Bits in *Bricks*

CARLO RATTI discusses how spaces — everywhere from bar to supermarket — evolve in a world of big data.

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OPPOSITE 'The idea that architecture becomes more responsive to conceived dynamics can apply to any space with any function, including retail,' says Carlo Ratti, head of MIT's Senseable City Lab and director of Carlo Ratti Associati.

'FUTURE-CRAFTING' IS the term used by Carlo Ratti, head of MIT's Senseable City Lab and director of Carlo Ratti Associati, to define his work. Ratti uses interventions and experiments in his visionary scenarios for urban life, which explore the potential of big data. It's an approach that's discussed in his publications, such as *The City of Tomorrow*, a book coauthored with Matthew Claudel and published in 2016 by Yale University Press. It's the experiential projects that connect to daily life, however, that make Ratti's work so approachable. Hospitality, workspace *and* retail — he addresses all urban-related industries. And what often seems to be a flash from the future is just as often rooted in reality. The technology he and his team developed for the Future Food District, a pavilion at Expo Milano 2015, has just been licensed by supermarket chain Coop for implementation in its physical stores. It's the starting point of a conversation about the influence of smart technologies on our everyday surroundings, including retail interiors.

We are living in a digital age. Has widely available technology changed consumers' expectations of what a physical space should offer? CARLO RATTI: Today we can find out everything about anything by simply googling a word or phrase. In no time at all, we know the background and specifics of a product. But that kind of information is not there when we're in a supermarket, for example. There's no seamless connection between online information, mobile devices and in-store products. But our brains are used to information at our fingertips, and we should try to translate this instantly accessible data seamlessly into physical space. It should be there and available for you to access, but only when you want it.

The most interesting technologies are the ones that become invisible. It's about merging the bits with the bricks. In the 1980s, Xerox Parc computer scientist Mark Weiser already hinted at a more seamless presence of technology. He dissected computing into three 'types'. First there were mainframes, which were shared by groups of people. Now we are in an age of personal computing, which Weiser said would be followed by ubiquitous computing, when technology recedes into the background of our lives and disappears.

How did you incorporate the principle of ubiquitous computing into the Future Food District for Expo Milano 2015? The Future Food District explored the impact of digital technologies on the production chain and examined the interaction between product and consumer.

In 2011, Tesco's Homeplus allowed commuters in South Korea to do their grocery shopping while waiting for the train. A wall-length billboard in a subway station featured images of filled supermarket shelves; each product had a QR code that could be scanned with a smartphone. That system was soon dismantled, but it gave us an idea for the pavilion. We wanted to do something that would create a richer interaction between people and products. We overturned the conventional supermarket layout and presented products in a space that was more like a traditional market. Simple hand gestures provided augmented information about a product, such as its nutritional value and its journey to the store. The more you played with the products on display, the more they told you. The concept helped people to reconnect with the production chain and to develop a more conscious pattern of consumption. Interestingly, sales were higher than expected. »

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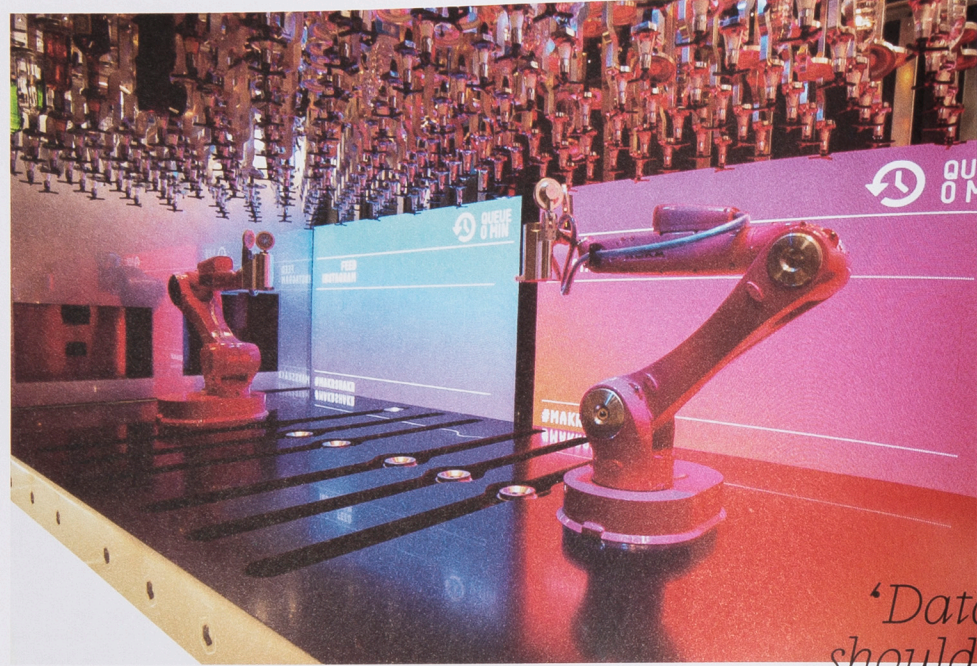
Makr Shakr is a bar that invites users to create personalized cocktails which are mixed and served by a robot. More than an experience, it's a social experiment that looks at how people might embrace new possibilities offered by digital manufacturing.

As customers browsed the space and purchased items, a computer gathered information about their activities and displayed the results as digital data. **What for?** Information often works in a way similar to Newtonian physics, where every action has a reaction. If you give information to people, you can get some back. This is not new. Our online behaviour is tracked as well. In the case of the supermarket, we knew what people were looking at, so we managed to take the 'click' from the digital world to the physical world. After seeing what people were 'clicking' on, we showed the results in the supermarket. We selected different categories, such as 'the most popular thing that people are buying today'. We used customer feedback – the way shoppers interacted with products – to inform people in real time.

Ultimately, could visitor-generated information affect the spatial design of shopping locations? Could it help us to make environments that adapt in real time? Totally. Although not implemented yet, several projects that we're working on use people's input to form personalized environments that 'move' with you. When Rem Koolhaas invited us to the Venice Architecture Biennale in 2014, we did a project on 'local warming'. We created bubbles of heat

around people, using motion tracking. It not only saves energy – you don't have to heat a whole building for just a few people – but also allows for a very personalized climate. Technology lets us use resources in a more efficient way for all kinds of things. Sensors make our environment much more responsive and our interaction with space more fluid. We are now implementing the idea in new projects, including an office, but the idea that architecture becomes more responsive to conceived dynamics can apply to any space with any function, including retail.

Today technology can be integrated as a discreet layer of the physical space, yet in some projects you worked with robotic arms. Whether or not technology should be visible depends on the purpose of the project. Ultimately, it's about making the human experience as rich as possible. And sometimes that means adding an educational aspect. Twenty years from now, 50 per cent of our current jobs might have disappeared because of robotics. Even today, robots are making cars, fashion items, et cetera. Yet lots of people have never actually seen or touched a robot, let alone interacted with one. That's why we wanted to make the technology visible in our robotic bar, Makr Shakr, which was unveiled at Google I/O in San Francisco

and, as an independent company, now travels from event to event. Makr Shakr's robotics function as an extension of the arm, without being in full control. Users are bartenders who can create personalized cocktails in real time, using a phone application. The project isn't about replacing people with robotics; it's more of a social experiment that looks at how people might embrace new possibilities offered by digital manufacturing.

Our online behaviour is tracked constantly – sometimes with our knowledge, but not always. Based on information collected in this way, Spotify tells you what music you might like and travel sites suggest holiday locations. The internet ought to broaden our world, but isn't such extreme tailoring making it smaller? That's exactly why we want to use data to multiply choices, not to reduce them. Big data is usually good, but if you use big data to do what is called predictive analytics – trying to predict what someone will do next – it usually makes life poorer. In that way, the future will just be a copy of the past. That's often the problem with artificial intelligence. It tries to predict the future based on lessons from the past. Take Amazon, for instance. You read ten books and Amazon suggests an eleventh book that is based on the previous ten. But if you think about it, the *best* eleventh book that you could read is something that has nothing

to do with the previous ten but opens up a new perspective and helps you discover something you don't already know.

How can we reintroduce an element of surprise? I think it's very important for us to keep a sense of serendipity in life. We should use data to maximize serendipity, whether it's the way you listen to music or browse a shop. Together with Dirk Helbing – professor of Computational Social Science at ETH Zurich – I wrote 'The Hidden Danger of Big Data', an article that states, among other things: 'As the Internet expands into new realms of physical space through the Internet of Things, the price of anarchy will become a crucial metric in our society, and the temptation to eliminate it with the power of big data analytics will grow stronger.' That sentence describes exactly what we should try to avoid.

You have also worked on projects that deal with infrastructure and mobility. Can autonomous mobility change the way stores stock and distribute their products? I'm actually here today, at the Amsterdam Institute for Advanced Metropolitan Solutions, for a collaborative project about autonomous mobility. Now that self-driving cars are hitting the road, we are exploring the possibility of having a fleet of autonomous boats on Amsterdam's canals. Roboat [a project involving scholars from MIT, Delft

University of Technology, and Wageningen University and Research] will be able to monitor the environment, transform into on-demand bridges or stages and, getting back to your question, provide transportation for both people and packages. Amazon's warehouses are already automated. Why not extend autonomous mobility even further? ●

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'Data should be used to multiply choices, not to reduce them'

The Future Food District aimed to promote more informed consumption habits.