exercise in participation and design will take place. EIMS models could then be used to inform the decisions through real-time interaction between citizens, planning processes and designers that these platforms offer. Indeed, we would go one step further and suggest that the EIMS model has to be at the heart of the tools developed on these platforms.

In exploring an interdisciplinary approach based in human action to investigate alternative ways urban systems may be managed then, the contribution of this research rests on the challenges in the interactions and inter-relationships between disciplines and the underlying lessons it offers in the development of new media platforms for participation and design. It is suggested that future work should aim to further refocus urban theories and disciplines, and point to the importance of the interdisciplinary approaches to the study of cities and urban development on these platforms. In addition, it is argued that ICT can build on the human focus of these models and , potentially, bring more dynamism to urban planning without necessarily compromise adequacy of human intervention.

REFERENCES

Alexander, C. (1966), 'The City is not a Tree', *Design* 206, pp. 46-55.

Alexander, C. (1977), *A Pattern Language,* New York: Oxford University.

Alfasi, N. and Portugali, J. (2004), 'Planning Just-in-Time versus Planning Just-in-Case', *Cities*, 21 (1), pp. 29-39.

Arendt, H. (1998 [1973]). *The Human Condition*, 2nd ed., Chicago & London: The University of Chicago Press.

Augé, M. (2008), *Non-places: An Introduction to Supermodernity,* London: Verso.

Batty, M. (1994), *Fractal Cities,* London: Academic press.

Batty, M. (2005). *Understanding Cities with Cellular Automata, Agent based models, and Fractals*, Cambridge: MIT.

Bazerman, M.H. and Chugh, D. (2006), 'Decisions Without Blinders. *Harvard Business Review,* 84, pp, 88-97.

Blizzard, J.L. and Klotz, L.E. (2012), A Framework for Sustainable Whole Systems Design, *Design Studies,* 33(5), pp. 456-479.

Bourdieu, P. (1989), 'Social space and symbolic power', *Sociological Theory*, 7(1), pp. 14–25.

Coleman, A.M. (1985), *Utopia on Trial: Vision and reality on Planned Housing*, London: H. Shipman.

Cassell, C. and Symon, G. (2004). 'Promoting new research practices in organizational research', In C. Cassell and G. Symon (eds.), *Essential Guide to Qualitative Methods in Organizational Research*, Los Angeles, London, New Delhi, Singapore, Washington DC: Sage.

Conniff, A., Craig, T., Laing, R. and Galan-Diaz, C. (2010), 'A Comparison of Active Navigation and Passive Observation of Desktop Models of Future Built Environments', *Design Studies,* 31(5), pp. 419-438.

Cowen, T. (2002), *Creative Destruction - How Globalization is Changing the World's Cultures*, New Jersey: Princeton university Press.

Cullen, G. (1971), *The Concise Townscape*, New York: Architectural Press.

Daft, R. L. and Lengel, R.H. (1986), 'Organizational Information Requirements, Media Richness and Structural Design'. *Management Science,* 32(5), pp. 554-571.

Daugherty, T., Li, H. and Biocca. F. (2008), 'Consumer Learning and the Effects of Virtual Experience Relative to Indirect and Direct Product Experience', *Psychology and Marketing,* 25(7), pp. 568-586.

Duck, S. (1994), *Meaningful Relationships*, London: Sage Publications.

Friedmann, J. (1997), 'Design for Change: Flexible Planning Strategies for the 1990s and Beyond', *Journal of Urban Design*, 2(3), pp. 277-295.

Friedmann, J. (2011), *Insurgencies: Essays in Planning Theory*, London and New York: Routledge & The Royal Town Planning institute.

Greenleaf, R. K. (1977), *Servant Leadership: A Journey into the Nature of Legitimate Power and Greatness*, New York: Paulist Press.

Hammond, J. S., Keeney, R.L. and Raiffa, H. (2006), 'The Hidden Traps in Decision Making', *Harvard Business Review,* 76(5), pp. 47-8.

Hodgson, A. (2011), *Ready for Anything*, United Kingdom: Triarchy Press.

Huxtable, A.L. (1984), *The Tall Building Artistically Reconsidered: the Search for a Skyscraper Style*, New York: Pantheon.

Jacobs, Jane. (1961), *The Death and Life of Great American Cities*, 2nd ed., England: Penguin Books.

Jacobs, Jane. (1970), *The Economy of Cities*, New York: Vintage Books.

Jacob, S. (2011), 'Beyond the Flatline', *Architectural Design,* 81(5), pp. 24-31.

Jaina, J. and Tyson, S. (2004), 'Psychological Similarity in Work-Based Relationships and the Development of Self-Efficiency Beliefs', *Human Relations,* 57, pp. 275-96.

Jencks. C. (1981), *The Language of Postmodern Architecture*, 3rd ed., London: Academy Editions.

Knowles, R.N. (2002). *The Leadership Dance: Pathways to Extraordinary Organisational Effectiveness*, Niagara Falls, NY: The Centre for Self-Organizing Leadership.

Koprowski, E. (1983). 'Cultural Myths: Clues to Effective Management', *Organizational Dynamics, 26,* pp. 39-51.

Laing, R., Davies, A-M, Miller, D, Conniff, A, Scott, S and Morrice, J. (2009), 'The Application of Visual Environmental Economics in the Study of Public Preference and Urban Greenspace, *Environment and Planning B: Planning and Design,* 36, pp. 355-375.

van der Land, S., Schouten, A.P., Feldberg, F., van den Hoof, B., and Huysman, M. (2013), 'Lost in Space? Cognitive Fit and Cognitive Load in 3D Virtual Environments', *Computers in Human Behavior,* 29, pp: 1054-1064.

Lane, D., Maxfield, R., Read, D. and vam der Leeuw, S. (2009). 'From Population to Organization Thinking', in D. Lane, D. Pumain, S.E. van der Leeuw, and G. West (eds.), *Complexity Perspectives in Innovation and Social Change*, Springer, 7, pp, 11-42.

Leon, M., Laing, R., Malins, J. and Salman, H. (2014), 'Development and Testing of a Design Protocol for Computer Mediated Multidisciplinary Collaboration during the Concept Stages with Application to the Built Environment', *Procedia Environmental Sciences,* 22, pp. 108-119.

Loorbach, D., (2007), *Transition Management - New Mode of Governance for Sustainable Development*, Utrecht: International Books.

van Leeuwen, T. (1992), *The Skyward Trend of Thought,* Cambridge, MA: MIT Press.

Markus, T. (1993), *Buildings and Power*, London: Routledge.

Marshall, S. (2009), *Cities Design and Evolution*, London and New York: Routledge.

Marshall, S. (2012), 'Planning, Design and the complexity of Cities', in J. Portugali, H. Meyer, E. Stolk and E. Tan (eds.), *Complexity Theories of Cities Have Come of Age*, London and New York: Springer.

Mikellides, B. (ed.), (1980), *Architecture for People. Explorations in a New Humane Environment*, London: Studio Vista.

Miller, J.G. (1978), *Living Systems*, New York: McGraw-Hill.

Morgan, G. (1997), *Images of Organisations*, London: Sage.

Morse, G. (2006), 'Decisions and Desire', *Harvard Business Review,* 84, pp. 42-51.

Ostrom, E., (1990), *Governing the Commons: The Evolution of Institutions for Collective Action,* Cambridge UK, USA, Australia, Spain, South Africa: University Press.

Panerai, P., Depaule, J.C., Castex, J., and Samuels, I. (2004). *Urban Forms: The Death and Life of the Urban Block,* Oxford: Architectural Press.

Polzer, J. T. and Kwan, L. B. (2012), 'When Identities, Interests, and Information Collide: How Subgroups Create Hidden Profiles in Teams', in M. Neale and E. Mannix (eds.), *Looking Back, Moving Forward: A Review of Group and Team-Based Research: Research on Managing Groups and Teams*, UK: Emerald Group Publishing Limited, 15, pp. 359-381.

Ponty, M.M. (1962), *Phenomenology of Perception*, London and New York: Routledge & Kegan Paul.

Portugali, J. (1997), 'Self-Organizing cities', *Futures*, 29, pp. 353-380.

Portugali, J. (2000), *Self-Organization and the City*, Berlin: Springer-Verlag.

Portugali, J. (2012), "Complexity Theories of Cities: Implications to Urban Planning", in J. Portugali, H. Meyer, E. Stolk and E. Tan (eds.), *Complexity Theories of Cities Have Come to Age*, London and New York: Springer, pp. 221-244.

Rapoport, A. (1977), *Human Aspects of Urban Form*, Oxford: Pergamon Press.

de Roo, G.. and Rauws, W. (2012), 'Positioning Planning in the word of Order, Chaos and Complexity: Perspectives, Behaviour and Interventions in a Non-linear Environment', in J. Portugali, H. Meyer, E. Stolk and E. Tan (eds.), *Complexity Theories of Cities Have Come to Age*, London and New York: Springer, pp: 207-229.

Sampson, H. (2004), 'Navigating the Waves: The Usefulness of a Pilot in Qualitative Research', *Qualitative Research*, 4(3), pp, 383-402.

Sassen, S. (1999). *Guests and Aliens*, New York: New Press.

Sheard, A.G. and Kakabadse, A.P. (2007), 'A Role-Based Perspective on Leadership Decision Taking', *Journal of Management Development,* 26(6), pp. 520-622.

Stedman, J. P. (2006), 'Why are most buildings rectangular?', *Architectural Research Quarterly,*10(2), pp. 119-130.

Stephens, S. (2000), 'The Difficulty of Beauty (Aesthetics in Architecture)', *Architectural Record,* 11, pp. 95-99.

Suh, K. S. and Lee, Y. E. (2005) 'Effects of Virtual Reality on Consumer Learning: An Empirical Investigation', *MIS Quarterly*, 29(4), pp. 673-697.

Venturi, R. (1966), *Complexity and Contradiction in Architecture,* Museum of Modern Art, New York.

Verganti, R., (2009), *DesignDriven Innovation*, Boston: Harvard Business Press.

Wilson, D.S. (2011), *The Neighbourhood Project*, New York, Boston, London: Little, Brown and Company.