A term which proposes a complimentary relationship between complexity and simplicity

Points, Lines, Structures, Networks, Systems

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Abstract

Simplicity and the City proposes a study of individual elements, their combination as structures, and the networks of physical and virtual structures which define contemporary cities. It is a broad ranging discussion aimed at defining a floating elastic, adaptable, dynamic, urban agglomeration to reflect the rapid changes and accelerations of our time. The challenge lies in defining changes to paths and processes that improve the workings of real cities. Analysis of systems is possible across all spectrums and a variety of scales, from political and geographical, to structural and geological, but the methods by which these interact is not yet well focused.

The proposal intends to unify the democratic exchange of data and knowledge to develop an understanding for the management of complex, global, socially interactive systems. The development of an expression of the sharing economy, and collaborative consumption of the information age.

Located in Clew Bay County Mayo, the resulting project is an attempt to bridge the gap between physical and virtual infrastructures, reappropriating new logic on to expired systems.

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There are a number of Q.R. Codes contained in this document which link to content which could not be described in print. They are generally referenced at the top of each page.

These QR Codes Refer to two blogs which accompany this thesis:

www.systemconstruct.tumblr.com
www.networknation.tumblr.com

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Quick Response Code

Sketch Model of Backminster Fullers 'Dymaxion Globe', Image source: Authors Own
The Network City Embassy
Interface: The Design Expression
Structural Network
Tensegral and Dynamic Systems
Path Edge District Node Landmark
The Emerald Express

Mayo Data Expo
Program
Clew Bay, Information Urbanism
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Acknowledgements
Just as reflection upon the 'Industrial Age' calls attention to the role of mechanics in the creation of the modernist form and experience, future architects will surely reflect on this century and attest to the effects of the digital age of information systems on the city, its built fabric and its inhabitants. The 'modern' world is bound in an endless, scaleless array of social, political, technological, financial and ecological systems, and this thesis aims to set out the bounds by which re-describing an aspect of the future may rethink how the present is constructed. This is essential in strategically planning for a world we cannot yet physically perceive. The intent is to analyse these networks, and infer the implications they may have on society, architecture, and the modes by which we design. Architecture is a discipline that has traditionally been shaped by material culture, but in an age where the material and immaterial are interlaced like never before designers must now begin to unfold the complexity of these relationships to adopt and respond to this new way of thinking.

For ease of discussion I may focus upon the 'City' as an accessible reference point. The City can be seen as a collective, or boundary that en-frames, protects and houses while at the same time taking its own form and functions from the (imaginary) bodies it constitutes. Simultaneously, cities are loci that produce, regulate, and structure bodies. Logically, this study of city systems is a subcategory of the more general topic of settlement systems. Similarly I may discuss various modes of man made networks or systems on a broad scale, in many instances ranging from the political to the infrastructural and encompassing many more in between. This will serve the greater investigation of the employment of a technological set of network interconnections and their various implications on design, styles and architectural focus. As a practical instrument, technological development has enormously complicated most of the built environment, from the towering metropolis, to the cavernous quarry. Its instrumentation and effects within varying degrees of virtuality are however still unclear.

There was a time when settlement alone was what brought people together, where markets, goods, transport, and information entwined. That day has long since passed, as cybernetic systems and a multitude of handheld devices are changing both spatial and social interaction, altering mobility from mechanical to informational. The individual’s conception of 'place', is now intrinsically synced both within and without their physical environs, and exposure to a worldwide network has irreversibly enmeshed much of the global population into a web of networked systems.

Although it is impossible to predict with any degree of accuracy the future within the realms of operation of these system networks, much can be surmised about the possible implications on future dimensions of architecture, society, and information. Adopting transdisciplinary development modes across a number of fields pertaining to science, mathematics, and architecture, as well as governance, finance and sociology, a number of rhetorical instruments can provoke much discussion relative to the ‘progression’ of the physical and virtual domain. The practice of architecture is in the process of ever contested change and the outcome is as yet unclear. This research explores the scope to which the information age may alter the scope of “the architect", and the realm within which they operate.
Cities in many ways are the greatest exemplars of complex systems. They grow organically, and they look as though they are created by nature in terms of the way their networks deliver energy to their parts. In so far as they are planned, such planning is dwarfed by the actions of millions operating from the bottom up.

Ancient cities were developed slowly through processes based on value systems which by today’s standards may seem inconceivable, and subsequently updated and retrofitted primarily in relation to military and civic infrastructural requirements for their sustenance. Urban infrastructure has often been designed to impress, and even control its citizens and would be invaders through its efficient infrastructural and military network.

Though cities today may still be made from mineral and geological matter, they are shaped by the embedding of invisible informational control systems, whereby the augmented cybernetic apparatus manages the daily fluxes, flows and pulses of the city. Contemporary urbanism continues to be organised by networks of interrelated systems, and this relational paradigm assumes the city to be a living expression of the parametric system developed in our modern world. This is not only true for the manifestations of networked technics in the physical realm, but also for the ideological or notional network systems which play on the human psyche, power, trends connectivity etc.

Cities in their broadest generality are undergoing major structural and pragmatic changes. Changes necessitated by the complex linkage between global corporatism, the technological revolution in information storage and retrieval, and the transformation of global communications. When we are hooked up to our computer terminals, talking to each other virtually, in different locations, the city is working through us rather than between us or around us. The methods by which we understand ourselves, our bodies, and our place within cities and communities are continuously evolving. City growth has been replaced by a more polycentric1 and web like sprawl; here multiple centres are served by overlapping networks of transportation, electronic communication, production and consumption.

Live Singapore provides people with access to a range of useful real-time information about their city by developing an open platform for the collection, elaboration and distribution of real-time data that reflect urban activity. http://www.youtube.com/watch?v=2aEPkyOBtRo
http://senseable.mit.edu/livesingapore/visualizations.html

The visualizations aim to provide greater understanding of some of the city’s dynamics. Exploring how transportation system behaves by combining realtime data with and weather information. Closing the feedback loop between people moving in the city and the digital real-time data collected in multiple networks, allowing them to make decisions based on information that reflect the actual state of their city.

3 Having multiple centers of authority, control, or development
Internationally of course cities are and have been important historical actors. Maritime metropolises cut across nation state borders, looking to the outside, making network connections with other ports, that are the backbone of globalisation, as Manuel DeLanda argues: “globalisation does not float on top of nation states.” Operationally the reactive infrastructures and flows of material have become more significant than static political and spatial boundaries, painting a picture of urbanism that is dynamic and temporal. As a consequence of this global cities pull away from associated nations, as they relate more to other cities.

Understanding the contemporary city is not possible with old tools, as its driving forces extend far beyond its physical realm, through an urban development that is for the first time in history beyond our understanding. Has urbanism as we know it already run its course? As the complexity of systems is not proportional to the number of its elements, but to the type and amount of communication, a complex reactionary interdependency of the elements results, as systems grow, adapt and restructure at ever increasing rates. "The myriad of parts and processes more or less mutually conditioning each other makes the city a highly complex system." writes Eckhard Schulze-Fieltz.

Long gone is the modernist perception that the city is something to be ordered and controlled. Instead, it is regarded as having its own collective intelligence and underlying pattern. This is surely a function of the networked system which binds it. Avant-garde architecture and urbanism are going through a cycle of innovation and adaptation. Retooling and refashioning of the discipline is essential to meet the socio economic demands of the “post Fordism-era.”

Within the past fifteen years, the network system has become the dominant cultural logic within societies and economies. Their conceptions of the public sphere, are evolving rapidly and show little evidence of regression, as networks, digital or physical, pervasive or otherwise, are reconfiguring our relationship to place by enabling "simultaneous presence in both physical and networked place". They are ever accessible and are inevitably altering our sense of proximity, distance and boundary. "These networks have become a prime tool for individuals seeking freedom and communication with others who share their interests, desires, and hopes." They have prompted much technical development, for which people worldwide have rapidly adopted digital tools and new forms of telecommunication into everyday life. Ever aware, as we are, of globalised systems, and virtual networks that increasingly dominate our daily lives, the notion of nation–states, and borders begin fade away.

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4 SC Architecture, Intensive fields Lecture 1 (Youtube, accessed November 2011) http://www.youtube.com/watch?v=0s1rE2BW81s
6 Eckhard Schulze-Fieltz, Metalanguage of Space, p.122
8 Varnelis, Networked Publics, Conclusion
Place however, is as important as ever, playing a key role in the networked relationships that we relate to the spaces that surround us, is often dominated by the seemingly inescapable logic that the price of new connections is local disconnection. Place, it seems, is far from a source of stability in our lives, but rather, once again, is in a process of a deep and contested transformation, facilitating a broad shift of our concept of place, and linking specific locales to a “global continuum”.

An ever evolving desire to interact, communicate, and trade, with a broad spectrum of other parties worldwide, is one of the most remarkably rapid evolutions of the past century. It seems that the more we are able to “enrich” our lives through enhanced connectivity, then the more we demand to have that ability at our fingertips. Dealing with this technology is literally transforming our patterns of communication, if not the way we conduct our lives. Yesterday’s aspirations for mobility have clearly become today’s fundamental needs, and this trend is strongly set to continue. Ineligible to the vast majority of habitual consumers who enjoy these mobile applications and services, are some of the most complex machines that man has ever made. Today, we inhabit multiple overlapping networks, at a variety of scales, and under a multitude of guises. Some are composed of those very near and dear to us, others exist at varying degrees of physical remove. This brings with it its own detrimental influence to the “local”. As Varnelis explores in ‘Networked Publics’, we as humans are able to maintain only a finite number of connections, and as we connect with those at a distance who are more like us, we are likely to disconnect with others in our community who are less so.

There’s no denying the fact that our entire civilisation has become heavily weighted in favour of the use of the mechanical, or even digital tool, over that of the manual. This is not only tied to the opportunities for commercial production, but to the degree of power and control with which it is now associated. Even in the first half of the last century Mumford was anticipating many of the difficulties this trend was unearting: As our technology becomes more refined, diverse and specialised, it becomes increasingly difficult to navigate the processes of the “machine”. In this way the “machine” has “broken down the relative isolation of the handicraft period.” It has intensified the need for “collective effort and collective order.”10 Frank Lloyd Wright pointed out in his memorable speech at Hull House in 1908, “That the machine itself was as much an instrument of art, in the hands of the artist, as were the simple tools and utensils.”11 Each facet of our civilisation must respond to innovation, and the implications with which it is served. Technologies emerge, thrive and obsolesce at an ever increasing rate, and disruptive innovation gets almost a free rein to realise the technology’s full potential— even if it ultimately nullifies mainstream interest in our processes which precede it. This form of system thinking has large precedence in the field of business and technological adaptation, but is just as applicable to the realm of architecture and the built environment in a time when the rate of change is greater than ever before. However when this process attempts to launch a “disruptive technology” that is rejected by “the mainstream”, “they fail not because they make the wrong decisions, but because they make the right decisions for circumstances that are about become history.”12 Technology adapts, society adapts, and the role innovation plays in cultural and societal evolution has never been more prevalent.

Whereas the educational values of craft were mainly tied into the “process”, those which emerged with the advent of machine were largely in the preparatory design. Alteration of the process itself was understood only by the mechanists and technicians responsible for the design and operation of the actual machinery. In creating the machine, we have set before ourselves a positively inhumane standard of perfection.14 Vernor Vinge15 argues that the acceleration of technological progress has been the central feature of this century, and that society is on the edge of a change comparable to the rise of human life on Earth. He explores the methods by which technological evolution may tend towards the singularity of the human. Will we begin to recognise ourselves as equal members of the global system, as explored by Adam Curtis16, happy components plugged into a vast network, like the luckless human batteries of the matrix?

Richard Brautigan’s poem, “All Watched Over By Machines Of Loving Grace” of 1967, offers an idyllic vision of technology’s place in an interconnected web of ecological, social, and cybernetic networks, co-existing as one entity for a harmonious future. It is unclear however whether it may have instead been a tongue in cheek commentary on their juxtaposition, either way, this poem captures the mood of a generation, a generation looking for technology’s place in the modern world.

It is doubtful that the poet saw how provocatively relevant this would be, forty years later. Today, society and technology, trends and innovation are changing at a pace that often outstrips our capacity to understand and manage them. Architecture today cannot concern itself only with that one set of structures that happen to stand upright and be hollow buildings in the conventional sense. It must concern itself with all man made elements, physical and conceptual, to create new nodes of concentration and focus.17
Online gaming such as ‘mine-craft’ has seen the unfolding of interactive societies online, reminiscent of the notional utopias of Archigram, Yona Friedman, and Cedric Price. Collectively people are creating and building in a structure designed for recombination, where a competitive system of capitalism is obsolete, and a new critique of society begins to emerge within set parameters. New societies are created, in these online computational systems which become cities all in themselves. The web has produced some of the most fascinating movements and phenomena of our day. The networks that have enabled rampant expansion of mobile telephony during the 1900s continue to expand and are now evolving through the rapid data transmission, to the full video interaction that was the stuff of science fiction within the timespan of just one generation. They have become mechanisms of mass cultural engagement and a tool for analysing social and cultural flows.

Beyond this, software advances in augmented reality offer viewers the ability to engage with and perceptively manipulate the physical realm, as a real time interactive experience, modifying environments before your very eyes. This immerses the participant in experimentation, developing computational and spatial literacies, and the ability to programmatically simulate changes in infrastructure, with the open-ended-ness found in online gaming. This may ultimately lead to the development of some form of human/computer symbiosis, an ‘intelligence amplification’ harnessing the graphic generation capacity of modern machines, with the aesthetic sensibility of humans.

In real life humans make decisions based on information, often subjective, often incomplete, and as the recent economic crisis has highlighted, often very bad information. Amid the host of stimuli to which people are subjected in contemporary society, it becomes more and more difficult to absorb and cope with any one part of the environment, to say nothing of dealing with it as a whole. What results is a reaction, the consequences of which we must live with. Our behaviour is emergent, unlike that of the machine. We are thinking intentional entities, and responsible for the vast majority of the environments within which we live, but often unable to perceive the variety of scales of our collective unintended consequences. As DeLanda professes; self organisation occurs in the human realm at the level of “collective unintended consequences of intentional action.” Certain emergent effects exist, so how can we bring computer simulations into the realm of understanding, exploring or developing intuitions about these actions. Simulation of future architecture in the information territory offers the possibility of avoiding some of the characteristics of physical architecture that have been recognised as detrimental to the environment or to the comfort of the inhabitants.
The interaction between known systems—such as the city—and virtual systems—such as the internet—is not yet well understood as they do not share a common language. People are conditioned to serve the interest of an established culture, the establishment gives us a value system which supports society, but this value system is changing. In an increasingly interconnected world, cultures no longer exist in and of themselves but rather as a web of connections. Money, an invention of convenience in a scarcity environment, is changing, physically, and ideologically, and value begins to take on an entirely different role in society. What is the real value in the future, resources, connectivity, efficiency? "We are so accustomed to the constraints of conventional territories that the disappearance of those constraints causes some real problems."  

Do we need to guard ourselves against the fatigue of dealing with too many outlets, too much information, or being unnecessarily bound by their presence? The logistical limitations in transport and communication before 1850, (which seem inconceivable today), meant that the condition of slow physical locomotion kept intercourse down to a human scale and under definite control. This permitted no more stimuli to reach a person than he could handle, meaning that the level of consideration necessary for any task could be defined by its immediate environment or conditions. This is no longer the case. Mr Bertrand Russell, an early twentieth century philosopher and logician, noted that each improvement in locomotion has increased the area over which people are compelled to move; so that a person who would have had to spend a half an hour to walk to work a century ago must still spend half an hour to reach his destination, "because the contrivance that would have enabled him to save time had he remained in his original situation now, by driving him to a more distant residential area—effectually cancels out the gain."  

If this expedience, which is being driven by technological advancement, is simply exacerbating a condition, whereby we design our life around our technologically augmented existence, it may well be that we are now so over-run with the level of connectivity, that we are enslaved to this web of enabling systems. Data may well be the new common currency, as its collection, and utilisation is at an all time high. Computational algorithms are already beginning to shape many aspects of the modern world, and the information realm is being constructed and described in a language that we as humans can no longer process without a subset of hard and soft electronic paraphernalia. Dr. Stephen Kinsella, recognises this danger of technological over reliance; "Robot Monkey butlers are not the answer, technology for all of its benefits is only a bag of hammers." Our cultural desire to progress beyond the machine rests in our ability to assimilate it.
So what is the impact of technologies (emergent/disruptive), complexity, and systems thinking on the design and analysis of cities? Over the past 15 years, the profound impact of computer-aided techniques on the production of architecture has been well charted. From the use of standard drafting packages, through to the more experimental use of generative tools, and parametric modelling; digital technologies have come to play a major role in architectural production. But how do they influence designers to operating on an urban scale? And how might they be changing the way in which we perceive and understand our cities. Are they disruptive?

Architecture today consists of a complex process, a complex product, and a complex life cycle. In all phases, the machine, (or to be more specific to the contemporary; the computer) is involved. In planning and designing, the machine helps to document, organise and store information, to visualise design alternatives and to produce working drawings or models for construction. There is a long and successful tradition of architects making use of new technology throughout the centuries. Dating back to the 10th century, architectural drawings in Europe were the first kind of abstractions that appeared virtually real, real enough to base decisions on. The advent of computers now offers design, construction, and management supports that are, by orders of magnitude, better than all instruments before, but can require a far more specialised and often complex set of skills. Today the newest methodological and technical instruments can help designers create a more “responsible” architecture, many aspects of which can be experienced and tested before construction. This includes the possibility of expanding the number of senses addressed for the explanation of an architectural idea.

With all of this in consideration a whole new realm to the environment in which society works, feels, and thinks begins to emerge. A new dimension beyond our physical limitations of proximity. This realm could see a “new nation” of ideas coming into existence. A new network citizenship is evolving with its own means of transportation communication and commerce. Increasingly, the immaterial production of information and its distribution through the network is the most prominent organisational principle for the global economy. The information nation will mean everything will have higher information content. Instruments, materials, buildings and cities, will adapt as information becomes the new raw material of any development. The network and its interface (at this juncture: the computer) facilitates the information processing infrastructure, and threatens to make many of our previous concepts of space and architecture obsolete. Every place, regardless of its “status”, is tied to the system in some form. Ours is the first modern age in which the network is the dominant organisational paradigm, and in time, evidence of this is bound to emerge in the infrastructure, the architecture, and the new network culture vernacular on a world wide scale.

30 Relating to expressions in terms of parameters.
31 Schmitt, Information architecture, p.83
In the future, information will become an even more important part of the realms of design including architecture, and special design on algorithmic rules set by the designer. This method sets up rules and parameters for structures which can be computationally manipulated to achieve a desired result. The formal language of the parametric is most strongly advocated by Patrick Schumacher (of Zaha Hadid fame) who regards it stylistically as the “rightful heir to modernism.” What confronts us is a new style rather than a new set of techniques.40 His is an arguable point, as the methods or tools employed lend themselves as much to the design of shoes as to the design of buildings, or for that matter cities. But one thing is for sure: that the techniques in question, the employment of animation, simulation, and form-finding tool, as well as parametric modelling and scripting, have inspired a new collective movement with new ambitions and values. In turn this development has lead to many new, systematically connected design problems that are being worked out competitively by a global network of design researchers.41

The realm of architecture has seen an emergence, in the past two decades, of modes of “parametric” design functioning, and special design on algorithmic rules set by the designer. This method sets up rules and parameters for structures which can be computationally manipulated to achieve a desired result. The formal language of the parametric is most strongly advocated by Patrick Schumacher (of Zaha Hadid fame) who regards it stylistically as the “rightful heir to modernism.” What confronts us is a new style rather than a new set of techniques.40 His is an arguable point, as the methods or tools employed lend themselves as much to the design of shoes as to the design of buildings, or for that matter cities. But one thing is for sure: that the techniques in question, the employment of animation, simulation, and form-finding tool, as well as parametric modelling and scripting, have inspired a new collective movement with new ambitions and values. In turn this development has lead to many new, systematically connected design problems that are being worked out competitively by a global network of design researchers.41

Innovation in architecture proceeds via the progression of styles, understood as the “alternation between periods of cumulative advancement within a style and of periods of revolutionary transition between styles.”42 Styles therefore represent cycles of innovation, and the gathering of design research into a collective endeavour. Before adoption or rejection of “parametricism” (as Schumacker supports), the discourse needs to be refocused and re-evaluated.

The information age, as an age of a new “Enlightenment” has seen growth in the production of a raw material which outstrips any other in human history. Individuals, governments, and corporations are both accumulating and producing larger volumes of digital data on a daily basis. Its ever increasing value means that in the midst of unquantifiable mines of raw data could be the answers to questions of vital human interest.

Parametricism or any form of system programming at a human level may turn out to be little more than a technological fire drill if we are ambivalent about the roles and responsibilities of software in our existing future organisational strategies. We cannot use computation for building and form generation, but often what emerges as originality, of, often, indulgent form making becomes “through familiarity, habit and banality.”43 Much of the resistance to investigating its merits, I believe, is tied up in a resistance to the imagery, of an often gimmicky or meretricious aesthetic. We could however model the decision making processes that give rise to development, devising intelligent decision making agents that can influence others and “reflect upon their own decisions”. Only then it would seem, would we be in a position to simulate the growth of real cities.44 Immediately this offers us two fronts from which to extend architectural discourse: the coordination and control of the forces, and ways to understand the scenarios and results from the bottom up, metering the as yet unknown dynamic quantities behind the city.
In order to fully grasp the impact or importance of data in the future of design, we need to take a step back from the use of the desktop and file folders to represent relationships between datasets. Investigating these nation network interfaces could spawn an extension of our ability to assimilate these systems even further into our social consciousness. Users rely on handheld devices to maintain an always-on relation to information and personal networks, as well as utilising them as ready-at-hand digital production devices for snapping photos and crafting text messages. We’ve begun to see digital devices and telephones as extensions of our mobile selves, our avatar in the network nation. In order to keep up with the speed at which new problems and opportunities are arising in our changing world as consequences of globalisation, technological, demographic and environmental change, we must begin to make a contribution in strengthening our societies’ adaptiveness, resilience, and sustainability in all realms.

The information infrastructure must mature to a degree that it will improve the physical infrastructure, but this will require an architectural re-thinking of the quality of the places where people work and live. “Physical and virtual reality must enter a state of symbiosis, as information has irreversibly expanded the dimensionality of architecture.” Virtual reality environments must mediate between those two worlds.45 Darwin’s fundamental message that life proceeds through a natural selection that slowly but surely preserves the fittest among the population and destroys the rest, appears increasingly attractive in explaining the growth dynamics of a variety of non-biological organisations such as cities. Such selection proceeds in very small steps that most now agree take place at a genetic level, with the result that those organisms that survive are very well adapted to their environment and each other.46 As Batty surmises, the emergence of order is the hallmark of complex systems and it is hardly surprising that with the growth of digital computation it is now possible to simulate such evolutionary processes thereby suggesting how “good designs might emerge among a universe of possible designs.” Cities and towns themselves must be understood as amalgams of processes, as spaces of vectorial flows that adjust to differing inputs of flows and impulses, like some self regulating system. Through digital tectonics: cities, networks and buildings are increasingly informed by the world of the computer, the system, and the network, to such an extent that it may perhaps be, as Varnelis suggests it, that in fact “network culture” is the evolutionary successor to postmodernism.47

Our task is the development and production of spatial urban systems with the greatest possible adaptability for change but possessing many archaic remnants of the craft era; architecture is by necessity slow.48 These systems have to enable growth, decline and relocation of functional typologies and zones. Within a structure or system, all requirements can be statistically measured and objectified. To develop them one must learn the laws of their behaviour. This does not threaten to supersede existing cities as we know them as their transformation is in resonance with the transformations of the body. The cities of the future will almost certainly resemble cities as we know them today, to the extent that bodies will resemble our own, but function according to their various modalities.
In order to become humane, architecture must begin to conceptualise the genuine complexity of human beings, their networks, and their environment. Discussions of architecture and complexity, hence become a play with the unrepresentable. The virtual negotiations between the material and the immaterial, the scientific and the social, the quantifiable and the immeasurable, but is not equivalent to the digital. Contemporary information technologies confront architectural theoretical discourses with developments that call for an expanded theoretical instrumentarium.\textsuperscript{51} The question we face at the dawn of network culture is whether we, the inhabitants of our networked publics, can reach across our micro-clustered worlds to coalesce into a force capable of understanding the condition we are in and produce positive change.\textsuperscript{52} Whether networked publics can come together to make decisions democratically is still unclear. As the recent financial crisis demonstrates, the systems that we have built to organise our affairs now possess an unprecedented degree of complexity and interdependence among their technological, social and economic components. This complexity often results in counter intuitive effects driven by positive feedbacks that lead to domino–like cascades of failures.\textsuperscript{53}

Perhaps a global participatory platform for the collection, and calibration of data in real-time, (a digital planetary nervous system) could support the decision–making of policy-makers, business people and citizens worldwide to effect change. This would facilitate better social, economic and political participation. Such an infrastructure would enable real–time, democratic, "data mining", a framework for citizens, businesses and organisations to be able to share and explore data and simulations, and debate the potential implications. It would democratise 'big data', promote responsible use of information systems and open up the modelling of complex systems to non-experts. "Next generation decision arenas for policy-makers will be developed to evaluate the consequences of interventions".\textsuperscript{54} The FutureICT project, aimed at large scale system analytics predicts that "insights from these models will inspire a new generation of socially adaptive, self-organised systems." Revealing the hidden laws and processes underlying our complex systems would develop social awareness, providing guidelines for society to evolve. The research of the human environmental, financial, and networked global system city is unavoidable in order to preserve the viability of today’s, and tomorrow’s hyper cities.

A floating elastic, adaptable, dynamic, urban agglomeration needs to be created in the rapid changes and accelerations of our time. The challenge however lies in defining changes to these paths and processes that improve the workings of real cities by meeting goals pertaining to flows, densities and economies of agglomeration. In creating this type of feedback loop: an event changes its environment and thereby also itself. In this sense the city would be alive, in the ways in which it evolves and adapt to dynamic contextual conditions. This is also necessary to reverse the capitalist led, consumerist paradigm which often sees the industry "privatizing profits and socializing losses."\textsuperscript{55} To continue to project city landscapes as formal and pictorial objects is to reduce significantly the full scope of their potential to adapt and survive as entities. They can be aggregated, and calibrated to correspond with changed conditions, "and can be adapted to the feedback of their own effects."\textsuperscript{56}
Can the instruments of the networked information age further life and enhance its values or not? Can an architectural invention adequately mediate the complexity of modern life to produce focused expressions and interpretations of the city? In the opinion of Eckhard Schulze-Fielitz, “a society should have enough adaptability to abandon evidently wrong ideologies” and facilitate the testing of others. “We need an integral ideology, the growing problems will force it to emerge.”59 As human beings, we are passionate about new ideas that promise to transform our lives and create new opportunities. We also tend to rapidly replace old technologies with new ones. Ours is a versatile society that runs on tomorrow’s software piled on top of the technological layers of yesterday and today. The future development of this landscape as a culturally significant practice is dependent on the capacity of its innovators to imagine the world in new ways, not to make cities more attractive, but to make them more adaptive, more fluid, more capable of accommodating changing demands and unforeseen circumstances. Rather than challenge the core principles that have underpinned town and city planning for several generations, built environment professionals must tweak the modus operandi,58 and accept that the task of overhauling the system as a whole is not beyond our collective ability.

What would that mean for the future of the physical realm? Is architecture in the conventional sense, too slow as a medium to respond to the ever increasing rapidity of cultural shifts? David Alford, writing on the works of Cedric Price noted the risk of giving permanence to ideas which seem quite improper as a result of the negation of “inbuilt flexibility or planned obsolescence.”59 Should the resulting physical realm be more temporal perhaps?

Architecture as a discipline, is changing; it always has been, and most likely always will. But architecture has never confronted the theme of managing its own death. In the highly digitised age of the 21st century, architecture has become so thoroughly enmeshed within a network of other disciplines that we are witnessing a range of new hybrid, mutant forms of practice that serve to reinvent the discourse of architecture as we know it. Re-describing an aspect of the future that re-thinks how the present is constructed is essential in strategically re-planning for a world which we cannot yet physically perceive. A hybrid form of practice may allow for the invention of this newly supple and reflexive built fabric, new network landscapes, new ideas of city, and nation and boundary. Architecture as a way of knowing and a means of research, could see a socially conscious practice that may not produce any “buildings”, depending on the systems needs. Is our century the turning point in terms of economic, environmental cultural and network sustainability. At a time when the space within which we spend our lives, and the value we place on resources, becomes increasingly virtual, we, as a society must begin to question how much space we actually live in. The future is all around us in and endless number of super connected systems, resources are limited and innovation is constant. The system is scalable and has no noticeable external limitations, such as beginning or end.

At the risk of oversimplifying or generalising the complexity of the vast array of these interdependent systems, using ecosystem analogies, applied to technology, power structures and global interactions, it is more conceivable today that Arthur Tansley’s proposal of all systems tending towards a balance of equilibrium, is nothing more than a romantic fallacy. Perhaps system collapse is an eventual inevitability. A full scale societal collapse, the scale of which has huge precedence throughout history, seems inconceivable in contemporary society. Is the singular human-being component so wired into the global network that centralised failure becomes either impossible or irrelevant? Or will humanity be, as Braughtgan suggests it, enveloped by a “cybernetic ecology, where we are free of our labours, and joined back to nature, returned to our mammal, brothers and sisters, and all watched over, by machines of loving grace.”60

57 Eckhard Schulze-Fielitz, Metalanguage of Space, p.122
58 A method of operating or functioning.
60 Adam Curtis, “All Watched Over by Machines of Loving Grace”, Episode 2,
Authors Own: Early concept sketch developing ideas of system analysis, cyclical events and forces which alter conditions over time. Early trajectory analysis, non linear causation factors, and process deconstruction.
Networked City Embassy. A part diagram, part spatial conception of a reactive urban composition which spawns as the tangible product of a virtual system, within a dense city fabric. It supposes that a reflexive response is plausible to mediate between two juxtaposed system dynamics, the city, and the network. The former is slow, rigid and rooted in a visual context and connection, while the latter is variable, dynamic and embedded in a responsive system far beyond the realm or scope of conventional wisdom.

The Networked City Embassy represents an incarnated reference point for the 'Network Nation', a fictional construct based on the logic of the thesis. Its association with the physical reality in an urban sense is necessitated by a global need for democratic access to system dynamics and data. Reflecting the Parisian salons of the 'Enlightenment' these embassies represent the collaboration and trade of information and ideas on a global scale, while being bound to the physical realities of an intensely urban condition and all of its limitations.

Authors Own Construct; based on imagery of a 'typical' city-scape.
While modern technology has greatly improved the quality of life on one level, contemporary life has also disassembled "place", and altered the physical and social structures once latent there, almost beyond recognition. More people than ever before live in cities, and while we are urbanising at an alarming rate, we are witnessing the rise of very different kinds of living. This research has spurred interest in the form of the city and the man made systems of structure and rationale that informed it over its life.

Despite all the advances in technology many things remain the same. Humanity as a collaborative species trade and exchange unlike any other animal. This is a profoundly human activity. This desire to exchange and interact effects everything we do and the things that we make, even our cities. Although the virtual is increasingly the realm of productivity, cities themselves are integrating to take advantage of different types of connectivity, specifically related to aviation, digital realm, expedience, and efficiency.

The passage of organisation to structure, the passage of design to building, and the passage of building to experience, is a methodology or lens through which this research has been continually assessed. With particular focus upon the architectural or spatial edifice, analysing the "logic" of technological evolution has driven a reassessment of physical, virtual, and digital reasoning, with a view to manifesting and architectural proposal. Architectural design is a form of communication as it suggests and embodies sensual and spatial ideas. Place as a physical phenomenon, is tangible through assimilation, through experience. So does it stand to reason that the physical place is the world in which architecture solely exists?

This architectural proposal suggests a place which means to mediate these realms, through the process of creating a new architectural intent which expresses each, and builds an articulation of the connections throughout. The monument acts as an emblem of physicality and place, which draws on the interpreted logic of the thesis, in light of a number of recent technological, economical, cultural, and environmental phenomena in these realms.

Moves by industry, and governments worldwide to tighten control over network rights and privileges are exacerbating tensions tied to citizens’ privacy, freedom of expression and demands for more transparency. Social media and the need for security are generating a move towards a more compartmentalised and fragmented Internet. The open-source economy which is thriving unlike any other, promotes free distribution and collaboration on products and ideas on a global platform, which drives a self enhancing diversity of production models. It is an exciting alternative to the capitalist let consumer based economy (of which abundant architectural evidence exists). The problem is this: internet collaboration has enabled the creation of “use value” in a way that totally bypasses the normal functioning of our economic system. This is merely the latest in a long line of human constructs whose logic has been up ended by emerging technologies.
Historically, urban settlements developed at natural hubs in waterways, rail and road infrastructures, and expanded around additional man-made routes, services and infrastructural capacity. Explosively, with the growth of city regions and the increasing interaction between multiple systems, transportation networks became more complex until their significance as networks superseded their functional significance around the transportation of people and goods. The cornerstone of urban capability, networks are critical to the functioning and progression of cities.

Repurposing the logic of previous infrastructural elements whose functional premise has been over turned by technological progression is an ever increasing necessity, as the longevity of its relevance was not reflected in the physical form.

This project aspires to re-imagine the conditions of expired infrastructures and overlay them with a purposeful interpretation of function, about which a new urbanism might spawn based on the logic of the data nation within the information age. An expression of the digital economy, collaborative consumption and the production, trade and sharing marketplaces for the worlds newest and most valued raw material, data.

This is by no means a question of futuristic science fiction architecture. The ambition is to reflect a humane architecture that conceptualises the genuine complexity of human beings and their environment, drawing on the logic of a data infrastructural city program, framed by the physicality of a structuralist theory of systems and networks.

Spawned around a data centric infrastructure, my project mediates between the physical and the digital. A ‘data mine’, exchange, ‘network embassy’, and computational infrastructure, based on the west coast of Ireland, connected via fibre optic lines to an offshore server bank, and subsequently to Iceland and New York, would be climatically and geographically plausible for the conception of an urbanity bred in the information age. It would be an operating System, & research ‘instrumentarium’ for a new generation of scientists/farmers/miners/traders of the “network nation” designed for the correct evolution of face-to-face interaction in public space considering the present in relation to future expectations and avoiding the introverted nature of personalised remote communication.

Seattle Waterfront Highway saw a similar proposal to the New Orleans City move whereby an infrastructural element whose premise was no longer valid would be replaced by a structural system, the logic of which was more reflexive and contemporaneous with the cities requirements. An inhabitable infrastructure with a ‘Plug in City’ styled nature sought to reflect a ideology with a definite lifespan and design accordingly.

Limerick Citys Networked Surface, a variation in this series of experimental proposals which saw the employment of a parametrically malleable canopy encroach the urban sphere based on network system operations and local environmental data, with the view to tangibly reflecting the urban influx of system forces, the socio economic impact, and provoke cultural collaboration in a public sphere.
The County of Mayo on the west coast of Ireland despite being the third largest of Ireland’s 32 counties in area is only 15th largest in terms of population. National population growth, increased urbanity and an ever increasing reliance on contemporary systems have seen a shift away from the traditional patterns of operations here. A landscape once shaped by agricultural patterns of settlement which were intensely local, has seen in more recent times a decline in population density greater than any other region in the country. The north of the county is largely covered with areas of extensive blanket-bog, whereas the south has a more productive agricultural landscape.

Within this realm of investigation, Mayo has proved extremely insightful as a study of landscape and settlement systems, infrastructural logic, with local and global actors. At the larger scale, the county has; The Corrib Gas Line, Knock Airport, and Mayo’s electrical generation capacity as manifestations of the ‘Network Culture’ in the physical space which have and continue to alter the landscape in unpredictable ways. They have superseded the logic of existing social and cultural patterns, and infrastructures. The north-west of Mayo has some of the best renewable energy resources in Europe, in terms of wind, ocean wave, tidal and hydroelectric generation. The Corrib gas project which involves the extraction of a natural gas deposit off the northwest coast of Ireland, includes a development of the Corrib gas field, off the coast of Mayo and constructions of the natural gas pipeline and a gas processing plant. The project has attracted considerable opposition locally and attracted a lot of international attention.

One of the most remarkable and influential developments of infrastructural importance in the past fifty years, has been latency in the transfer of data through fibre optics. The Emerald Express is a proposed 5,200km cable from US to Ireland, with a spur linking to Iceland will commence operations in 2013. The cable will have a transmission rate of 100 Gbps per channel with an expected latency of less than 62 milliseconds round trip from New York to London, via County Mayo. As transatlantic demand is expected to outstrip capacity by 2015 this cable linking Shirley, New York and Belmullet (Mayo) with a branching unit to Grinkavik (Iceland) will be one of the most important infrastructural elements of the next decade. The speed of computing doubles every 18 months and transatlantic capacity demand is expected to increase almost nine fold by 2017. As two data–centric nations, Ireland and Iceland are both climatically and geographically suitable for development in this industry. Innovation is constant but proximity and efficiency are essential in the maintenance of our data dependant economies and services, establishment of viable trade links and the sustainability of a dominating ‘Network Culture’.

This would make Mayo, as the western edge of Europe, an important nodal point in the global system of ‘Western’ culture and trade. If historical basis were a method by which to predict future development; around the employment of an influential infrastructure such as this, a new city fabric would emerge here at the edge of the Atlantic. However as the systems and networks of ‘The City’ have altered beyond our realm of understanding, and a new conception of urbanity is continually evolving, it is difficult to surmise with any accuracy the extent of the physical manifestation this will bear on the landscape.
The proposal, or edifice of architectural intent has taken the form of an exposition. A temporal installation in a landscape to reflect the ever fleeting logic of a ‘Network Society’. The program aims to speculate on a variety of functional typologies which as yet have very little precedent in the design of a physical manifestation but could be reasonably understood as a methodology in the trade and collaboration of data relative to technological advancement.

Parts of the program include:

The offshore server rig: Reappropriated Gas/Oil drilling platforms for the housing of a server farm in international waters (outside of legal jurisdiction) proximate to the grounding in Mayo.

The Network Embassy: For the international relations of the data network, and the management of complexity systems throughout

The Network Exchange: An open democratic forum for the trade and collaboration of data, face to face, and through the network.

Processor: Creation of a distributed planetary computer of enormous power. Such computational power, co-located with the gigantic storage that holds the data from all the incoming data streams, will enable faster-than-real-time simulations of many aspects of our physical world.

Data Flow Visualisations: Visualization fulfills two purposes in a data workflow: explanation and exploration. Focusing on the accurate representation of specific knowledge sets and the unique needs of the end user receiving that content

The program, the system, and the structure are scalable, with no fixed beginning or end. The process is in ever contested change and the outcome is as yet unclear. It explores the scope to which the information age may alter the scope of designers, and the realm within which they operate.
Investigating passage of organisation to structure, the passage of design to building, and the passage of building to experience, through a methodology with particular focus upon the architectural or spatial edifice, analysing the “logic” of technological evolution and driving a reassessment of physical, virtual, and digital reasoning, with a view to manifesting and architectural proposal. Structural tests focused on the experimentation of the relationships through scalable interdependency of elements which unite to form systems.

Central to this study was a search for a structural idea, or logic which was tied to its own reasoning, and reflective of a style, work method or ethos of a structured/networked/systematic age. Tensegrity became the pervasive structural logic for a number of reasons: Its efficiency of material, a geometrical complexity which meant an entire structural reliance with little or no structural redundancy. The ‘spiral type’ member developed was born out of investigation with the logic of tensegrity and the methods by which we conceptualise cyclical data over a time period. It consists of a number of independant compression elements which ‘spiral’ in one direction, that are bound together by contiguous tension elements which spiral in the opposite direction. Its a structure that responds very interestingly in both directions.

Subsequently the logic of the structural system developed was translated onto a computational system of data manipulation for further experimentation and testing. This was to test the reasoning by which we judge structural compatibility and rapidly offer a host of geometric alternatives based on the same concept, but reactive to the feedback of its own limitations and effects! This, as a form of parametric modelling, was as much an analysis of the rational by which we design, as it was of the tool itself.
Above: Sketch Model indicating the structural layering
Below: Program dynamic diagram
Right: Proposal Extent, Project path interpolated, connecting the mainland, existing piers and uninhabited islands, based on data concerning the topography of the bay bed, the current use patterns, and geometrical proximity.
Structural Floor Assembly: Contorted Space Frame Unit, within which the processors for secure usage are built.

To view assembly video: http://networknation.tumblr.com/ or use the QR code (right)
To view Environmental video: http://networknation.tumblr.com/
or use the QR code (Left)

Below: Landscape Elevation: Tower and gantry position within the Bay

Right: Still from Video: Building Section, structural floors, circulation and environmental system design
Structural Isometric, with services.

To view structure/facade relationship video: http://networknation.tumblr.com/
or use the QR code (right)
Above: Video Still: Elevation showing tidal relationship to cooling services, activity deck and docking activity.
To view tidal video: http://networknation.tumblr.com/
or use the QR code (left)

Below: Video Still: Activity Deck, Public Data Contains, Cooling Plant, and Structural Frame
Below: Video Still: Proposed structural floors being floated into the bay
To view Time Lapse video: http://networknation.tumblr.com/
or use the QR code (Below)

Above: Video Still: Port Function of Proposal within Clew Bay
To view Time Lapse video: http://networknation.tumblr.com/
or use the QR code (Below)
Structural Interdependence
Structure and Skin
Faceted Facades
Below: Activity Deck Video Still
To view Time Lapse video: http://networknation.tumblr.com/
or use the QR code (Below)

Above: Processor Floor Video Still: Scene within the towers structural floor and cold aisle.
To view video: http://networknation.tumblr.com/
or use the QR code (Below)
Below: Trading Deck Video Still
To view video: http://networknation.tumblr.com/
or use the QR code (Below)

Above: Visualisations Floor Video Still: within the towers open floor, and Clew Bay beyond
To view video: http://networknation.tumblr.com/
or use the QR code (Below)
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And to those at 23... 'you know..... yeah... you know...'