

New generation infrastructures to rebuild the urban space: from the European city to the Iranian one

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Abstract

As days goes by the progressive crisis that grips contemporary cities seems to be unstoppable. As architects we have the need for a new set of strong and revolutionary actions, that could completely change the link between architecture and city and introduce new enzymes intended to raise and develop, in order to invert the development direction. This is a worldwide situation not only located in one specific place but that invests both the European and Islamic city and shows how we need to develop a common strategy, a mutual manifesto of intents to stop this decaying process and to modify the space in which we live in, related to a machinist vision of the world that we are often obliged to accept. The paper focuses on infrastructures as the key for the future development of contemporary cities and explains how the growth of the urban fabric has always been strictly connected to the role of its infrastructures and has to start again from them to operate a proper paradigm shift. This contribution illustrates, with many examples, the history and conception of new generation infrastructures, a multifunctional and multitasking typology completely different from the linear and monotasking ones developed under the industrial age, and deeply analyse the development of a specific type of them: the inhabited bridge, which is seen as a strong element of connection between Europe (specifically Italy) and Iran. Furthermore, the city of Tehran is seen as a virtuous example of how these new architecture artifacts can change the city's shape and be the starting point, for contemporary architects, to develop new operative categories. At the end of the text a direct experience of a design workshop on the infrastructure theme made by the author in Iran, being part of a multicultural team, is reported.

Key words: multitasking, inhabited bridge, in-between space, leap, metaphor, drosscape.

1. Infrastructures and urban fabric crisis: searching for a contemporary paradigm shift.

In the last decades, the complexity of contemporary city led European architects to wonder which could be the most efficient strategies to face the large number of challenges gripping the strongly urbanized territories of the big metropolises. Hydrogeological instabilities, problems related to sustainability and to the excessive expansion of the built environment are just some of the many issues that have to drive to a both theoretical and operative paradigm shift^[1]. There is the need for a new set of strong and revolutionary actions, that could completely change the link between architecture and city and introduce new enzymes intended to raise and develop. Operating in residual spaces, requalifying unbuilt areas and restoring attractiveness to forgotten places are just some of the main topics from which we need to start again in order to activate a virtuous and constructive process over a very complex theme as the city of the XXI century. To respond to the always greater request



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of living arrangement and to stop the dreadful ground voracity that has devastated a whole number of suburban spaces during the last century, it is necessary to understand that those that today we identify as problems in the built environment are real possibilities, chances for a compensation of the major issues caused by an urban planning that was erroneous and not really interested in the territories in which they would be applied. Emerging data from European soil consumption studies are alarming and show an ever-growing trend in which Italy, second only to Germany, France and Spain, finds itself at the forefront among the less virtuous countries, with a soil consumption rate of three square per second^[2] and with consequences affecting the whole territory, already defaced and close to building saturation. The industrial paradigm, with its idea of the world as an assembly line, brought, in the last century, to a progressive fragmentation of the holistic approach that had always characterized the work of architects, which were seen as real artisans of the building environment. The machine society has given us a *monotasking*^[3] vision of the world where the assembly line is the winning metaphor: a series of processes are disposed following a linear and consequential pace where the subsequent optimize the previous one, without any possibility of turning back. Therefore, in case of error, there is no other option but to discard the imperfect item, in order to perfect the process with the following product. If a similar approach can find positive results, with limited temporal and material damages, in the manufacturing of furnishing and design objects, more dangerous is its application in the architecture field, which is so heterogeneous and rich of social, economical and cultural consequences and where the architect is loaded of a deep responsibility toward environment (not only the natural, but also the anthropic and built ones) in which he operates. The monotasking city, the assembly line one, is sure enough the place of the *zoning* phenomenon, of the space subdivision in homogeneous sectors (working areas, studying areas, leisure areas, ecc.), of the unchecked expansion in order to dominate nature and physical environment. In the zoning city every single moment of human life is marked by the ticking of clocks (the one located on the façade of the factory or on the school and railway station entrances) and every area has its own limits (not margin, let's make no mistake between the two terms) that impede permeability between themselves and the free flowing of life that is strongly organised in a monotasking (or mono-functional) way without any chance to invert its direction. A city of this kind has conquered the space around itself, defining a strongly anthropized, and at the same a-topic, environment that, in the last decades (from the big petrol crisis of the Seventies) has started collapsing on itself and transforming urban areas in a proper battle field where conflicts and tensions are more and more before our eyes. *Brown areas* (abandoned industrial sites), *brown fields*, *urban voids* and more generally *drosscapes* (following the words of Alan Berger^[4]) are only some of the results of those planning and management disasters that today affect the space in which we live in. However, we have the chance, in the paradigm shift in which we are living in from the industrial civilization to the information technology one, to change this *crisis* in *opportunities*, to fulfil these empty spaces with life and to shape them with a new identity able to inject new lymph in the contemporary city. The key to project ourselves in this new *conceptual leap* lies in finding a new galvanizing metaphor, a new catalyst of aims and will: not anymore the assembly line but the *net* (o *network* if we prefer) where all these entities, if put to react between themselves and with the surrounding space, could act as starting points for the regeneration of entire urban sectors and graft into the building environment in order to activate an economical and social revival. Then we need to restart from city's empty spaces, intended not in a negative sense, but as prospective catalyst of new and valuable enzymes. We don't have to forget that the identity of the city^[5], both European or Muslim, has always been built around empty spaces: be it the scar of the infrastructure defining the main foundation

axis, the layout of big bazars or the enclosed spaces of squares which gather the heart of city life. These spaces are, first of all, *relational spaces*, able to define a fluid and synergic set where every element resonates with the closer ones and establishes an urban space with soft edges but clearly recognisable in its structuring choices. The model to look up to is a city that could work as an *open system*^[6], an elastic and variable in time mechanism: a indefinite image with no precise edges able to involve all the activities of city life and to create new directions of use and where, this time, margins (not limits) are the favourite spaces for interaction and exchange, in order to develop a shared sense of citizenship and values between heterogeneous fields like the ones deeply related to urban space. Then, what we have to aim for, is a renewed ecological sensitivity for the planning theme, where ecology (from the Greek οἶκος, “environment”, ε λόγος “speech”) stands for the study of the complex interaction among organisms and their environment. The key is not to work using *grid*, but *rings*^[7], in order to activate not one-way input/output processes but stratified ones, to chase an idea of continuity and interrelation between the different actors involved. At this point there’s the need of a catalyst element to start this transformation, which could be the main ingredient for this development inversion and let us operate through the built environment and create new reactive models able to push to give value and rebuild the brown areas in which we are obliged to live in. If streets, and more generally infrastructures, had been for decades the favourite weapon of industrial development, it’s right from them that we have start again, re-imagining their figure in a whole different way: we need to think to them as bearer of all the features of that metaphor of the net of which we have previously dealt with. Infrastructure intended in a very wide meaning (not only streets, but also connecting bridges, ecological corridors, fluvial infrastructures, etc.) and where each of them it’s not just meant as a simple connection, from A to B in a linear physical movement, but as devices to allows *jumps*, vertical and stratified three-dimensional movements and to integrate inside them transports, cities features and *green systems*. We have to be aware that without infrastructures there is no development and without development there’s no future; its directions have to be inverted but not blocked, in order not to reach the decline, for lymphatic decay, of the space we live in. Our goal is to create new generation infrastructures, pointed towards the recovery and the requalify of the existent space and towards a new and virtuous densification. In short words *infrastructures for the recovery of the existing*. Therefore, we need *multitasking infrastructures*, which are inhabited and vital, where life flows and public space can find new shapes and new dynamics of relation and exchange; infrastructures that can do many things simultaneously and give a new sense of meaning to city activating process of economical and requalification investments for the years to come. And right here in Iran, where infrastructures have had and still have a fundamental role in the definition of urban space, between crowded bazars and coloured alleys, some tracks and *palimpsest* hide before our eyes. These important marks can be rediscovered and retraced to understand better the city development directions for the future years, not only the Iranian one but also and above all the European one. To ensure that the construction during the last years of an architecture piece in the northern part of Tehran has interpreted in a contemporary and dynamic key a living tradition, never completely soothed in the souls of Iranian architects, and has recalled the sight of European architects, making itself a catalyst of a set of international aims and tracing a new line that we strongly have to follow if we want to win the shared challenge of modernity.

2. The camel path. Infrastructural landscapes through the Iranian plateau

“According to Le Corbusier the donkey traced all the European cities, including Paris.

Donkey avoid obstacles and big rocks not to tire. Only man, the haughty man, knows what he

wants: he goes straight because has a precise destination. But does he really have it? Does he really know where he wants to go?"^[8]

In his book *Architettura e Società*, Erwin Anton Gutkind, defined the *donkey path* as one of the founding elements of the European city trace. A slow but rhythmical pace, well defined in time and space and able to travel unlimited distances in insuperable but perfectly punctuated time intervals, beyond which the moments of pause and rest were sacred, in order depart again to the following stop-over. If, according for Le Corbusier, donkey's pace is the one that contributed to the construction and definition of the features of European cities we don't think to be far enough from the truth in affirming that exactly the camel's one has been of one the generating elements of the city and the infrastructural interlaces of the Iranian and Muslim civilizations. The double soul of the Islamic population, always in balance between a sedentary and a nomad sensibility, has led, since ancient times, to the development of a network of architecture located at precise intervals one from another, measured on the maximum viable distance by a caravan in a single day (approximately thirty-forty kilometres) and, at the same time, essential in the definition of the structuring nodes of the territories' identity. It's a continuous travel over distances that follows the development of the Islamic culture: from the commercial routes along the *Silk Road* (or, if we want to be more precise, along the *Silk Roads*, in a plural sense as stated by German geographer Baron Ferdinand Von Richthofen to underline a net of roads and different commercial routes between China, India and the Mediterranean area)^[9] to educational journeys, from the *hajj* (the ritual pilgrimage to Mecca and other places of worship) to the simple path of the farmer through his fields in the Iranian plateau. It is clear, at this point, that thread that binds Iranian cities development to their infrastructures it's impossible to be disregarded and, instead, fundamental if we want to start a concrete reflection over the future evolutionary possibilities of contemporary city and, above all, to define the strengths of a tradition from which restarting, in order then to reinterpret it, in a modern process full of tensions and desires. A development which, in a civilization that has always resisted to an imposed arabization and kept well clear its identity and uniqueness, finds more and more contact points with the European situation confirming a deep relationship that nowadays, despite someone is trying to deny it, puts Iranian culture closer to the old continent than the one of many countries around Iran. Starting from this point in the urbanisation history of the Iranian plateau we can consider three main levels of infrastructure, totally heterogeneous among them (whether historically, functionally or typologically) but with a systemic importance in today's country definition: a first system made by *knots*, represented by the caravanserai (کاروانسرو) network through the desert; an underground system related to a singular water infrastructure, the *qanat system*, and a linear one, composed by the huge infrastructures (*motorway, railways, ecc.*) that have seen their peak from the development plan elaborate during the Fifties and the Sixties.

2.1 Knots | The caravanserais

The horizon line of the desert flows uninterrupted for kilometres when travelling the boundless Iranian desert. The eye runs captured by a line where sky and ground (sand more precisely) meets and never split up; only occasionally this line loads itself with tension and rises towards the sky climbing on the steep slopes that belong to one of the two main mountain ranges of the country: The Alborz, that cuts the Iranian territory east to west for almost one-thousand kilometres and The Zagros, that runs for one-thousand and eight hundred kilometres from the north to the south. What permeates this lonely tracks through desert is a feeling of emptiness and dismay, only occasionally interrupted by some punctual elements that articulates the space giving it a proper identity, able to donate the peculiarity of a *place* to the immense desert. We are talking about caravanserais, places of exchange and

interaction, mixed places and meeting points between different ethnic groups and cultures, scattered all over the Iranian territory and exactly located at the daily distance covered by a caravan. Today, if we observe a map that marks their position we cannot do other than be fascinated: a myriad of points covering all the space, populating and igniting areas otherwise completely deserted. If, of all the European coaching inns little is now visible, in Iran, although they have give way to petrol stations, they still dominate the harsh land, mostly in the typological defined in the safavid era^[10]. These are catalyst spatial knots, where the empty fulfil itself of tensions and relations, where the spaces from atopic turns to be public, shared and dynamic (journalist Andrew Lawler compared to ancient airports). Despite today many of them appear as isolated building, cut out from the modern fast infrastructure networks, their presence was fundamental for the development and the infrastructure of the Iranian space and generated relational spaces where the emptiness of the desert used to make movements incredibly difficult and, even today, many built-up areas, still bring the marks of their presence as traces of a generative DNA that deepen its roots in the history of the different eras of the plateau.

2.2 The water networks | Qanats

A recently published book (*Attraverso l'Iran. Città, architettura, paesaggi, 2017*)^[11], establish an original point of view regarding the formation of the Iranian urban areas and of the major cities of the country. A reflection that sees, as a founding element of urban tangles not a more or less rational organisation, simply structured over abstract main and secondary axes on the territory's surfaces, but that considers the *forma Urbis* as a vertical projection of an invisible trace coming from the underground, from a palimpsest (in the "eisenmanian" sense of the word), specific and original, that lied for centuries in the meanders of the Iranian land: the *qanat network*. Proper underground aqueducts, *qanats* have contributed to the development of each of the main Iranian city since ancient times (the holes for the water extraction are still visible, for example, in the cities of Tabriz and Yazd) so that the urban fabric, in most cases, comes from the conversion of agricultural lots in urban ones and the road network corresponds, in case we would superimpose the *qanat* map to a recent one, to the system of the main and secondary irrigation canals with the streets following the antique water distribution infrastructure. In addition to this the network also affects the morphological conformation of the historical city, the richest areas, in fact, used to be located in the northern part (where the water was cleaner and clearer) and the poorer ones in the valley close to the edge of desert, defining a significant hierarchy of the social classes that sill resists nowadays. Furthermore, to confirm this, in the Tehran alone, *qanats* influenced the shape of the road network where the main street was traced parallel to the main flux and orthogonal to that all the secondary streets which followed the lateral irrigation canals and used to define all the suburbs, blocks and city areas. This vision, original and convincing, strengthen even more the deep relations between infrastructures and city development and highlights a fundamental reflection on the links between infrastructural networks and contemporary urban renaissance systems: a way of thinking that, in the city of Tehran, which will analyse later, sees in ecological corridors a plan for the future.

2.3 Linear infrastructures Vs. Ecological corridors | The Tehran case

Tehran (تهران) is a fascinating and mysterious city, at the same time complicated and fragmented and, for this reasons, very difficult to visit for who is not used, as Europeans, to an urban system of that complexity. Who has never been there barely, from books and tales, can catch its splendour, always in balance between antique and modern, where life pulsates underground then to suddenly emerge to get hold of squares, streets and public spaces; a life that, fast as it made itself known, rapidly disappears to be again covered by the indefinite



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edges of the spaces that distinguish the Iranian capital. In this city, despite the big amount of highways, viaducts, junctions and flyovers, it's easy to become disoriented: you always have the perception of where you are, of where the north, rich and nestled by the mountain peaks, is, and where the south, poor and at the edge of the desert, lies. The history of Tehran is crossed by a red string which links indissolubly the city to its infrastructures which have had, as we'll see, a major role in the city construction: on one side the underground *qanat* system and, on the other, the network of the motorways (almost three hundred kilometres) that, from the Sixties, contributed to change the urban morphology and, even if they solved many functional problems, also contributed to sharpen other ones that today are the focus of debate between the different actors involved in urban planning. It is obvious, recalling the main moments of the urban development, that in the relationship with infrastructures lies the past and the present of the city, its frenetic expansion of the last sixty years and the saturation of many social and spatial tensions still today unresolved, between the the north and the south and it's precisely in this relationship we believe to find the key to win the match against the future that Tehran, as the direction taken in the last decade shows, want to win through a paradigm shift: from a city based on linear infrastructures to one built on ecological and systemic structures that see the emergence of new *infrastructural landscapes* in the existing urban space. Therefore, we'll retrace shortly the evolutionary history of the city in order to a developmental line strictly related to the reciprocal exchange connection with infrastructures and to understand properly how today is it possible to start again from them to propose a leap, a paradigm shift which could change again the shape of the city. Tehran that history brought to us has seen a period of huge expansion during the period between the 1950 and the 1960 when, due to a a strong desire of modernisation imposed by the Pahlavi regime, the Organisation Plan puts in place two highly impactful and radical projects: the Karaj dam on the same name river (1958-1961) and the TCP^[12] (*Tehran Comprehensive Plan*). The architects imposed a urban model based on a "sparkling" *american way of life* and the uncritical adoption of many themes coming from modern city planning of European origin. An abstract modernity was exported in Iran, without any proper consideration regarding the human, cultural and urban reality in which the planning would have been applied. What was proposed was a urban model made for rich people not taking into account the poorer ones who were already in a forced process of sedentarization due to the new land reforms, that led more than three millions people to move to the city. The new linear infrastructure system was definitely placed in the context without any critical reflection. Huge viaducts were built and the road surface was raised from its original level in order to dominate space without taking into account the real problems of the city and, more importantly, its morphology: a big sloping plane marked by deep valleys and crossed by waterways. A total abstraction of the urban space seen only as a big space to be dominated and not to be rethought starting from its original features and strong points that since the beginning had guaranteed the survival of the city organism. The territory was disfigured, social tensions were increasing day by day and, at this point, the linear infrastructure ruled the time and space of the modern city. The Islamic revolution of 1979 interrupted this process but wasn't able to heal the scars that were brushing the urban fabric. The public space almost completely disappeared, the relational spaces, since the beginning the basis of the development of the Islamic city were now ancient memories. Colours and life had been left out the city that was developing only following the fast movement of the car traffic, unable to break the walls of that linear prison that the new infrastructures had hinged to the ground. Many administrations followed the line traced by TCP (like the Korbachi one of the 1989) and only in 2005 something changed: what spreads was a renewed desire to recreate the old relationship between city and its mountains through a

management and valorisation plan of the water system. The Ministry of Housing and Public Development entrust to the team led by architect Hadi Mirmiran an ambitious plan: to look for a city regeneration starting from the requalification of the urban corridors that retrace the ancient marks of the rivers from the Alborz. The project leans on five deep valleys and defines a series of five ecological corridors as proper new generation infrastructures alternative to the existent ones because of their circular and systemic nature and where, beside the principal direction, lies a series of knots and transverse connections that wants to graft a cyclical system composed by rings that could resound with the surrounding environment. New *infrastructural landscapes*^[13] can come to life from this plan; these landscapes are vital and adaptive, productive and economically sustainable and able to remedy to the marginality situations that modernity has intensified. The plan that follows this strategy shows us a different Tehran, where green areas and infrastructures are linked again; where the space of life are not disconnected by the public space that claims his role of main character in the environment of the Islamic city. What can be activated is a three-dimensional stratification of urban space where different vectors and layer (natural systems, public transports, production chains) can converge and pervade one another in order to activate synergies and processes. Reification of this new sensibility it a recent architectural work that explores the potentialities of new generations infrastructures to activate virtuous cycles in the building environment. We are talking of the Tabiat Bridge (*fig. 1a*) (طبیعت پل), designed by architect Leila Araghian that connects two parks in the northern part of Tehran, grafting on an ancient valley marked by on the river descending from mountains.

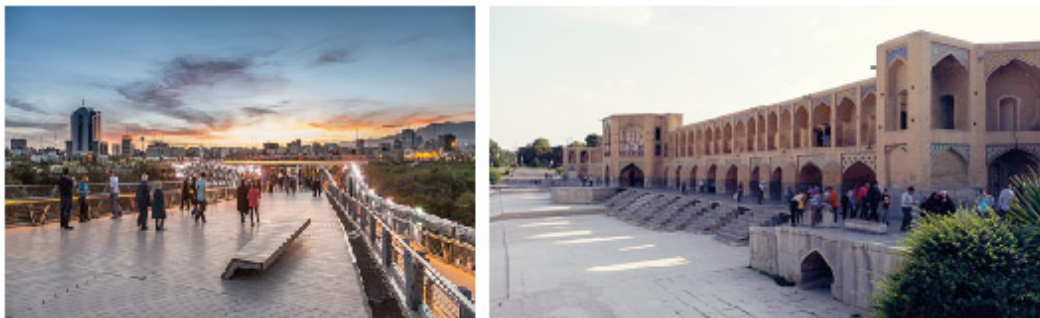


Figure 1: past and future of Iranian infrastructures. On the left: Tabiat bridge (Tehran); on the right: the Khaju bridge (Esfahan);

It's a very important work that acts as the contemporary reinterpretation of a class of multitasking infrastructures that has distinguished for centuries the history of humanity: the inhabited bridge. Scanning ancient maps of Europe we can find a thousand-year old tradition regarding this particular kind of infrastructure, that has its roots in medieval times then to disappears in the new Haussman style city. As strong was their presence in Europe, as dynamic was their development in the historical Iranian city and, also today, many of them play the role of urban and political catalyst in cities' life. The Tabiat bridge takes these old enzymes and propose them again in a contemporary key with a a completely renovated aesthetic, in a deep discontinuity with the past one (as architects, therefore, we recognize in discontinuity a founding valour to operate through leaps and paradigm shifts) but able to catalyse same energies and release them as structural elements of new spatial, economical and social values. We'll analyse now the peculiarities of new generations infrastructures in order to connect to the inhabited bridge tradition which confirms, more than ever, our vision that

sees many tangent points between the Iranian city and the European one and recognizes in *multitasking infrastructures* the starting points for the relaunch of both these realities: so distant and at the same time so far, linked by different but resounding paces like the donkey's pace and the camel's pace.

3. Multitasking infrastructures and inhabited bridges: new development ideas between tradition and innovation

Perhaps we've never thought about it but today's culturally shared idea of infrastructure is relatively young and related to the industrialism development of the last two centuries. The machine predominance, the processes rationalization and the loss of an holistic and systemic idea of the categories that compose the world in which we live in, produced a strong split making the infrastructure just a sort of big assembly line to move from a point A to a point B following a linear movement, where time and space are flat and flow in an automatic and repetitive way. Actually, if we look at the past traces that sprinkle our cities (both in Europe and Iran) we realize how infrastructures previous to XVIII century are intrinsically different from the ones we are used to and hold in their DNA a series of enzymes every time mixing themselves in a different, articulated and multifunctional way. Let's think about walls: these were not only a defensive system from the outside, of division between what was inside and outside the sacred precinct; they were a walkway, a road, a lookout point and, if necessary, housing system, deposit and goods storage. There was never a separation between themselves and the city life but a continuous and multiform flowing which found reification in the countless uses of the architectural system. We can assume the same for aqueducts that, despite their nature of a linear sign over the earth surface, in order to guarantee water supply, through times they have opened to multiple reinterpretations: first among all the usage of their arches to build superfetations and grafting to resolve housing problems. A linear born infrastructure which, however, in its essence and its relationship potentialities with the surrounding environment, is anything but linear and, instead, systemic and integrated with the world. The tradition that connects city and its multitasking infrastructures has always been fundamental in the urban development of the last centuries but then was interrupted by the arrival of the industrialism; it's not a casualty that the remaining traces of walls and aqueducts are relegated to be isolated objects, alien fragments to the shape of the city that was designed during the last one hundred and fifty years that didn't want to understand the heritage (not the physical but creative one) of its structure and sought, in every possible way, to banish them as foreign bodies of to freeze them as lifeless ruins. Looking at the history of these infrastructures is amazing to realise how they're not just a peculiarity of the European continent but, instead, a constant that links populations with different cultures, territories and completely heterogeneous urban needs. Populations that precisely in the features of complex architectural system used to see the key for their development. A particular type of infrastructure binds deeply Europe (especially Italy) and Iran: a singular one, from which to start for a future growth, that sinks its roots in the medieval times and whose traces are still visible, as we'll see, in many contemporary cities. We're talking about the *Inhabited Bridge*^[14].

3.1 Inhabited bridges. A shared history between East and West

The *Inhabited Bridge* is an original typology of architectural artefact that had a large diffusion, particularly in the European area, between late Middle Ages and the XVII century. The most important cities of the world were constellated by these singular architectures that was not just a crossing path but as a place for commerce and living, as a custom and a market. The pre-Enlightment French printings, or the medieval incisions of the English city, give us a

portrait of the urban fabric where bridges are in the foreground, so big was their role urban space catalyst and, most important thing, their structure was always depicted dynamic, full of life and people doing the simplest actions of every day's life. Most of them was destroyed during the XVIII century, for reasons that we can connect to the city planning changing of the time. In a point of spatial *caesura*, in a discontinuity between two points, the inhabited bridge creates a connection with the city that, at the same time, is social, economical, cultural, emotional and symbolic. Jean Dethier (Dethier Architects) described these typology as: "both seductive and functional^[15]", giving it a values peculiarity that transcends the mere formal definition and opens them to a widespread feeling as bearer of sharable and communicable in time aesthetic features. From an architectural point of view these bridges are made by two elements: *platform and structure – architectural superstructure*. A reasoned analysis of these two components allows us to operate a classification not just following a temporal scanning but also to make a functional sub classification in order to identify first the main function of the artefact and then the secondary ones. In medieval times (the first period in which this typology appeared) we have the *chapel bridge*, where the connective function overlaid the religious one, like the *Pont Saint-Benezet (fig 2a)* (1177-1226) near Avignon, where the original structure is topped by a Romanesque style chapel that was used until 1775. At the same time, beside this typology, for military purposes we can find the *fortified bridge*, still visible nowadays in the elements of the *Pont Valentré* in Cahors (fig. 2b) (1308-1380), made up of three fortified towers, real landmarks in the French country land landscape. The transition to the Renaissance gives us a completely revisited typology, in which we have a new historical significance and new functional features. The *rural bridge* (es. *Chateau de Chenonceaux – XVI century*), usually diffused in private properties, has always been the result, especially on the aesthetic point of view, of personal fantasies. They can be divided in two groups: *chateau bridge*, which included residential parts and *garden bridges*, with an essential decorative function. Alongside them we have the development of bridges that could satisfy the economic development of the single cities during a period in which, with the help a calm military life, we can find new propulsive energies over art, culture and commerce. It's the case of *commercial bridges*, like the *Rialto Bridge (fig. 2b)* in Venice (1588-1591) where a single big arch, an audacious choice for the time, sustains slopes and shops on both sides and the whole thing is covered by a huge portico.



Figure 2: examples of inhabited bridges. From left to right: Pont Saint-Benezet; Pont Valentré; Rialto bridge

In modern age the typology evolves again and divides in two main branches: the buildings by the ones who wanted to enrich their country side villas far from the chaos of the city and the buildings that wanted to be the direct expression of a political power, following the birth of the big empires and the travels of conquest. In the first category we have the *palladian bridge (Wilton Bridge – 1736-1737)*, a kind of bridges that are inserted in the bucolic life of the English country side villas. Their shape follows, as in Wilton case, the Palladian

architecture with superstructures generally made by a ionic colonnade with four columns and two more half columns that linked the order to the pavilions. The other type of bridges of the period was the *triumphal bridge*, most of them not constructed, that aimed to be the material prove of the empires power. We are in front of a utopic architecture, with considerable dimensions and spatial complexity, characterized by a pastism that didn't allow anything else but arches, columns and stones. After that period there's the arrival of a *caesura* that we still are trying to fill. The Enlightenment age and the rationalisation of building processes led to the final abandonment and disappearance, even physically speaking, of many inhabited bridges that enriched the European city. Management problems of urban spaces, with the consequent demolition made to avoid the creation of barricades in the narrow alleys of the city, and the will to open big perspectival visual axes at the end of the new boulevards, brought to a massive and acritical destruction of the major European inhabited bridges. Their traces are erased without any interest: the city changes its shape but loses her particular systemic-relational strength and goes towards that mono functionality that will deprive its public spaces of their figure of *empty* in the urban fabric, impeding the elastic permeability between its areas on which the past city had been founded. The image of the city (to use Kevin Lynch's words) is defaced without hesitation: knots, landmarks and symbols seem not to count anymore. Everything is doomed to be demolished, everything is expendable for an idea, more or less valid, imposed from the top. If this happens in Europe instead we have, in a country with a long tradition (much more ancient that the one of European states) where urban space still has strong multifunctional features that have not lost their peculiarity of dreams and will catalyst and, indeed, are central to social, cultural and human life of the country. We refer precisely to Iran, visited last year by the author for didactic purposes, where the inhabited bridge tradition has always been intense and has articulated some of the main important cities of the country and that could be, according to who is writing this paper, one of the most important infrastructure typology for the rebirth of the contemporary city. In the city of Esfahan (اسفهان) we find two of the most astounding inhabited infrastructure of the whole history: the *Sio-o-se Pol bridge* (پل سه وسه و سدی), made up of thirty three arches and one of the oldest bridge in the city of Esfahan with a tea room that dominates the Zayandeh river, and mostly the *Khaju bridge* (خواجه پل) (*fig. 1b*), proper masterpiece of Iranian architecture^[16]. Its beauty is not in its figure or in the mastery in which bricks are put in place. Its charm lies in the life he hosts, in the presence of people that every time redefine its sense of existence, in the fact that it is intrinsically multitasking and able to do more things simultaneously. At the same time it is a dyke and a passage; the place where young people meet and have fun together; destination of adolescents that wants to live a night adventure outside their house walls; the place where old people sit and start to sing traditional Persian songs for the tourists. Life palpates strong and powerful in Esfahan and the Khaju is its catalyst because true examples of public space: neither static or private, it lives thanks to its plurality and reprogrammability, thanks to the different singularities that populate it and contribute donate to it every time a new sense of existing. Living the public space it's a political act, and politic is the synonym of life inside the cities, it's an aggregative moment and awareness of being an individual in a complex and dynamic ecosystem. The Khaju bridge is pure infrastructure because it is all of these things: it's life, it's a catalyst of desires and will of the entire collective. The population recognizes itself in it and this creates a new sense of citizenship that makes the empty space alive, that relational space of which we have talked and that in the Iranian city is powerfully returning to light. What we want to activate is an open city process with a semi-lattice structure (about this Colin Rowe in 1965 wrote "*A city is not a tree*", in order to stand against a pyramidal *top-down* vision of cities, where planning comes from the

top without any critical debate with all the involved actors) with a flexible tactic, in which guidelines are not dictated by the power, both political and religious, but a shared sense of citizenships and common responsibility. Therefore, a city seen like an ecosystem, following a cellular structure where the membrane (the margins) are the meeting and exchanging point where the match of the contemporaneity between public and private space, interior and exterior space, voids and solids is played. In this case multifunctional infrastructures perform a key role due to their inclusive nature, for the continuous accessibility features, for their strong relationship with their territories and their capacity to activate processes in the urban fabric and to work in that interstitial space, the *in-between space*, that enriches the XXI century's city. It's not a case that simultaneously in Europe and Iran (the Tabiat example in Tehran it's explanatory of this process) there is a new interests for the infrastructure field. Two seemingly different cultures are trying to develop a common manifesto to relaunch their urban environment and their cities' structures. Even without any real shared debate these two trends have shown common level of criticality (even with the natural, cultural, political and religious hints) and proposed very similar solutions where a diagonal typology, omnipresent in human history, can come to the aid to solve same problems. The next step is to find a connection point in a similar movement, a series of operative categories that can lead to the definition of a common objective and the starting of shared work between Europe and Iran, in order to reach significant progresses in design and research, to create deeper relationships between two far places but always linked (in particular there's a special thread that binds Italy and Iran, an ancient and never soothed bond even in the darkest days of international politics, that can be the starting point to spread creative energies for the upcoming future). In the definition of these categories there's a particular place to start defining a common plan for *new generation infrastructures*. Who deals with this is Antonino Saggio, professor at "Sapienza" – University of Rome, and one of the leading expert on infrastructures and urban regeneration. His words on this topic are clear: "*A new generation infrastructure has to be able to do many things at the same time interlacing and reinforcing them one another. The world changes and in the Third Wave^[17] [...] multitasking has erased the monotasking idea coming from the industrial civilization, the mixité erased the zoning and the tablet from the Silicon Valley erased Henry Ford's Ford T [...]^[18]*". The author offers us five keywords for a new kind of infrastructures that constitutes themselves as operative categories from which taking inspiration in the difficult works of designers in the contemporary city. These keywords are: **1. Multitasking:** the possibility of an infrastructure to do multiple and related things; **2. Green system:** the capacity of creating sustainable and virtuous cycles (able to reclaim the land and to free from pollution); **3. Slowscape:** stands for the needing of a *slow* mobility, which it's not less useful but have the peculiarity to improve the perception of urban space; **4. Information Technology Foam:** these infrastructures can not just use data but interlacing them to create Information Technology models; **5. Galvanize:** the most important thing that move this contribution. The possibility to create symbolic values in which the citizenship can identify itself. Giving back to infrastructure their civic role is the key for the future. It's clear that we have to invest energies in this direction to allow a different development for our cities. Iran, especially Tehran, has been working for years in this direction beside its political and economic issues caused by different forces. In the last part we will deal with a design and didactic experience made by the author who, like a traveller of the 1800s, had the chance to visit the Iranian plateau in his personal *Prix de Iran*, to discover the vitality that fulfil Iranian contemporary architecture. A modern *cahier de voyage* will be presented, made by different stations and punctuated by slow movements along the highway and by the landscape running on the glass of a car window.

4. Tehran Metro Stations. Reports from a workshop in the Iranian city

Tehran Metro Station. Public space, garden and water it's the title of a workshop^[19] held between the 14th and the 21st September 2016 in Iran and in which, the author of this contribution was involved as a design tutor. A fifteen or so student coming from "Sapienza" – Università di Roma, and many from different Iranian universities (University of Tehran, University of High Education of Alaodole e Sooreh University) met and worked together for seven days, in heterogeneous and multicultural teams, to offer concrete answers to the infrastructure problems in the municipality of Tehran. In particular, the attention was focused on a specific urban team like subway accesses: not intended only from a functional point of view but as new possible public spaces in contemporary city. The Italian group had already arrived in the country one week before the beginning of the workshop for seven days of intense sightseeing along the country, in order to comprehend the culture and the different dynamics of a so far land. Each student was asked to bring a *cahier de voyage* to write down impressions, sketches and reflection on what they would have seen and learnt. Only after this first phase, (which saw the visit of places like Shiraz, Yazd, Persepolis, Esfahan, Nayin, ecc.) the participants were made aware of the design tasks for the following week. The selected places for the work, chosen both by Italian and Iranian professors, were in two main areas of the city: the tube stops of Valiasr and Tajrish. The first located on the intersection between the two principal axis of the city, Valiasr and Engelab, in a crowded and dense urban areas with many different architectural artefacts: an old theatre of the Palhavi era (Tehran City Theatre), a new mosque and a historical park (Daneshjou). Here we have line 3 and 4 of the subway line and the tram. The second place, Tajrish, in the rich northern part of the city, it's a sequence of different events, barely tellable if you have never been there. Tajrish is a big meeting point for who visits the bazar or the holy mausoleum (Imam Zadeh Saleh) and for who has to take a bus to reach another part of Tehran. In this area we have a very special landscape feature that it's impossible not taking into account by who has to deal with the design thing: the huge skyline of the Alborz mountains that dominates an area always related to this magnificent natural system. From there starts the Darband valley, one of the five river ways descending from the mountains. Divided in multicultural groups of four-five members the students (as well as the tutors) started thinking about which could have been the best strategy to requalify such important city knots as Valiasr and Tajrish. Only basic information were provided before started designing because the will of the tutor was to incentivize a negotiation among the participants in order that everyone could share his point of view and discuss it with the other colleagues. The only suggestions that were given to the students were not to forget some precise features that defined Iranian urban fabrics during the centuries: public spaces, as relational and meeting points, water, linked to the *qanat* network and in the last year the main focus of the ecological corridors system, and the green systems of park and gardens, another peculiarity of the Islamic city. After a first phase of brainstorming and discussions, in which every student and tutor brought his personal point of view and sensibility the proper design moment started. Two main approaches were followed by the teams: a first one focused on working for isolated and formally different objects, that could activate tensions and spatial reactivation and a second one based on a very intense soil modelling in which the three components (public space, water and green) could melt in one design. The variety of the projects elaborated in only seven days was remarkable. The team involved in the Valiasr site worked in completely different directions: one choose to insert a water basin to dematerialize and soothe the presence of the city theatre and, at the same time,

create a suspended walkable path to link two separated parks. Another group decided to dig the square to protect it from traffic noise and pollution and imagined a ludic and multifunctional square where the spaces flexibility could transform it in a market, a playground or a performative area for the typical Iranian street theatre. Even in Tajrish the three proposal were completely different, despite the working space was shared and there a continuous *know-how* sharing by the participants. One team worked a on a big terraced square that, using the water level, permitted a light slope to the river. Another one decided to put the bus terminal underground and to create a new park on the top of this last in direct connection with the lower level in order let the visitor fastly being projected in the square to sightsee the skyline of the mountains from different points of view. In the end, the third group, choose a fascinating but arduous path: they multiplied vertically the road section to create a vertical layer system where the connection with upper part were true lines of force breaking the road plan and guaranteeing the diagonal crossing of fluxes. This project was completed by a massive interactive 3d wall along the river. The final works were shown the final day at the Sooreh University in a public debate between students, teachers and government representatives.

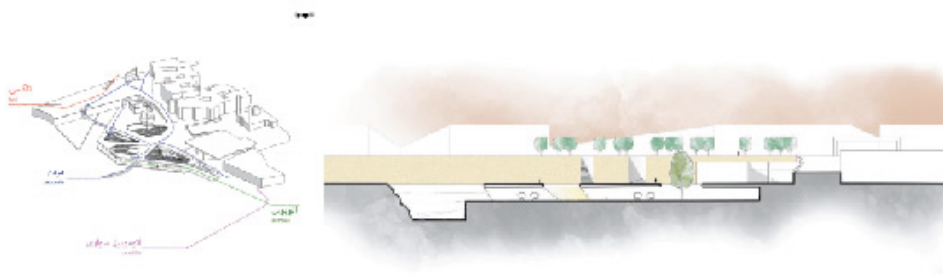


Figure 3: project Tajrish 3. Team: Marco di Monte, Martina Giardi, Paolo Pizzichini – Tutors: Valerio Perna, Shadi Keighobadi, Ario Nasserian

The workshop demonstrated again how public space, and the infrastructure role, are the key points from which we have to start again to rethink the relational, cultural and economic space for Iranian (and not only) contemporary city. We need time, we need a common action in which different figures have to be involved for a shared future. The results of a short experience as the workshop one confirmed that with the power of the ideas it's possible to modify the space in which we live and the vision of the world that often we are obliged to accept. We need courage and a firm direction always remembering that in heterogeneity, diversity and multi-functionality lies the real valour of the epoch in which we are called to operate.

^[1] For further information on the idea of *paradigm shift*, *IT Revolution* and *leap*: cf. Saggio A. The IT Revolution in Architecture. Thoughts on a Paradigm Shift (2nd edition). Lulu.com, Raleigh USA 2011

^[2] ISPRA (2017). Il consumo di suolo in Italia. Edizione 2017. Roma: ISPRA.

^[3] For further information regarding multitasking infrastructures as system for urban renaissance: 1. Saggio, A. and De Francesco G. Tevere cavo una infrastruttura di nuova generazione per Roma tra passato e futuro, (1st ed.). Lulu.com, Raleigh USA, 2016 – 2. Saggio, A. Parola d'ordine multitasking. L'architetto, [online] n.17 (June 2014), <http://magazine.larchitetto.it/giugno-2014/gli-argomenti/attualita/parola-d-ordine-multitasking.html> [Accessed: 20.10.2017]

- [4] Berger A. Drosscape: Wasting Land in Urban America. Princeton: Princeton Architectural Press, 2007
- [5] for more information regarding space in Islamic cities: 1. Guerrieri A. Mayamey. Ricostruire il vuoto gli spazi di relazione. In De Cesaris, A., Ferretti, L.V. and Osanloo H., Iran. Città, percorsi, caravanserragli, (1st ed.). EdilStampa. Roma, 2014 – 2. Cueno P. Storia dell'urbanistica. Il mondo islamico. Laterza, Bari, 1986
- [6] cf. Sennett R. Open city, in Burdett R., Sudjic D., The Endless city, Phaidon, London 2007
- [7] Cf. Saggio A. Infrastrutture e verde. Il grande innesto. L'architetto, [online] n.19 (September 2014), <http://magazine.larchitetto.it/settembre-2014/gli-argomenti/attualita/infrastrutture-e-verde-il-grande-innesto.html> [Accessed: 20.10.2017]
- [8] en. trad. by the author from Gutkind E.A. Architettura e società, Edizioni di Comunità, Milano, 1958
- [9] cf. David Christian, "Silk Roads or Steppe Roads? The Silk Roads in World History". Journal of World History 11, no. 1 (2000): 1-26.
- [10] We can divide caravanserais in four main groups: mountain ones, Persian Gulf coast ones, quadrangular plan ones with central court, circular plan ones. The quadrangular one with central court is the most widespread all over Iran and subdivided in two sub-groups: wit two or four *eivans*. Further consideration in: De Cesaris A., Di Giorgio G., Ferretti L.V., Attraverso l'Iran. Città, architettura, paesaggi, Manfredi Edizioni, Roma 2017 pp. 102-109
- [11] De Cesaris A., Di Giorgio G., Ferretti L.V., Attraverso l'Iran. Città, architettura, paesaggi, Manfredi Edizioni, Roma 2017
- [12] TCP was made iranian architect Abdol Aziz Farmanfarmaian (1920-2013) and american one Victor David Gruen (1903 –1980)
- [13] For more information on infrastructural landscapes: De Francesco, G. and Massaro, S. Infrastructural Landscapes | Regeneration strategies for an adaptive city, in RECUPERIAMO TERRENO Politiche, azioni e misure per un uso sostenibile del suolo. National Congress, 6 Maggio 2015, Frigoriferi Milanesi, Via G.B. Piranesi, 10 Milano
- [14] for further information on inhabited bridges: Murray, P., Stevens M.A and Royal Academy of Arts, Living bridges : the inhabited bridge, past, present and future, Prestel Pub, New York, 1997
- [15] *Ivi*
- [16] 1. cf. Perna, V. Il Khaju Bridge a Esfahan. Compresenze vitali nell'altopiano iranico in (AA.VV), Compresenze. Corpi, azioni e spazi ibridi nella città contemporanea 2017 (in publishing) – 2. cf. Perna, V. Ricostruire lo spazio. L'infrastruttura di nuova generazione come occasione di rilancio nella città contemporanea in De Cesaris, A. and Osanloo, H. TEHERAN METRO STATION. PUBLIC SPACE, GARDEN AND WATER, Aracne Editrice, Pomezia (RM) 2017
- [17] cf. Toffler, A. The third wave, Bantam Books, New York 1989
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- [19] The results of the workshop are collected in the book: De Cesaris, A. and Osanloo, H. TEHERAN METRO STATION. PUBLIC SPACE, GARDEN AND WATER, Aracne Editrice, Pomezia (RM) 2017