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Return to 1975 and Some Aspects of the Built Environment Analysis Discipline & Methodology The Thiberg Triangle and Beyond (Revisiting the ideas from 1999)

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Abstract. Each reader will most probably come into this topic with hers/his professional background, different perceptions and view of things, understandings, expectations, etc. Given the incredible depth of the subject, but at the same time wishing to be approachable and ‘user-friendly’ to the reader, the paper will demonstrate a particular way of seeing the built environment. What will come out between and behind lines is multidisciplinary and systemic view as a *conditio sine qua non* of viewing this field as well as an approach, which tries to integrate different issues. The paper will also try to debate, bring out and question things as well as problematize around these issues. Its purpose is not to bring solutions, give answers or put up new theories or models. It will nonetheless have to give some suggestions and try to look at some things differently, especially where some postulates, definitions and outlook on things are fuzzy, hazy or unclear and based on false premises and undefined concepts. The main focus is to show that “faulty” models (defective and contradictory concept and categories and prepositions) can have disastrous consequences for the development of a certain discipline. As Norman Crowe pointed, ‘such is the nature of this subject that any discussion of it can be neither complete nor conclusively definitive.

Keywords. Built Environment; Cities; Built Environment Analysis; People; Society; Models; Conceptual Framework; Discipline

“The Built Environment Discipline”

The Built Environment is a holistic, generic, complex and systematic discipline that encompasses a comparative and multidisciplinary approach in a variety of levels. What makes the built environment so unique is its diversity and the spread over a range of areas and fields. It is not just the main streams of architecture, surveying, planning, building and civil engineering that are the focus of interest. It is also the spin-offs such as regional and town planning, landscape architecture, industrial design, building and construction management, housing, urban design, governance, geography, applied art, environmental planning and management, interior architecture as well as subjects like applied aesthetics, development studies and environmental psychology.

Built environment encompasses many aspects of the urban infrastructure systems around us: water supply, sewage and waste disposal systems, roads and bridges and all types of buildings, facilities and services above and below ground. It also includes the internal

architectural environments, such as interior design. Another important aspect is the management of infrastructure and the planning, design, evaluation, implementation and maintenance of urban as well as rural environments. And last but not least the relation between the close environments (our neighborhoods), changes in society and us human beings as the users of that built environment.

For the sole purpose of this paper we will focus and problematize on some aspects of the analysis of the built environment methodology as well as posit that Thiberg's Triangle is a tautological one. In other words, the analysis will point to all the relevant components that must go into such a complex discipline. When analyzing the various aspects of the built environment and studying these complex and interrelated issues we need to ask important questions. Built Environment discipline is of crucial importance for urban and community development, buildings and facilities, infrastructure, open space, relations to the natural environment, correlations and networks between the buildings and the users, etc.

As Amos Rapoport points out, 'built environments do not just make distinctions among various places clearly visible, but they also communicate and disseminate information about the different forms of order in society – spatial, social, economic, temporal and other.'¹ The entire built environment is essentially social and cultural product. It results from social need among other things and accommodates a variety of functions, economic, political, social, religious and cultural. Its appearance, location and form are governed by physical factors as well as by society's ideas, its forms of economic and social organization, its distribution of resources and authorities, its activities, and the beliefs and values which prevail at any one period of time.² As changes in societies occur, so does the built environment change. The built environment discipline (practice, education, research and implementation) should thereby make a vital contribution to the quality of life of all members of society and the economic prosperity of the nation, now and in the coming future.

Creative Inquiries and Open Questions: “The Thiberg Triangle”

Sven Thiberg has discussed the discipline of built environment at length. His specific focus was on the *Building Functions Analysis* or what became later known as *Built Environment Analysis*. He has defined it as a 'discipline that deals with the relations between people, society and built environment with the aim of developing knowledge for physical planning and design of the built environment.' This has been illustrated by his 1975 classical triangle of *people*, *society* and *local environment*.³ He places the subject into a triangular relation of three mentioned aspects. The local environment was substituted in the later days by the *built environment*. People, according to Thiberg, form the environment they live in and are also formed by it. The environment is framed by society and in turn gives physical form to that society, while the human beings form the society and are the product of that society.⁴

This conceptual model was a starting point for further problematization of the subject. Rolf Johansson has been one of the few people who have tried to develop the model, namely presenting a contextual analysis model in evaluating residential housing in use. He understands the three concepts of the triangle as independent of place and general, i.e. abstract and comprehensive (overall-overarching). This paper leads to the whole idea of the triangle being so abstract, out of any context and useless. Unfortunately, the development in Johansson's work did not go further than the micro-built level.⁵

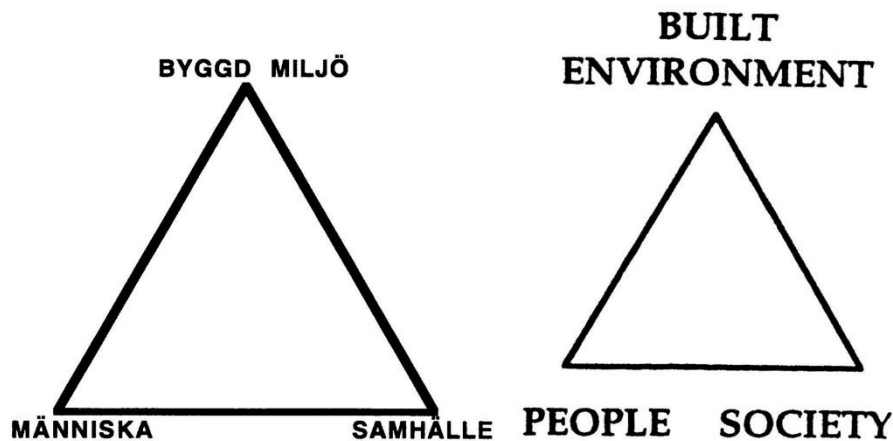


Fig. 1 ‘The Thiberg Triangle’. Originally postulated in 1975 (reprinted in 1982), graphically represented in 1995.

(Figures used from Johansson, 1997 and Svane, 1999; please see endnotes for full reference)

Coming back to the very idea of the triangle and the relation between people, society and the built environment, we need to analyze certain aspects of it more in detail. Thiberg states: ‘the triangle is in constant change/movement and that is why it must be studied in continuous analyses.’⁶ How can a triangle change if it represents a rigid geometric form? It seems that this whole notion is a *contradictio in adjecto*. In fact, triangle is a very archaic representational model, and in Thiberg’s definition of the Built Environment it is also a tautological one. Yet, if we are to accept its postulates and theses, the triangle disappears as a representational model. In short, the whole thing has to be looked at in a much more complex way. Thiberg further claims that the ‘triangle is both an explanation model and a way to problematize, as well as thought model and a symbolic representation’.⁷

What does this all mean? Does it have to do with a basis for a grounded theory or a conceptual analysis? How can we deal with such a simplified scheme? If it is really a model, is it a mapping tool or representational diagram? Or is it maybe a formal system? In any case it is a strange triangle: it should continuously change its shape, dimensions, angles, etc. Therefore, it can be used as a ‘model’ either for trivial talk about trivial things, or abstract talk about abstract things without any pragmatic value whatsoever. The problem is that all those notions should be used and looked upon in very complex interrelationships, interdependencies, etc. What is the meaning of the notion ‘model’ in this context and what the concept ‘platform’ is supposed to designate?

The relations like society vs. people, people vs. built environment and society vs. built environment with all their regularities, law-like connections, specific aspects, etc., do not determine a unique model. The thing is that the interpretation of terms and relations with all their complex aspects in one or another conceptual framework can give us a ground for a model of the domain or the entities whose properties and relations we want to describe. That is why the conceptual and semantic clarifications of the notions, terms, and definitions we employ are crucial at the very beginning of such a discourse. We should know precisely what we mean by model, ‘platform’, etc., as well as what kind of explanations and deductions we expect to make and why we can expect them.

As to the meaning of models themselves, some preliminary clarifications are needed for we are faced with various questions. Here are some of them. If model serves to help us understand what our explanation is like, by providing precisely such a model of explanation, then this

should suggest the following: Models are not simply pictures or mechanical toys (or tools) that help us just to ‘feel’ the sense of description, or just to get the general ‘impression’. The model may be highly abstract and may involve non-pictorial relations (like in the theory of systems). A model may, in this sense, represent a theoretical ‘picture’ and not simply a mechanical one. The feature of models seems to be that they are expendable and that we adopt them as we need them and drop them when they fail to explain.⁸ That is why we should not forget for a single moment that all our investigations, our analysis, etc. are understood in terms of some conceptual framework or some model of the things we are investigating.

If the starting points, or basic premises and foundations are not well defined, or even misleading, the whole construction that follows – the built-up structure that we form in our discourse – will later suffer from unavoidable problems. Moreover, we need to look into the category frameworks and methodologies more carefully. If we are to define things within a geometrical structure, such as a triangle or a square or a pentagon we need to know a little bit more about things such as mapping, formal systems, representations, i.e. mathematical and geometrical models that we are dealing with. If there is an attempt to create an overall picture, a model representation of the ‘world’, theory, discipline, society, built environment, etc., one has to look again on a number of things. In our case at very different categories: development and culture of cities, history, tradition, customs, values, art and art forms, aesthetics, technology, innovations, capital, market, profit, state, government, society, social groups, etc. In a way we are faced here, so to speak, with a system of a systems, with a set of subsets, with a complex of complexes. If we take for granted that the main elements of the built environment constitute a kind of discipline within social sciences (according to Thiberg, the whole issue ‘started as a natural science and has its main focus, emphasis in social sciences’) there are some important issues, which should be pointed out from the start. We can give here only a few hints without going into the matter in more detail. Due to continuous changes in society, relations of dependence of the three notions (people, society and the environment) may profoundly be modified as a consequence in the development in various areas and changes in society in general. Triangle as static, archaic, Euclidean model cannot reflect these changes and processes in a proper manner.

One of difficulties confronting the *social sciences* has its source in the fact that the human beings frequently modify their *habitual modes of social behavior* as a consequence of acquiring fresh knowledge about the events in which they are participating or the society of which they are members. Another difficulty concerns the *validity of conclusions* reached in social inquiry.⁹ Particular problem concerns *individuals* vs. *society*. The term human beings could be accounted as an individual one since it is predicated of individual human beings, but nevertheless it could also be accounted as collective term on the ground that it involves reference to forms of activity characterized by the behavior of the groups of human individuals. However, there are *no firm principles* of deciding between these alternatives nor there is much prospects of developing these rules.¹⁰ Especially important aspect that one has to keep in mind is the problem confronting the social scientists in importing their own values into the analysis of social phenomena, the so-called *value judgment*. The bottom line is that we need to clear out the problems that confront us in the social sciences and see what we can apply and what not.

An aspect, which could be of considerable interest for this whole analysis deals with the problem of the relationship between technology, capital and society (history and philosophy of technology included). Since technology is one important factor, especially today, in the development of the built environment, it would be appropriate to give a brief comment on this issue. Technology is very often cited as one, if not the most important forces behind the changes and rapid transformations of society’s, cultural values, habits, customs, ways and quality of life.

Invention and new technologies play central roles in these changes, but their importance must be extrapolated to a broader social context.¹¹ This in turn connects and refers to economic forces and systems, questions of capital, profits, markets, investments, companies, etc. If we take the example of economic system, namely capital as an important component within the built environment, then the whole outlook on the triangle and built environment should be founded in a definite historical totality. More precisely, the whole problem of built environment could be shifted to the issues of capital and modern society - to all aspects of the analysis of capital as abstract totality and relations and place of man in this totality. Jurgen Habermas has looked upon these issues in depth. He draws special attention to the concept of new technologies and the way they can be understood more profoundly. He analyses the very concept of capital and how it is related to technology.¹²

Most of all existing and all possible knowledge and skills, all materials and potentials are set to work in the 'system of overall usefulness' with one clear purpose – endless production of abstract value - capital and profit. Thereby, systematic relationship between science and technology in production process is established and capital makes 'innovations' and inventions as principle on which rests its reproduction.¹³

Complex Outlooks on the Aspects of Possible Built Environment Discipline

Tom Bartuska and Gerald Young define the built environment as a set of interrelated characteristics: It is everything humanly made, arranged and maintained fulfilling all human needs, desires and values. Built Environment mediates the overall environment with results that affect the environmental context.¹⁴ Authors select a group of components to describe more easily the variety and wide scope of the built environment:

1. Products (generally created to extend human capacity to produce specific tasks);
2. Interiors (generally created to enhance activities and mediate external factors);
3. Structures (generally combining related activities into composite structures)
4. Landscapes (generally combining both natural and built environments)
5. Cities (generally grouping of structures and landscapes of varying sizes and complexities)
6. Regions (generally grouping of cities and landscapes of varying sizes and complexities), and 7. Earth (all of the above).¹⁵ (Fig. 2)

They are connected layers or levels of varying scale interwoven together to form the built environment. The interrelationship of each component to each of the others and the content of each component is made from a combination of smaller components where in turn each component is a part of more complex components. Bartuska and Young call this approach *content-component-context hierarchy*.¹⁶ Great importance is given to inter-disciplinary approaches and methods in dealing with the built environment. Drawing attention to the complexity and interrelations of issues in the built environment, special emphasis is given to the built environment as a holistic and integrated process.

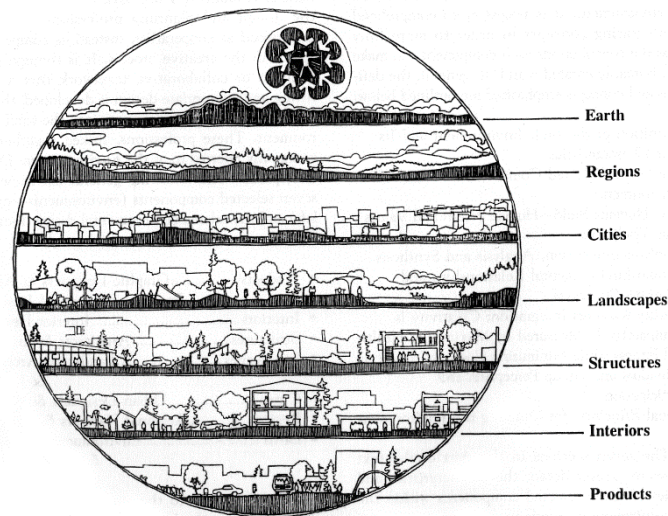


Fig. 2 The Layers of the Built Environment. Composite Symbol Diagram. (by S. Recken and J. Singelton. Conceptual idea by Bartuska and Young).

When one is faced with a subject like the built environment and the challenge to understand it, the most common attitude streams towards an individual, personal and value-related approach. Because of its complexity the simplified and reductionist approach is to focus on one or at most a couple of aspects of the topic. It can, only in the short run, prove to be a good choice in the sense of delimiting oneself to a certain issue, topic or aspect. On the long run it could prove to be a ‘dangerous’ approach due to ignorance of subject’s importance and its more comprehensive characteristics. Simple conceptual tools and representations have always been developed to help in the understanding of complexities. Here too one could face certain problems and ‘obstacles’ if dealing with oversimplified representational tools, where the ‘big picture’ might become hazy, fuzzy and unrecognizable. Graphic conceptual tools like, matrices, diagrams, model representations, layerings, mapping, system tools and networks, etc. are a good way to illustrate things only if it is done in a interrelated and synthesized manner.

Bartuska and Young point out that it is important to grasp the overall concept of the built environment as a *dynamic working tool*, and not be overcome by isolated definitions or detail. That is why they approach the topic in a manner where they look at each part of the built environment as an interrelated level or component of a larger whole. It is all about a parts-to-whole or whole-to parts organizational structure where hierarchical representations point towards an interplay between parts and wholes and between analysis and synthesis.¹⁷ (Fig. 3) This ‘integrated level approach’ to wholeness and content-component-context relationship was emphasized in Christopher Alexander’s and Robert Trancik’s seminal works on urban design theory.¹⁸

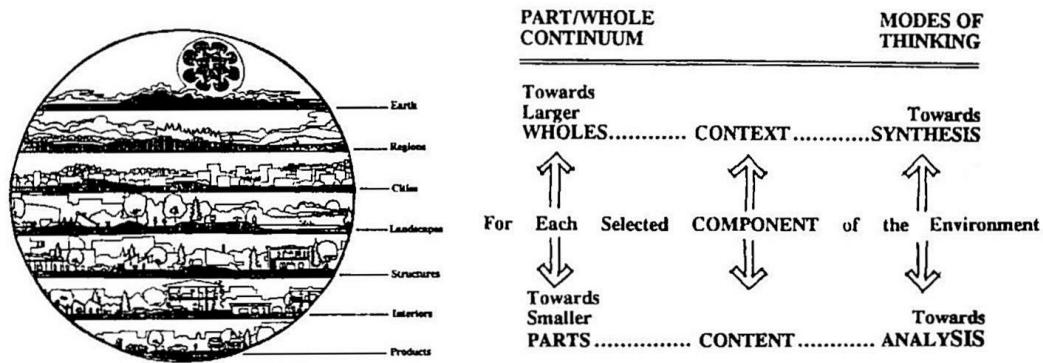


Fig. 3 Analysis and Synthesis of the Built Environment. Analysis of Parts and Synthesis into Wholes. (Bartuska and Young)

Also as a sideline we can mention that Amos Rapoport, as well as Bartuska and Young and other authors, studied particularly the human-environmental relationships within the larger study of the built environment. Rapoport approached the problem of the ‘meaning in the built environment’ through studying environment-behavior studies (EBS). He is concerned with the meanings which buildings, their contents, and their inhabitants convey through the role of cross-cultural variables, variety of environments and sources, intersection of different disciplines, relationships between the natural and the man-made (built) environment, and through mechanisms that link people and environments together.¹⁹ Bartuska and Young studied the human-environmental relationship as a theme of a four-part concept: people, the natural environment, the built environment and the dynamic relationship between parts.

David Chapman and others look at the development of built environment, which results from the interaction of a complex and diverse range of forces and the actions of a multitude of actors, in context of the nature of settlements and how buildings, spaces and human activities combine to create lively and enjoyable neighborhoods and places. In other words, they look at the built environment as a complex, diverse and multidisciplinary area. The authors focus and draw attention to four important aspects of Built Environment Analysis: social, political and economic forces, and the way people interact in the creation of buildings and places (built environment); how society and technology change and the way these changes affect the environment (built and natural); how we, as individuals and human beings, intervene with the natural world (environment) to create human settlements, to modify microclimates and create places and spaces which are enjoyable for people; and, the nature of problem solving activities in the built environment, particularly creativity in the management of settlements and places.²⁰ Similarly Tony Collier and others focus on the same issues but more in the context of design, technology and the development process as integrated issues in the built environment. They also explore the fundamental generators and contextual issues, philosophical, physical and political, those that influence built environments.²¹

N. J. Habraken discusses *form* and *control* in the Built Environment. He makes an important and interesting analysis in his discourse. For him the most fascinating and one of the fundamental aspects of the built environment is the interaction between people and forms they inhabit.²² Chapman and others have similarly pointed out the importance of buildings, spaces and especially human activities.²³ Habraken continues by saying that built environment is created by people and that change and renewal is the key to our knowledge of this area of study. The most important statement is though on the multidisciplinary character of the built

environment. To him this area is far too complex, too large and too self-evident that it cannot be perceived as a single entity, as an artifact or building and that it cannot be studied alone as it cannot be extracted as a sole and individual discipline and theory without involving a complex structure. It is an organism, which is growing and changing through time, it is not an artifact.²⁴

Habraken also points out the major mechanisms, distinct but interrelated orders that structure the built environment. Personal judgment is not the only major mechanism. There are also three others. We present them here in a small schematic form. When the three orders are referred to as the right side of the table below, each term implies, according to Habraken, a very particular meaning. (1) Order of *form* engages the built environment as a part of all physical matter. (2) Order of *place*, including in its scope control of space, reflects territorial behavior among all living beings and thereby connecting environment to the biological sphere. (3) Order of *understanding* gives us the purely human organization component. It is all about reflection and weigh of alternatives before acting, thus being a primarily social component.²⁵ (Table 1)

Table 1. Major mechanisms that structure the built environment (by Habraken)

Personal Judgment	(Order of Value – Human Values)
Physical Order	Order of “Form” (1) – Physical Domain
Territorial Order	Order of “Place” (2) – Biological Domain
Understanding Order	Order of “Understanding” (3) – Social Domain

Åke E. Andersson has analyzed the built environment discipline in some depth. He has specifically looked at the *Built Environment Analysis* as an area of education, research and network-knowledge dissemination in Sweden. The most important thesis that he puts forward centers around a tripartite vision and future direction of the discipline, which according to him needs to be centered around *macro regional analysis*, *overall town planning questions* and *analysis of urban and town planning & design on the micro level*. These three points are very important in the overall picture of the built environment analysis.²⁶

The first component that Andersson mentions is the macro regional analysis. To understand these issues in a holistic and systematic way the built environment has to be placed in a macro regional level. The overall town planning issues should be oriented, as Andersson puts it, towards synthesis, planning and policy questions. He calls this meso analytical level. Closely related to these issues are the environmental and urban design issues that relate to the overall placement of the building, the urban setting and the urban region in which that setting is located. Of importance are the causal and dependent issues of different types of built environment with the infrastructure systems, especially transportation, as well as other complex issues of building use.²⁷ When we speak of the micro level, the area of interests (not just in practice, but also in education and research) should include the micro built level, namely issues ranging from room analysis and use extending to encompass the building in which a person(s) is housed. Evaluating residential built environment in use is just one component of that. The focus should not be only on housing, but also be directed strongly on the other aspects of the built environment such as civic, culture, leisure, industrial and other facilities. The third component would be a strong focus of the above-mentioned components of the built environment to its surroundings and all the psychological, social, political, economic and environmental aspects playing part in the overall town planning level.²⁸ Andersson’s final important conclusion deals with complexity of

issues in the built environment, which point toward a multidisciplinary approach. This was clearly evident in the result of his survey of prominent schools and research institutions around the world (MIT, Cornell, Bartlett, Berkeley, Harvard, and some others in America, UK and Canada.).²⁹

In the light of things and dealing with multi-disciplinary issues, we should turn our attention slightly to the field of urban design and planning. Urbanism is a discipline that analyzes and tries to solve problems of the built environment regardless of its scale. Urbanism is in many respects the core and the heart of the built environment discipline and thereby the mentioned Thiberg triangle. Essentially, it is about the form and forming of the built environment. It is also about analyzing the built environment. This includes the relationship of buildings, spaces, places and environment as well as movement systems and human activities. It is about the functioning of the built environment, its spatial, social, economic, historical, cultural, environmental, technological and temporal aspects. But it is also about the aesthetics, quality of life and the wellbeing of all the people that are part of it. The renowned Pratt Institute in USA also points out in its curricula description that for example the urban designer is also concerned with other, more qualitative and conceptual aspects related to understanding the city as a spiritual and cultural artifact that conveys meaning. The emphasis is on the investigation of the spatial and perceptual characteristics of the environment, including the study of urban history, the use of urban models and precedents, building typology, urban morphology, infrastructure systems, graphic and product design techniques, landscape architecture, GIS, and other ordering strategies. Problems vary in scale from designs for a street, or a large-scale project intervention within a district, to urban design controls for a city. The work involves many disciplines; the urban designer may work with planners on challenges years away from realization or with architects working on solutions to immediate problems, involving either research or traditional design tasks.³⁰ All of this shows that there is a multiplicity of sets involved and complexity of areas and in that light, inter disciplinary approach is a must in dealing with different aspects within the built environment. (Fig. 4)

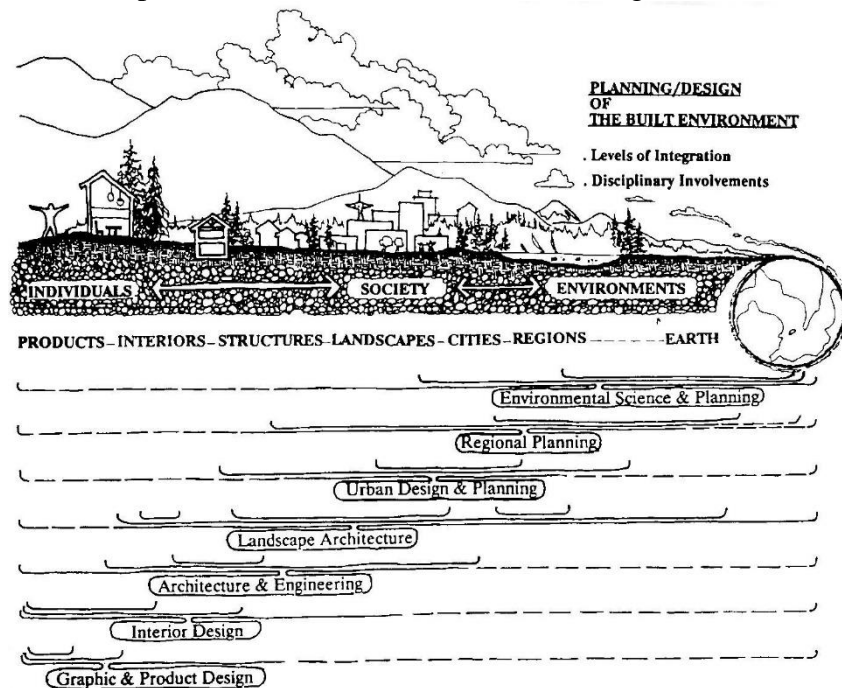
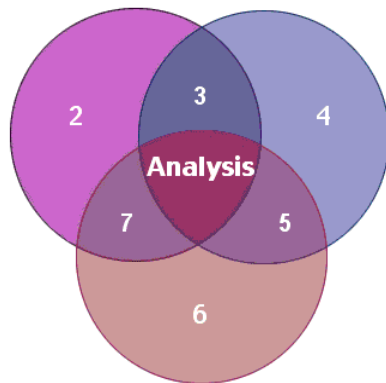


Fig 4. Overlapping relationships, responsibilities and multidisciplinary approach in planning/design of the built environment. Example of environmental design disciplines; content-context-component relationship (by Bartuska and Young)

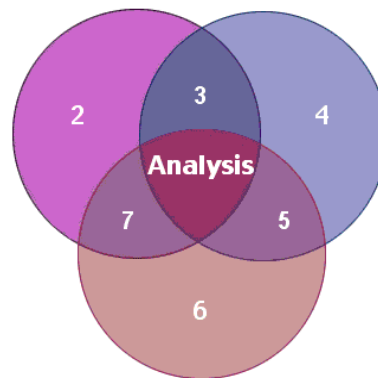
Multi-Disciplinary Approaches in the Built Environment: An Alternative Conceptual Built Environment Set-Concept- Model

As pointed out before, the purpose of this paper is not to bring out solutions, give answers or put up new theories or models. It will nonetheless have to give some suggestions and try to look at some things differently. In order to this we will use as a possible approach the example of Venn diagrams³¹. These diagrams represent a way of mapping, modeling or using sets to describe a problem, concept, idea, etc. in a very approachable and understandable way. In our case they will be used to show the complexity and the system and subsystems (sets and subsets) structure of the built environment. They will also show very clearly that such a complex area cannot be just simply defined and thematically and spatially ordered by a single geometric representation, such as a triangle. Being a model, it represents a simplified version of some aspect of the real world. They are produced to show the relationships between two or more factors, such as land use and the distance from the city center for example. Being idealized representations as they are, they give only a general guide, indication, suggestion and possible outline to what might happen and to how it might be looked upon. We will now, for the purpose of our discourse, present a Venn based diagram/set (collection of objects or elements that have at least one characteristic in common) of the built environment. It is a convenient way to illustrate concepts, definitions and ideas within the algebra of sets. It is important to keep in mind that this does not represent any solution, golden rule or definite outlook on the built environment. On the contrary it will just show that there is not such a recipe and rigid solution of representation due to the complexity of this subject and that this representation is just one way of looking at things, but looking at them in a more interwoven and complex way. The overlap areas are the most powerful area of the diagrams, even more than the circles themselves. The following four sets of Venn diagrams portray one way of looking at a typology of sets of relations in the analysis of the built environment. (Fig. 5, 6, 7 & 8)

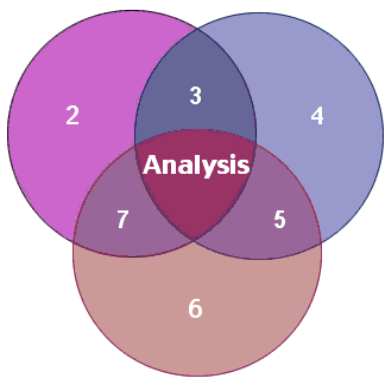
What this example wanted to show is that the Triangle as a representational body with very clear and distinct corners of society, people and the built environment can be misleading. In it these three components are portrayed, whether we like it or not, as three totally independent and autonomous entities. They should rather be represented as a union, as one complex component, which cannot be an autonomous entity, rather a sum of continual sets and subsets as each component of the triangle entails the other two and each and every one is defined by, with and from the other. Venn diagrams are used here to show that things can be represented in a different way, encompassing the above mentioned. It does not mean that this is a new 'solution' or a much better way of looking at things. It is just simply an indication that things need to be looked in their complexity and totality. We are dealing here with very complex, polyvalent interrelationships, not one-dimensional outlooks.



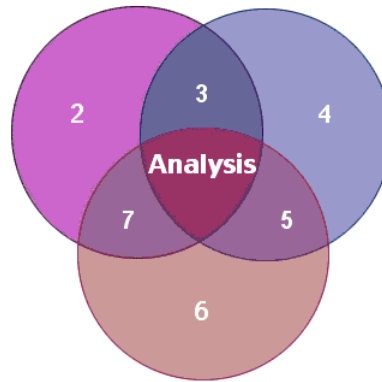
- 2. Built Environment
- 3. Technology & Infrastructure
- 4. Society and Politics
- 5. Cities: Culture & History
- 6. Human Beings and Networks
- 7. Natural Eco-Systems



- 2. City Centers and Cores
- 3. Spatial and Regional Planning
- 4. Settlement Patterns and Housing Areas
- 5. Urban Planning and Design
- 6. Human Beings and Relations
- 7. Urban Infrastructure



- 2. Governmental Regulations, Laws and Decision Making
- 3. Information Technology and Industry
- 4. Consumer, Individual and Specific Group Needs
- 5. Cultural Heritage, History, Aesthetics and Quality of Life
- 6. Investments, Capital, Markets and Profit
- 7. Regional, Spatial and Urban Planning & Design



- 2. Urban Economies, Policy and Governance
- 3. Information Technology, Telecommunications and the City
- 4. The Social and Cultural Life of the city
- 5. Individuals, Groups and Urban Environments
- 6. Urban Physical Form and Planning
- 7. Urban Infrastructure and Transportation

Fig. 5, 6, 7 & 8. Concepts & Sets of Venn Diagrams/Sets adapted for mapping the Built Environment.

(A typology of Sets, Concepts and Relations in the Analysis of the Built Environment)

Another way of looking at things across an example of complexity of issues, multiplicity of actions and series of alternatives is the approach, by C. A. Doxiades and others in dealing with biological processes, human institutions and physical planning, illustrated by Edmund E. Bacon.³² The diagram shows a way of looking at things where rigidity planning, mapping and crude representations of the future or the way we look at things today, is replaced by in continuo process of hypothesis formation and reformation in response to feedback. What we have here is a continually changing organism, system of order, one capable of influencing a multiplicity of individual actions to interrelate to such a degree that some sort of coherent structure, organism or systems is produced.³³

Coda

The intention of this 'raising the issue position paper' was not a development of new Built Environment syntax or a creation of a new theory, model, etc. Its sole purpose was to show that there is a need to avoid the pitfalls of extreme and crude determinism or some all-explaining grand metaphor. We should rather strive towards basing our analysis, our premises, starting

points and foundations in a comparative evaluation of all theoretical approaches at hand, to build upon on relevant and tested empirical evidence and most importantly to be able to synthesize work from an interdisciplinary approach (variety of disciplines and sources) and full range of crucial issues such as semantics, etymology, conceptual and category frameworks, methods, approaches, representations, models, mappings, sets, etc.

If we see “Thiberg’s Triangle” and alike as an attempt to Qualitative Modelling we need to acknowledge a number of things then; as David Britt has correctly pointed out “we need to establish the legitimacy of modeling underlying realities that are approximately defined by the conjunction of context, history, and social entities (individuals and social groups); this objective of modeling is in opposition to simply modeling available data points to provide the best fit.”³⁴ We must not forget to take into account the fundamental economic, social, political and technological changes taking place around us and bringing us radically into a different and new epoch. As a model The Thiberg Tringle succeeds in the fundamentals of opening up for criticism or as Sven Thiberg calls it, “offers possibilities for development”. The key to success of any modelling is the three key points: *simplification, explicitness, and reformulation*. As Richardson and Pugh observe, models are collections of explicit, specified assumptions-not vague understandings regarding how the world works. They simplify reality to bring the critical dynamics that shape that reality into better focus. The Richardson and Pugh definition makes clear that assumptions in models are always open to criticism and being reformulated. This is the dialogue.³⁵

In sum, the definition of conceptual and category systems, or qualitative models, or simple diagrammatic triangle representations that portray themselves as models has to be connected and emphasized with the principles of structured organizing devices that can and are able to facilitate a continuous, stable, structured, logical and explicit dialogue among multiple sources of data and assumptions.

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- ¹ Rapoport, A. 1980. 'Vernacular Architecture and the Cultural Determinants of Form' in King, D. (ed.) *Buildings and Society: Essays on the Social Development of the Built Environment*. London: Routledge & Kegan Paul. (pp. 283-302)
- ² King, D. (ed.) 1980. *Buildings and Society: Essays on the Social Development of the Built Environment*. London: Routledge & Kegan Paul. (pp. 1-15). The essays in this book explore the relationship between society and the built environment to which it gives rise.
- ³ Thiberg, S. 1975. 'Människa, Närmiljö, Samhälle' (People, Local Environment and Society). Stockholm: Statens Råd för Byggnadsforskning. pp. 9-17 (The Thiberg Triangle was conceived in this publication, which deals with an introduction to the subject of Building Function Analysis. It also deals with the status of architecture as a discipline in Sweden and goals for education and content.) This work has been used as a starting point in the analysis of the triangle in my paper. I have also utilized and used as background information the following works: Uno Åhren: Ett Planmässigt Samhällsbyggande from 1945/reprinted in 1981; Birgit Krantz: A Historical Review of Housing research, in Sven Thiberg's (ed) 1990. 'Housing, Research and Design in Sweden.' Stockholm: Swedish Council for Building and Research; Eva Öresjö: Vadan och Varthän (Den Svenska Valfärdstänkan och Bostads-forskningen), in Arkitekturforskning, Volym 3, Nr.1-2, 1990; Dick Urban Vestbro: Byggnadsfunktionslära – med eller utan funktionalism? (unpublished work, 1997) KTH: Arkitektur och Stadsbyggnad; Åke E. Andersson: Forslag till tillsattningsprogram för profesur i bebyggelseanalys vid KTH. KTH: Infrastruktur och Samhällsplanering 1999/2000. and Rolf Jonasson: Utvärdering av bostadshus i bruk: Om att bedöma kvaliteten i boendet. (doctoral work) KTH: Arkitektur och Stadsbyggnad, 1997. Svane Örjan: A Sustainable Neighborhood: A Place and its people, its services and exchange with nature. (doctoral work) KTH: Arkitektur och Stadsbyggnad, 1999 Thiberg's, Andersson's and Johansson's works have been cited in my paper.
- ⁴ Thiberg, 1975 *Ibid.*
- ⁵ Johansson, R. 1997. Utvärdering av bostadshus i bruk: Om att bedöma kvaliteten i boendet (Evaluation of residential housing in use: A study on estimating quality in housing – PhD Thesis) KTH: Arkitektur och Stadsbyggnad. (pp. 11-33)
- ⁶ Thiberg, S. 1995. 'BFL 25 år 1970-1995.' KTH: Byggnadsfunktionslära, Arkitektur och Stadsbyggnad, Stockholm. (This document represents an internal publication of the Division of Building Function Analysis, later known as Built Environment Analysis, marking the 25 years of the division. Sven Thiberg's triangle is represented in his contribution entitled: BFL's Future (Swedish).
- ⁷ Thiberg, 1995 *Ibid.*
- ⁸ Wartofsky, S. M. 1968. *Conceptual Foundations of Scientific Thought*. London: Macmillan. (pp. 123-153) and Wartofsky, M. 1979. *Models: Representation and the Scientific Understanding*, Dordrecht: D. Reidel Publishing Co.
- ⁹ Nagel, E. 1979. *The Structure of Science: Problems in the Logic of Scientific Explanation*. Indianapolis: Hackett Pub Co., and Wartofsky, S. M. 1968. *Ibid.* Most probably, one of the most fundamental and key works in the Theory and Philosophy of Science. These two works cover philosophy of science in living contexts and historical origins, methodological, epistemological and ontological questions, and discussion of causality, space, time, matter, mind, consciousness, and questions in the social sciences and history. (Nagel: pp. 447-502, and Wartofsky: pp. 123-153).
- ¹⁰ *Ibid.*
- ¹¹ Suarez-Villa, L. 2000. *Invention and Rise of Technocapitalism*. New York: Rowman & Littlefield Publishers, Inc.
- ¹² Habermas, J. 1970. 'Technology and Science as Ideology' in *Toward a Rational Society*, J. Shapiro, (trans.) Boston: Beacon Press.
- ¹³ Habermas, *Ibid.*
- ¹⁴ Bartuska, T. J. and Young, G. L. (ed.). 1996. *The Built Environment: A Creative Inquiry into Design & Planning*. Menlo Park: Crisp Publications, Inc. (pp. 5-35). This seems to be one of the most comprehensive studies done on the theme of built environment. Its authors, 22 leading researchers, come over a range of disciplines together to create this collaborative work. It features a thorough, comprehensive, interdisciplinary and integrated approach to the complex field of built environment.
- ¹⁵ Bartuska and Young, *Ibid.*
- ¹⁶ *Ibid.*
- ¹⁷ *Ibid.*
- ¹⁸ Alexander, C. 1987. *A New Theory of Urban Design*. New York: Oxford University Press. Trancik, R. 1986. *Finding Lost Space: Theories of Urban Design*. New York: Van Nostrand Reinhold Company.
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- ²⁰ Chapman, D. (ed.) 1996. *Creating Neighborhoods and Places in the Built Environment*. London: E & FN Spon, An Imprint of Chapman & Hall. (pp. 3-30)
- ²¹ Collier, T. (ed.) 1995. *Design, Technology and the Development Process in the Built Environment*. London: E & FN Spon, An Imprint of Chapman & Hall. (pp. 2-18)
- ²² Habraken, N. J. and Teicher, J. 2000. *The Structure of the Ordinary: Form and Control in the Built Environment*. Boston: MIT Press. (pp. 1-15).
- ²³ Chapman et al, *Ibid.*
- ²⁴ Habraken, *Op.Cit.*
- ²⁵ *Ibid.*
- ²⁶ Andersson, E. Å. 1999. 'Forslag till tillsattningsprogram för profesur i bebyggelseanalys vid KTH.' (Proposal for an introductory program for a professorship in built environment analysis division at KTH) KTH: Infrastruktur och Samhällsplanering (Internal document, not published).

²⁷ Andersson, *Ibid.*

²⁸ *Ibid.*

²⁹ *Ibid.*

³⁰ *Pratt Institute*, New York. 2000. The School of Architecture at the Pratt Institute entails the following programs: Architecture (U), Graduate Architecture (G), Graduate Center for Planning and the Environment (G), Graduate Architecture and Urban Design (G), Construction Management (U), and Facilities Management (G). The institute was founded in 1887.

³¹ *Venn diagrams* were introduced in 1880 by John Venn, "M.A. Fellow and Lecturer in Moral Science, Caius College, Cambridge University", in a paper entitled *On the Diagrammatic and Mechanical Representation of Propositions and Reasonings* which appeared in the *Philosophical Magazine and Journal of Science* S. 5. Vol. 9. No. 59. July 1880, (J. Venn, *On the diagrammatic and mechanical representation of propositions and reasonings*, *The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science*, 9 (1880) 1-18.). He published his first book *Symbolic Logic* in 1881 and *The Principles of Empirical Logic* in 1889. The use of diagrams in formal logic is not an easy history to trace, but it is certain that the diagrams that are popularly associated with Venn, in fact, originated much earlier. For more of the history of Venn diagrams there is mores referred to Baron and Hamburger and Pippert (1969) and (1996).

³² Bacon, E. E. 1974. *Design of Cities*. Harmondsworth: Penguin Books Ltd. One of the major works on urban design and the development of urban form. (pp. 252-263)

³³ Bacon, *Ibid.*

³⁴ Britt, W. D. 1997. *A Conceptual Introduction to Modeling Qualitative and Quantitative Perspectives*. New York: Psychology Press (Ch1.p2.)

³⁵ Richardson, G. P. and Pugh, L. A. 1981. *Introduction to System Dynamics Modeling*, New York: Pegasus Communications