

ANALYZING WORLD EVOLUTION AND ITS EFFECTS ON URBAN DESIGNING

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Abstract

Our society's modalities of communication and hence our cities have been rapidly changed due to emergence of several revolutions most lately the digital one. In fact, recently with emergence of the fluid, responsive, kinetic, data-driven worlds of infoscape and its combination with urban landscape, urban designing faces a radical reshuffling of a number of its principal underpinnings. It seems that once again we as urban designers in order to catch up with the current world's situation need to evolve or in better words to re-ontologize concepts of urban designing for twenty-first century. Therefore; in this paper for better understanding of the main characteristics of current changes we try to identify the effects of new actors on urban structures through analysis of different evolution phases of our cities. To do so we make a diagram called "Evolutionary Trend" through which we can trace world's evolution history to help us know where we are and what may happen in coming decades. This "evolutionary trend" can be used as a guideline for urban designers to help them navigate better in future

Keywords: Evolutionary Trend, Urban Evolution, Infospherization, Softerial Era, Digital revolution

1. Introduction

Regarding the emergence of new technologies, computation and sensing are moving from computers and devices into the environment itself¹. Consequently, our society's modalities of urban designing have been changed rapidly. As an example large panel displays and screens are being installed in many public and private spaces, ranging from open plazas to private houses. Therefore, many places like Times Square or Ginza have become "*playgrounds of programmable LED's (Light-emitting Diodes)*"

¹ At Massachusetts Institute of Technology (MIT), the first generations of environmental sensors named MIT environmental sensor (MITes) are being developed for pervasive computing research in natural settings [Munguia et al., 2006]. By installing these sensors in every place, spaces become much more informative. They could even be used to extract history of the inhabitants' activities and then those collected personal activity recognition data could be used for further customization of spaces. Nowadays, many researches projected the practical application of these Environmental Sensors (ES) in physical spaces namely Keio University SFC's cooperation in the 50th anniversary of Shinjuku Imperial Garden in Tokyo [Ito, 2007].

(Mitchell, 1999) that can even make us believe just as Ventury that *pixel* is the new *tessera* of current era².

However the important point is that as the space around us is going to be instrumented with sensors and displays, it even tends to reflect a diffused need to combine together the information landscape of the Internet – *infoscape* - with the urban landscape of the city. We believe that these changes should not be ignored especially when we find out that according to the Independent Commission for Worldwide Telecommunications Development, recently, use of *information and communication technology* (ICT) has been exponentially increased all over the world [Yamaguchi, 2006]. This global digital network is not just a delivery system for e-mail, web pages, and digital television. It is a whole new urban infrastructure - one that will change the forms of our cities as dramatically as railroads, highways, electric power supply, and telephone networks did in the past. "It's an old script replayed with new actors. Silicon is the new steel, and the internet is the new railroad" (Mitchell, 1999).

Interestingly the world's first *ubiquitous city* in which all information systems -virtually everything- is instrumented with sensors and linked through technologies such as wireless networking and Radio Frequency Identification (RFID), is being promoted in New Songdo, South Korea and the first phase will be completed by 2014³ . Still this is just a beginning and several others are yet to come.

Previous revolutions -*urban* and *industrial revolution*- created macroscopic transformation in our social structures and architectural environments often without much foresight. The *information revolution* is no less dramatic. We shall be in serious trouble, if we do not take seriously the fact that we are constructing the new environment that will be inhabited by future generations [Greco & Floridi, 2004].

With the emergence of such fluid, responsive, kinetic, data-driven worlds of *infoscape* and its combination with urban landscape, architecture faces a radical reshuffling of a number of its principal underpinnings such as context, boundary, contiguity, comprehensibility and etc. For this reason, many researchers like Mitchell believe these legacies of industrial era, and of ever earlier times, will require transformation in order to function effectively in the future. Actually we need cities that work smarter not harder. Cities that can respond grow and prosper, while many that can not will reach their deadlines.

² For further information see [Ventury, 1998]

³ For further information see [Block, 2005]

Architecture that can parametrically and in real-time “respond to remote data through kinetic tectonics holds the most promise” (Senagala, 2002)

2. Literature Review

Our job is to design the future we want, not to blindly follow its predetermined path. Therefore; we believe contemporary architects and urban designers are facing two major challenges: first, to reshape the physical environment in order to respond to the major structural changes in society caused by the emerging *Information Age*, and second, more importantly, to try to understand how the new technologies will change people's activities and interactions and then try to be ready for those *evolutions*. In other words, urban designers might have to deal with both the physical and the virtual aspects of the living environments, and should seek answers to one of the most interesting questions for twenty-first-century urban designers, as William Mitchell has put it: "How should virtual and physical public space relate to one another?"(Mitchell, 1999)

Much research and experimentation needs to be done in that direction in order to give us the vision for not to be shocked suddenly by facing such an era where everything is *re-ontologized*⁴ according to emergence of *ITentities*⁵, ICT and media enhanced technologies. For this reason, in recent years, theorists from all areas of science and technology have been trying to come up with a logical projection of what the future *Information Age* would look like. Most scientific interest has focused on the virtual aspect of the future - including theories of *Noosphere* [Vernadsky, 1926], *Bitsphere* [Mitchell, 1995], *Cyber City* [Boyer, 1996], *E-topia* [Mitchell, 1999], *Cybiont*⁶ [De Rosnay, 2000], *Information Marketplace* [Dertouzos, 1997], *Infosphere* [Floridi, 2006] and many others. With most theories, the virtual world of the future is referred to as an immaterial and dimensionless environment (e.g. the Internet) that has little to do with the existing physical space while this paper will attempt to look at the future cities as physical representations of virtual spaces affected by *data wind*⁷. In this sense, one goal of the paper is to investigate whether information age can bring digital qualities to the physical

⁴ A neologism coined by Floridi (2006) that means re-engineering so dramatically that re-defining their ontology seems to be inevitable

⁵ A portmanteau formed by contracting either the word IT with Identity that was coined by Floridi (2006). For further information see [Floridi, 2006]

⁶ "Cybiont" is coined by Joel de Rosnay in his book .The book provides a "biological" perspective on the "evolution of matter, life, and human society on our planet." The term "Cybiont" implies a combination between "cybernetics" and "biology"

⁷ For further information see [Vande Moere, 2006]

domain. To check this hypothesis, we have focused on the *evolution* of cities and urban designing in different eras.

3. Objectives

It seems that once again we need to evolve or in better words to *re-ontologize* concepts of *city images* for twenty-first century. But as we can not predict and comprehend specific ontology of a product while we have not any exact idea about its process, we propose that as the first step it is very important to analyze the history of *evolution* and its major affects on urban designing.

In that point the very important thing is that we should not be reoriented so digitally that we neglect other dramatic factors for human beings. We had experienced that kind of reductionism once and we paid for that. Michel Foucault coined the term *medical gaze* [Foucault, 1973] for modernism impacts on mankind to describe those *biological reductionisms* after emergence of Biosphere. We believe that as *digital immigrants*, we should be very aware not to be stranded in *digital gaze* and *digital reductionism*, to let our children as *digital natives* enjoy our new environment with its new characteristics, opportunities and of course threats.

4. Evolutionary Trend

In the first decades of 20th century and along with invention -and wide distribution- of the term *industrial revolution*, many scholars tried to describe the current situation of their time and predict next world's possible developments. These approaches have continued till recent years and many competing terms have been proposed to define world's transformations such as '*Revolution*' [Bernal, 1939], '*Evolution*' [Vernadsky, 1926], '*Wave*' [Toffler, 1980]. Recently even in architecture the term '*Trend*' has been introduced in Charles Jencks ground-breaking book "Architecture 2000" [Jencks, 1971]. In fact, what is interesting about Jencks' *Evolutionary Tree* is Jencks' system of classification. What he calls prediction makes it very clear that a *trend* is a "framework of continuities" that we can identify for comprehensibility. His notion is almost applicable for all of those mentioned theories. The importance of these theories cannot be overrated since, besides affecting our future lives, they underlie our assumptions and actions in a very basic way. "If trends did not exist we would have to invent them, because, to a large extent, they constitute that common framework of continuities on which we speculate and act" (Jencks, 1971).

Among these theories, Teilhard [Teilhard, 1955], presented a coherent and captivating framework of various worlds' evolution (Diagram 1). In many ways, what we are proposing –Diagram 2 - is both an extension and a revision of his evolutionary system which is mostly being urban design oriented. Bringing together a series of other theories of the same field, we propose that there is an emerging trend with specific and identifiable set of characteristics which is missing in his theory. We would like to group them under the rubric of what we call "Infosphere"⁸.

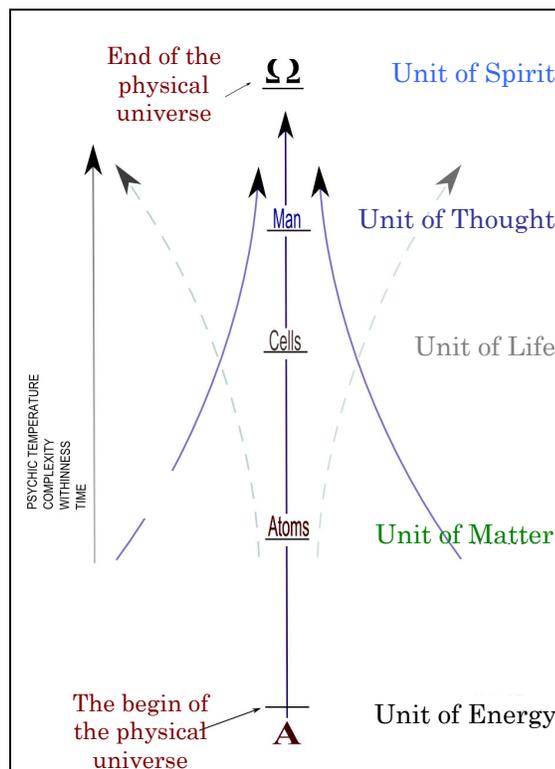


DIAGRAM 1 TEILHARD'S DIAGRAM (1955)

In Teilhard's theory of how the earth develops, the *Noosphere* is the third stage in a succession of phases of development of the earth, after the *Geosphere* (inanimate matter) and the *Biosphere* (biological life). In the present paper, we will outline the birth –emergence- of another phase i.e., *Infosphere*, before entering Teilhard's *Noosphere*.

⁸ Infosphere is a term used probably for the first time by Steven Vedro in his book "Digital Dharma". The term has also been used widely by Floridi, to denote the whole informational environment (Floridi, 2006)

As the entire world is mostly made up of materials, our theory for world evolution is based on importance of each kind of materials on the specific era and their impacts on urban designing. Due to Senagala's theory all materials are categorized in three main groups: *Harderials*, *Softerials* and *Minderials*⁹ [Senagala, 2001a] that we believe each one plays a major role in a specific period of human's history.

First are *harderials*. They are whatever made of atoms. For long time after invention of the word *material*, many considered both *-materials* and *harderials*- as the same concept however Senagala for the first time has revealed its paradox. Second, there are *Softerials*. Those are the materials which flicker between zeros and ones. *Softerials* are made of *bits* instead of *atoms*. *Minderials* are the third and so the last category. *Minderials* are the materials of your mind which are made of *memes*. A *meme* consists of any unit of cultural and/or intellectual information, such as a practice or idea, that gets transmitted verbally or by repeated action from one mind to another. Looking backward to the world's history, reveals our world was dominated by *harderials*' impacts for long time from its beginning and that's why we have named the first era as "*Harderial Dominance era*" or in short *HD era*. Each separated era and their main characteristics are shown and explained in right inner side of the Diagram 2.

4.1. Harderial Dominance Era

4.1.1) Geosphere, Biosphere

At the beginning was the space of earth itself with its unanimated matters. Earth was populated by rough *atoms*. This phase of earth development was called *Geosphere*. *Emergence of life* fundamentally transformed the *Geosphere*. The first evolution i.e., *biological evolution* [Vernadsky, 1926], which had lead to the formation of biological life was occurred and *Biosphere* as the next phase was appeared. By its emergence we had a shift in the main particles of existence. *Geosphere atoms* were replaced by *Biosphere genes*. "*Networking of creatures*" had altered the main features of the world. However, they were just a beginning, a symptom for birth of a new force that is on the way.

Later on, with the creation of mankind, that new force which is called *human consciousness* [Bergson, 1911] started to make dramatic changes in almost everything in the world. While "*networking of*

⁹ All three words are neologisms were coined by Senagala (Senagala, 2001a)

creatures” make it possible to enter biosphere, “*networking of humans*” and though human consciousness caused *urban revolution*. The first cities had constructed, first *citizens* were borne and urban history started. From then on, the cities and so city images have been transformed continuously during centuries. In fact we believe instead of using the term ‘transformation’ of city images for those changes, the term “*evolution*” -the same as what Archibald Wheeler has speculated about the laws of physics that may be evolving in a manner analogous to *evolution* by *natural selection* in biology - seems much more appropriate[Wheeler, 2006]. We also propose that their *evolution* is not only based on *natural selection* but also it is a kind of *creative revolution* that is very analogous to Bergson’s idea of *biological creative revolution* in biology [Bergson, 1911]. The reason is that different paradigms for those changes like technology -as one of the main factors for world evolution- has not only adapted to, but also educated us as users. Among several examples, very simple one is considerable in Butler’s book while he developed his idea of “*machines as extensions of our limbs*” [Butler, 1923]. There he introduced differences between the nomadic persons living in deserts and a nineteenth-century modern man and though the societies in which they live.

In fact, along with each evolution, humans too started to evolve and extend their *primitive body* via making and though complicating manmade-machines to improve their abilities. These extended body-parts for their turn caused the evolution of the occupied spaces of humans. Trough such a process, *human consciousness* found its way to become much more complicated trough ages and as a result make more complex cities in each one of its phases until they will reach their final *complexity* in a phase that is called as “*Ultimate Goal of Universe*” or “*Omega point*” in Teilhard’s term. The Diagram 2 (left side) describes how human beings as one of the main factors of the famous interlinked quartet of *relativity theory* have been evolved trough ages to reach their final destiny and complexity. There, in the inner part of the mentioned diagram the motivations and other factors which are involved in these evolutions -both as a result of *natural selection* and/or *creative revolution*- are introduced in details. Consequently, invention of *second generation of machines* and “*networking of machines*” lead to formation of another revolution, i.e., *industrial revolution* as the next phase¹⁰.

¹⁰ The urban designing situation of this era was introduced comprehensively in Banham’s famous book which he called that era as “the first machine age” [Banham, 1963]

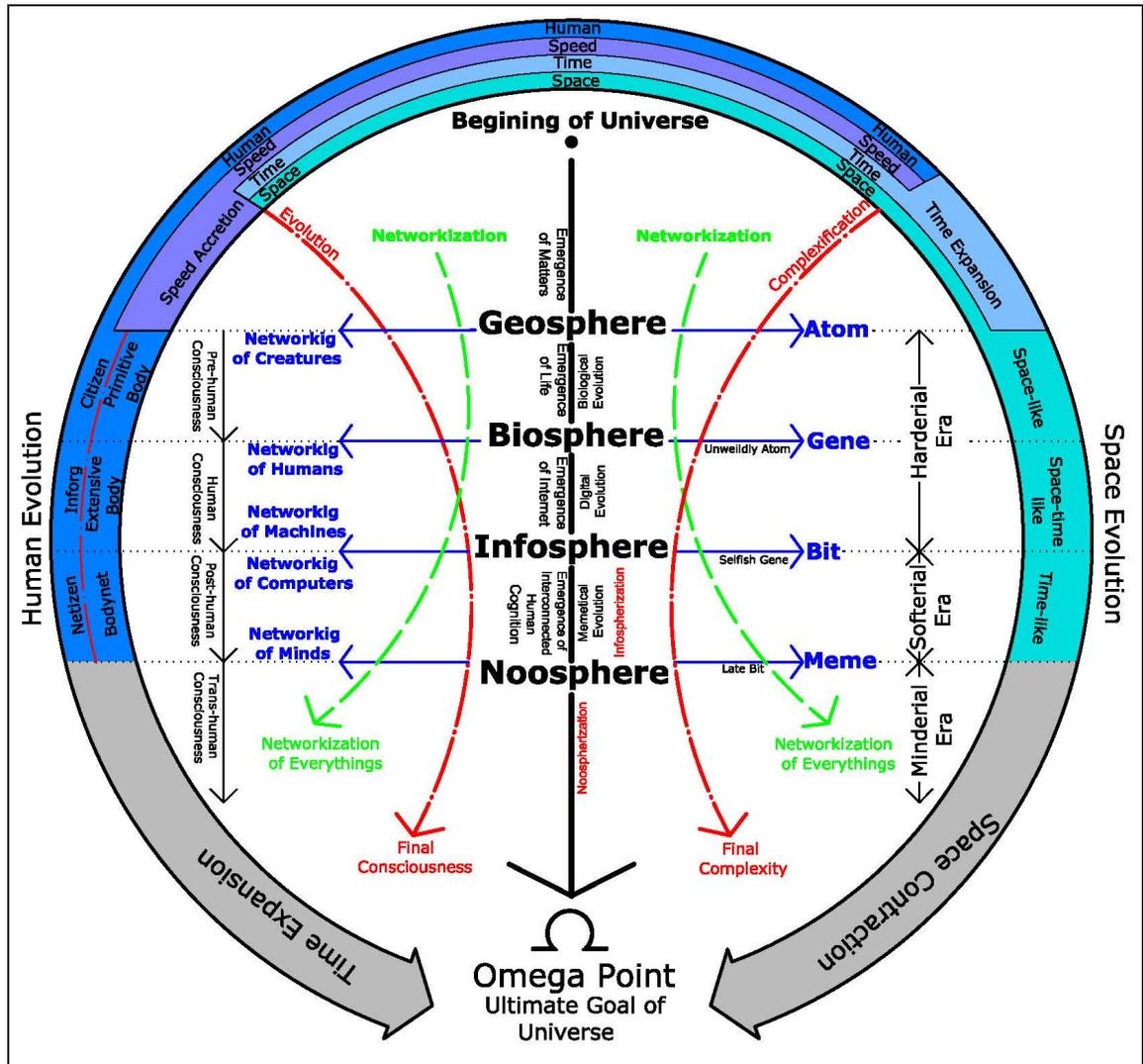


DIAGRAM 2- PROCESS OF CONVERGENCE AND DIVERGENCE IN WORLD EVOLUTION (AUTHORS, 2008)

4.1.2. Hardieral Era and Architecture

The more complex machines like radio, telegraph, telephone and television, transformed the composition of how societies built themselves. While text was still rooted in the physicality of paper, with the electronic media one did not have to move a thing in order to communicate. "While print media undercut the *epistemological contiguity* of the built world, electronic media undercut the *ontological contiguity* of experience and context." (Senagala, 2003) Political debates and propaganda could take place and reach millions of people without moving a thing all happening in simultaneous time. As

Marshall McLuhan noted, *there would have been no Hitler without radio* [McLuhan, 1964]. While books and bodies could be banned, exiled, and locked up in buildings, electromagnetic waves could not be. Many contemporary researchers [Mitchell, 2003; Benedikt, 1991], believe that traditional architecture lost their importance as knowledge and communication could not be organized, controlled, or prohibited through conventional architectural means. The traditional notions of wall, enclosure, perspective, horizon, etc., which were based upon *somatic space*, became meaningless in the light of *televisionic space*. "Solar day held little meaning in the televisionic day, which came to structure new rhythms of the cities in technological societies" (Senagala, 2003).

The metaphysics of theory of *Relativity* explicates the interdependence of *space*, *time*, and *speed* in an uneven field of forces. In the language of Relativity, where movement is relatively less, events become "space-like." Where movement takes precedence over stillness and approaches speed of light, events become "space-time-like" and "time-like" [Born, 1962]. As speed increases, space contracts and time expands. Therefore; *speed* is the distinguishing factor in reading between these three kinds of events. Senagala shrewdly noticed the role of speed in formation of Architectural spaces¹¹ [Senagala, 2003]. He called those kinds of initial spaces produced by speed of a walking man -2mph- as the *Somatic Space*. Movement of knowledge was synchronous with the movement of the body in that era. As a result a circle of walls is served as the ideogram of those cities of pre-modern times which illustrates the enclosing, dividing and boundary.

As Senagala put it, not until the advent of printed text did the grip of somatic space loosen on the human civilizations [idem, 2003]. As Victor Hugo exclaimed, *word killed stone*. Knowledge could now move by itself through the virtual medium of printed text with the human messenger being only an infrastructural carrier relegated to a marginal status. "Knowledge was, for the first time in human history, liberated from being embodied in architecture and human body" (idem, 2003). However; still the architecture of stone and brick that embodied a sense of timelessness, namely the *architecture of atoms* was the dominant sphere of life.

But we were on the verge of moving from the outmoded notions of space and time to the post-spatial notion of space-time. Jacques Ellul have repeatedly pointed out the shift in technological societies from

¹¹ He categorized spaces regarding the impacts of speed in their formation to four major era:(10,000 BC-1400AD)Somatic Space(2MPH-30MPH),(1400AD-1900AD)Textual Space(2MPH-1000MPH), (1900AD-1946AD)Broadcast Space(186,000MPH) and (1946AD to present) Cyberspace (186,000MPH and more)

space-centered institutions to time-centered institutions, from material-based economies to information-based economies and from fixed, coherent belief systems to fluid, fragmented worldviews [Ellul, 1964]. By entering the modern times in mid-twentieth, these themes entered architectural discourses too. Le Corbusier as the father of modern architecture, for the first time pointed out globally the importance of *time* in architecture and used the term *zeitgeist*¹² to describe the effects of time in architecture. Later on, Jencks mentioned that we are reaching a point that '*form follows worldview*' rather than old notion of Sullivan's *function*. Even the ideogram of the cities changed as in mid-twentieth century the most memorable ideogram of cities like London or Los Angeles was their underground networks or freeway maps instead of those Medieval or Renaissance walled cities. "Riding the networks, not dwelling within the walls, was what made you a Londoner or an Angeleno. *Network* rather than the *enclosure* has emerged as the desired and contested object" (Mitchell, 2003). These are the symptoms of *space-time like architecture*.

However, the *space-time like architecture* of modernist era seems to be evolved soon in a world that temporal matters play more important role than spatial matters. Interestingly, printed media and electronic analogous media both contain within them traces of space they travel. A letter from your friend in other part of the world would contain the traces of its trajectory. A radio reception fades away as you move away from the transmitter [Senagala, 2003]. However, with digital environment, space and distance bear no effect on its content. They are all symptoms of another evolution in which harderials with their spatial characteristics plays less and less roles. Urban design is due to bits rather than *selfish genes*¹³ or *unwieldy atoms* [Negroponte, 1995]. When our cities' *fortress walls* have been replaced by *Firewalls* everything seems to be concerned with softerials and not with harderials anymore.

4.2. Softerial Dominance Era

4.2.1) Infosphere

Nicholas Negroponte has made a very acute observation when he noted that the world is being increasingly concerned with the movement of *bits* than the movement of what he called *unwieldy atoms*. In fact, another dramatic shift has occurred in the main particles of existence. While *Geosphere*

¹² A German expression that means "the spirit of the age", it is best known in relation to Hegel's philosophy of history. For further information see Lectures on the Philosophy of History (Hegel, 1837)

¹³ The term has been borrowed from the name of a book by Dawkins [Dawkins, 1976]

atoms were replaced by *Biosphere genes*, the third wave replaced the biosphere genes with *bits*. That is why Senagala considered bits as atoms and *vectors* as molecules of the new world [Senagala, 2001c].

Necessary in such a world, *softerials* play a more major role than do *harderials*. There is no need to go bank, offices, and libraries anymore. Much kind of buildings are leftover after IT impacts. Only 2% of the US economy is paper-based [Zach, 1999] and the rest is in an electronic, non-spatial form, flowing through the non-spatial channels that are not designed by architects (*weightless economy*). They are due to bits as we live in a *post-spatial* world.

Many themes such as productivity, consumption, business and etc. have been changed. As an example after the *Agricultural Revolution*, men considered as *productive* while they produced more agricultural corps. By emergence of *Industrial Revolution* it seems the more machine-made products made men more productive. However; it reveals that the analogy for current era doesn't work. Nowadays the more you produce information the more productive you are. A simple glance at the latest Forbes list ¹⁴ for world's top 20 billionaires will reveal that we can trace a new generation of billionaires that are not dealing with atoms but instead they are bits that make them billionaire. It is not the end of story. McLuhan and Nevitt suggested that with electric technology, the consumer would become a producer [Nevitt, 1972]. Later on the futurologist Toffler coined the term "*prosumer*"¹⁵ when he predicted that the role of producers and consumers would begin to blur and merge [Toffler, 1980].

That is why we can say digital ICT's are re-ontologizing the very nature of our sphere. Every single bit makes changes. The earth has experienced another evolution -digital evolution- and entered its third phase that we call as "infosphere" (Diagram 2). It is a term on the basis of biosphere, to denote the whole informational environment constituted by all informational entities (thus including informational agents as well), their properties, interactions, processes and mutual relations. Floridi (2006) while introducing several characteristics of infosphere, also noted that we are all become "connected informational organisms" or in his term "Inforg" in current era. Among several noted characteristics of Inforg, an interesting one is that "if you spend more time connected than sleeping, you are an Inforg" (Floridi, 2006). Astonishingly a research has revealed on average, Britons already spend more time

¹⁴ http://www.forbes.com/2007/03/07/billionaires-worlds-richest_07billionaires_cz_lk_af_0308billie_land.html , (Retrieved 2008-10-14)

¹⁵ It is a portmanteau formed by contracting the word producer with the word consumer

online than watching TV.¹⁶ It is even believed that in less than a decade, more than one billion people all over the world will be spending half as many hours in front of computer screen as they will in physical space¹⁷.

The softerials have been confined to the status of mere virtual world. It is time to recognize them as legitimate materials out of which very important politic-economic virtual environments are constructed. As the physical world's power structures migrate into virtual domains, virtual worlds become the powerhouses. Senagala pointed out how imagining, defining and constructing (and even communicating) with softerials becomes definitely more exciting, rewarding and lucrative activity.

"Whilst a dishwasher interface is a panel through which the machine enters into the user's world, a digital interface is a gate through which a user can be (tele)present in the infosphere. It follows that we are witnessing an epochal, unprecedented migration of humanity from its *Umwelt* to the infosphere itself" (Floridi, 2005). Nowadays, it seems we are evolved and get much more similar to Floridi's Inforg rather than Clynes' Cyborg. "Networking of computers" influenced its users. We are not any more citizens but instead Netizens of current world. As a result, humans will be inforgs among other (possibly artificial) inforgs and agents operating in an environment that is friendlier to digital creatures. As *digital immigrants* like us are replaced by *digital natives* like our children, the latter will come to appreciate that there is no ontological difference between infosphere and *Umwelt*, only a difference of levels of abstractions [Floridi and Sanders, 2004]. They even mentioned when the migration is complete, we shall increasingly feel deprived or handicapped whenever we are disconnected from the infosphere, like "fishes out of water".

Although human *consciousness* has evolved to what almost a century ago Bergson forecasted i.e., *post-human consciousness* [Bergson, 1911] but still our urban designing are far behind what happened in the infosphere. Still we are limited by the laws and limitations of being embodied in corporeal buildings very similar to Marc-Antoine Laugier's '*primitive hut*' [Laugier, 1977]. One of the reasons is that we are still bounded to our body and its limitations that Toyo Ito once called as '*primitive body*'¹⁸. Ito believes the modern man exists in two planes – one, the body in which he lives and the other, the virtual body in which his senses, stimulated by modern technology, exist. Contemporary architecture

¹⁶ <http://www.statistics.gov.uk/pdfdir/intacc0702.pdf>, (Retrieved 2008-10-14)

¹⁷ For further information see [Kerckhove, 2001]

¹⁸ http://www.egothemag.com/archives/2005/04/toyo_ito.htm, (Retrieved 2008-10-14)

must expand its notions of space and movement to incorporate this second realm of existence. His idea may be considered as successor of other philosophers who noted that the new technologies and media are *extension of limb* [Butler, 1923] *extension of body* [McLuhan, 1964] or even very recently the idea of “Bodynet” [Mitchell, 2003] which exhibiting several potential opportunities these body extensions include to improve our physical surroundings. Nowadays the idea of *Bodynet* not only seems tangible but with the invention of Body Area Network (BAN) along with–Local Area Network (LAN) it seems that we are ready to apply that theory globally and use it not only in medical world¹⁹ but also in other fields such as urban design. In fact, as built environment is converted into information interfaces, designers are becoming the ideal experts to interpret the collection of spatially acquired, abstract datasets and to develop suitable data representation metaphors that create ambient, spatial and inhabitable experiences.

4.2.2. *Softerial Era and Architecture*

Through various digital communication and transportation technologies, we have moved far beyond the 2MPH speed of a walking human being to 186,000MPH speed of radio waves and telecommunications. “We have moved from populating space to populating time. In the process, space-like architecture has lost most of its social, political, cultural and existential significance” (Senagala, 2001b). For example when you want to download any file it doesn’t matter how far the host is but it is bit-per-second interchanges that make changes. It is also the same for broadcasting and advertisements in TV programs. The more time you *populate* the more you should pay. For this reason theoretician like Hays rightly pointed out that we have moved from Sigfried Giedian’s modernist notion of space-time to Henri Lefebvre’s Marxian production of space to a Foucauldian linking of space, knowledge, and power [Hays, 1998]. More recently, Senagala coined the term *time-like architecture* [Senagala, 2001b] to describe the current situation of architecture we need and we are proceeding towards in our contemporary architecture trends. In a radical departure from the locational metaphysic, *time-like architectures* have moved forward to a *temporal* metaphysic.

Ten thousand years after we first built with brick, Louis Kahn had to ask a *hard* question: what does a brick want to be? “Well Louis, things are not so simple now. Thirty years after that, we must ask a *soft* question: what does a bit want to be” (Senagala, 2001b). In such a world, architecture of bites will

¹⁹ <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=552302> , (Retrieved 2008-10-14)

definitely outplay architecture of bricks. Following Sullivan’s concept of “form follows function” and Le Corbusier’s comparison of a house with “a machine for living” consequently, one can imagine the concept of “form follows data”, or the use of bits as *virtual bricks*. The famous notion of “it from bit” [Wheeler, 1990] seems to be much more considerable nowadays.

These virtual bricks are not only in the context of exploring formalistic data-mapping principles, but also they can even be uncovered within physically built architecture. As an example we can mention van Berkel and Bos’ Moebius House and MvRdV’s Dutch Pavilion at the World Expo 2000 (Figure 1). Both buildings are examples how analytical data can be literally translated into an architectural program. In fact instead of or in addition to responding to local parameters such as sun and wind, architecture begins to respond to the non-local parameters of “data wind.” The same spirit could be found in a speculative project, The Muscle, or even Trans-ports by Kas Oosterhuis and Ole Bauman²⁰ (Figure 2). Instead of putting together *spaces*, connecting them, transforming them and configuring them, the new architectures put together *space-times*, transforming them and configuring them. “Such architecture can be transmitted, remotely accessed, published, projected, compressed, encoded, licensed, rebooted, archived, upgraded, evolved, interfaced, compiled, flexed and folded” (Senagala, 2002).

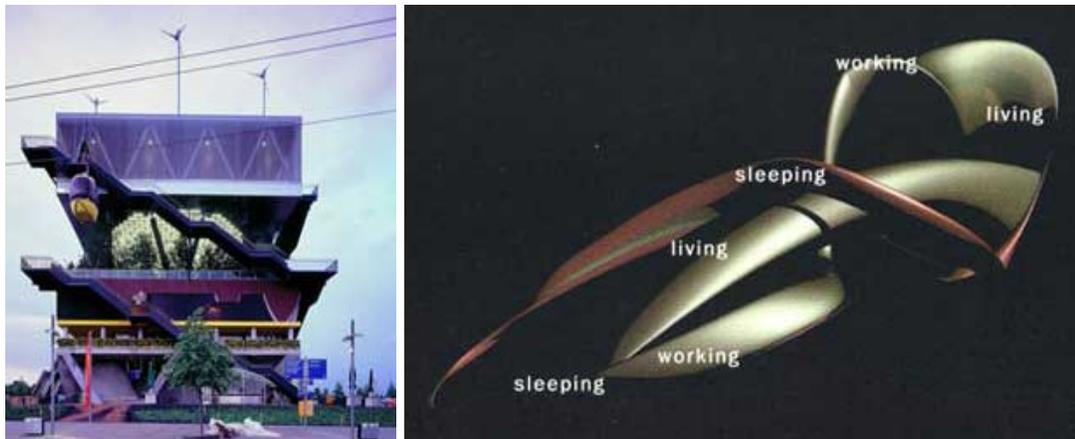


FIGURE 1 - LEFT: DUTCH PAVILION (MVRDV), RIGHT: MOEBIUS HOUSE (VAN BERKEL AND BOS 1999)
 REF.: (VANDE MOERE, 2005)

For example, Marcus Novak’s architecture often looks fluid or viscous and he argues that digital architecture should become “liquid” [Novak, 1991] because it can, in the virtual world at least, flow and change in responsive and interactive ways. Similarly, other architects propose designs that look like

²⁰ <http://www.oosterhuis.nl/quickstart/index.php?id=347>, (Retrieved 2008-10-14)

bodies or organs [Palumbo, 2000] and have argued that “instead of architecture existing in any one fixed state it can and should exist in an “alien third condition” that merges different aesthetic and functional roles in previously unforeseen ways” (Vande Moere, 2005).



FIGURE 2 - LEFT: MUSCLE (OOSTERHUIS, 2003), RIGHT: TRANS-PORTS (OOSTERHUIS, 1999)
 REF.: [HTTP://WWW.OOSTERHUIS.NL](http://www.oosterhuis.nl)

However still in describing digital design many noted the simultaneously exciting and unnerving character of digital designs and many designers themselves openly acknowledging that “a fine line exists between pleasing and ominous results” (Ostwald, 2004). Zellner portrays that as “strangely beautiful” yet “uneasy”; not spaces “geared for popular consumption” (Zellner, 1999). Betsky describes digital architecture as “very strange, strangeness that reflects the challenges of an increasingly complex world” (Betsky, 2000). Greg Lynn calls his own digital architecture “alien” [Lynn, 2002] and for Kolatin and Macdonald their architecture is potentially “monstrous” and “chimerical” [Kolatin, 2000].

Soon other design research fields, such as urban design, want to visually represent this knowledge by adding user experiential and sensor-tracked datasets to their otherwise lifeless and static urban models. Building automation services enable spaces to react to dynamic, physical conditions or external data sources in real-time. Currently, these interactions are programmed by engineers, and imply simple action-reaction rules, such as the control of lights, security or climate control: what would be possible if these tools are offered to designers, concerned with the emotional experience of people?

Some design laboratories even started to do some researches on these gathered “*data shadow*”²¹ like *Senseable City Lab.* in MIT who are introducing the term ‘*wikicity*’ to promote a city that performs as a real-time control system and make it practical by working on a real project in Rome, Italy -*Real Time Rome*²²-. Nowadays we will characterize cities of twenty-first century as systems of interlinked, interacting, silicon- and software-saturated smart, attentive, and responsive places. This is what we call ‘*infospherization*’ of cities.

4.3. Minderial Dominance Era

4.3.1) *Noosphere*

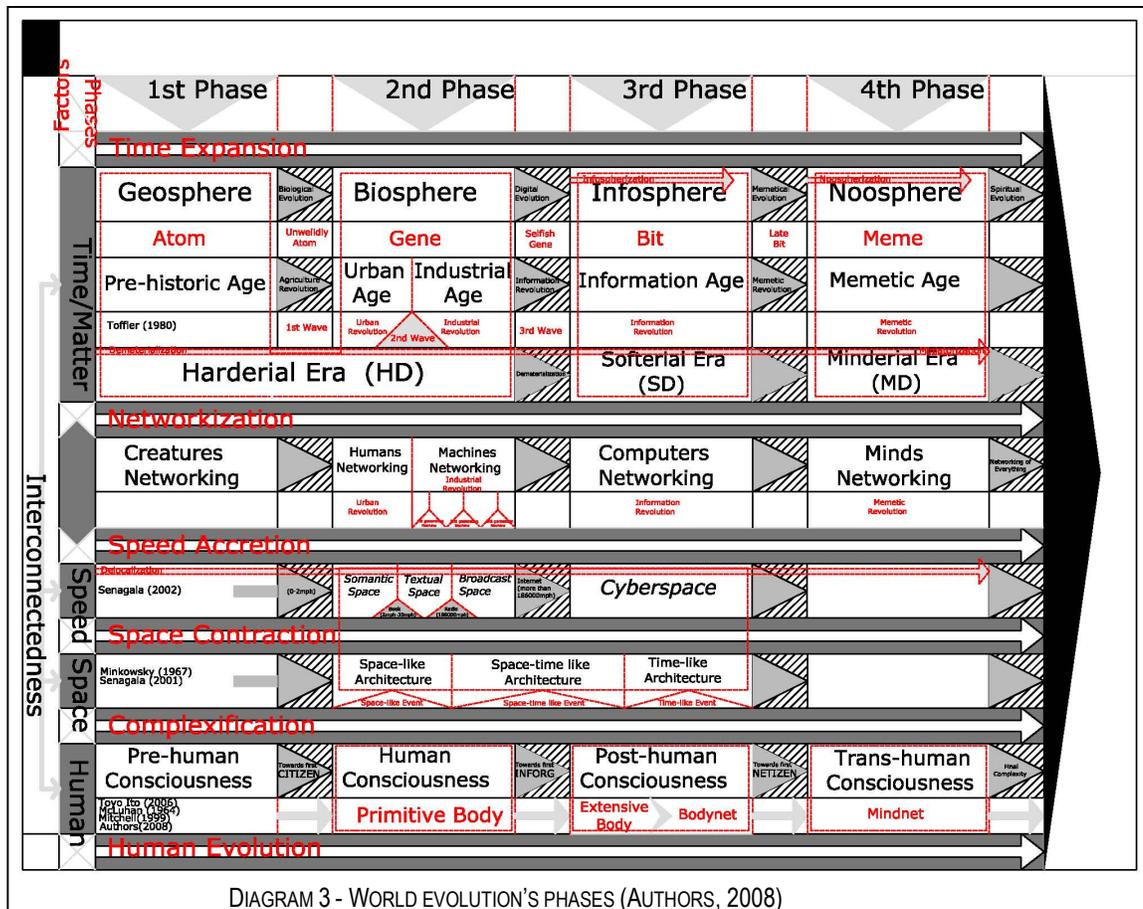
Nearly five decades ago, much before the computer became a popular machine, Teilhard prophetically proclaimed that the human evolution is heading towards a global coalition of an interconnected world. He called such a world *Noosphere*- the sphere of interconnected human beings-. He predicted that such a coalition would happen at a point in time called *Omega Point*. Not in a too distant future and with the further dispersion of *Ubicomp*, we can easily envision people being connected with invisible threads of digital communication where anybody, anytime, anywhere from anything can communicate with anybody and even anything. As an example Karinthy’s hypothesis of “*Six degrees of separation*” has been proved. In that theory if a person is one step away from each person he knows and two steps away from each person who is known by one of the people he knows, then everyone is an average of almost six “steps” away from each person on earth [Sanderson, 2008].

Due to technological advances in communications, networks could grow larger and span even greater distances. We propose that it is not just about *networking of computers* but instead it is opt to “*networking of minds*”. In particular, we can believe that modern world was ‘*shrinking*’ due to this ever-increasing connectedness of human beings. In fact, despite great physical distances between globe’s individuals, the growing density of human networks made actual social distance far smaller. We are moving towards a “*Shrinking World*” where the satiric expression of Andy Warhol, “*15 minutes of fame*” will not seem an impossible mission anymore.

²¹ Data shadows are the traceable data that a person creates by using technologies such as credit cards, cell phones, and the Internet. The term coined by Columbia professor Alan Westin. He described that as “digital profile generated from data concerning a user’s habit online” (Westin, 1968)

²² <http://senseable.mit.edu/wikicity/rome> ,(Retrieved 2008-10-14)

We will be influenced by another world evolution. We call that “*Memetic evolution*” as we believe the main world’s particle will be changed one more time. The same as how importance of atoms and genes has shifted to bits, what we called as *late bits* will offer their turn to fresh *memes*. Then it is due to *Minderials* rather than *Softerials* in the *Memetic age* in which *noospherization* of everything in real-time, will lead to the emergence of *trans-human consciousness* (Diagram 3). We believe that Kerckhove was right when he pointed out that the “Architecture of intelligence is the architecture of connectivity. It is the architecture that brings together the three main spatial environments that we live in and with today: mind, world and networks” (Kerckhove, 2001).



The world has evolved continuously and it will not stop its evolution too. We as designers should take into account these evolutions and try to go along with them in order not to be neglected. Each new era offers its special infrastructures that can be used to improve our cities appropriately if they are

comprehended properly. In this paper we tried to mention some main changes that have been occurred or will occur soon in urban designing.

Here we mostly focused on infospherization of our world and its characteristics. As a result, we tried to highlight some main opportunities that can guide us to go further steps in designing our cities with more foresight. As an example what if we are able to expand the ways by which we see, hear, touch and sense information in this era? What if we can release more people from the screen for more hours by distributing the interface around the architectural environment? What if the walls, floors, lighting, ventilation and other facets of the architectural environment begin to communicate information to the user? What if architecture, as a whole, becomes a gigantic immersive interface to send and receive information? If, as Heidegger proclaimed, dwelling is the primary *ethical imperative of human beings*, then architecture needs to be brought into the world with a critical mission of connecting, re-spatializing and temporalizing a world that is fast disintegrating into bits of sand.

We believe such kind of infospherization causes some evolution in our cities consequently; we propose that we as urban designers should know what has been happened and try to be aware of the next generation of architecture which is highly reference to a self and relative to his destination and necessities in RT. Furthermore; experiencing what had happened in last revolutions, one may find out that the new infrastructures will not demolish what had constructed. It is not the same as *order 66*²³ -in *Purge of Jedi*- to re-instruct them. Instead the same as what old tubes, pipes and wires did, the new *backbones* will remain much of what is familiar to us today. They just will be superimposed on the residues and remnants of the past like neural structure over the old lizard brain. With their mentioned characteristics they can improve our “sense of time” along with “sense of place” a necessity in our current life which is inevitable.

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²³ Order 66 was one of a series of contingency orders to kill all Jedi in Star War series It is an ironic term to describe destruction of all bright parts of anything completely

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