

# **“La Citta’ Ideale” Generative Codes Design Identity**

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## **Abstract**

The aim is: how cities could fit the quality idea, the urban lifestyle that is our welfare dream?

**But what is our dream? A city that reflects, as in a mirror, our identity.**

We know very well what we want: beauty, harmony, naturality and safety. For gaining them, we need to define "how" to satisfy these needs.

1. We look for **naturality**, but in the same time we love sophisticated answers to our needs. And naturality that fits human needs is a result of high quality design and management approach.
2. We are looking for **beauty and harmony**, but we are losing these qualities, that we had in the past, in these convulsed improving density cities that satisfies only pre-defined and functionally optimized necessities
3. But first of all we need **clarity and safety**; and we discovered that also what appeared as impossible and unthinkable catastrophe was happened. And Safety can be realized only if each people can share a process of evolutionary conscience.

The complex structure of a city can be identified as not-linear complex system, and we need a tool that can emulate and manage, operating in real time, the transformation process of cities.

As all the dynamic not-linear complex systems, every city has a proper attractor, a specificity that countersigns it and that we can represent with a series of specific codes of transformation, with a Generative Project. Like DNA in nature, we can design the city's identity



*Ideal City, Piero Della Francesca atelier*

## **1. Ideal Cities**

**Ideal city** has always been a fascinating matter.

The thought of possible urban scenarios were **always representations of cultural approaches**.

These researches and utopias have produced visionary scenarios that tried to conjugate functional, aesthetical and symbolic aspects with those belonging to a good government able to realize the aspirations of citizens.



*Lorenzetti, the good city government*

**The ideal city is a concept of possible, not a defined form.** An adaptive concept that is able to fit the dynamics of the incoming transformations.

Ideal Cities are ideas in progress, cultural approaches, tensions toward possible existing cities, proposals that people can share giving his contribution that mirrors his uniqueness, his own ideas, desires, traditions and aims. It is ideal in how much it unites in a project an identifiable and characterized physical and social organization.

The idea of an ideal city is a philosophy, is a challenge, is how to look at future, how to think the increasing quality process. And this process must fit and support local culture and traditions.

Every cultural identity has, as art expression, its ideal city. This possible city represents the possible evolution of a *particular* existing city, traced using **codes belonging to local cultural reality**, to genius loci, to a recognizable urban identity expressed by its history. The ideal city of Venetians is Venice in its future possible configuration in progress. The dream is Venice incomparably much more Venice than before.

The idea of a city is, therefore, a visionary representation of modes of changing the city itself. When this idea is realized, the possible moves itself forward, looking for a new possible.

More, some cities are open cities. Who arrives feels so well as if he always lived in that place. And these cities are really impressive for the fact that, despite their inhabitants have different traditions and cultures, and different needs, the city's identity remain however so recognizable and unique.

**And all different people recognize themselves in this city.**

## 2. How to look at future

The city must answer to the increasing requests and needs of its inhabitants, but above all to the **unpredictable subjective needs of each individual**, who "lives" the city following his own thoughts and his own desires and his own conceptual paths.

The fields of relevance of these requests are manifold:

1. Contradictory requests concerning artificial and natural ware;
2. The needs concerning the recognizability and the preservation of differences;
3. The esthetical needs;
4. The needs of security;
5. The functional needs concerning the adequacy, in real time, to the evolution of human life:



6. The need to find in the cities the patina of time that tells us we are alive because we had a past.

But all these needs are not so easily classifiable in optimized data that are legitimate for all people. Each of us is unique and unrepeatable, and our needs are, above all, subjective needs. The city, to be livable, must know how to respond to the unpredictable subjective requests of each of its citizens.

**The city must be adaptable to the multiplicity of subjectivities, but in the same time must be recognizable, unique and, more, it must preserve its identity.**

A precise relationship exists among the subjectivity of needs, the city identity and security of living there.

Everyone needs to live in an environment that respects the uniqueness of its inhabitants. This is possible only in a city in which identity, difference and oneness of environment is saved too. A town environment homogenized by an approach following only optimization standards contrasts to our subjective search of the happiness, to the sense of our presence and existence. (Soddu, Colabella, “recreating the city’s identity”, Freiburg 1995)



### 3. Generative Projects

Therefore we can identify a possible approach to pursue the urban quality in even more complex cities: not the construction of a static system, with previously defined events, but the **construction of a dynamic system and its logical rules** in which the initial paradigm, the conceptual structure of the city, is a first step of a reference process able to support and carry the subsequent dynamics toward the attainment of the quality.

**The urban quality is tending towards quality.** Quality will be reached when the build events represent our time of human beings in the history process.

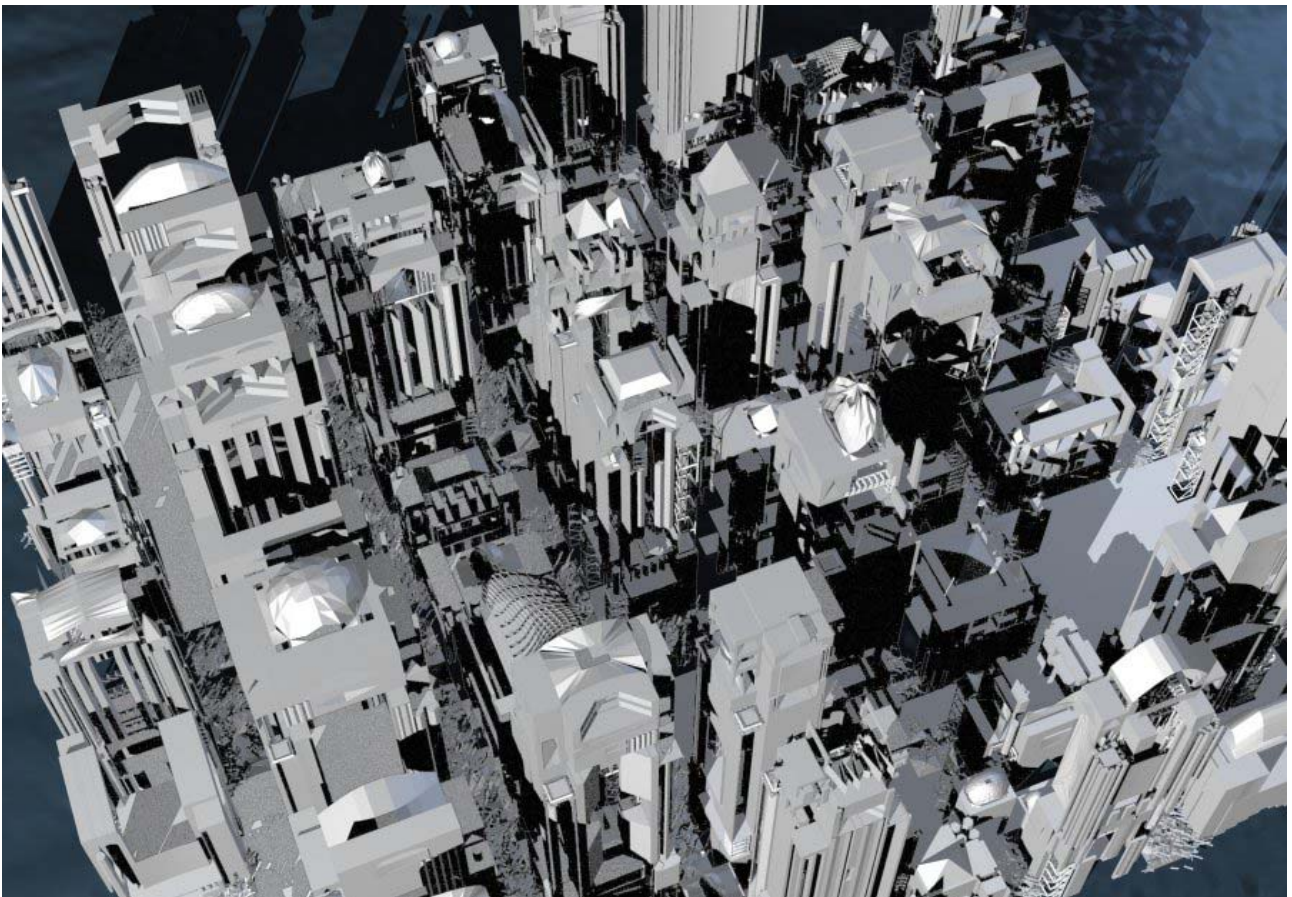
The most opportune operational approach to the future of quality, safety and harmony of the cities is to manage the not-linear dynamic system that represents each city with a **Generative Project**. Manage, re-design and design the town system. Generative urban design must define a paradigm of management, in progress, of the increase of complexity and not a plan proposing, in axiomatic way, forms and static orders.

**This design act, and the strong clarity that springs from it, is essential.**

The impressive matter is: identity, complexity and quality of cities can be **designed**. We can create the identity of a city putting together a sequence of creative acts, stratifying manifold different points of view, manifold concepts of city belonging different fields of interest, and constructing something like an artificial DNA performed like a table of transforming codes. These codes are not only theoretic but operative devices too.

We can use this **artificial DNA to emulate evolutionary sequences of city's life through increasing complexity processes**. Doing that we can generate new cities with a strong identity belonging to this artificial historic life. But thought these visionary scenarios we can, above all, identify and manage the existing cities and their quality.

The essential points of reference of generative projects are: identity, complexity, harmony, clarity and safety.



*Generated city. The identity belongs to the transforming rules used and to the self-organizing paradigm that manages the process. The identity generative code used in this town design is my interpretation of New York City Identity through an operative generative meta-project*

#### **4. Identity**

Cities are extremely complex systems. Each city has and must have its own strong identity, due to its own cultural tradition, strongly recognizable and loved from people living it. If a city has not



identity, it's not a city; it's only a built-up area, a primordial broth without structure. We can transform it into a city, if we identify a concept strongly related to the environment and to its inhabitants. Our challenge in globalization era is: **a city equal to an other city doesn't exist**. Each one is unique and unrepeatable. We have to work for that. This is the reason why it is not possible to look for optimized solutions usable for all urban realities.

But, as often happens, increasing complexity due to the increasing needs of contemporary life can deteriorate this identity. And **cities can loose their identity**. Contingent solutions owed to specific needs and new functions can weaken this identity until losing it.

It happens, above all, if the city's management forgets the harmony and the cultural specific identity and operates transformations that are repetitions of evolutions used in the other cities. The immediate functional objective can be reached but this approach can damage the harmony and the clarity of the town system.



*Singapore. Generated architectures with the aim to fit a particular town concept that identifies Singapore.*

But what does the "identity" of a city means, and **how is it possible to save this identity** from destruction, from the homologation of the image and from the flattening of its performances?

We can follow **two** different paths that come from different and contradictory presuppositions.

1. A way is to save the existing events by freezing them, because we read the environment identity as belonging to a particular static equilibrium. But this approach run the **risk of transforming each**

**city into a museum** and could not be an approach that brings us far. At most we can apply this approach to some exceptional existing events. The city, considered as a structure which identity is static, doesn't evolve and die, totally losing its real living identity.

2. The other approach, even if it is more difficult to manage, sees **the identity as developing procedures**. These procedures, sometimes consolidated by time, act controlling the increase of complexity, and represent the culturally unique and unrepeatable matrix of the site.

**Like an olive tree that, overworked from the wind and from the rain becomes more and more an olive tree.** It enhances its own identity, while, if grown protected in a bell of glass loses its own identity because it has not the occasion to explicate and represent its character. Following the same way, each city explicates its own identity living the perpetual shifts of cultural moments and unpredictable events, living and using the occasions created by the increasing of complexity of the life of the man, and of his needs, but also created by the chancing of each subjective approach. This way is, however, much more complex than the first one, and more difficult.

After 11<sup>th</sup> September, I think that we must rebuild Ground zero with a strongly positive image of our era because we believe in human progress and, as our fathers made before, we must leave to our sons a Hope space and a Beauty place.

If we choose this second dynamic approach, **we certainly cannot identify the city's identity with a database of forms or solutions** that reflect, in their specificity, different historical and evolutionary moments. Identity is not already savable through the repetition of facts and events. Identity is a *modus operandi* toward the future.

We must conceive something different from old planning tools: **a generative code, an evolutionary code that interprets, in the specificity of the contemporary moment, the bringing forward an idea, going toward the increasing of identity and recognizability of each city.**

We could identify as "**clarity**" the goal to be reached. Every new event that is realized in a city, also in specificity, unpredictability and novelty that can countersign it, it has to bring an increase of clarity.

Every new realization must increase the identity of its city. The city must make a footstep toward the attainment and improving of its unique city's idea, that is not necessarily tied up to specific forms, colors or recognizable events but to a recognizable logic representing the cultural and ideal character of this city.

Because each city, to be livable, must have a recognizable idea. There is not a static possibility: **the identity can be or improved or loosed.**

## 5. Clarity and Safety, the Livability

The relationship between the citizen and their city is a relationship of mutual clarity. Each people recognize his own city and, recognizing himself in this city, works for increasing the livability of the environment in which he lives.

Recognizing the city in which lives, each people finds, mirrored, his own identity of man.

Livability is harmony, safety, feeling good, feeling to be at home and sharing a city concept that reflects own history.

Clarity is, above all, sharing the evolutionary process of conscience, knowing what surround us and feeling it.

If we share the cultural concept of our city as code, we feel home, and we perform, in fractal way, all spaces following this code. From urban spaces to architectural spaces until interiors.

The urban scenarios emerging from these operational logics have, simultaneously, clarity of image and structure, recognizability and harmony and, in the same time, they fit the complexity of contemporary cities.

But this not means that urban spaces are all equal. On the contrary.

They are only like individuals of the same species. **Every urban and architectural space, unique and unrepeatable public - private events, will propose, in its oneness, multiple variations of the identity of the same place.** A city inside the city, each one different but able to interpret and represent the same urban idea.

Everybody as part of the same living entity, as inside a historical district in which life flows without interruption and all people know very well where they are, also if they never visited this particular place before.

Identity means that each inhabitant has a clear concept of his city, also if it is a megalopolis.

**Because the complexity is understandable applying a fractal logic.**

Each quarter, each place, each square is different and, perhaps, unpredictable for the citizens.

Because it was realized in different moments and with the support of different designers. Each place may be unpredictable and fascinating for its uniqueness but it will be not a surprise for inhabitant people. The place is recognizable as belonging to the same city's idea.

Each people recognize each space, knows it and, discovering its unpredictable uniqueness, unconsciously improve its quality and clarity. As happened in historical ancient quarters. Or in natural environments where each people can value if something can be a problem because he knows clearly the structure of nature and he wonders looking at the multiplicity of uniqueness.

## 6. Naturality

In other terms, we can value incoming **megalopolis as a new naturality**. Where complexity is not a character that brings difficulties but, as in nature, can help the approach to identify and manage problems and new needs.

More, this approach to complexity can, unpredictably, satisfy the need of naturality of town's inhabitants. All different events, but clearly recognizable, perform a natural quality. Where artificial **events are all different like in nature**. And, with their uniqueness could mirror the uniqueness of each human being that lives the city.

**Generative approach performs these possibilities.**

Using a Generative Project, we can generate a sequence of different possible incoming scenarios, and value them. In the meantime, we can verify and control the structure of evolutionary process we have designed. All the results generated by this project are different, really complex like natural sites and fitting the complex needs of contemporary life.

These results define, in the plurality (we could say the endless) of possible figured scenarios, the identity concept of a city. Each generated town design is a performed Ideal City because this generative project is not only a solution but a way to look at future and to design the mailfold future possible evolution of the city.

## 7. Complexity

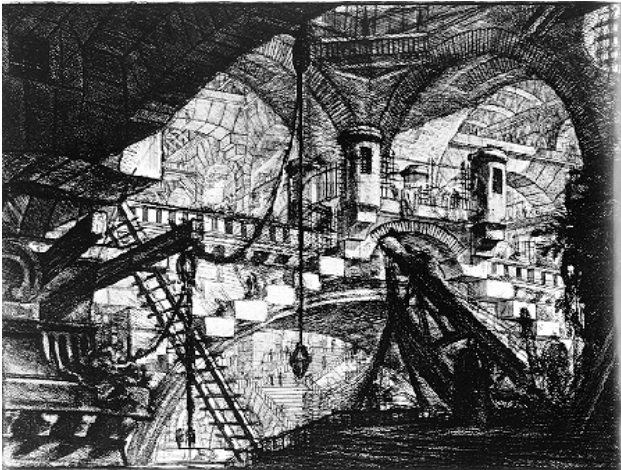
Complexity and not complication. Complexity fit clarity and quality. On the contrary complication fit confusion.

It is extremely difficult to define the complexity as static attribute of an event, of an environment. Complexity is not only the result but also the **same structure of an evolutionary dynamics**. It depends, essentially and entirely, from the "how" the system-object-project-environment-city that we are considering is evolved.

It is in fact impossible, and unthinkable, to directly produce complexity at once without activating and attending the evolution of a dynamic trial. A process of accumulation of following results and possible different points of view and, contemporarily, of progressive synthesis acts.

If, as architects, we try to imagine ex-novo, and to extempore draw a city that has the character of an environment with complex historical stratifications, we will go toward to a sure failure and we would probably produce simplified sketches.

In the past Piranesi too, drawing visionary cities, used to stratify, in different times, a plurality of possible histories, transforming the previous one in way to leave traces and forms that progressively accumulate and evolve themselves. His drawings are **complex because they represent traces of life too**.



*Piranesi, visionary complex environment*



*Giotto, medieval city image*

Complexity is ever connected to the dynamic path of transformation. It is born from this process.

**To design and manage city's complexity we must run its evolutionary process. And Generative Design does it.**

But if dynamic trials of development are necessary to produce complexity, these are not enough to reach complexity and not only complication. Something further is needed.

A city increase its complexity from the length of the lived time, but also, and above all, from having crossed different historical and cultural moments, programs of development conceptually different and contradictory, and from the ability of simultaneously living these different points of view concerning its development.

A generative tool managing the increasing of complexity (and belonging complexity, quality) must emulate two types of growth: the **accumulation of events** and references (due to the trial), and the **performing of clarity**, due to the growth of the ability of continuous self-organizing of the system in front of what changes, also suddenly.

But not only. Complexity also manifests itself with the ability to effort (we could also say to react in front of) these events, satisfying incoming needs unpredictable before. This ability is an attribute that we can identify and define as self-organizing power of the system. Managing the changes in progress to maintain entire, rather to increase, town identity, quality and characterization. (Soddu, Colabella, "Il progetto ambientale di morfogenesi", environmental design of morphogenesis, Esculapio Publisher, 1992)

**Generative approach produces projects able to emulate self-organizing processes and to design complexity.**



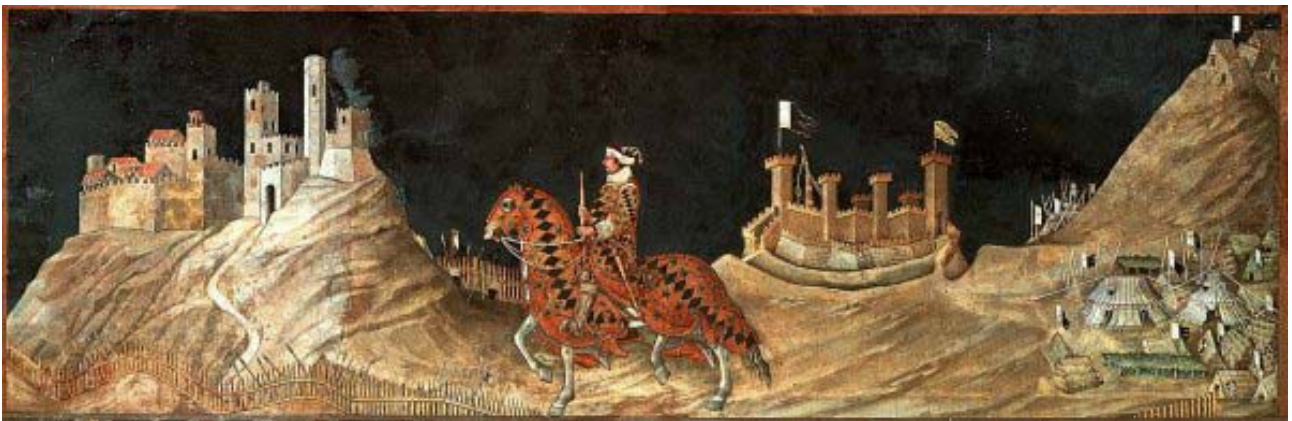
## 8. Case Studies

One of first case studies that I realized was the generative project of **Italian medieval towns Identity**. (C.Soddu, Citta' Aleatorie, Masson publisher, 1989 Milan, Italy)

The urban image painted by the Italian masters of '300 and '400, have been one of the occasions for my experimentation. Looking at these images I have tried to represent, through algorithms, design logic and an urban evolutionary logic. The aim was to understand, identify and represent the "urban and architectural character" of this city's concept.

For the characteristics of the research and of the tool that I had in mind and I was setting, this was a theme that has not been developed looking in preference at the philological and historical references, but operating only through harmony's stimuli that some pictorial images of medieval time are still able to give to me as a contemporary designer and architect.

To do that, and to find a composition reference with the more univocal possible identity, I observed a whole series of images of urban spaces and architectures represented by Giotto and Simone Martini

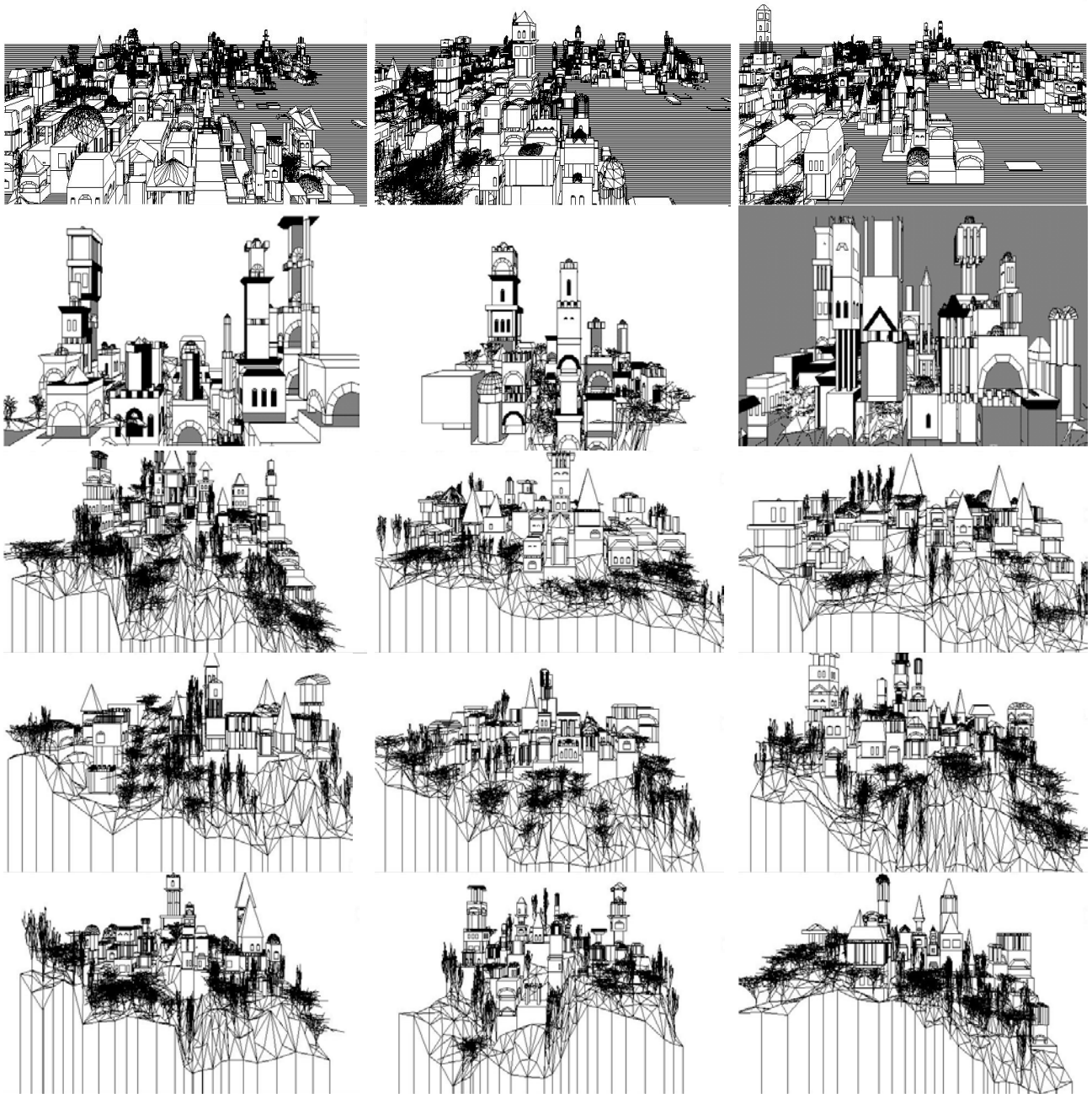


*Simone Martini, cities scenarios*

The operational choice has not, however, the setting up of a library, an abacus of elements to be composed, because this approach would have been able only to furnish "predictable" images, therefore far from the complexity of possible urban systems and urban shapes that I was looking for.

The aim has been, above all, the **representation of a conceptual dynamics**, of logics through which such elements (at the various scales) can be produced. And the representation, in parallel, of the temporal dynamics of construction of the urban shape.



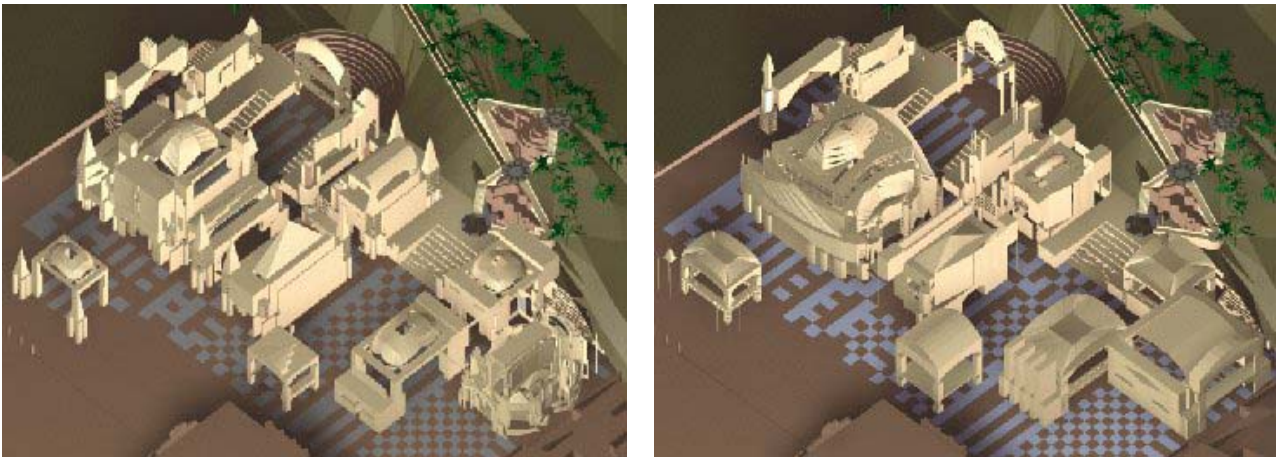


*Generated scenarios of medieval Italian towns (1989)*

Each generative device, separately, acts on different aspects of the same element. They are activated by the simultaneous presence of different logics.

Artificial Life emulation is used and the generative project is structured in way to produce also absolutely unpredictable elements. But such elements, generated using the formal logic rules identified to fit the medieval town identity, are strongly recognizable as “medieval”. The three-dimensional models generated with this project have the “patina of time”. They belong to recognizable spatial orders, scenarios that seem to be produced by a temporal run, by a common “history”.

Unpredictability comes from the different time of starting up the artificial design life, not from using random factors inside the code. Generative codes are strongly identified transforming rules and the aim is reaching different results but belonging to the same identifiable architectural concept and town idea.



*Two scenarios of Rome's "Borghetto Flaminio". The increasing complexity sequence using medieval and baroc transforming codes*

Another case study was **Rome**. The historical center of Rome is certainly one of the more complex city environments. Its complexity is directly in relationship with the ability to preserve, rather to increase, its identity and characterization through different and discontinuous historical and cultural moments.

In this study case the design approach for a new project inside this historical center was to identify different codes of harmony as transforming rules and apply them to manage increasing complexity. Particularly, these codes of harmony were performed trying to fit, with a design hypothesis, three of the most important historical and cultural steps of Rome: Imperial age, medieval age and baroc. These **codes were dynamic contemporary interpretations of historical rules**.

We applied, in sequence, these transforming codes of harmony to manage the "clarity" of final results. At the end a "**Generative Project**" was realized. And this project was used to pursue the concept of increasing identity of Rome identifying and performing a contemporary approach to complexity were future scenarios will have the memory of stratified cultural references as time patina.

This approach works because the design idea is a concept of possible future scenarios performed as operative metaproject, and is not only simplified with a form. The idea, performed as Generative Project, is a code of transformation, a set of rules that can start up an evolutionary process that can manage the increasing complexity and identity of an artificial environment in reaching ever more levels of quality and satisfaction.

The generative approach fit the new concept of town design.

The last experimentations were about **Hong Kong, Los Angeles** and other cities.



*Hong Kong waterfront, generated sequence of skyscrapers.*





*Hong Kong waterfront, increasing complexity and identity*

I designed a DNA of these cities and I used that to perform incoming new scenarios.

The idea was:

1. Find **the identity codes of these cities, fitting the concept approach to multi function semi-public semi-private architectures**. These codes avoid to simplified town organization but pursue a fractal complexity: each space is like a town inside the town, and so on.



*Two different scenarios of the same evolutionary generative architectural project in Hong Kong*

2. Design a **set of transforming codes** that can represent the identity of these cities.
3. Experiment these codes generating a sequence of different and unpredictable scenarios that reach the aim:
  - a. **An increasing complexity** of the city
  - b. **An increasing identity** of the city

To verify that, I generated sequences of urban scenarios as improvements of existing scenarios. I presented these scenarios in public exhibitions to verify how this increasing complexity of their city could fit the evolutionary ideas of its inhabitants. Results were impressive and exciting talking with exhibition's visitors, especially young people.



*Hong Kong Central, behind the HSBC, increasing the site identity and recognizability.  
A generated new building.*

The reason was that the inhabitants discovered that their city could increase its identity! Now, I am working in visionary evolutionary scenarios of other cities: Washington DC, Macau, Shanghai, New York.

The verified that citizens of these cities recognize themselves in these generated evolutionary scenarios.

So the subtended Generative Projects work. And it's possible to use it in managing the evolution of cities. More, it's necessary if we intend to preserve these city's identities.

## 9. Codes of Harmony

The first step, in generative design, is to construct the set of codes that identify each city. We could call them codes of **harmony**. And we can perform, with them, a generative town project.

Italian Renaissance culture had identified the harmony as logic linked to the process of construction of artificial environments, to the systems of relationships and proportions that tie different events inside architectures and cities. The harmony therefore is a logic that defines the *modus operandi* of designing acts.

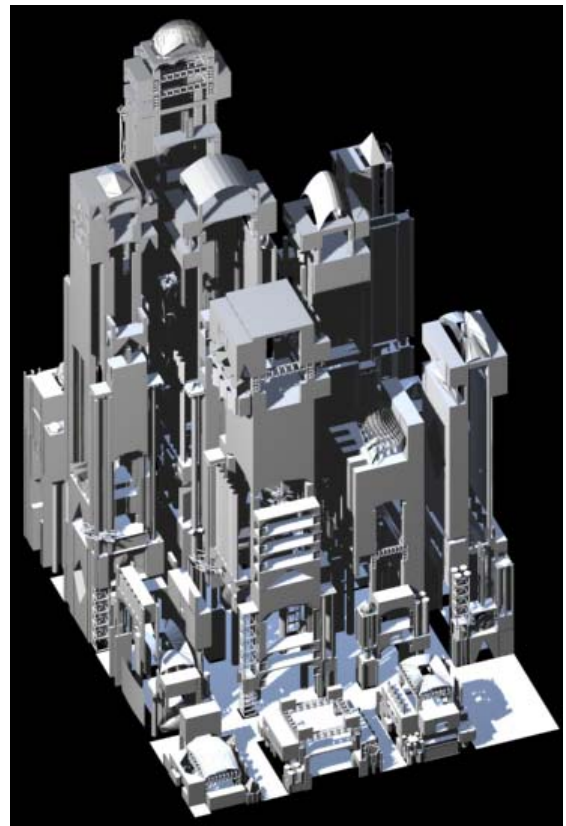




*Hong Kong waterfront in the night. A generated new architecture.*

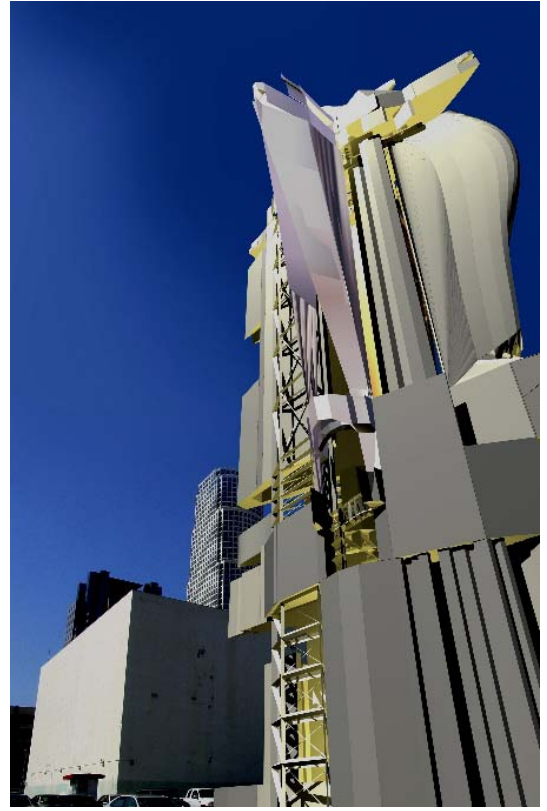


*New architecture in Hong Kong Central*

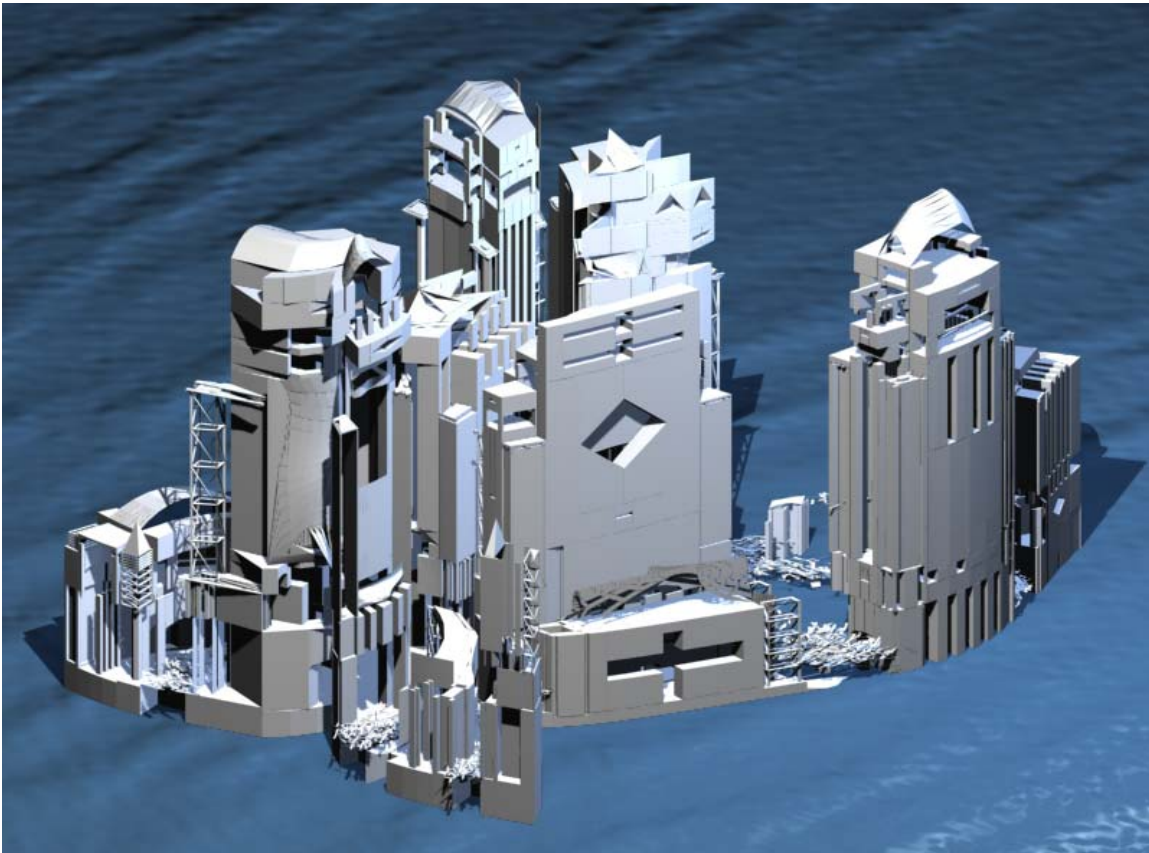


*A generated multi function semi-public semi-private city block*

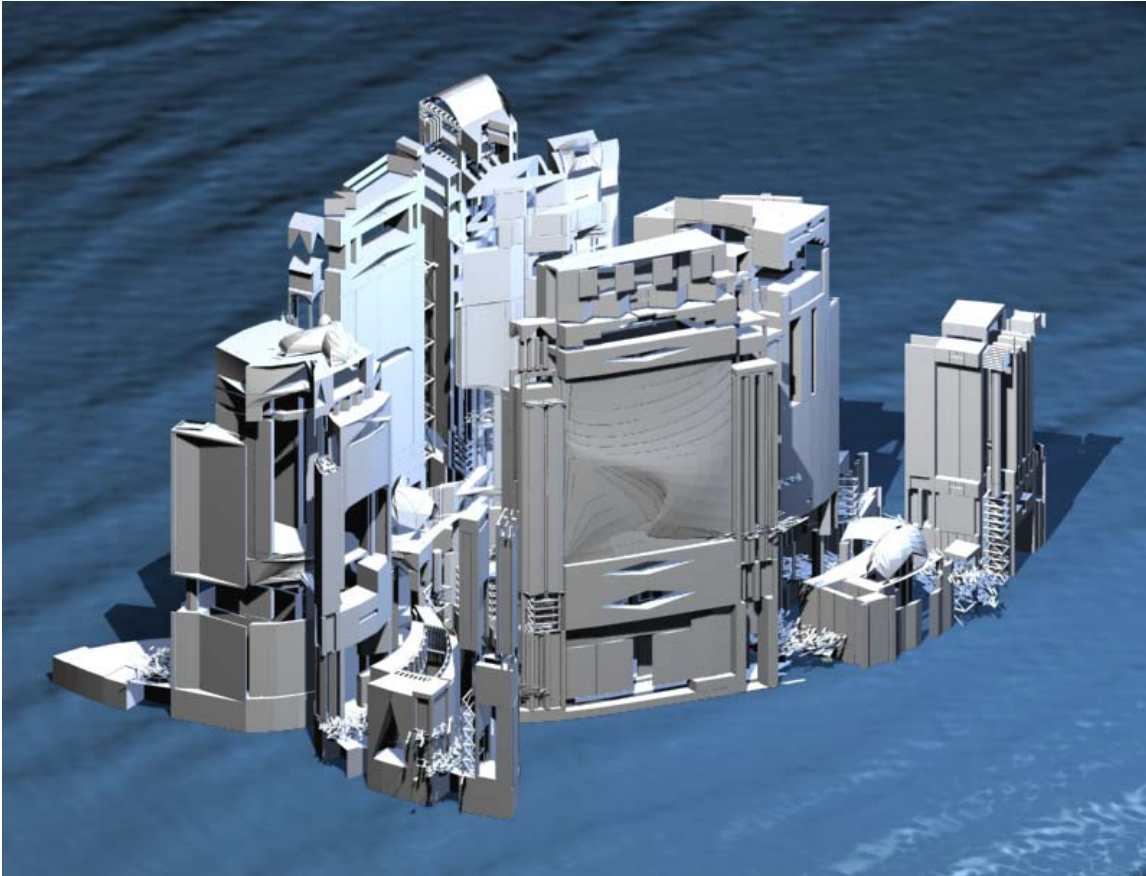




*Los Angeles, generated architectures to increase city identity.*



*Two parallel generated urban scenarios for an Asian city on the sea*



The codes of harmony, in the different cultures, has always been the way to find and use, in the construction of artificial environments, the logics that is possible to read in the natural world. These logics are strongly tied to each different culture even if it is possible to find a common substratum between different traditions in the processes of interpretation of nature. These logical rules, interpreting nature, define dynamics of transforming environments toward harmony. These rules are a design synthesis of the manifold aspects belonging to the construction of possible scenarios.

The operational hypothesis to manage the evolutionary dynamics of cities is to identify and to realize, as generative executable projects, the codes of harmony that represent specific urban identities.

We can do that through some different phases:

- A. **Identification of urban dynamic transformations** proper of a specific city, reading, as rules of transformation, the historical evolutions of the city and the contemporary tensions. Particularly it is possible to identify and to codify these evolutionary rules as:
  - Structures of dynamic progression of the **spatial dimensions**;
  - Structures of progressive transformation of the **topological relationships**;
  - Rules able to control the progressive scenarios represented through **perspective visions**;
  - Sequences of **rhythms** and progressive discoveries of urban space;
  - Contemporary presences of events structured in dynamic relationships among the **dimensional multiplicities** of the built;
  - **Coincidences and contradictions** between the existing spaces and those possible;
  - Relationship between whole and parts, activating controls on the dynamics of **fractal sequences** proper of complex systems.
- B. Construction of whole codes **of transformation** that represents the identity of a city through operational tools of emulation and simulation of the existing executable dynamics.

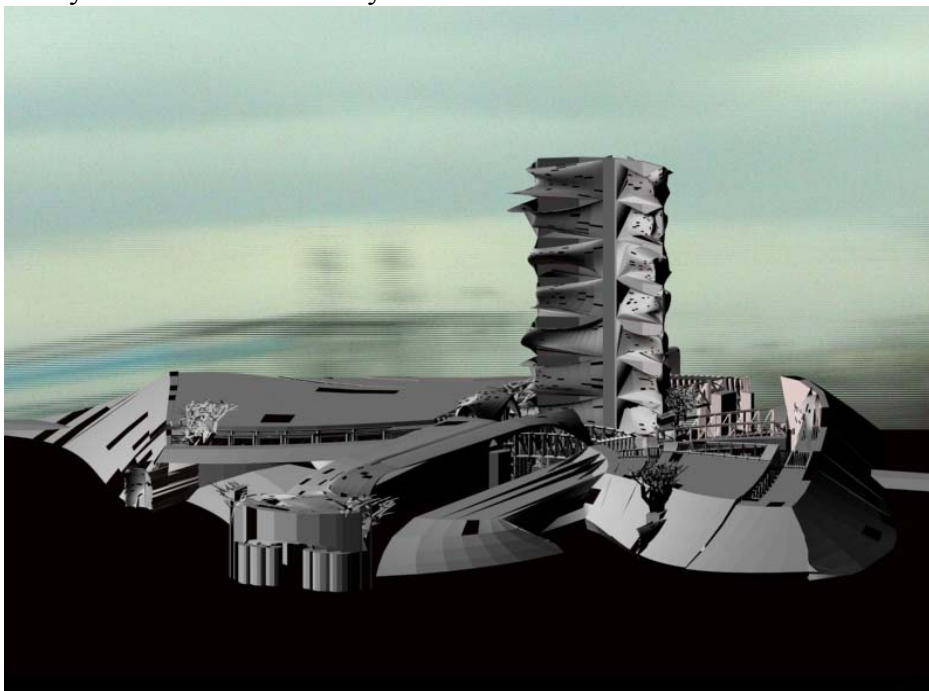


- C. Construction of a **paradigm of control** of complexity that represents, in the city's evolutionary dynamics, the structure of relationships subtended in the system of the city, and that fit, at various scales, the same codes. This paradigm becomes the operational tool to manage connections, contaminations and mutual conditionings among the dynamics of growth of the manifold events that transform the city.
- D. Identification of **bifurcations** in the complex system representing the city and that determines the **plurality of possible identities** in the various districts of the same city. These manifold identities represent possible scenarios belonging to same species, to same urban identity. Urban identity, in fact, is such if it succeeds in generating different individuals of the same species, quarters and places that, also in their oneness, represent different evolutionary possibilities of the same city.



*A generated sequence of two different “quarters identity” and their relationship.*

- E. Identify and design the role of **possible exceptions** as incoming engine for increasing dynamic order and clarity.



*Semi-public semi-private space: commercial center, entertainments, private offices and residences, a city inside the city.*





*Los Angeles, a skyscraper as exception that enhances the town identity*

The result is enthusiastic: the city grows following its own vocations and each incoming need becomes occasion for an increase of quality, identity and uniqueness of the city.

## 10. Structure and use of Generative City Projects

Building a Generative Project is putting together:

1. **The paradigm that is the plan that defines relationships and structure of complexity;**
2. **The rules of transformation**, the algorithms that explain and design how the present can evolve through the future.

A generative code with these elements, paradigm and rules of transformation, can become, in a progressive increase of complexity, an **executable meta-project** that identifies the character, the recognizability and the communicative clarity of every possible event of city's development. If we

use it, we can generate an endless sequence of incoming town shapes and city's scenarios, all different and unpredictable but all belonging and representing one of the possible result of the same city identity.

This is due to the fact that algorithms are logical structures of representations of transformations that can be operated with manifold and different objects and on different occasions. Paradigm and algorithms of transformation define in fact "how" to operate and not "what" to do or to choose.

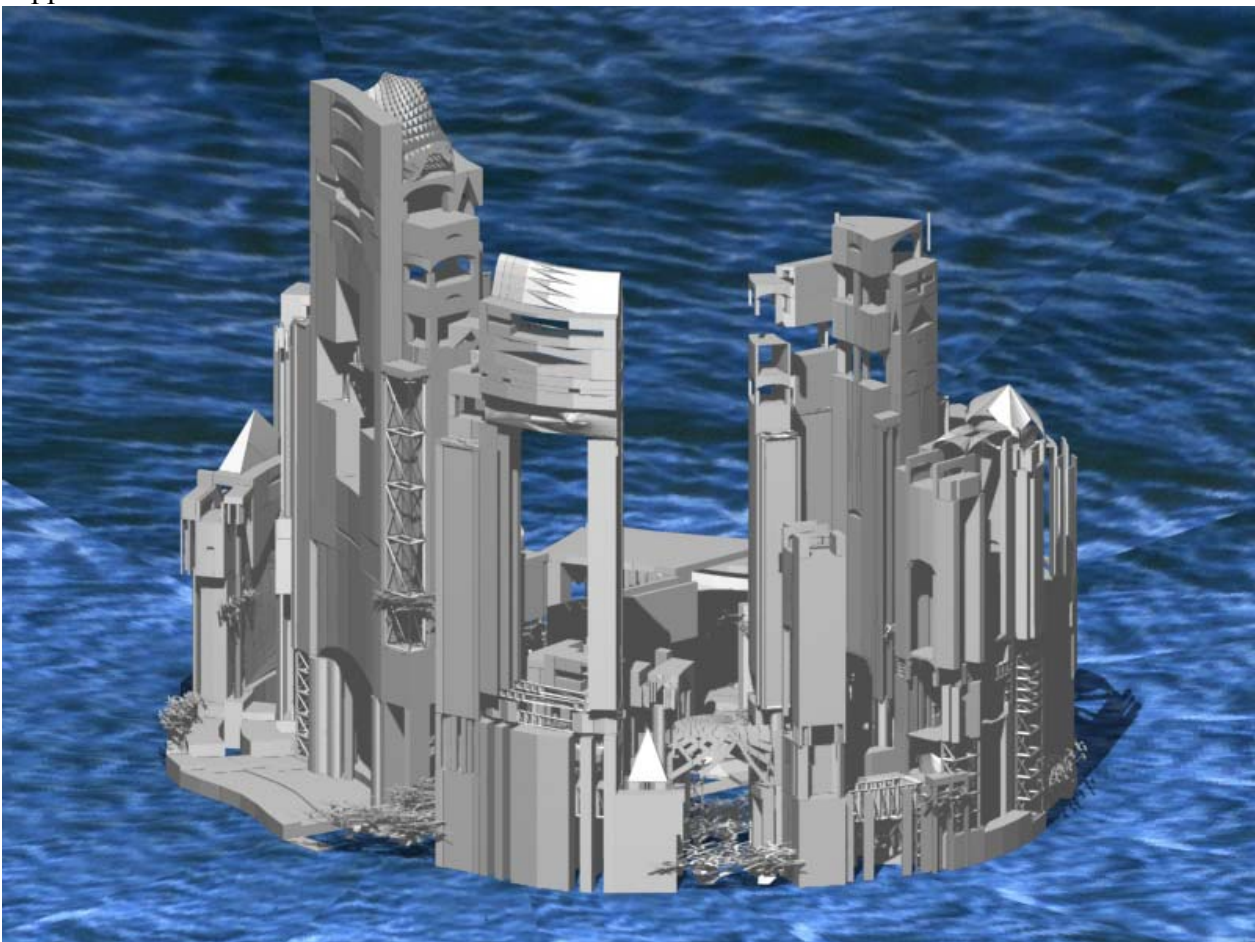
**The interaction between citizens peculiar needs and city evolutionary project** is made possible by the fact that logics, roles and relationships present in the generative project are not simplified and are in progress.

The structure of the functional needs of each inhabitant finds, in this increasing complexity and in the potentiality of functional performances, a wide space to express itself through the paradigmatic interpretation, also multiple, of the possible evolutions.

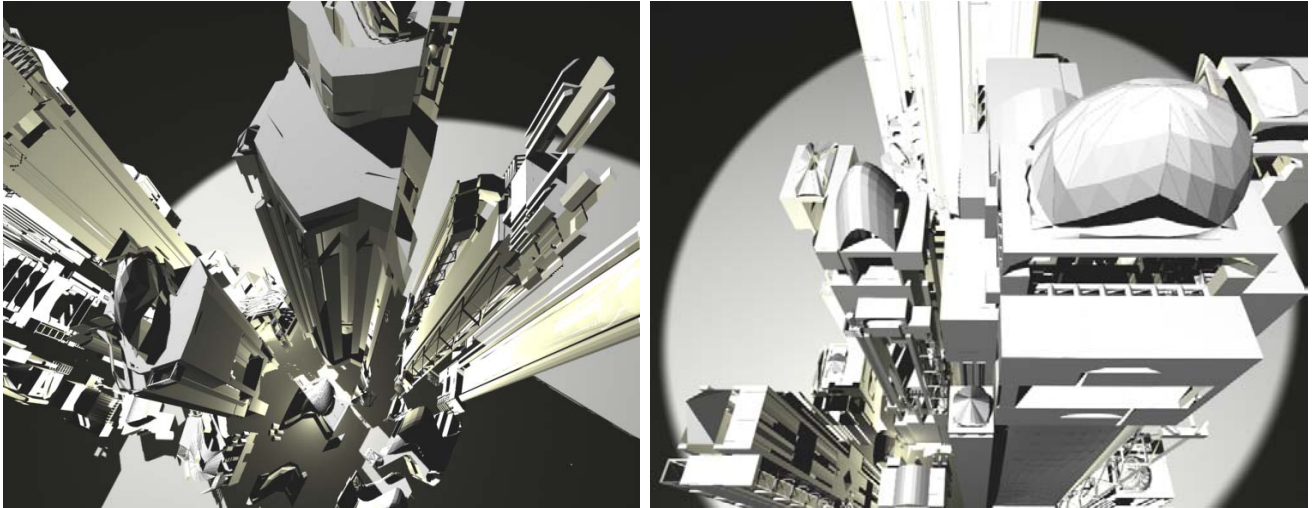
At the same time the more the paradigm consolidates, the more the occasions grows to apply the code of harmony, as in nature.

In other terms we can affirm **that the more the requirements of the citizen are complex and "impossible", the more the potentialities of the generative code are made operational, and therefore doesn't remain unexpressed.** And consequently if the control of the code, taking advantages of the occasion for specific requirements, work on all levels, from the global to the detail, it increases the communicative clarity, the identity and the quality of the city. (C. Soddu, Generative Art Conference, 2000)

Requests and new needs are occasions and not constrains. This is the peculiarity of Generative approach.



*Generated City using Asian Identity transforming codes, (2002)*



*Two city scenarios generated with a particular code managing building's topology.*

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