

# URBAN HORIZONS

## FROM THE THIRD LANDSCAPE TO THE THIRD INDUSTRIAL REVOLUTION



an interview with  
**Carlo Ratti**



**WE HEAR A LOT OF TALK ABOUT THE THIRD INDUSTRIAL REVOLUTION. IF YOU HAD TO DESCRIBE IT BRIEFLY AND ILLUSTRATE IT IN THREE IMAGES, WHAT WOULD YOU SAY AND HOW WOULD YOU DEPICT IT?**

The basis of these systems is easy to describe: their foundation is the so-called file-to-factory process, which creates a direct connection between the digital world (an ordinary PC) and the physical world - almost always comprising a mechanised system of movement based on simple translations or rotations. At the extremity of this mechanism one generally finds a tool, which makes it possible to carry out various kinds of process, such as removing material (for example, in the case of a milling machine or laser cutter) or adding it. This latter function is the purpose of some of the most interesting machines around today: three-dimensional printers which, by depositing drops of material one on top of another, make it possible to print not a sheet of paper but an object of any shape. There is a shift from the world of “pixels” - the coloured dots that form the basis of normal printing processes - to the world of “voxels”, little three-dimensional cubes, similar to minuscule Lego bricks, which can be used to construct any object.

Just to be clear, today we are not yet able to ‘print’ a food processor or a computer from scratch.

Nonetheless we can already print complex pieces from one or more materials. The first three-dimensional printers developed at MIT over ten years ago created very primitive objects: models made of powder held together by resins which, at best, succeeded in suggesting the shape of an object in three dimensions. In the years that followed, we moved on to printers with extremely tough resins, producing usable prototypes. Today we are entering a third phase, where genuine finished objects can be created, perhaps even made of metal. General Electric, for example, is starting to produce jet engines - which are very hard to make with traditional techniques - using three-dimensional printing systems.

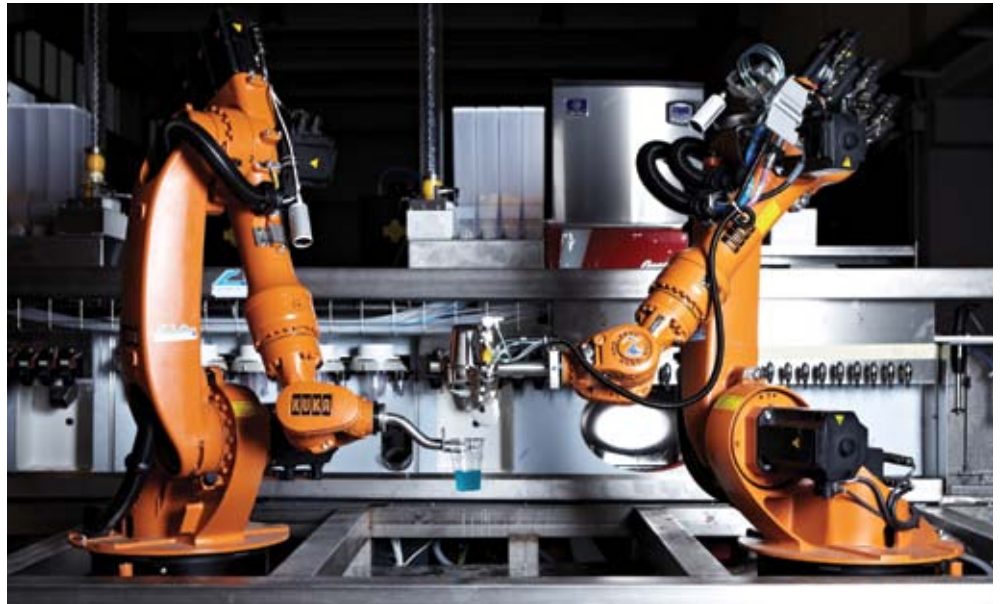
If I had to choose three images to illustrate the changes that are underway I would take them from our project Makr Shagr, presented at the Milan Furniture Fair. While only a game, it attempts to cover the entire “Design - Make - Enjoy” chain. Using a simple tablet, people have the opportunity to invent recipes for their own drinks, which are then produced by robotic arms and digitally controlled machines. After a few seconds, we can taste the fruits of our labour (and that of the robot), alone or with friends - with whom we can share our impressions and our comments.



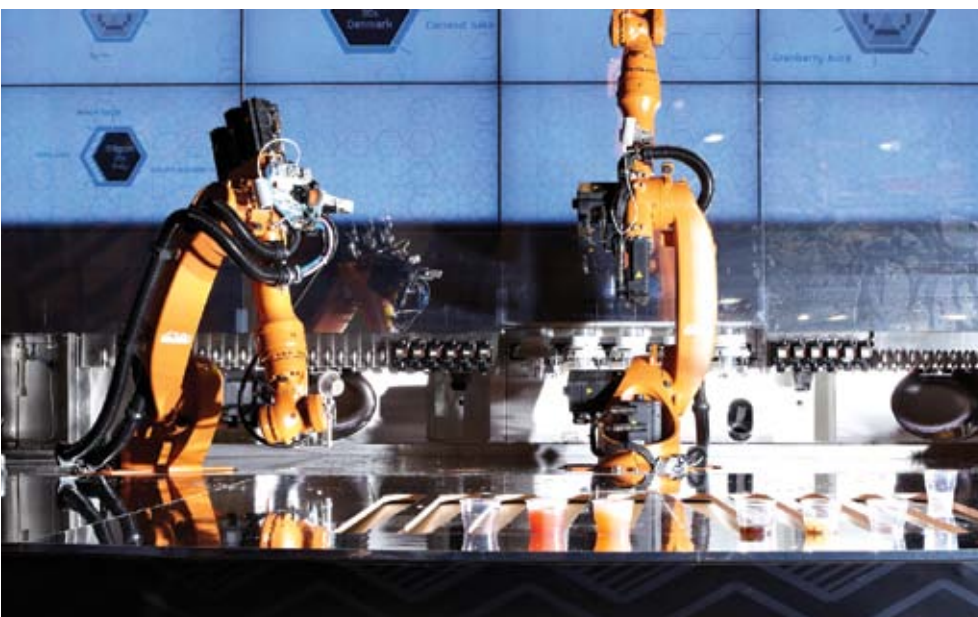
Design: visualization showing the data processing in Makr Shagr by Super Uber

The MIT Senseable City Laboratory aims to investigate and anticipate how digital technologies are changing the way people live and their implications at the urban scale.

Director Carlo Ratti founded the Senseable City Lab in 2004 within



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Makr Shkr: what could you make with the power of three robots in your pocket?

the City Design and Development group at the Department of Urban Studies and Planning, as well as in collaboration with the MIT Media Lab. The Lab's mission states that it seeks to creatively intervene and investigate the interface between people, technologies and the city.

Indeed, perhaps the most interesting aspect of the Third Industrial Revolution is its impact on the design process. Systems of digital manufacturing make it possible to unleash the creativity of the individual and rethink the chain that links design, production and consumption. In a certain sense, each of us can have more freedom to create the objects he or she needs and then produce them in an automated way. In a way, it feels a bit like a revisiting of Constant's old situationist utopia: "Homo ludens, freed from the necessity of labour thanks to automation, will no longer need to create works of art because his life itself will be a work of art...".

#### AT THE MIT IN BOSTON YOU CREATED THE SENSEABLE CITY LABORATORY. WHAT IS THE CITY OF THE SENSES AND HOW DOES IT REVOLUTIONISE OUR WAY OF RELATING TO IT?

The smart city - or rather Senseable City, a name we like more because it puts the emphasis on the citizens and not on the technology - is a city that talks to us and, through networks, constantly supplies us with data to process and cross-reference. The potential applications are infinite: from energy consumption to traffic to refuse collection and disposal. In other words, all the aspects and dimensions of the city that are radically transformed thanks to this increased understanding. The theme of the intelligent city is one that is being talked about in many countries around the world.

We might say that today we are witnessing the birth of a hybrid dimension, between the digital and material worlds, which is transforming our way of living. Take, for example, Formula 1 races: twenty years ago to win you needed a good engine and a good driver; now you need a telemetric system that gathers data from thousands of sensors on the car and processes them in real time. The same thing is happening

in our cities; they are being transformed into veritable open-air computers....

#### HOW IS THE CONSTRUCTION OF CITIES AND URBAN PLANNING CHANGING TO ADAPT TO THE THIRD INDUSTRIAL REVOLUTION AND NEW MANUFACTURING MODELS?

The first phenomenon we are starting to see is the return of factories to areas previously hit by delocalisation: if I manufacture an object using automated, digitally controlled processes, it reduces the competitive advantage of companies with low labour costs, like China and other areas in South-East Asia. Moreover, on the urban scale you can begin to glimpse the return of industry to our cities - think of the example of the Brooklyn lofts which are now home to productive facilities characterised by this kind of technology - for the first time contrasting with the widespread process of deindustrialisation that has hit the major cities of the western world: factories abandoned and, in the best cases, rehabilitated and put to new uses or, in the worst cases, as often happened in Turin or Milan, razed to the ground and replaced with pointless three-room apartments.

However it would be wrong to start imagining futuristic cities à la *Metropolis*, Fritz Lang's 1927 film. At first glance, the cities of tomorrow will not look very different from those of today. Like the Romans of 2000 years ago, we still need flat surfaces to move on and windows to protect us from the elements. What will change most tomorrow will be the way we inhabit our environment, thanks to new forms of sharing information, the key to it all. For designers and planners, new horizons are opening up, where architecture is responsible not only for the "shells" constructed, but also for creating a dialogue between IT and social sciences.



**CARLO RATTI** An architect and engineer by training, Carlo Ratti practices in Italy and teaches at the Massachusetts Institute of Technology, where he directs the Senseable City Lab. Co-author of over 200 publications. His work has been exhibited worldwide at venues such as the Venice Biennale, the Design Museum Barcelona, the Science Museum in London, GAFTA in San Francisco

and The Museum of Modern Art in New York. His Digital Water Pavilion at the 2008 World Expo was hailed by *Time Magazine* as one of the 'Best Inventions of the Year'. Ratti was recently a presenter at TED 2011 and is serving as a member of the World Economic Forum Global Agenda Council for Urban Management. He is also a program director at the Strelka Institute for Media,

Architecture and Design in Moscow and a curator of the 2012 BMW Guggenheim Pavilion in Berlin. He is currently serving as a curator for the Future Food District Pavilion for Expo 2015 in Milan, which will explore a future in which food and people are reconnected through a network of information, exchange and social interaction.