I, Jill K. Pugh, hereby submit this work as part of the requirements for the degree of:

Masters of Architecture

in:
The College of Design, Art, Architecture and Planning

It is entitled:

Architecture in the Digital Age:

Community Space in Small Town America

This work and its defense approved by:

Chair: Gordon Simmons
Michael McInturf
Architecture in the Digital Age:
Public Space in Small Town America.

A Thesis Submitted to
The Division of Research and Advanced Studies
In partial fulfillment of the requirements
For the degree of

MASTER OF ARCHITECTURE

University of Cincinnati
College of Design, Architecture, Art & Planning
School of Architecture & Interior Design

June, 2007.

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Digital technology has had a profound impact on contemporary culture—not since the advent of the Gutenberg Press has communication and the distribution of information undergone such a radical shift. No longer living in an Industrial Age, we are dealing with the Information Age.

Digital technology has introduced new materials, processes and methods to the conception, development and manufacture of architectural projects. The implementation of these technologies in design practice has spurred invention and development of new techniques. Computer technology has allowed the ability to simulate and calculate systems too complex for human imagination.

Despite the advantages of using digital tools in Architectural design and production, it has also lead to a proliferation of mediocre architecture. Rather than considering architecture in an age of newness, we should consider ourselves in an age of refinement.

THESIS PROPOSAL

This thesis asks how we can refine these advances in Technology to create responsible and meaningful public spaces, as well as how Architecture can have a social impact, acting as a catalyst for cultural change.

The emphasis of this project is not merely the production of a form as a function of digital techniques, but a refinement of those forms that are resultant of digital techniques. A mastery of progressive digital techniques is pivotal to moving forward in the field of architecture. It transcends the ability of computational methods, as the architect is challenged to control the form in order to endow each project with the desired affects. This rectifies the Architect with the role of the Artist, returning architecture to a sensuality that has been undervalued in Modernist and Postmodernist building.

Observing the shift in the American economy from an Industrial powerhouse towards an Information-based economy, I propose to use the new ideas towards Technology and Architecture to design an environment for the people of Rust Belt America to more gracefully transition into the Information Age.

Using the idea of Technology not only as a method, but also as a subject, I hope to show that our existence as an Information-based culture in the digital age should in fact be visible through our architecture. Reciprocally, I propose that a technology-infused architecture can insight the embrace of technology to a culture that has not yet accepted the cultural shift.
<table>
<thead>
<tr>
<th>IMAGE INDEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>SECTION 01: SOCIAL AND ECONOMIC FACTORS</td>
</tr>
<tr>
<td>DE-INDUSTRIALIZATION</td>
</tr>
<tr>
<td>POST-INDUSTRIALIZATION</td>
</tr>
<tr>
<td>THE INFORMATION AGE</td>
</tr>
<tr>
<td>COMMUNITY IN THE INFORMATION AGE</td>
</tr>
<tr>
<td>GLOBALIZATION &amp; THE GLOBAL VILLAGE</td>
</tr>
<tr>
<td>PLACE AND SPACE IN THE DIGITAL AGE</td>
</tr>
<tr>
<td>VIRTUAL SPACE</td>
</tr>
<tr>
<td>SECTION 02: NEW PHILADELPHIA</td>
</tr>
<tr>
<td>NEW PHILADELPHIA: HISTORY</td>
</tr>
<tr>
<td>NEW PHILADELPHIA: TODAY</td>
</tr>
<tr>
<td>CENTRAL BUSINESS DISTRICT</td>
</tr>
<tr>
<td>THREE SQUARES</td>
</tr>
<tr>
<td>PRIMARY SITE</td>
</tr>
<tr>
<td>NEW PHILADELPHIA AT THE CROSSROADS</td>
</tr>
<tr>
<td>SECTION 03: THEORETICAL &amp; ARCHITECTURAL UNDERPINNINGS</td>
</tr>
<tr>
<td>TYPOLOGY</td>
</tr>
<tr>
<td>DESIGN IN THE DIGITAL AGE</td>
</tr>
<tr>
<td>DIGITAL TECTONICS</td>
</tr>
<tr>
<td>SWARM INTELLIGENCE &amp; EMERGENCE</td>
</tr>
<tr>
<td>COMPOSITIONAL CHARACTERISTICS</td>
</tr>
<tr>
<td>REFINEMENT &amp; ELEGANCE</td>
</tr>
<tr>
<td>AESTHETIC CHARACTERISTICS OF ELEGANCE</td>
</tr>
<tr>
<td>ROLE OF THE ARCHITECT IN THE DIGITAL AGE</td>
</tr>
<tr>
<td>SUMMARY</td>
</tr>
<tr>
<td>SECTION 04: DESIGN METHODS AND OBJECTIVES</td>
</tr>
<tr>
<td>METHOD</td>
</tr>
<tr>
<td>SCOPE</td>
</tr>
<tr>
<td>PROGRAM</td>
</tr>
<tr>
<td>FORM GENERATION</td>
</tr>
<tr>
<td>REFINEMENT</td>
</tr>
<tr>
<td>OUTCOME</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
</tr>
</tbody>
</table>

Architectura in the Digital Age: Public Space in Small Town America.
SECTION 01


7B. www.cookscorner.com  
7C. The Fitness Store’s interior retail space. http://www.thefitnessstore.com/images/store80406g.jpg  
7D. www.fitnessstore.com  
7E. Employees at Roorbach flowers. http://www.roorbachflowers.com/arrangement.jpg  
7F. www.roorbachflowers.com  
8A. LED Wall. Data from four stereo video cameras is combined to locate and individually track up to 30 separate visitors as they enter and walk around the space. Upon entry each visitor is automatically assigned a “personality” by the 3-D tracking system and is in turn followed by individualized light colors and patterns. http://ledlightray.com/photos/Rockefeller.jpg  
SECTION 02


26A. Site Plan by Jil Pugh, December, 2006.


SECTION 03


   http://www.thomasmayerarchive.de/data/media/786/110ac20050705D5387.jpg

   http://farm1.static.flickr.com/68/190580243_0717b81236.jpg?v=0

41. Gaudí’s hanging models for Sagrada Familia. 
   http://www.gaudiclub.com/ingles/i_vida/fotobras/colonia/1102.jpg

42. Emergent Pattern from a flock of birds. 

43. Emergent Pattern from a flock of birds. 

44. Generative Diagram by O.C.E.A.N. North. 
   http://www.ocean-north.net/ (image no longer posted)

45. Lattice Diagram by O.C.E.A.N. North. 
   http://www.ocean-north.net/oldbackup/architecture/jyv/01.jpg

   http://www.ocean-north.net/oldbackup/architecture/jyv/05.jpg

47. Exterior view Jyvaskyla Music Hall. 
   http://www.ocean-north.net/ (image no longer posted)

48. OCEAN North Generative Diagrams for Ambient Amplifiers. 
   http://www.ocean-north.net/ (image no longer posted)

   http://www.ocean-north.net/ (image no longer posted)

50. Paolo Ucello’s painting Battle of San Romano. 
   Niccolò da Tolentino Leads the Florentine Troops. Tempera on wood, 182 x 320 cm, National Gallery, London. 

51. Birger Sevaldson’s depictive diagram of the structural organization of Ucello’s composition. 
   http://www.aho.no/staff/bs/phd/Computer%20aided%20design%20techniques.pdf


   http://architettura.supereva.com/files/20050825/01_c.jpg

   http://archrecord.construction.com/projects/portfolio/archives/images/0412_5_06.jpg

   http://architettura.supereva.com/files/20050825/02_c.jpg


   http://archrecord.construction.com/projects/portfolio/archives/images/0412_5_08.jpg


64. C_A_P: Reebok Flagship Store, Shanghai. 
   http://architettura.supereva.com/files/20050825/07_c.jpg

65. C_A_P: Reebok Flagship Store, Shanghai. 

66. C_A_P: Reebok Flagship Store, Shanghai. 

67. C_A_P: Reebok Flagship Store, Shanghai. 

68. C_A_P: Reebok Flagship Store, Shanghai. 

69. C_A_P: Reebok Flagship Store, Shanghai. 

70. C_A_P: Reebok Flagship Store, Shanghai. 
SECTION 04


64A. Layers of information to be folded into solution. Diagram by Jil Pugh, March, 2007.


SOCIAL & ECONOMIC FACTORS

De-industrialization has had a profound effect on the lives of small town residents—once thriving communities now struggle for economic security. The lack of physical and cultural structure to take the place of the dwindling local manufacturing industry has began to threaten the quality of life upon which these small Midwest towns were founded.

The post-industrial economic state of the 21st Century (regarded as an evolution from industry to information) has not been recognized—architecturally or culturally—by the American small town.

Designing a place to encourage the community to have free access to technology and information will enable the community to have more power in their own lives—allowing them marketable skills for the changing economic climate, a voice in local politics, and access to local, national as well as international information.

The history and culture of the small town should be respected, while the design of this site should benefit the existing modest urban center, as well as promote the exchange of ideas in the community.

I propose the design of a community place—that contains, but is not limited to a building—that works to physically, socially and economically benefit the small Ohio town of New Philadelphia based upon the prevailing theme of Technology. Technology will be viewed as a pivotal social element that must be embraced for a more viable future.

The objective of this project is to illustrate that the evolution of technology in architecture and urban planning strategies could effectively persuade the culture of Small Town America; showing that the resources for a more economically secure future are attainable, yet dependent upon the ability of the small town to adapt to the changing economic climate of our nation, as well as the world.

1A. Location of ‘Rust Belt’ within the United States.
DE-INDUSTRIALIZATION

De-industrialization of manufacturing towns has been a significant trend present in the United States for the past thirty years. Its effect has been devastating to the Midwest, especially for smaller cities. These small cities find themselves with vacant storefronts and dilapidated central business districts because the local factories that have economically supported the community have shutdown, leaving the people who stay stuck in lower-paying, service-sector jobs. While many feel obligated to move away from their hometown roots to find employment in another city, it is a difficult decision, as the personal attachment to the community has a strong history.

During the 19th Century, the geographic stretch between New York City and Chicago situated between the Great Lakes and Ohio River became the home to a dense network of manufacturing cities. These cities were fed by the ready sources of coal in the southern stretches, and iron ore deposits near the Great Lakes—these resources were crucial to the manufacturing industry. Rivers and lakes weren’t the primary transportation for long, a dense railroad network and canals were soon developed, supplying transportation routes that not only connected Midwest towns to each other, but also to the seaboard. An influx of immigrants in the nineteenth century supplied the manual labor. These cities in the Midwest were founded and grew to be the envy of the world, at the time, due to their economic and cultural success in the nineteenth century. Developing their own economies, policies and aesthetics, cutting-edge urban planning, architecture and literature helped gain respect throughout America. These cities owe the livelihood to the local manufacturing plants and steel mills.

The Midwest had its heyday in the early 20th century, and helped transform the urban landscape—freeing the urban streets from horse and buggies and introducing as well as adopting new technologies. Maturity was reached around the time of the First World War, and the first signs of decline were seen between 1920 and 1945 when the Depression and labor conflicts took their toll on the industrial Midwest. In the year 1981, Joel Garreau, the author of ‘The Nine Nations of North America’ referred to this region as The Foundry, and the industrial core of America. Only ten years after this publication, James Patterson and Peter Kim published a book under the title ‘The Day America Told the Truth.’ In this book, the same geographic region defined by Garreau was further divided into two ‘moral regions,’ that of the Metropolis and that of the Rust Belt. While the Metropolis excluded from the Foundry the regions surrounding New York City and the Washington D.C.-Baltimore Corridor, the remaining areas were then dubbed the Rust Belt.

There are several explanations for the lessening demand for American steel, but one commonly overlooked reason is that of America’s maturity. While the foundry flourished during the time of America’s rapid building, and the advent of the skyscraper, the amount of construction tapered dramatically along with the need for steel. Other nations were approaching a time of rapid growth and building their own steel mills to avoid importing American steel. The automobile industry, which once consumed massive quantities of steel, is now turning to more lightweight solutions such as aluminum, graphite and plastic. To further problems, America is dealing with the expensive prospect of cleaning the steel production process in order to reduce pollution, while other countries do not follow such regulations and produce steel regardless of environmental effects. Another key element may be that the foundry had priced itself out of the market with high-priced unionized labor, high land costs, high-energy cost and high pollution-control costs.

The dwindling market causing factory shutdowns is visually recognizable throughout the city, full of vacant storefronts, out-of-business signs, unemployment lines and loitering people. Survival takes priority over maintenance, education and other community functions. Once vibrant cities become dirty, empty and desolate shells of what they used to be.

2A. Demolition of the Ohio Works Steel Mill.
POST-INDUSTRIALIZATION

The problem of declining aesthetic qualities of the city is no more than an effect of the greater problem: a changing economy that has abandoned the Midwest, and the government’s refusal to invest in the futures of the Midwest.

With foresight and revision in policy, the economy of small towns has the capacity to grow in productivity, ultimately determining the outlook for living standards overall and allow the deep healing that is needed in the Rust Belt.

Being able to adapt to changes in technology and economy is tantamount to economic and cultural progress. While the steel industry has ‘bottomed-out’, new industries have arisen; service sectors dealing in telecommunications in specific are growing rapidly as we enter an age of information as opposed to the previous manufacturing age.

What does such a future hold? Some suggest that the evolution of productivity growth in services most likely will depend on developments in technologically progressive areas such as information technology, as well as on changes in competitive structures (as opposed to the unionized structure of industry) within the service sector. Technological developments will likely make it feasible for some services to grow faster than others, and the service sector will thus undergo significant internal structural changes. Product innovation in manufacturing will continue to be important, inasmuch as it provides spillover effects to productivity growth in services.

Barry Bluestone and Bennett Harrison have outlined a ‘Main Street Model’ Policy to counter the ‘Wall Street Model’ that is more advantageous to help small towns cope with this enormous change. Following these principles establishes hope for an equitable future for the economies most hit by the collapse of the manufacturing, particularly steel, industry. These are lofty and idealistic goals that aim at changing not only government policies, but also at getting private businesses to invest in the effort. One of the most important aspects of this model is investing in education. Because the service sector has a more diverse set of wages based upon the qualifications and skills of the laborers, more education is needed. The government must invest more in the future, and worry less about the immediate future, looking to the long-term goals of success.

If more healthy opportunities are established for the Midwest—different choices of employment, and more security—then the real change can occur. Until the residents of the Midwest have the foundations for a sustainable future, nothing can be done to aesthetically enhance the urban core. Revitalizing an atrophying community is futile and our efforts should look towards shifting economy and policy to counter the decline of the Rust Belt.

The fact is that many of these people who have been raised in an industrial culture do not hold many skills that are considered marketable by today’s standards. The nation will likely never again need a force of manual laborers the way they did through the beginning of the twentieth century. It is negligent as a country to take away as many of the industrial jobs as we have and not give the opportunity for these people to recover and look to the future.

<table>
<thead>
<tr>
<th>Wall Street Model</th>
<th>Main Street Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encourage unlimited free-trade.</td>
<td>Establish fair trade based on labor rights and standards.</td>
</tr>
<tr>
<td>Maintain downward pressure on wages.</td>
<td>Foster rising wages.</td>
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<tr>
<td>Encourage employment insecurity.</td>
<td>Improve employment security.</td>
</tr>
<tr>
<td>Derregulate domestic markets.</td>
<td>Create incentives for corporate best-practice policies.</td>
</tr>
<tr>
<td>Impose conservative Federal Reserve Policy.</td>
<td>Allow expansionary Federal Reserve policy.</td>
</tr>
<tr>
<td>Derregulate global markets.</td>
<td>Regulate global speculation.</td>
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</tbody>
</table>

3A. Wall Street Model v Main Street Model.
THE INFORMATION AGE

For the sake of discussion, the term information must be defined. Information is “a collection of facts and data.” It can also be defined as “the communication or reception of knowledge or intelligence.” It is a constantly changing entity. Distribution of information, as used in this writing, is allowed primarily by media or by technology. Technology [media] is pivotal, as it is the medium. Media is the plural word of medium, which is defined as “a middle condition or degree: a means of effecting or conveying something.” Technology/Media (these words may be used almost interchangeably) in the form of televisions, radios and computer all receive continual streams, transmitted through air or wire, of data and information for our consumption. This information is used in a free exchange of ideas and in its full realization can be considered knowledge.

Not since the Gutenberg Press has there been such a radical change in communication and the distribution of information. The internet has become the ultimate tool in the accelerating flow of relevant information. This plethora of information is gathered and stored digitally, by converting it to a universal binary code. As opposed to the analogue transmission of information, digital information is stored without degeneration. This gives people the ability to collaborate regardless of geography and share and generate new information, recipients have the ability to glean this resource and use it for their own purposes, such as to build more ideas and redistribute them. This instantaneous exchange has allowed people to work progressively together.

Economic theorists such as Peter Drucker have observed that an abundance of technological advances have thrust us into the post-industrial Information Age. Both the rules and practices of the Industrial Age must be rewritten to fit the Information Age. The Information Age is not an era of scarcity, rather one of abundance, where know-how skills are much more important than physical resources. Mass-interconnectivity has brought the idea of a ‘global village’ even closer, with electronic networks such as Ebay and Google revolutionizing and leading a new economy.

Richard Lipsey, an economist, has outlined several ways in which our culture will change because of new technologies, they include:

- Big changes in regional patterns of industrial location (globalization).
- Big changes in required education (learning new skill sets).
- Big changes in infrastructure (e.g., the internet).
- Big changes in rules and regulations (intellectual property, antimonopoly, etc.)
- Big changes in the way we live and interact with each other

It is certain that technology has changed the economic climate, favoring service sectors and information over the manufacturing industry. A small town’s ability to adapt to this shift, and become comfortable with technology will give them the benefit of a continual access to endless amounts of information as well as marketable skills. Because the nature of information is a ‘virtual’ resource, rather than an industry that requires heavy machinery as well as ample amounts of land and facility, information jobs can be maintained almost anywhere. This flexibility allows the tie to a physical plant to be cut, and jobs to be available more remotely throughout the country.

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4A. Decline of Manufacturing Industry with Growth of Information Industry.

![Graph showing decline of manufacturing industry with growth of information industry.](image-url)
COMMUNITY IN THE INFORMATION AGE

We have technologically extended our senses to observe objects too small or too distant to see directly. The list of such devices is large—ranging from radio and television to digital technologies and computer networks. We are increasingly dependent on such technologies to sustain our social and cultural reality. They are part of being human in our time.5

Today our lives, both as a community as well as individuals, are split by the part that lives in an electrical world concerned with relative speed, and the other part that lives in an electronic world, concerned with absolute speed.9 Relative speed is that of mechanical transportation and industry, while absolute speed is the transmission of information in real time.

A connected screen is more than a "window on the world"; it is a searchlight and a hand right into it. It is also the portal through which minds interact and leave common traces. The private mind is newly connected to other people via cyberspace and that relationship is spatialized as well as specialized. Cyberspace is visible on screen. Otherwise, it is hidden in wires and waves and pulses. It is like the human nervous system, under the skin of culture. It is quite certainly a “space” because it has an inside and an outside (the wired versus the not-wired), and a deep interiority (the depths of connectivity and hypertextuality).10

The social implications of the Information Age are changing who, how and why we communicate. As the sociologist Manuel Castells has noted,

"Technological revolutions are all characterized by their pervasiveness, that is by their penetration of all domains of human activity, not as an exogenous source of impact, but as the fabric in which such activity is woven.”11

Technology, particularly the Internet, is definitely changing social relations. The convenience provided by the Internet have led some people to turn to the Internet for emotional and psychological needs. The Internet has become a means and method not only for doing business, but also for reaching people on a social and personal level. Castells describes the impact of the Internet as people organize themselves into social networks. “Networked individualism,” this idea is “a social pattern, not a collection of isolated individuals.” These individuals build networks, both on-line and off-line, based on their interests, values, affinities, and projects. Because of the capabilities of the Internet for communication, people will build virtual communities that are different from physical communities. These communities, however, are not necessarily less intense or less effective in binding and mobilizing people. Furthermore, a communication hybrid is now developing in our societies, bringing together both the physical and the virtual space as the material support of networked individualism.

The Internet and the digital revolution have also helped establish a group considered “sovereign individuals.” These are individuals who are empowered because they have access to new learning opportunities; are able to sell their own ideas, services or products directly to others; and can access medical information to make their own choices about health care. These sovereign individuals also have reliable and up-to-date information about government policies and programs that allows them to become better citizens.12

The urban topics consider the possibilities of engaging and empowering the American small town with information. An agricultural-turned-industrial society, America has shifted into an evolved high-tech information-based society. A rift has formed between metropolitan economic success and small town frustration. Is it possible to reconcile Small Town America with high technology to offer the quality of life and opportunities on which these small towns were founded?

Small towns are considered to be conservative and resistant to change. While the attitudes in small towns that view technology and media as difficult, or even opulent, with the possibility technology and media present, the general public might be more open to the idea when they are encouraged to learn how to use these tools to their advantage. Technology and media are not physically intrusive, and are more user-friendly than ever. Creating an accessible environment that is comfortable for the community to use and gives visibility to the presence of information exchange already existent within the city may likely have the capacity to persuade the culture to be one that more easily accepts information and technology in their collective daily life.

The digital divide separates the information rich and the information poor. The Organization for Economic Cooperation and Development defines the digital divide as the difference between individuals, households, businesses and geographic areas with regard to (1) their opportunities to access the Internet and (2) their use of the Internet for a wide variety of activities. It
is the gap between those who have real access to information and communications technology and who are able to use it effectively, and those who don’t have such access.¹³

Lack of access to Internet provided goods and services poses social and economic disadvantages. More and more, developing countries are recognizing that they cannot compete in the new global market unless they take advantage of the Internet revolution. Countries that do not undertake measures to enhance their communications infrastructure risk not just being marginalized but also being completely bypassed in the new global order. The experience of a number of countries, like Singapore, Malaysia and Korea, demonstrate that bold actions in bringing their countries into the digital age pay off.

The reasons for introducing a means for small town residents to utilize technology as well as access information are numerous, and the risks of not introducing it are disastrous. Information technology offers a connection with the world at large, while giving individuals a unique voice. While transnational conglomerates typically control media, a new trend in micro-media is allowing the average citizen to take control of media for their personal enjoyment, commerce and even as a political tool.

The impact of accessibility to media in small communities is thoroughly explored by Kevin Howley,¹⁴ who concludes that accessible local media supports the fundamental idea of democracy, while giving even the most diverse and specialized communities a common identity.

GLOBALIZATION & THE GLOBAL VILLAGE

Internet connectivity and digital technology have also transformed how and where goods are produced, but it has also impacted how goods are exchanged. Mass connectivity and eCommerce have the power to change our ideas of location. The significance of location in the Information Age can be seen in one of two ways:

1. It can be seen as diminishing the importance of location: using appropriate technology and methods, virtual marketplaces and virtual organizations that offer benefits of speed, agility, around the clock operation and global reach can be created.

2. or, on the contrary, reinforcing the idea of location in some other economic fields, by the creation of business clusters around centers of knowledge, such as universities and research centers having reached world-wide excellence.¹⁵

It is no longer necessary to be located within an economic hub to successfully operate a business. Access to fiberoptic cables and the internet is now more beneficial than physical location.

The adoption of a culture of information by the small town can offer commerce and employment opportunities. Internet access of information uniquely allows for a remote exchange of information and even resources, allowing for the opportunity of employment or vending of goods to and from the outside world. Many people can now be located in more remote regions, such as small towns, while working for organizations and institutions located elsewhere. These people are able to have a distant employer while they can work from their remote home. Independent employment is also possible, as a person can establish internet-based businesses, and employ their self. There are many opportunities available for employment from high-tech skills.

Inspiration can be taken from a small town in Michigan called Manitowoc. For the past 20 years, it has suffered from these problems of de-industrialization. Now it is proof that the internet can contribute to downtown revivals. The internet is propping up bricks and mortar downtown, acting as a mainstay for the stores that have helped Manitowoc establish what development specialists call a ‘recreational’ shopping experience. The internet is allowing small stores to develop the niche products that shield them against the threats of big-box retailers. It enables them to turn
over their inventory much more quickly, so owners can add more products and variety to their sales floors. That, in turn encourages more interest and customer traffic, diversifies the revenue stream and contributes to downtown street life.\footnote{16}

In 2002, the Small Business Administration published a study finding that 61 percent of small companies managed a Web site, and 35 percent were selling their products online.

Regardless of whether or not a person is able or willing to work remotely, it is beneficial for people to be familiar with the skills that are demanded in the world of the Information Age. These skills open the doors to many jobs in myriad industries. Even manufacturing is getting more complex, and requiring more skills than mere manual labor. Having these skills is imperative in marketing one’s self to employers.

7A. Cooks Corner, located within the Central Business District of Manitowoc.

7B. www.cookscorner.com

7C. The Fitness Store’s interior retail space.

7D. www.fitnessstore.com

7E. Employees at Roorbach flowers.

7F. www.roorbachflowers.com
PLACE & SPACE IN THE DIGITAL AGE

In the past, two dimensions have defined matter: mass and energy. Paul Virilio has suggested that there is a third: Information, which has become more apparent with the advent of new computer-technology. Information is constantly changing, always in flux. Architecture, for the past centuries, has focused on the static (resistance of materials, equilibrium, and gravity). At the time of Paul Virilio’s interview (1993), architecture had not yet found a way to appropriately consider the realm of information, which is constantly in flux. While for centuries, architects had been able to answer to mass and energy in architecture, information remains fugitive. He realized the importance of responding to information through architecture:

Today, information counts more than mass and energy. The third dimension of matter takes the place of the thing itself.17

Form is no longer defined as something static, but something constantly changing and re-emerging in new configurations. One of the consequences of virtual space (or a digital culture) on architecture is a radical modification of its dimensions. Time and Movement must be integrated into architecture as spatial parameters. Deterritorialization and Decorporation run parallel with the dematerialization of architecture.18 Matter is disappearing in favor of information, just as architecture does—not in the sense of ceasing to exist, but rather in the state of disappearance, as an aesthetic change.

Our attempts to consider the dimension of information have been superficial ‘dematerialization’. The application of technology and digital media to architecture (in the form of display walls comprised of LED screens, etc.) is merely a metaphor for the dissolution of boundaries—because fundamentally, the digital screen wall and glass partitions function no differently than a conventional wall.

While the invention of the printing press structured cultural and social consciousness, reinforcing space, as we know it, the result of ‘cyberspace’, and a ‘connected culture’ is a new continuity between private mind and the world. This ‘space’ that is hidden in wires, waves and pulses acts as a portal through which minds interact and leave common traces.
VIRTUAL SPACE

Cyberspace is a specificity of virtual space. It is a space that is no longer subject to gravity and the physical constraints of real construction, but subject to electronics, electromagnetic waves and electrical current. While cyberspace is the result of the network of information called the World Wide Web, we have been designing virtual spaces to cover our need for sensual experiences for centuries. ‘Tele-topology’, an idea presented by Paul Virilio, articulates the splitting of architecture into two separate functions. The first branch of architecture is occupied by the unsophisticated spaces necessary only for humankind’s physical survival. The second branch, however, is a more subjective mode that seeks out these sensual experiences. In early civilization, the Romans covered the walls in glass to reflect the light of the stars and moon to create an artificial setting for their night parties and orgies. This was later refined by the French romantics in the construction of the Chateaux de Versailles, and its ‘La Galerie des Glaces’ or Hall of Mirrors. These events and spaces split society into two groups, those poor individuals who toiled at day in the concrete existence of corporality, and those rich individuals, who lived at night in the opulence of virtuality. It is similar today, with society being divided into two categories, although the division is different. There are those who live in the electronic world of relative speed (mechanical transportation) and those who live in the world of absolute speed (transmission of information in real-time). In other words, those who are ‘connected’.

This process of virtualization is touching upon the very concept of space itself, and even transfers into our experience of the world in a sequential manner. Biologically and psychologically, we already experience our world in a sequential manner. First is that of our eye’s blink that communicates a series of snap-shop like captures to our brain for observation. The other is our experience of sleep. We experience time in a series of cuts; even during the day we have periods of micro-sleep that are necessary for our brain to interpret the constant streams of information.
The alcove, for example is a kind of virtualized room. The vestibule could be called a virtualized house. A telephone booth then virtualizes the vestibule: it is almost not a space, nevertheless it is a place of personal encounter.

-Paul Virilio, 1993

10A. "Virtual Space" Telephone booth.
THESIS PROPOSAL

The economic benefits of accepting technology and information as an important forces is beneficial both to the individual and the community. The individual is learning new skills, and the ability to directly learn the first-hand knowledge he or she desires to access. These resources also give the individual the ability to participate more directly with the community and local government. This exchange of information through the community becomes another form of communication integrated into the social atmosphere. The benefit to the ‘virtual’ realm of the community is supported by its physical presence in the central business district. Not only filling a derelict void in the urban fabric, the physical presence also persuades more people to frequent the central business district.

Most idealistically, this project questions the extent to which architecture impacts culture. Architecture is customarily viewed as a result of culture, but what influence does it itself hold on the culture in which it is situated? Is architecture potent enough to act as a catalyst for cultural change?

Architecturally, this thesis searches for an appropriate utilization of digital techniques to devise an architectural object that is not alienating to the conservative small town individuals, but has the ability to express the character and significance of digital technology in a sensitive and successful means.

Functionally it is concerned with urban strategies for designing a thriving and sustainable urban core. Recently, within the discipline of Urban Planning, technology itself has been viewed as an additional facet of a city, akin to typical physical urban infrastructure. ‘Wiring’ a city is the most fundamental concern, with designing a ‘connected’ community that allows a city’s citizens to fully interact and participate with the community and its operations.

This thesis seeks to reveal an architecture that embraces the idea of digital technology as a strategy as well as a subject, looking ahead toward a promising future. This architecture is a direct appeal to the existing culture of the specific locale—an architecture that is truly accessible to, and utilized by the citizens of the town. While it’s founded in the locale, it broadens its vision to the information and knowledge of the near and far. It becomes a place where the citizens can have their voice, while learning the invaluable tools that predominate the twenty-first century workplace.
ENDNOTES >> SECTION 01

12 Manuel Castells, *The Internet Galaxy* (1999), P 130-131
13 http://www.bridges.org/digitaldivide/index.html
NEW PHILADELPHIA

LOCATION
Degrees   N 40.4747  W 81.4402
Degrees, Minutes N 4002.482  W 8126.402
Elevation 910 feet.
Land Area: 7.8 Square Miles.
Accessible by Interstate 77.

RELATIVE LOCATION
Nearest City with pop. 50,000 Canton (22.4)
Nearest City with pop. 200,000+ Akron (40.7 mi)
Nearest City with pop. 1,000,000+ Philadelphia, PA (434 mi)

POPULATION
Estimated population in July 2005: 17,430
White Non-Hispanic (96.1%)
Median resident age: 38.1 years
Median household income: $33,235 (year 2000)
Median house value: $87,800 (year 2000)
High school or higher: 83.2%
Bachelor’s degree or higher: 14.6%
Graduate or professional degree: 4.6%
Unemployed: 3.7%
Never married: 22.2%
Now married: 53.5%
Separated: 1.4%
NEW PHILADELPHIA: HISTORY

New Philadelphia is the county seat of Tuscarawas County, Ohio on the Tuscarawas River. It is an historic small city in Northeastern Appalachian Ohio. It was first incorporated in 1808, and grew according to a well-implemented plan, designed by John Knisely, inspired by the gridded pattern of Philadelphia, Pennsylvania.

John Knisely happened to choose the site of New Philadelphia as a result of his fondness for hunting. In the autumn of 1803, he with his son Samuel went on a deer-hunting trip into the Ohio Country. Crossing the Ohio River, just above where Steubenville is now located, they followed an Indian trail to the Moravian Mission Village of Schoenbrunn, which had been established in 1772 by David Zeisberger. John Knisely was greatly impressed by the natural resources, the beautiful plains, the fertile river bottomlands, and the fine stand of oak timber in the Tuscarawas River Valley. He also noticed that a big plateau in the bend of the river, with numerous smaller valleys centering there, would make a beautiful site for a town. John Knisely also persuaded 33 pioneers to accompany him, as they formed the nucleus of the new town. In 1804, Ohio was almost a complete wilderness, with the exception of Marietta, Cincinnati, the Moravian Missions and a few other small clearings in Eastern Ohio.¹

Mining interests and the manufacturing of steel (canned goods, roofing tile, sewer pipe, bricks, vacuum cleaners, stovepipes, carriages, flour, brooms, and pressed, stamped, and enameled goods) sustained the people. In 1900, the population was 6,213; by 1940, the population grew to 12,328. As of the 2000 census, the city had a total population of 17,056.²

At one time, the Central Business District was thriving; trees lined pedestrian-scaled streets full of restaurants, a variety of shops, a theater, and historic courthouse. Three central squares organized the urban layout, and gave the residents a formal green space. The present public square, or upper market square, called Franklin Square, is the present junction of West High Avenue and Fourth Street. A lower market square called Washington Square still exists at the junction of East High and Beaver Avenues.

1. An extract of the text is shown.
2. An extract of the text is shown.
17A. In 1882, the county’s third courthouse was designed by architect Thomas Boyd and built for $98,860. On October 25, 1882, over 10,000 people attended the cornerstone-laying ceremony after a parade that converged on the Public Square.

17B. The lighting of the “Welcome to Our City” sign atop the Anderson building drew a large crowd on September 24, 1912. Over 3,000 people gathered for the occasion.

17C. In 1881, Ernest Schmidt erected the Schmidt (Sherman) House on North Broadway just north of the courthouse. In 1883, the Grimm House was demolished, and Harrison Kail erected a large three-story brick hotel on the northeast corner of Broadway and Front (later known as the Empire Hotel).

17D. On August 23, 1877, there was a double parade—one for a circus in New Philadelphia and one in Dover on the same date. They passed each other on Tuscarawas Avenue. In 1895, the village was advanced to the status of city, and in 1898, Public Square was paved providing the city’s first paved street.

17E. In 1902, the Belmont Stamping and Enameling Company organized and built a plant in New Philadelphia that would later become a flourishing manufacturing plant that continued for almost half a century.

17F. In 1869, Burry built a large brick building on South Broadway. The Burry building housed the Albert Reiser Grocery and the Albert Reiser Saloon. Today the building is owned by Attorney Michael Johnson and houses numerous businesses including the law practice of Johnson Urban and Rang.
NEW PHILADELPHIA: TODAY

New Philadelphia suffers from the issues plaguing many small towns within the American Midwest. It has an aging population, most of whom never attended college. Residents more often than not have been born and raised in New Philadelphia, creating strong roots for the residents. Family and community ties keep many people close to New Philadelphia.

Most residents graduate high school, but many do not continue into higher education, rather they work in the construction or service sectors. The healthcare industry is beginning to grow with the aging community.

Founded upon local manufacturing plants such as GRADALL, the manufacturing industry has employed twenty-eight percent of the population. Today, New Philadelphia has not lost all of its industry, but unemployment is high, and local plants are threatening to leave. This high percentage of unemployment, coupled with the new presence of national chain retailers such as Wal-Mart located at its perimeter, have pulled life away from the downtown area, leaving struggling independent retailers and only a few cafes.

The median household income is lower than the national average, but so too is the median house cost. Most people live in modest single-family homes, and have a daily commute of eighteen minutes. There are many historic homes within the downtown central business district, but housing is also beginning to sprawl out into the more rural areas.
CENTRAL BUSINESS DISTRICT

Daytime population change due to commuting: +2,872 (+16.8%).
Workers who live and work in this city: 3,589 (43.8%).

The Central Business District remains the focal point for local economy. Peripheral developments at the interstate connections have started to drain some of the potency of this CBD with their national-chain retailers and big box developments. However, many local doctors, lawyers, businessmen and small retailers are still located within the CBD along with the Civic employment and Historic Courthouse functions.

The CBD is the most dense area within New Philadelphia, and remains organized in a highly regular gridiron layout. Sidewalks flank the two-lane and one-way streets and some irregular trees and plantings are maintained along these sidewalks. New Philadelphia holds the title of 'Tree City USA' because of the number of trees, but the trees lack any organization.

Much of the quaint charm of the New Philadelphia Central Business District has been decayed, demolished or covered up with vinyl siding and large, plastic signage. Ignoring the proportional and material subtleties of the historic buildings, people have constructed additions or alterations to suit their needs, while planners in the city allowed parking lots to consume green spaces and congest their main streets. Lots have been subdivided and a congestion of small buildings clutters the Central Business District.

There are many historic masonry buildings that remain. Some mid-century buildings have filled in gaps, and a general disregard for material has allowed many business owners to make repairs or rehabilitations with illogical building materials.

Despite on-street parking on nearly every street, many businesses have divided their lot and made curb-cuts in order to enable off-street parking. The overall effect of the parking situation is that of a disproportionate amount of paving for such a small community.

Regardless of the negligent aesthetic quality existing today, the Central Business Districts continues to house a number of community activities. Seasonal decorations are threaded through the streets, and there is even a sound system that plays music on the street every day. Small festivals and parades occur during the summer, which fill the streets with local residents.
20I. Playground at the elementary school.

20J. Ice cream shop near high school.

20A. Typical intersection situation of the CBD.

20B. Quaker Theater.

20C. Welcome to Our City Sign across from the Court-house.

20D. Lamp post with New Philadelphia Banner.

20E. Historic home between Courthouse Square and Washtion Square.

20F. Historic Cemetary.

20G. Typical three-story masonry building of CBD.

20H. Ice cream shop near high school.
21A. John Knisely Municipal Center.

21B. Sidewalk detail near Washington and Franklin Square.

21C. Dilapidated historic building.

21D. Sidewalk detail near Courthouse Square.

21E. Central Elementary School.

21F. Relief detail.

21G. Local Retailers.

21H. Masonry building texture.

21I. Local Italian Restaurant in a historic home.

21J. Store front glazing.
22A. Contemporary view of CBD with two existing squares indicated.

22B. Franklin Square.

22C. Courthouse Square.
THREE SQUARES

At the turn of the 19th century, John Knisely designed the three squares of New Philadelphia and its street layout to resemble that of Philadelphia, a contemporary exemplar of planned city development. The squares differ from those of other small Midwest towns in that their design is not a square with streets binding it, rather it is a street intersection flanked by four symmetrical squares. Traffic does not move around the squares, it intersects them, creating more or less four separate squares that are read to be as one.

Of the three main squares New Philadelphia was designed around, only two remain, while the third has become a parking lot for a local Laundromat. This project seeks to reintroduce the fallen third square as the ‘Information Square,’ and reestablish the relationship of the three squares with each other as well as with the community. The decline of the central business district of New Philadelphia is not unlike that of most small Midwest cities, but most importantly, it is not irreversible—a sensitive application of the content of this thesis can help the small city to have a more optimistic view of their city’s future, and improve the quality of the Central Business District.

FRANKLIN SQUARE: The first square, at the intersection of East High Street and 4th Street NW is a quaint green area with small wooden fences defining the area and small flowerbeds as decoration. A small placard denotes the historic name of Franklin Square. With the exception of one Tanning business, the buildings around the square maintain the original vision for the square. It is not highly frequented, but has a nice appeal as a small garden-like square.

COURTHOUSE SQUARE: This Square is a very formal, hardscaped square. The historic courthouse outlines its perimeter on the Northwestern corner, and there is a gazebo for public performances as well as many benches. This square contains a lot of activity, with many workers eating their lunches on the benches, and families strolling around.

WASHINGTON SQUARE: Historically designated the Lower Market Square, named Washington Square. Today, it is a poorly maintained parking lot for an economy tobacco retailer and a Laundromat. The geometry of this square is much more stimulating, being a five-point intersection, but it has been a long time since it has been recognized as a public place.

These three squares share no qualities, and their contribution to the urban scheme is currently nil.
24A. North-east corner of Franklin Square.

24C. South-east corner of Franklin Square.

24E. North-west corner of Franklin Square.

24G. North-west corner of Franklin Square.

24I. South-east corner of Franklin Square.

24B. North-east corner of Courthouse Square: Courthouse Building.

24D. South-east corner of Courthouse Square: public pavilion.

24F. South-west corner of Courthouse Square: cafe and public seating.

24H. North-west corner of Courthouse Square.

24J. South-west corner of Courthouse Square.
RELATIONSHIP OF THE THREE SQUARES

As these photographs illustrate, there is currently no asserted relationship between the three squares. The materiality and structure of each square is different, and any sort of cohesion is neglected. It becomes difficult to read the three squares as defining features in the CBD because of the lack of presence. The boundaries of each of the squares are treated very differently, and it becomes impossible to recognize the quality of the squares as ordered features.
26A. Site Plan at Washington Square.
27A. North-east corner of site.

27B. South-east corner of site.

27C. South-west corner of site.

27D. Existing Site: Dry Cleaners.

27E. Existing Site: Discount Tobacco.

27F. Existing Site: Take-out Pizza.

27G. Existing Site: Intersection.

PRIMARY SITE @ WASHINGTON SQUARE

The site selected is the western Washington Square. At this five-point intersection, the fixed grid of the Central Business District is not just rotated 45°, but it also skewed, whereas the grid is no longer at right angles. Originally demarcated as one of the three prominent squares, it has since been paved and acts as the parking lot for a discount tobacco retailer and a laundromat. From this square stretching east is the Central Business District, although the stretch between this square and the courthouse is somewhat dilapidated. There is an even mix of residential and small businesses and local retailers. West of this square is exclusively residential, with a large percentage of historic homes.

The primary approach to this square is Eastern bound on East High Street. Currently access is mostly vehicular, but it is within walking distance (only 3 blocks) from the previous square that contains the Courthouse. With the objective of this design—that of making this square an attraction—it is hoped that pedestrian activity would increase. Half of the church’s parking lot will be available to the community on the weekdays (for overflow parking), but the on-street parking with thirteen parking spots on the rear of the lot should provide adequate parking for the public.

The site itself borders with two residential lots, and is an odd geometry. Building faces on Beaver and West High Street maintain a parallel line with the street, as the lots run perpendicular to the street angle. Buildings to the west of the site maintain a strict grid.
SITE GEOMETRY
The geometry of the site is a very unusual geometry, and is severed by 4th Street and East Broad Street.

STRUCTURAL GRID
This diagram shows the regular, grid-iron pattern of the Central Business District, west of 4th Street as it rotates and deforms east of 4th Street. The gridded pattern not only rotates, but becomes more irregular and less dense.

TRAFFIC PATTERNS
A five-point intersection is located nearly at the center of the site. Off street-parking and the large parking lot of an adjacent church should have the capacity of desired parking for the facility.
FIGURE-GROUND
The site, outlined in blue, is closely flanked by residential, one-family dwelling units. Most of these homes are two to three stories tall, with a small front yard, and large back yard.

29A. Descriptive Diagram New Philadelphia.

COMPLEXITY
Geometry, Urban Patterns, Traffic Patterns, Existing buildings and Edges endow this site with a very complex nature that will be dealt with in the final design.

29B. Descriptive Diagram New Philadelphia.

EDGES
The dashed pink lines indicate the street-front boundaries with high traffic, while the more narrow solid lines indicate boundaries that are adjacent to other properties.

29C. Descriptive Diagram New Philadelphia.
NEW PHILADELPHIA AT THE CROSS-ROADS

The city planning committee realizes its quality of life is being threatened by its dependence on a diminishing manufacturing industry, and has acquired a federal grant to construct a new Research and Development Park on the periphery of town, near the local Branch of Kent State University. While it is an effort to embrace new industries, it is an isolated and blind act that is financially grounded, and lacks urban cohesion. The threat of maintaining a failing R&D Park on the outskirts of town is real and menacing if action isn’t taken to understand, and prepare for the impact of the introduction in order to make it a positive addition to the community.

The introduction of a new industry is futile if not many locals would be able to participate in the market. Despite how many or few locals were employed by these industries, there would most likely be an influx of new people. These transplants would tend to be educated young people who enjoy the notion of what a small town can offer in terms of quality of life, but are accustomed to the technological resources available in larger cities and university campuses.

The idea of a community space that promotes the understanding of the information culture is an attempt to allow locals to gain familiarity with the tools of this Research and Development industry, as well an offering of the amenities to persuade new businesses to relocate more easily within New Philadelphia.

The insertion of this public space offers the opportunity to give the Central Business District of New Philadelphia the urban cohesion with new amenities that would re-establish a desirable and sustainable community.

The existing community buildings such as libraries, schools and government buildings presently are the only buildings that are built for the purpose of the public’s access to information. The new library has been built within the past ten years, but all other buildings are at least fifty years old. All of these buildings, regardless of age, are typical masonry buildings that hold volumes of books on shelves, and a few computers on partitioned desks. Currently, information has broadened its media basis from books, periodicals and documented records to the realm of the virtual. Information has transcended mere written record into an interactive and participatory process that is achieved through utilization of technology and media. This allows for a real-time transfer of information. There now exists no architectural answer to media as a part of our daily lives and our communities. Large metropolises have not answered the problem, and certainly small Rust-belt communities have not even tried. To design a facility to represent the significance of information and its intangible presence in even our small-town communities is a new problem. Community connection, both physical and virtual is the primary function this place is to perform, giving a platform to the public to communicate freely among themselves and extending out to the world.

Secondly it is to give a physical presence to the existence of the ethereal streams of information that shape our concepts of community and space. As E-mail, chat rooms, and E-commerce have altered our perceptions of our physical environment, so too should architecture respond to these ideals? We now form more specialized relationships and communities, and as our boundaries of proximity expand, our communities become even tighter and more precise. We are able to remain socially intimate with those who are removed from us, or form new relationships with people or places that are beyond our reach.

Interestingly enough, New Philadelphia has a new web site devoted to the revival of local retail sponsored by a group called ‘Main Street New Philadelphia, Inc.’ On the web site, it is observed:

All across America, an interesting trend is occurring in the retail industry. Small cities and towns are rediscovering and reclaiming their downtown shopping districts. People are yearning for the nostalgia and historic roots that our downtowns represent. Independent business owners are finding success again in these traditional shopping districts. There is a definite revival of Main Street USA taking place.²

While this group is mainly interested in the presence of Banners along the street, it is a willing participation and a civic pride that is hopeful in spirit.
ENDNOTES >> SECTION 02

2  http://factfinder.census.gov/
3  http://www.msnp.org/
THEORETICAL & ARCHITECTURAL UNDERPINNINGS

The second section of this writing will look at the contemporary discussions in the realm of architecture and urban design that have affected the approach of architectural design in the 21st century. Socially, technologically and aesthetically architecture has readdressed many of the topos within architecture to take into consideration the radical differences and a new complexity that has emerged. First, the question of typology will be addressed, looking at the historic approach to a priori building types, then at our ideas concerning type today.

Next, a series of new tools and technologies will be explored, outlining the impact of digital design on architecture. These advances have informed a new branch of architecture that can certainly be considered avant-garde. The strong reliance on computing processes can be unapologetic in the resulting form, and designers such as Ali Rahim, Hina Jamelle, and Patrik Schumacher argue for more refinement by the designer, reasserting architecture’s position as a primary art in its aesthetic pleasure. From these new developments, we can distill the key concepts that will guide architecture in the 21st Century.

From these new ideas, principles and strategies will emerge to inform a process that will reveal a new exploration of architecture in the digital age.
TYPOLOGY
The more specific query involves the question of architectural typology and evolving technology within the field of architecture. While architecture has always been refined and altered to accommodate new developments in technology and culture, the advent of an information-based culture has already radically altered the way in which we work, learn and interact (primarily through the introduction of the internet), but has not appropriately altered the way in which we build or experience our environments.

But what happens to architecture when even more radically new elements are introduced? If architecture in the past has been able to respond to such substantial changes as those of the Industrial Age, why should it not respond to the changes introduced in the Information Age?

Technology and Internet connectivity has changed the way we live our lives. Daily errands such as going to the bank, ordering new shoes and filling prescriptions now take only seconds and are done online. Music, video and photos are almost exclusively accessed and stored on our home PCs. Business connections are made and maintained through widespread networks, and some people have even opted to work primarily from their remote home-offices.

These domestic examples can be met with academic and business models. Entire office structures and academic assignments have changed within the past twenty years, yet most new offices and schools look as though nothing has changed in the past century.

While typologies are essential in our perception of the world, they can appear to be obstacles when we want to reach new solutions and/or design for changing environments.1 In such situations we need to escape from our historical spatial vocabulary to invent new ways of organizing space and finally to reach for new forms, not hindered by type. Digital technology’s effect on architecture, its design methods and construction techniques are readily evident—especially with CAD/CAM applications. There is now a greater ability than ever before to create forms that break free from old constraints. Now the challenge is in deciding what form is ‘right’? What rules or creative models should be followed?2

The appropriate response is not a rigid ‘type’, but a dynamic process that allows for an adaptive and flexible environment that is in-line with the new physical and organizational demands of space. Spaces with an inherent multiplicity and respect for fluid movement now adopt the new topos of technology.

The question of architecture’s new typology based on information is more significant than the installation of a plastic computer into a rectilinear room. Not only does it need to meet the physical requirements of technology, but be inspired by the qualities stemming from the continual stream of data and accessibility of information.

This project was designed by NOX in 1998 for a technologically progressive organization. It has been published as an exemplar for the impact of technology on architecture, but in analysis, it is an entirely interior installation within an existing brick and mortar structure, that does not, in fact, fully respond to the technology it contains. The project was developed by computer with animation software that ‘allows for a non-linear and time-dependant architecture,3 the vector-based interior is designed by technology, but not for it. The conventional office spatial organization is limited in its alteration, and technology is only suggested in the superfluous and undulating transparent feature wall. Ultimately, it is not different from the simple computer labs that exist within public libraries, office spaces as well as most elementary schools, except from its additive undulating forms.
THE NEW TYPOLOGY

Before the complexities of the digital age, Anthony Vidler defined two existing ideologies, and outlined his proposal of a Third Typology—as a new, and more appropriate ideology. The two ideologies guided the production of architecture from the middle of the 18th century: the 'organic analogy' of Natural Origins defined by Laugier and the 'machine analogy' of Le Corbusier.4

The Third Typology does not discredit the previous two, but realizes that architecture, made by man, should not be legitimized by nature (as thought by Laugier), but by architecture alone. Citing the city as an autonomous entity, the site of a new typology, all elements are absorbed into a whole. Past and present are revealed in its physical structure, and it is ready to be decomposed into fragments, which can be reassembled according to three meanings. The first is inherited from the ascribed means of the past existence of the forms; the second is derived from the specific fragment and its boundaries, and often crossing between previous types; the third is proposed by a recomposition of these fragments as a new context.5

"The heroes of this new typology are therefore to be found not among the nostalgic, anti-city utopians of the nineteenth century, nor among the critics of industrial and technical progress of the twentieth, but rather among those who, as the professional servants of urban life, direct their design skills to solving the questions of avenue, arcade, street and square, park and house, institution and equipment in a continuous typology of elements that together coheres with past fabric and present intervention to make one comprehensible experience of the city."6

This denies a one-to-one reading of function, but at the same time ensures a relation at another level to a continuing tradition of city life.

This typology places its faith in the essentially public nature of all architecture. There is no clear set of rules for the transformations and their objects. The precise demands of the present should be analyzed over the "holistic mythicization of the past."7

Furthermore, realizing the complexity of modern life, and advances in technology that allow us to analyze and understand these systems, it is argued by theorists such as Niklas Luhman that there is a new phenomenon that disregards preordained perfection and the quest for the appropriate ‘type.’ An idea termed ‘self-programming’ increases the role of a self-determined composition: or an emergent perfection.

"In this sense, creating a work of art generates the freedom to make decisions on the basis of which one can continue one’s own work. The freedoms and necessities one encounters are entirely consequences of decisions made within the work. The necessity of certain consequences one experiences in one’s work is not imposed, but results from the fact that one began, and how; this entails the risk of running into insoluble problems."8

These theories allow us to look forward to the uniqueness of each set of problems, and each solution as a fairly autonomous set that is supported only through Architecture, and not through history. This allows a freedom to explore radical new forms to address new cultural and technological advances.
We can look to Zaha Hadid's 2003 design for the BMW Plant in Leipzig as an example of how technology and architecture have changed the organization and aesthetic of the typical automotive factory. Ignoring the conventional type of an automobile factory allowed for a more revolutionary and progressive architecture that is suitable for the new organizing characteristics of BMW. Transparency and Flexibility have replaced the Mass and Rigidity. Programmatically, a mixture of functions overlapping programmatic spaces allow for a more spontaneous interaction of all employees. Day lighting and visibility are critical to the open feeling and give a fresh new vitality to the industry. The form of the building, and as well as of the parking lot give a fluid movement and indicate the progressive nature of the BMW Company.

Traditionally, blue-collar and white-collar positions have been segregated, but in this plant, all workers are treated as an integral and creative member of the process. A conveyor system is threaded throughout the building, visible to all workers and visitors.

The Central Building acts as the active nerve center of the factory complex. Threads of the building's activities gather together and branch out from this center. A dynamic spatial system encompasses the whole northern front of the factory and articulates this center building as the point of confluence and culmination of the various converging flows.

The car-park is an integral architectural feature that draws on the inherent dynamism of vehicle movement to generate a sense of fluidity. The result is an assimilation of complex forms and directions within a seamless whole. This organic architecture adapts and moulds itself to the peculiarities of the terrain and orients itself to the various directions of access to synthesize a complex series of concerns into an integrated composition.

While universal rules such as balance within an asymmetric, dynamic equilibrium, and the range of plausible proportions guide the overall generation of form they also pertain to the rhythmic flow of interior spaces. The refinement of spatial and structural organization, with a nod towards complexity allows this automotive plant to stand as an exemplar of architecture that understands the digital culture for which it was designed.
39A. Plant entry and car park. BMW Plant, Leipzig.

39B. Plant entry and car park. BMW Plant, Leipzig.


39D. Interior conveyor system of the BMW Plant, Leipzig.

39E. Interior communal space at BMW Plant, Leipzig.

39F. Conveyor belt with cars in BMW Plant, Leipzig.
DESIGN IN THE DIGITAL AGE

Inventing and exploring new techniques and design strategies adapted from the use of computers is an exciting new phenomenon. The implementation of graphic computing in design practice has triggered a renewed interest in the design process and a leap in the invention and development of new design methods, strategies and techniques. Recently, traditional design skills have experienced a renaissance where these techniques have combined with the computer-driven techniques to result in a new synergy. Computer technology has allowed the ability to simulate and calculate systems too complex for human imagination. Speed and storage capacity have allowed the computer to become a powerful engine for qualitative research where spatial formations, patterns and structures are concerned. Digital representation allows for an easy manipulation and reconfiguration of data that in the past has been too difficult for manual computations.

The recent development of graphical 2D and 3D design tools has lead to a new state of visualization in the design process, as well as an increasingly spontaneous and stimulus/response or trial-and-error way of designing.

This new design frontier implies the arrival of something new, something that has never been imagined before.
DIGITAL TECTONICS

In the nearly fifteen years since Paul Virilio outlined a need for architecture to respond to the new emphasis put on Digital tectonics and posed the question ‘how can the digital be tectonic? And how—for that matter can the tectonic be digital?’ Once thought as mutually exclusive, these two ideologies can now be seen—in part due to advanced sophistication of CAD/CAM software—as the digital servicing the tectonic. There is a renewed interest in the architectural structure, as well as a deepened relationship between the architect and engineer. This new relationship seeks to break down the perceived barriers and allow each to play an active role in the developments within architecture, establishing within architectural design itself a new sensibility.

The history of architecture, in the opinion of Neil Leach, can be reduced to a dialogue between two ways of thinking: the Classical and the Gothic. The Classical, regarded as the primary discipline for post-modern design, is focused on the visual composition and surface, whereas the Gothic understands architecture in ‘terms of materiality and structure’. Championing, not the aesthetic, but the ideological stance of the Gothic, a process-oriented approach toward architectural design is advocated here.

The influence of digital tools has promoted the understanding the material properties, not in their static state, rather their dynamic roles, which deepens the possibilities of structure. Experimentation and scientific research are paramount, and the computer can be seen as a tool to quickly decipher complexities and make sense of our physical world. These digital tools also sabotage the rectangular dogma of Cartesian space. The reading of space in three dimensions, organized along the X, Y and Z-axes, is central in western spatial thinking, but provides a confining mental mould in which our spatial thinking is formed. This acts as a limiting method much the same way as looking in a building only in plan form.

The Classical representations of plan and section are no longer capable of expressing the complexity around which projects are developed. With new technologies, we design not in two dimensions, but in three, and sometimes four. The speed and power of digital tools now allow us to view an architectural project in three dimensions before its even been constructed, and manipulate and deform its elements, forms and systems in an accurate and expedited method. This speed and agility can give a rapid series of iterations for the designer to select and manipulate. In researching and presenting these architectural forms, we can look to animated sweeps and other digital techniques that answer to the time-based fourth dimension.

41A. Gaudi’s hanging models for Sagrada Familia.
SWARM TECTONICS & EMERGENCE

Recent thinking in science has turned away from the idea that nature is governed by closed, static rules and is embracing the idea that almost everything operates within a dynamic open system. Complexity theory— which has been aided by advent of the computer—searches to understand how complex patterns of behavior are generated in nature.

At the root of complexity theory is the idea that everything in the universe operates as a clearly defined and structured system. Paradoxically, it teaches that complexity is not overwhelmingly complex, but is born from a clear set of principles. This line of thinking was originally interested in observing Swarm Intelligence, and studying how groups of animals behave. Within these social patterns, there is no one leader that determines the movement of the group—such as in a flock of birds that seems to move in one uniform movement—in reality each individual is responding to those around it.

Complexity Theory and Swarm Intelligence are specialized fields that offer a scientific explanation of the universe that extends to all aspects of life. It represents a shift in understanding from 'low level' rules to higher-level sophistication, a kind of bottom-up development of complex adaptive systems that self-regulate, in opposition to the top-down overarching principles. These systems are intelligent systems, based on interaction, informal feedback loops, pattern recognition and indirect control.

These ways of thinking have now transferred interest in understanding groups of animals to understanding group behaviors in people, such as in cities, and even extends to computer operations and design.

Cities have no central planning commission that can solve the problem of purchasing and distributing supplies...How do these cities avoid devastating swings between shortage and glut, year after year, decade after decade? The mystery deepens when we observe the kaleidoscopic nature of large cities. Buyers, sellers, administrations, streets, bridges and buildings are always changing, so that a city's coherence is somehow imposed on a perpetual flux of people and structure.

If we can regard a city as a self-regulating system comprised of amalgams of 'processes' and spaces of vectorial flows that 'adjust' to differing inputs and impulses, then we can question the need for 'master plans'. Cities are not static beings, but intelligent organisms that grow and adapt. The city is
43A. Emergent Pattern from a flock of birds. 
Emergent pattern formed from a computer simulation of a flock of birds. The basic flocking model consists of three simple steering behaviors which describe how an individual bird maneuvers based on the positions and velocities its nearby flock-mates:

**separation**: when a bird is to close of a neighbor, it changes of direction

**cohesion**: when a bird is to far from one of its neighbor, it try to join quickly the farthest

**alignment**: when the neighbors of a bird are neither too far or too close, the bird chose a direction which is the average of the direction of its neighbors.

In a society of increasing complexity and information overload, the impact of the Chaos Theory and Swarm Tectonics is a need to offer ‘an alternative way of designing “intelligent” systems, in which autonomy, emergence and distributed functioning replace control, pre-programming and centralization.

Emergent architecture can be seen as not a style, but a method that prefers ‘process’ over appearance. It is a form that is the result of competing forces. Just as emergent thinking relates to cities and swarm intelligence, it also relates to a programmatic architecture that registers the patterns of human habitation and adapts to those patterns.

According to Deleuze and Guattari’s references to architecture, and as we have partially touched upon in talking of digital tectonics, the history of architecture can be broken into two categories. These categories are not referring to ‘style’, but rather is setting two distinct ‘sciences.’ One is the science of extensive thinking that seeks to understand the world in terms of laws, fixity and representation, while the other is an intensive thinking that understands the world in terms of forces, flows and processes.

The first can be called the ‘Romanesque.’ Containing the styles of renaissance, Mannerism, Baroque, neo-classic, even neo-Gothic, Modern and some post-Modern architecture, the ‘Romanesque’ can be defined as the ‘Romanesque’ as a broadly aesthetic outlook that tends to impose form on building materials according to some pre-ordained ‘template.’

On the other hand, there is the ‘Gothic,’ which is a dynamic model of understanding architecture. In a sense, it directly appeals to the future, in its most evolved form, trying to predict through exhaustive analysis the activities that will have happened, so as to facilitate those processes. This method does not crystallize into a single, inflexible form, but is able to reconfigure itself over time, and adjust to the multiple permutations of programmatic use that might be expected of it.

The ‘science’ of emergent architecture has a sympathetic engagement with the principles of structural engineering. It embraces the structural concerns not as some practical afterthought, but as a vital component folded into the whole conceptual process of designing. The ultimate goal being the production of forms that have a unique structural integrity.

The role of an architect now can fulfill the role of what UN Studio has coined as the ‘public scientist.’

The outcome of research and the exchange of ideas in a collaborative effort manifests a joint ‘product’, suggesting architecture should be rethought of as a form of product design, not overwhelmed by a heavy sense of rooted specificity or semiotic depth. Rather it is joyful, light, and passion inspiring, and in a profound sense is governed by the way that products behave in time.

By observing and pattern the qualities—both static and dynamic—of contemporary urban life, and synergizing it with new needs, created by technology and population, a well-informed and democratic process emerges, creating an architecture that is able to benefit the culture infinitely.
O.C.E.A.N. NORTH: JYVASKYLÄ MUSIC CENTER

This competition entry for the Jyväskylä Music and art Center in Finland sought to fuse the existing urban grid with the new functions—represented in the program for the space. The project was an attempt to create a fresh architectural context for producing and communicating culture from within an institution located in an urban context. The circulation was seen as a formative device that flowed from the historic grid of the city into the building and vice versa, allowing these two entities to inform each other.

A complex and iterative morphogenetic process was established by the designers, in which data contained within the site informed a series of elements that generated deformations of terrain, structure, envelopes and circulation systems.

The project is constructed from three parts that have their have been formulated by the existing city patterns:

1. A TOPOLOGICAL SURFACE that continues the grid of the urban fabric, and folds up to house all vertical transportation

2. TWO FLOATING BLOCKS that house arts and music facilities. These blocks float above the topological surface, creating what is termed the ‘liquid flow space’.

3. A LIQUID FLOW SPACE is where the outside urban condition becomes fully internalized and transformed into a space with free flow of light and movement.

The Music Center may appear simple on the outside, but it is exceedingly articulated on the inside. The interior of the box provides highly differentiated spatial, material and ambient experiences and extends the space of the town square park into an acoustically animated interior landscape. While the space of the box can be clearly comprehended as confined, it cannot be perceived from the interior as a finite whole. The result of material vastness (created from the locally varied transparency and reflection of the envelope) and spatial arrangement is the perception of a boundless space of infinite depth.

The material and spatial vastness, and extension of the existing urban fabric creates a public space that offers itself to the pedestrian. The observed circulation paths welcome unobstructed movement into the space, while a poetic and joyful space conveys the culture contained within the building itself.
THE IMPACT OF DIGITAL DESIGN

COMPOSITIONAL CHARACTERISTICS

Because of the speed, connectivity, multiplicity and deterritorialization now evident in culture, it is implicit for Architecture to follow suite and adapt to the re-organizational attributes of digital culture. There has been a departure from the modernist line of thinking that form-follows-function in the Digital Age. The genesis of data-informed design and digital techniques seeks to offer a more specific, concise and objective solutions that embrace these new cultural attributes.

Non-Linear Organization—This idea deals with the deterritorialization effects of the information-age. No longer is there a highly defined boundary of here as opposed to there. Boundaries are blurred, and dissolved. Flux and Flow are more applicable than the conventional Stability and Materiality. Contemporary projects remain incomplete compositions, referencing the Deleuzian notion of assemblage than to the classical conception of the organism.

Multiplicity/Overlapping Domain—As a product of Non-Linear Organization, this multiplicity allows singular domains to service multiple functions. Boundaries are not rigid, and easily distinguished, instead domains overlap, interpenetrating and intersect. The idea of a one-to-one reading of domain and function is dismissed.

Maximization of Program—A modulating form results in innumerable spaces and places that can be adapted for an equally innumerable program. Within the composition, a wide range of communal as well as intimate spaces, stretching expanses as well as quiet reflective retreats are maintained. The existence of myriad spaces allows for an ultimate maximization of program.

Mutual 'Amplification' of Site and Program—Elegance is achieved when rather than allowing external constraints to alter and compromise the internal organization, the internal organization is manipulated and transformed to adapt to the external constraints. Internal and external compositions mutually benefit each other, thus amplifying the quality between the two.

Emergent Form—Digital techniques allow the underlying social and physical complexity to be registered, facilitated, and expressed in spatial formations. Design ability incorporates myriad conditions for creation including constraints associated with zoning, building codes, organization, space, program, circulation, fabrication, assembly and cost, in a process facilitated by the digital algorithm and enabled by scripting.

Integration of Structure/Systems/New Materials—A composition of elements and subsystems should be an economy of means that conquers complexity and resolves unnecessary complications. These compositions are so highly integrated that they cannot easily be decomposed into independent subsystems—a major point in difference from modern design ideologies that define a clear separation of systems.

Adaptive to Change—Multiplicity is a factor that endows a composition with flexibility. The ambiguous nature of spaces, and the idea of maximizing the program offer a form, which is, inherently, adaptive to change. The final composition should allow itself to be open-ended and flexible.
O.C.E.A.N. NORTH AMBIENT AMPLIFIERS

The project in Oslo, created for civic use, shatters the idea of form and function as a one-way relation. The idea of form following function is expanded. The production of artifacts is seen as a process where the generation of form is influenced by action, reciprocally, form influences action through hosting, triggering, modifying and amplifying the program.

The intention is to investigate the use of computer technology as engine for mediation of processes where form and program reconfigure and redefine each other in a mutual time-based process. Denying the intentions of the designer was important for the project to realize the incapacity of the designer to envision all possible program possibilities; the imagination of the designer is too limited. In doing so, the architect also becomes more of a mediator than a designer, sorting through many stimuli, which manifest in a physical object.

Relentless research as to movement and flow, along with culture, politics, and psychological functions were objectively analyzed by computer software, rendering a diagram for these artifacts.

The dynamic generative diagram always feeds on contextual matter, but it deforms the fields and forces in a topological animation, resulting in the mediatory forms that articulate both spatial and temporal thresholds.24

Ideas of artifice and appropriation contribute towards an outcome that is more than a singular use environment, instead, a program-less (or infinitely-programmed) artifact is conceived which is ultimately flexible and adaptive. These artifacts are considered to be ‘Ambient Amplifiers’.25

The data based, open-ended result resists the notions of program and typology, and heightens the importance of context.

REFINEMENT & ELEGANCE

Rather than considering architecture in an age of newness, we should consider ourselves in an age of refinement. The advance of technology and emergent techniques does not presuppose a more evolved or stimulating architecture, only a proliferation of mediocre architecture. The emphasis of this project is not merely the production of emergent form as a function of digital techniques, but a refinement of those forms that are resultant of digital techniques. While an off-putting alienation can be the result of avant-garde techniques such as computer-generated designs, it is intended to uncover a way to refine these designs and instill them with a quality that is universally accepted.

Elegance is a rather novel idea in architecture. Unlike the Classical idea of Beauty, which regards the ends; a holistic view based upon harmony, and perfect closure. Elegance is more an attribute of the process, allowing for a project to remain an incomplete composition (akin to the Deleuzian notion of assemblage). There is no fixed or ideal type, nor any privileged symmetry or proportional system. Rather the parts and subsystems of the project mutually affect and reference each other. The act of design is ultimately not framed by a singular aesthetic end, but by the multiple constraints and ambitions of each project, as negotiated by the author. To develop elegant work, layered levels of design intelligence are required, and it becomes the role of the author to orchestrate these organizational and spatial aspects. This answer to complexity in a sophisticated and defined ‘result’ is elegance.

Complexity and elegance stand in a relation of precarious mutual amplification: a relation of increasingly improbable mutual enhancement; that is, mutual amplification with increasing probability of collapse.

The fundamental idea defining elegance is ‘orientation within complex organizations’. Elegance signifies the capacity to articulate complex life-processes in a way that can maintain overall comprehension, legibility and continuous orientation within the composition. Elegance allows for an increased programmatic complexity to coincide with a relative reduction of visual complication by means of integrating multiple elements into a coherent and continuous formal and spatial system.

Modernism sought to establish order in the means of a radical reductionism. This reductionism is antithetical to the complexity evident in contemporary life. Simplified singular-use environment. Figures and domains are no longer required to remain separated, alternately, identifiable figures and bounded domains have dissolved. The complexity of overlapping or interpenetrating programs does not denote chaos, or a breakdown of order, rather it is a re-organization that is more aligned with how we actually perceive our world.

Conventionally, spatial relations operated on the basis of inclusion or containment within easily discernable boundaries. Where changes of position are demarcated by the crossing of a boundary. In this view, there is a one-to-one reading of the programmatic and the spatial provision. In order to create legible compositions without the rigid boundary, we can look to the Baroque systems of lawful inscription of information and mutual inflection to carefully articulate these domains. The figure and domain have been replaced by the navigation of lawfully modulated field qualities such as density, directionality, agitation in the field and so on, affording inferences and anticipation.

Adopting the language of system theory, we can speak more or less of complex systems and distinguish two types of systems. These two types of items have the ability to differentiate as well as compose a system. Elements and Subsystems, or collections of related/connected elements, compose an ordered complexity in successful projects. Elegant compositions are highly differentiated, yet this differentiation is rule governed and based on a systematic set of lawful correlations that are defined between the differentiated elements and subsystems. These correlations integrate and (re-)establish a visible coherence and unity across the differentiated systems.

Rather than allowing external constraints to alter or compromise the internal organization, elegance is achieved by manipulating and transforming the internal organization to amplify the external conditions. The internal and external conditions should mutually complement one another.

Complexity lies in the problem itself, while elegance is an attribute of the solution. A successful project has the ability to manage considerable complexity without descending into disorder. It is also significant that the elegance in the process is evident in the material manifestation.
A mastery of progressive digital techniques is pivotal to moving forward in the field of architecture. There is a goal of establishing an aesthetic quality that is so highly provocative that it has the ability to foster bodily sensation and emotional stimulation.

The driving force of aesthetic pleasure does, in fact, possess particular formal characteristics. This aesthetic is nearly universal, rather than defined by the customs and habits of cultural tradition. These qualities should be aligned with the Compositional Characteristics summarized previously.

**Lightness**—This includes properties that are moving to the subject. Gracefulness, fineness, balance and daintiness allow a perception of lightness that is an anti-gravitational illusion. This restrained opulence has the ability to fulfill aesthetic desires.

**Movement**—A certain fluid and dynamic quality is suggested the form as a moment frozen in time. This is contingently related to the quality of lightness as it contributes to the perception of lightness; things in motion tend to appear lighter than things that are static.

**Articulation of Complexity**—Refined elegance thrives on complexity. It achieves a visual reduction of underlying complexity that is thereby reduced rather than eliminated. Complexity exhibits an appearance of lightness that is intensified by its suggestion of forms on the move. A certain smoothness of surface and style allow a project to manage a considerable complexity without descending into disorder.

**Legibility and Orientation**—Navigation is essential, as it is an orientation in a complex field that is a morphing trajectory rather than a snapping from position to position. A field must be established against which transformations of features are read. This surface itself is key, as it provides a background for the features to be made legible.

**Intrigue and Variety**—This phenomenon, ultimately is a novelty to the subject, one that rewards the viewer with a diversity of elements. These elements are endowed with differences, and the transformation between features is attenuated and gradual. The scale of the part-to-the-whole must be attenuated and adjusted with precision and refinement. The composition of elegant structures possesses formal features and material articulations that are rich enough to stimulate the realm of bodily sensation. Elegant sensations can be achieved through particular formal characteristics such as presence, formal balance, refinement of features, surface and restrained opulence. Gracefulness and movement reveal the precision and mastery that is accomplished with certain techniques.

Grace, movement and elegance in architecture can be derived from qualities in painting that allow the same qualities. The beauty contained within dynamic paintings, (such as Ucello’s painting “Battle of San Romano”) can be attributed to its highly complex composition that appears as a frozen moment. Figures are not stiff and static, rather they move throughout the bounds of the painting, extending off the field. The painting depicts a singular moment in a timeline that offers a potentially limitless selection. This perspectival quality along with the geometric and time-wise extension alludes to the activity that extends beyond the frame, as well as the activity prior to and after this moment in time. The dynamic quality of this composition also comes from its structural and diagrammatic order.

As illustrated in Birger Sevaldson’s depictive diagram, he has diagrammed the position of each lance in the painting. The spatial relations, direction, density, distribution, clustering and fragmentation greatly contribute to the dramatic and dynamic composition.

Underpinned by mastery of technique and digital technologies, a highly sophisticated formal language is maintained, and aesthetic pleasure becomes the driving force.
Contemporary Architecture Practice, CAP, located in Manhattan, is an exploratory practice that uses the ideas of technology to promote culturally significant work. The contemporary city is a necessary context for their work, which facilitates a dialogue between environment, technology, culture and subject. Their work harnesses cultural proliferation as a generative model and uses digital tools in a temporal process of cultural change through intervention. The ambiguous nature of their inventive forms has the capacity to illustrate the organizational complexities of digital age architecture in a striking way.

RESIDENCE FOR A FASHION DESIGNER, NEW YORK

The consideration of the client’s manifold activities as well as the countryside’s seasonal changes informed the design of this residence for a fashion designer. Open, non-specific zones can be used for all dwelling functions, and the open organizations develop a
new sense of occupying space and variability. The exploration of different event-based temporal cycles within the client’s lifestyle helps define an architecture that performs at an ecological, material and spatial scale. A concrete shell is covered in aluminum and fiberglass on the exterior and linoleum on the interior, giving a near-seamless form. Ease of dispersed and fluid movement dictates the arrangement of interior spaces, which in turn allows for a greater possibility of functions inside of the form.\textsuperscript{32}

The elegant forms that emerge from their digital processes manage a complex amount of activity through overlapping domains and spatial qualities. The forms are not based upon a rigid program; instead, the program is informed through the resultant form. Multiplicity is a critical element, as each space is not exclusive to one type of activity, but has the potential to insight many different activities. The controlled manipulation of surface creates a light and dynamic quality that reflects the movement upon which the project is based.
OLYMPIC LEISURE CENTER, ATHENS

Fluid, dynamic forms create the design for the Olympic leisure center, in Athens, Greece. The 24,000 SF environment of white fiberglass encourages a variety of activities determined by the user. The form itself was designed to take advantage of new methods of fabrication—allowing for the form to be fabricated from advanced materials off-site and assembled on-site. Modulating surfaces produce a performative architecture that allows athletes and spectators to use the form for their own purposes with no preconceived assignment of function. Viewed as a study in multiplicity, the center houses myriad conditions. The concept is to stimulate patterns of emergent behavior, resulting in a form that reciprocally drives new cultural behaviors and actions—ultimately influencing the maximum number of behaviors inherent in the interstitial spaces that exist between cultural, social, and political production. This reciprocity is a new idea in contemporary architecture that allows the architectural form to be not just a product, but also a very integral piece of the process.
REEBOK FLAGSHIP STORE, SHANGHAI

The Reebok flagship store in Shanghai, China has spaces that blend seamlessly into one another, with overlapping functions. Beneath the skin of an existing mall, a single epidermis peels down from the walls and ceiling while viscously peeling up from the floor, creating the form of the three-level shop. Stairs become shelving or seating, ramps become walls—structure in continuous variation is the only differentiation of space. The programmed function of each space is not rigidly assigned, allowing for a flexible interior that can be adapted for many uses. Functions are suggested, not mandated, by the architecture.

The concept of the Reebok Flagship store centers around the idea of an inhabitable vector, formed around the idea of energy and movement that wraps around the subject, and determines the character of space. “Wear the Vector, Outperform” became the mantra for the design of this project. The vector has direction and force, and literally shapes the store. As one moves through the store, they are engulfed by the vector, which wraps around one just as clothing does. The perception of speed and movement as you moved through the space was essential, as the vector is spatialized and inhabited. Perceived pressure in the materiality of the form re-articulates the intentions of the force from the vector.

Ambiguity acts as a critical element in the architecture. This ambiguity is formed with intention. The intention is to provide the most potential for emergent user behaviors within the space. This ambiguous form is holistic in its own right—nothing can be added, and nothing can be taken away, as Ali Rahim believes a truly elegant architecture completely integrates all conditions.
55A. C_A_P: Reebok Flagship Store, Shanghai.

55B. C_A_P: Reebok Flagship Store, Shanghai.
ROLE OF THE ARCHITECT IN THE DIGITAL AGE

The computer and animation software become the ultimate tools in mapping and managing complex systems and can produce large arrays of potential forms. Certainly, it would be a mistake to leave everything to generative simulations and computerized emergence. In doing so, the integrity of the designer and the design itself would be severely compromised. The architect would be reduced to a less creative workhorse in the design process, while a void of cultural content and meaning that would result from an unprocessed formalism.

The act of design is ultimately not framed by a singular aesthetic end, but by the multiple constraints and ambitions of each project, as negotiated by the author.

The question is how to pair the emergent out-of-control productivity of the computer with the desired control by the human designer. Birger Sevaldson suggests three ways to utilize the potential in computer aided design that alter but do not alien the designer. First, the computer acts as an aid in visualizing abstract structures. It has the ability to process such abstract data into recognizable systems. Secondly, it is important to connect the cognitive analytical processes of the human designer to visual computing. The computer’s lack of the ability to ‘reason’ must be countered by the designer’s intellect. Finally, the designer should take advantage of the computer’s generative power by exploiting the computer’s ability as an ‘engine of the unanticipated.’ Because the imagination of the designer can sometimes be limited, or contaminated by a preconceived vision of the final form, the computer reaches a fully objective form that is a manifestation of raw data.

With these developments in a process-based architecture, it is important to not work to achieve a pre-conceived form, but to allow the freedom and flexibility to work with new and unexpected forms that are a result of the computational methods.

As mentioned previously, UN Studio has described the architect as a ‘public scientist.’ Digital technology gives the architect the responsibility of taking a scientific approach to form generation. The designer takes on the tasks of setting up a unique process for each design, and orchestrating the methods in such a way as to manifest an appropriate result. In the formative stages of the project, the architect becomes more of a mediator than a designer, sorting through many stimuli, which manifest in a physical object.

Design ability enables such architects to incorporate the myriad conditions for architectural creation including constraints associated with zoning, building codes, organization, space, program, circulation, fabrication, assembly and cost in a process facilitated by the digital algorithm and enabled by scripting. Ultimately, the architect’s challenge is to control the modulation of these relations, in order to endow each project with the desired effects.

These techniques are based on the implementation of the computer as a visual tool and the importance of the imagination, or the designer’s interpretation, and speculation should not be ignored. What is of paramount importance concerning the architect is the selection, recombination and refinement and articulates complexity. To develop elegant work, layered levels of design intelligence are required, and it becomes the role of the author to orchestrate these organizational and spatial aspects. The codification and manipulation of the computer-generated output becomes the creative role of the designer. Through the process of refinement, the architect is given more freedom to explore the role of an artist, and utilize his or her creativity.

It then transcends the ability of computational methods, as the architect is challenged to control the form in order to endow each project with the desired affects. This rectifies the architect with the role of the artist, allowing them to discriminate, select and modify, returning architecture to a sensuality undervalued in Modernist and Postmodernist building.
SUMMARY
The foundational step for architectural projects through history has been based upon the selection of an appropriate architectural type. However, as discussed previously, it is asserted that the establishment of a fixed ‘type’ for this project is no longer necessary. We can take ideas from projects we designate as exemplars or precedents due to certain features, but these do not have the same amount of constraint on the project, they can only influence or support ideas within this process. The denial of any fixed type gives a freedom to begin the exploration of new and unanticipated forms that emerge from an informed process.

The second step in the historic approach may be a defined or a fixed program. In this process, we will approach the idea of program as an unfolding feature, even the result of the form. In doing so, the form can emerge more naturally, to inform the program. The form will trigger the program. Singular programmatic elements should not be contained within domains; easily distinguished as separated spaces. Rather, maximizing the programmatic potential, and allowing for the overlapping and interpenetrating of programmatic elements that coexist and cohabitate benefits the idea of deterritorialization. Deterritorialization and dematerialization are both qualities of the new complexities established in the digital age. A new approach to organizing systems and spaces must be established through the overreaching idea of orientation rather than segmentation. This idea of orientation will order a legibility and comprehension in the composition. This lends itself to a more flexible and adaptive environment.

Without the presence of typology or program as the fundamental form-generators, new systems and forces must inform the form. Taking the role of a mediator in a scientific and objective process, diligent research and analysis of existing conditions will be folded into the design process. A thorough qualitative and quantitative analysis of the traffic patterns, both automobile and pedestrian, as well as social and structural patterns that emerge from the existing urban grid should show emergent patterns that may influence the physical form. Using digital technology as a tool to formulate potential forms, the outcome at this stage of the process will be a generic form that is the ‘un-anticipated’ result of computational methods.

After this generic form has emerged from existing and expected patterns, it can then be infused with ideas and intentions of the designer. Acting in the role of an artist, and with the addition of an adaptive program, and a responsive materiality, the form will be refined in order to realize the aesthetic qualities of Elegance. The designer has the authority of selection, manipulation, and deformation to further explore the functionality of the space. Through this process, the designer will formulate a more definitive idea of the material and structural aspects of the form. From the uncovering of form, material, and structure, an iterative series of abstracted and diagrammatic models as well as physical architectural models can be constructed and refined through.
ENDNOTES  >>  SECTION 03

22 Ben van Berkel and Caroline Bos, Live It/Love It. P 136.
23 http://www.ocean-north.net/oldbackup/architecture/jyv/index.html
24 http://www.ocean-north.net/oldbackup/urban/amplifiers/index.html
25 http://www.ocean-north.net/oldbackup/urban/amplifiers/index.html
DESIGN OBJECTIVES & METHOD

Taking cues from the ideas laid out in the Theoretical and Architectural Underpinnings, A process-oriented approach to this project will explores and uncovers the form for the proposed community space. This community space will be a place that contributes to the richness of the physical environment and opens the dialogue of technology's role in the future of New Philadelphia.

Not pinned to one particular site, the solutions will be applied in a series of layers that establish a cohesive Central Business District. One of the primary interests lies in re-establishing the connection between the three main squares as well as the importance of the squares to the community. The focus of this project will be the eastern square, Washington Square, which lies at the edge of the Central Business District grid. What was once regarded as the market square is now a shared parking lot for a dry cleaner and take-out pizza place. Special considerations will establish its unique meaning and identity as an information-based square. The relationship to the other two squares will be rectified, resulting in a more cohesive urban fabric. The intention is not to provide a solution that will upstage the existing urban fabric, but enhance it, as well as help give the space definition, physically and symbolically. Defining this neglected square with new meaning will promote New Philadelphia's embrace of technology, as well as a common vision of civic progress and solidarity.

In order for this town to develop, it must to keep up with trends in contemporary technology, but radical change would be alienating and ultimately ineffective. It will be important to study the existing circulation and lifestyle patterns of residents as they live in the community. If the citizens realize technology’s positive impact on their life in a non-threatening way, contemporary technology will begin to be a stimulating element within the town, and begin to be expressed in more of the city’s happenings.

Materials and construction methods should exemplify the new possibilities of digital fabrication. It is now possible to remotely expediently manufacture the structure and construct it on-site with relative ease. The issue of sustainability should also be approached, as it should be a fundamentally responsible and sustainable element within the community, as technology rapidly progresses and changes, so too should this communal space.
METHOD

The project will reach out from the autonomous building, incorporating strategies and designs that will impact the community of New Philadelphia, re-establishing a sustainable pedestrian urban space and introducing technology to the community. The avant-garde nature of new digital processes could result in a culturally alienating or even distasteful composition, as the very basis of the avant-garde is the off-putting effect on the general public. Refinement in accordance with the objective of elegance, as proposed, seeks to reconcile the radical newness of design with the values of the mainstream and the conservative values of small town America.

Through this quest for elegance, there is a certain responsibility to not be satisfied with the unequivocal result-form from a series of fixed design strategies. While the objective of many emergent-based designers is to be content with the computer-generated outcome of their projects, as it is a pure solution from empirical data, we have outgrown the novelty of this process and must begin to refine its results. This gives not only the liberty, but the responsibility to the architect to refine the form and its components. What is of paramount importance rather, is the selection, recombination and refinement of the form to produce a legible and desirable outcome.

The design of this facility will commence with the careful regard for existing conditions of New Philadelphia and surrounding regions. Empirically regarding the dynamic movement patterns through quantitative data and merging that with the qualitative properties of the town proper will give design credibility. In designing a building for use specifically by the residents of New Philadelphia, for example, it would be neglectful to start designing without this stage in the process.

The foundational step for the design of conventional architectural projects through history has been based upon the selection of an appropriate architectural type and a prescribed program. However, as discussed in previously, it is asserted that the establishment of a fixed ‘type’ for this project is no longer necessary. We can take ideas from projects we designate as exemplars or precedents due to certain features, but these do not have the same amount of constraint on the project, they can only influence or support elements of this process. The denial of any fixed type gives a freedom to begin the exploration of new and unanticipated forms that emerge from an informed process.

The idea of program will not be that of a form generator, rather, program will be viewed as an unfolding feature, even the result of the form. In doing so, the form can emerge more naturally, to inform the program. The form will trigger the program. Singular programmatic

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**Diagramming: Generative Forces**

**Emergence: Generic Form**

**Refinement: Infuse with Meaning**

**Existing Condition**

**Adaptation: Programmatic Flexibility**

**Adaptive & Meaningful Public Resource**

62A. Flow-chart of Design Methodology.
elements should not be contained within domains; easily distinguished as separated spaces. Rather, the approach here is to maximize the programmatic potential, and allow for the overlapping and interpenetrating programmatic elements that coexist and cohabitate benefits the idea of deterritorialization.

Deterritorialization and dematerialization are both qualities of the new complexities established in the digital age. A new approach to organizing systems and spaces must be established through the overarching idea of orientation rather than segmentation. This idea of orientation will order a legibility and comprehension in the composition. This lends itself to a more flexible and adaptive environment.

Without the presence of typology or program as the fundamental form-generators, new ideas must inform the form. Diligent research and analysis of existing conditions will be folded into the design process. A thorough qualitative and quantitative analysis of the traffic patterns, both automobile and pedestrian, as well as structural patterns that emerge from the existing urban grid should show emergent patterns that may influence the physical form. As these emergent patterns are charted, through a series Descriptive Diagrams, they emerge and materialize through Dynamic Generative Diagrams. From this point, it will be possible to formulate a more definitive idea of what the material and structural aspects are comprised of. From the uncovering of form, material, and structure, an iterative series of abstracted and diagrammatic models produced with 3 Dimensional Modeling Software (Maya) as well as physical architectural models can be constructed and refined through selection, manipulation, and deformation to further explore the functionality of the space.

Maya software is advantageous due to its NURB (Non-Uniform, Rational B-Spline) modeling capabilities. This allows for a mathematically exact representation of free-form surfaces. Used originally for the designs of automobiles and aeroplanes, these parametric design tools have become beneficial to architectural design. Because of their accuracy and speed, a large number of variations can be made and reproduced by programmed machine. This allows for an expedited documentation and fabrication of highly complex forms.

Using the strategies of emergent form based upon digital technology, a form will emerge that will have an innate multiplicity and ambiguity which will allow for program flexibility. The form itself will be informed in such a way to incorporate structure and systems into an integrated composition.
SCOPE

The ideas related to typology and program coupled with the idea of Technology act as a keystone for this project. The conventional idea of form-follows-function will be dismissed, as it leads towards a centralized building exclusive to one function. Rather, a set of elements for each layer of the city will be addressed from macro to micro-scale. The layers will be designated as followed: Global Community, Local Community, Urban Core, and the Primary Site at Washington Square. In doing so, the embedded technology that lays latent within the city already will be materialized and threaded through the city of New Philadelphia. Following are the defined locations [domain] and physical solutions [structure] that will make up the layers of this project.

GLOBAL COMMUNITY

[domain] The intangible network of connections enabled by the World Wide Web. This dissolves political and geographical boundaries and is parallel to location.

[structure] The design of an Internet resource, and community network, in the form of a community website that posts relevant community information can help promote the idea of an individual’s connectedness with other individuals within the community as well as New Philadelphia’s connectedness within the Global Community.

The design of this local website will allow the residents of New Philadelphia develop a stronger sense of community. It would have the ability to stimulate more community interaction with each other as well as with government officials. Bulletin Boards, Event Listings and other resources can be offered in an on-line format to keep people knowledgeable about their community activities.

This also presents New Philadelphia to the World, at large, as a collected group of organized citizens. People who are unfamiliar with New Philadelphia would be able to gain insight into the thriving community in New Philadelphia.
LOCAL COMMUNITY

[domain] This considers the social networks and cultural qualities of New Philadelphia and its residents.

[structure] A series of satellites will be designed that correspond with the primary transistor. These will be located at socially relevant places and allow for the access to Internet information at many different locations through the city.

These ‘Satellites’ would reference the main community center, and extend internet connectivity throughout the community. They would not only act as visual beacons to denote where wireless internet areas were, but these satellites would also be designed similar to an ATM or information kiosk, where there would be a monitor and console, allowing pedestrians to access the Internet at various locations throughout the community.

Locations for these would be where there is a large concentration of active people. Schools, Libraries, Highway exists, and even the local mall are potential location for these elements, as they could provide their own information into the network, but they would also be places where pedestrians would find it opportune to access information on the network.

URBAN CORE

[domain] The physical nature of the Central Business District and its organization.

[structure] Pedestrian elements such as lamps and surface treatments can give a unity to the Urban Core. Also, these will act as a visual indicator for the presence of wireless Internet service. This will act as an amenity that could attract new business to the CBD.

These pedestrian elements as a whole will give a cohesive sense of order to the CBD as well as orient pedestrians and define the extents of the CBD. Although these elements could be seen as ‘accessories’ or superficial elements, they are necessary in the legibility of an urban space, and they offer another rich layer to the community which express the unique history and the values of the community.
PRIMARY SITE @ WASHINGTON SQUARE

[domain] Washington Square will be seen as the Primary Transistor, or Hub of the Technological turn of New Philadelphia.

[structure] A structure in the form of a building will act as the primary transistor for all technology resources. It will act as a host in introducing technology to the community.

The ‘Primary Transistor’ is the main thrust of this thesis, and the part that will most importantly manifest itself in a final composition. These unique speculative program and qualities for this site will be discussed in the following paragraphs.

SPECULATIVE PROGRAM

The program cannot be a fixed entity; rather, it will be inspired by the generative form studies. However, a certain amount of preconception is necessary in order to begin to develop the form. It is a flexible set that can vary upon the materialization of the form. Ultimately, the form will determine the prospective program, and the community and time will determine the actual program, which will be left somewhat open-ended for future adaptation and flexibility.

PUBLIC TECHNOLOGY RESOURCE CENTER

The thrust of this project will be the design of this structure, which will be a community attraction. It should function to raise the public awareness of Technology as a benefit to contemporary life. It should have a high profile and be an inverse of the static masonry buildings that surround it. Visual appeal and stimulation should compel the community to participate with the activities transpiring within. Its design should be somewhat ambiguous, thus allowing the community to take it and use it as their own.

To support the projected ethos encompassed by this square, a Technology Resource Centre will be a public point where people can develop their skills as well as interact with their community. Programmatically, a large portion will be a flexible, public open space where people can congregate and assemble. A smaller, and more closed area will house technological resources, including hardware, software as well as expert assistance. Classroom areas may enter as a programmatic element providing for small groups of people to learn new skills in an accepting environment.

Aside from these formal functions of the Primary Transistor, some more functional elements can be speculated:

66A. Vehicular diagram of the Primary Site @ Washington Square.
PUBLIC SQUARE
A vision of a vibrant and thriving park with communal green space will guide the project. This park should have a character that inspires the public to interact with the landscape and interact with each other. Multiplicity should be regarded, allowing the park to be a quiet refuge at times, and transform into a public attraction at other times.

SMALL BUSINESS INCUBATION
Apart from providing the physical and technical resources required for starting small businesses, these incubation units will offer valuable services to prospective and new business owners, including mentoring in important areas such as financial planning, marketing, and future growth strategies. Workshops, seminars and classes on all aspects of successful business development will be offered, and the center will be able to provide guidance from experienced sources in developing business contacts, pursuing government contracts and opportunities, and gaining recognition for small business through and media resources.

- ACCESS TO CAPITAL—Local entrepreneurs looking for funding to realize their ideas will be able to turn to The Small Business Resource Center for guidance. Experts at this Center will help new business owners navigate the various available funding sources, evaluate business structures and determine what kind of capital is needed as well as the best ways to pursue it.

- AFFORDABLE SPACE—This Center will offer an incubation program and facilities for businesses less than three years old. Through this program, resident businesses will be offered low overhead and shared resources such as administrative support, fax and postal services, audiovisual equipment, copying equipment and meeting rooms.

- COUNSELING—Business owners who utilize this incubation program will have access to counseling and advice from prominent business leaders. Entrepreneurs can tap into the wealth of knowledge and experience possessed by other members and experts to help them at every stage of their growth, from conception onward. The Center will also help advise owners on key items such as bookkeeping and human resources materials they need to get started.

- EDUCATION—Classes, workshops and seminars can aid business owners at all stages of development. These educational classes are an important asset for members, covering a variety of topics such as marketing, business planning, web site creation, hiring and management techniques, and even business etiquette. These programs help owners set a strong foundation that fosters future growth and success.

- MARKETING—Successful businesses require marketing strategies that will get a name out in front of the public. It is speculated that this center will partner with the Tuscarawas County Chamber of Commerce to offer a variety of showcase opportunities such as Business Expos, Business After Hours and Small Business Week activities to help publicize small businesses.
68A-C. Generative Diagrams created in Maya.
FORM GENERATION

From observation, traffic patterns were charted according to volume, velocity and variation. Both vehicular and pedestrian traffic created two sets of data. This data informed a series of plot lines that were imposed on the site. Each of the two sets of data were then independently transformed into free-form surfaces. These plot lines were lofted into a NURBS surface that informed the two roof planes. These planes were cropped at the extents of the site and the result were two planes that allowed for a volume that could be read as an inhabitable space.

Because of the capacity of the software, it is possible to then build a form on differing sets of data. The process acts as a form-generating machine, so that different outcomes result from different sets of data.
REFINEMENT

This process of refinement will endow the final form with specific features that give the architectural solution cultural meaning. It is the role of the architect to guide the previous formative processes in attempt to uncover desirable results. These strategies are the result of a controlled composition of complex forces and systems.

The idea of the necessity of refinement relies on the importance of aesthetic elegance. There are particular characteristics and aesthetic qualities that are universally desirable. This attenuation of detail, materiality and scaling of part-to-whole are the responsibilities of the architect. The insight and intuition of the architect guide the processes that mould the form into a fine architecture, while the speed and accuracy of the modeling software will allow for many potential designs to be explored before the selected form is chosen and refined with consideration for the qualities of an elegant composition.

The aesthetic qualities of movement and lightness are two critical qualities that must be maintained, while the characters of variety and complexity must be managed in order to render a legible composition. The ease of creating and manipulating complex free-form surfaces will service a more fluid and dynamic form.

This process of refinement also determines the functionality of the form. While the idea of program was ignored in the foundational steps of the design, now is the time to begin to overlay the form with the modifications that will allow for a more functional building. This considers zoning conditions, spatial and material requirements as well as accessibility issues.

Once the computer model has been refined into a state of resolve, the designs can be replicated physically by a 3-Dimensional Plotter for study models, but furthermore, finalized designs can be constructed full-scale, in a number of sections, by fabricators and shipped to the site for final construction.

70A-D. Generative Diagrams showing magnitude of adjacent traffic patterns and their effect on the building form.
71A-D. Plans and elevations.
72A. Site Plan

72B. North Elevation

72C. South Elevation
71A. Elevations
74A. View from square across street.

74B. View from square across street.

74C. Approach from North 4th Avenue.

74D. View on-site.

74E. Interior.
OUTCOME

Based upon Paul Virilio’s statement that mass and energy are no longer adequate as the only two characteristics of matter, but now, INFORMATION becomes equally, if not more important. The design will reference the characteristics of Information, or that of an ever-changing, entity in flux.

Through new digital techniques it is possible to design a culturally significant architecture that incorporates the qualities of life in the Digital Age. Despite the mediocrity of some new digital architecture, it is possible to rectify digital design with an aesthetic of elegance. The refined form that is a mastery of digital techniques that confirms the idea that the elegance lends itself to a universally accepted and sensible direction for the future of architectural design.

The advantages of using digital technology to design range from an efficient way to generate a large variety of potential forms to the ability to manage more complexity within a project. With sensitivity to the values of the existing community and its urban fabric, emergence allows for a unique solution that is specific to its location, becoming a trace of the intangible networks surrounding the project. Furthermore, refinement imparts the computer-generated forms with more universally appealing sensibilities. The formal organization and the digital processes of design fully embrace the topos of technology’s impact on architecture.

Architecturally, the computer has aided in allowing for more complexity within design conception and construction. Dynamic and free-form compositions not only metaphorically address the Digital Age, but they are also a result of it, in the fact that Digital Methods allow for a more accurate and expedient exploration of curvilinear forms. The form is, theoretically a direct result of emergent patterns from community and individual behaviors layered with the aesthetic and organizational characteristics afore mentioned. This form will act as a visual cue, referencing the intangible qualities of digital culture, and will become inextricably embedded within the community.

With this project, it is proven that our existence as an information-based culture in the digital age should in fact be visible through our architecture. Reciprocally, a technology-infused architecture can insight the embrace of technology to a culture that has not yet accepted the cultural shift. The impact of the virtual spaces and interactions are not be implausible to represent through our physical environment.

With the success of an elegant digital composition, and sensitivity to the existing community, Architecture does have an innate ability to act as a catalyst for cultural change. A provocative architecture has the ability to stimulate the intellect, as a dynamic architecture can motivate the senses; Architecture certainly holds a richness and the capacity to express profound ideas and emotions to which people, places and communities are not immune.

Besides the aesthetic improvements in the Central Business District, this project illustrates potential for architecture to promote significant social changes. The application of this technology to the lives of these people has the potential to be a great equalizer. The current information culture and its industries, specifically, can give new financial possibilities to small town America, allowing them to once again sustain themselves. This project allows visible traces of the intangible networks to be seen throughout the community. As if these forms were residual artefacts of Digital technology itself, residents can take these as cues for cultural change. The prominent new structure embedded within the built environment act as an impetus for individuals and local businesses to look towards new industries for their future. Embracing new ideas, new tools and new skills will extend new opportunities for generations to come.
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B


C


Rahim, Ali & Hina Jamelle. ‘Elegance in the Age of


DIGITAL RESOURCES

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