De Derde Individuele Revolutie

The Third Individual Revolution
English version

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The Third Individual Revolution

In this age of promising new economic models and beckoning new technologies, the human factor has to come first, be up front and take centre stage. The *maker movement* awakes something in us that a few decades of organization charts had nearly destroyed: the love of craftsmanship, creative amusement, experimentation, entrepreneurship and autonomy. These are the characteristics that the city dweller of the future is going to need. These are the human responses to all those new opportunities. And for the cynics, these too are what the market now demands from people. So let us introduce you to: the Third Individual Revolution. The next step forward in the development of urban dwellers and their city, thanks to the *new makers.*

1. Makers

Human roles change with each new technological breakthrough. Generally it means progress, because for the time being we benefit from them. Just look for instance at that luxurious device which you are using to read this essay. However, there is always some pain involved, simply because technology replaces human skills. The legend of John Henry is iconic. He was a railway worker who challenged and won against a steam machine at the end of the 19th century, but then dropped down dead, exhausted. Or think of Garri Kasparov who lost against the Deep Blue chess computer in 1997. They were heroes, but de facto losers; the people who embraced technology became the winners.

From Rifkin to the shop floor

We are now entering an age of smart cities, data streams and decentralised technologies. The leading philosophy is Rifkin's Third Industrial Revolution: the production of energy and goods in local systems. This should make the economy take root, become more sustainable and more efficient. The theory has a large power to the people content - literally everyone can become a producer thanks to new technology. Enthusiasm is growing, especially in the top layer of policy makers, transition enthusiasts and of course manufacturers of revolutionary technology. They speak the language of economic models, paradigm shifts, data flows and infrastructure. Another, larger part of the city, speaks the language of the shop floor, skills, individual opportunities and risks. They are not yet so enthusiastic; for them this new development is called robotisation, for them it is the reason that jobs are disappearing.

However, the gulf is smaller than it seems, and the maker movement holds an important key. Because these new makers do what Rifkin is writing about, at the shop floor level. They embrace the technology, they create their own opportunities and develop communities and local production chains, in which the new craftsman gets all the space he needs. It is now only a niche, but if you look carefully, you will see that it holds plenty of opportunities for our cities.

The maker movement

Enter a *makerspace* and behold: students, engineers, designers, hobbyists and starters are experimenting with new machines, materials and designs. There are 3D printers and 3D scanners, laser cutters, CNC machines and you name it. Here they play, design, produce and learn. These makers exchange tips and ideas on the spot, they work together on projects and develop new skills through *tinkering* – sometimes helped by brief training sessions. These makerspaces or fablabs, of which there are now more than forty in the Netherlands, are the shopping windows of the maker movement.

The movement itself is a motley group. It is the old-school inventor in the attic who, thanks to open source knowledge and new technology, can suddenly achieve a lot more. It is the designer who can make a prototype of any idea straight away. It is the hacker who doesn't accept any technology that he cannot fathom. It is the start-up who can manufacture a first line without heavy logistics or complicated business models. It is the corporate R&D that sends its engineers to a fablab to learn to play again. It is the sustainable entrepreneur who sets up a production chain using local raw materials. It is the consumer who can order a customised product to his very exact specifications. The maker movement is technology, craftsmanship, design, experimentation, business and play. And foremost: DIY.

Characteristics

Getting on board is exceptionally **easy.** Knowledge is easily and freely available online, the new tech is getting rapidly more affordable. For instance, a 3D printer costs no more than a thousand euros, and in a few years this will even apply to nano and DNA technology. Moreover, makerspaces make large investments unnecessary. You only pay for the use of equipment, for instance via a subscription. It is even more simple at a hobbyist level. For one hundred euros you can buy toy electronics, programmable LEGO robots or home-made computers. Four year-olds can do 3D printing within a few minutes and within half an hour you can download a 3D design and send it to one of the two hundred local printers around Utrecht - where you can collect your product the next day.

The maker movement is about **open access knowledge sharing.** Neil Gershenfeld of the *MIT Center for Bits and Atoms* expects the maker movement to do for industry (atoms) what the internet revolution did for information (bits). The two are closely related. Online, on fora and social media platforms, makers share projects, designs and repair tips and help each other with hiccups. Communal ICT standards ensure that a maker can as easily print an item at home, as have a few thousand printed on the other side of the world. Internet makes marketing cheap and products can be offered instantly in the global arena.

The maker movement **creates business.** Hobbies can grow into businesses because so little investment is involved in making a small niche profitable. For instance, Will Chapman, a fanatical LEGO hobbyist, missed firearms in the LEGO range and now runs the flourishing BrickArms company with his whole family. Of course, some companies grow large: Ultimaker in Geldermalsen is now one of the most important desktop 3D printer manufacturers in the world. It started with a workshop "build your own 3D printer" at one of the Dutch pioneers, Protospace in Utrecht, and Ultimaker holds fast to the maker-roots. The printers are open source and the company stimulates users to continue improving the products and to think along with a business strategy.

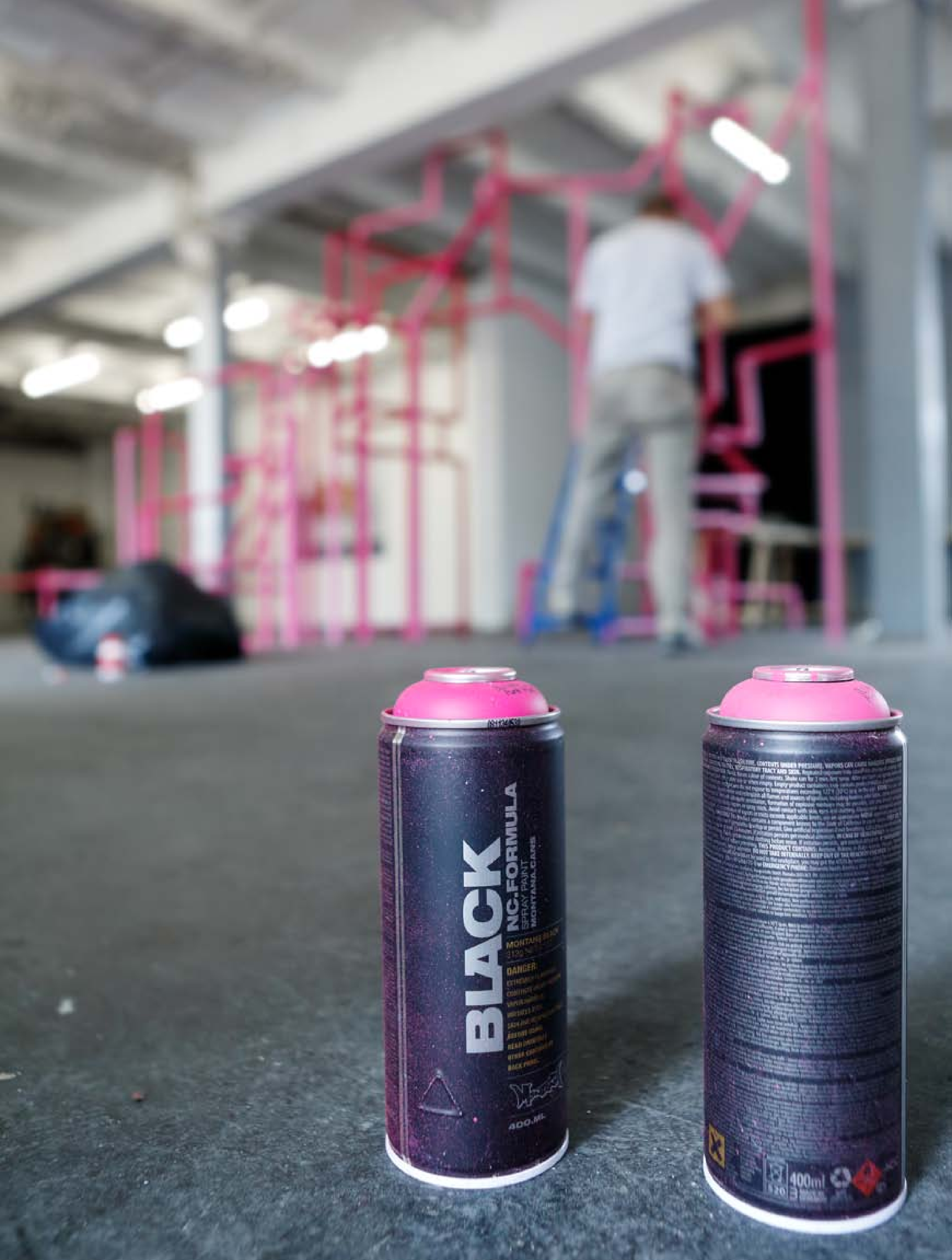
This potential has now also been discovered by the corporate world: the maker movement as the **catalyst of innovation**. *Rapid prototyping* and unexpected collaborations are chiefly seen as a source of innovation. Ford, the car manufacturer, renowned for the introduction of the assembly line, now invests in makerspaces and obliges its engineers to spend part of their time in them.

Above all, the maker movement is a **culture** and herein lies the inspiration for the title. A maker is someone who looks for solutions himself, collects the necessary knowledge and technology, who plays and experiments, exhibits entrepreneurship where necessary and collaborates where possible. A maker doesn't fit into an organization chart, doesn't follow a permanent curriculum and isn't bound to existing production chains. The maker movement crosses the boundaries of businesses and professions, as well as those of work and private life. The maker movement is emerging, assumes freedom and own initiative and has virtually no institutions.

The Third Individual Revolution

In the approach to the first industrial revolution, professionalism was learned in a master-apprentice relationship: personally and traditionally, but with little degree of freedom. In the second industrial revolution, employment developed into standardised categories. This created a lot of choice, but within a rigid framework. We still use quotas of engineering, logistics, administration, et cetera. Moreover, this framework is hierarchical: who used to be a craftsman, is now called a lower-skilled worker.

With the approaching of the third industrial revolution, we can see the third step in the development of the individual as well. In this phase, man is no more an employee-consumer but an entrepreneur-producer, who makes his own choices, manages and produces. We fall back on individualism and craftsmanship, but now with a treasure trove of new possibilities and degrees of freedom. Exit organization charts, exit permanent curricula, exit career paths. Make your own choices, do it yourself, develop yourself. That is the Third Individual Revolution. For this it is necessary to supply craftsmanship with new skills and to deal with it in a new way. For this it is necessary to review the city afresh as an ecosystem, with the development of its inhabitants as the main function.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2. Skills

Individual propositions

Of course the maker movement is not made up of solely super-heroes. Each maker masters a little. There are beginners and advanced people, and the professions point in all directions. What they have in common is 1) a sufficient dose of new-tech skills; 2) a sufficient dose of individual initiative; and 3) a sufficient dose of connectivity – with partners, knowledge and the market. From these three clusters, everyone draws his own constellation of skills and this way everyone also forms his own value proposition. These propositions vary from high-tech to low-tech and from cosy to big business. For instance:

- A PhD student at the TU Delft thinks that earlier generations of architects were not interested enough in the making process and so lost authority. He writes the codes for converting 3D designs into robot movements himself – a technology that does not yet exist. He starts with the robotic cutting of polystyrene at a makerspace. He then makes templates for prefab concrete, moulded parts for windmills and now he has designed a diamond cutter for cutting marble, together with a company in Italy. He now runs a quickly developing start-up with a Danish investor.

- An Eindhoven based lady is specialised in screen-printing, ceramics and chocolate moulding. She makes unique objects which she gives away, sells in small batches or uses at events. She invites everyone to come to her workshop, which looks more like a curiosity cupboard. Sometimes she puts a chocolate plate on, an idea she got from an old advertisement. This lady scores extremely high on craftsmanship, experimenting and prototypes. Collaborating with a strong entrepreneur enables her designs to be taken into production and gets her assignments for festivals and large fashion brands.

- A designer wants to expose the social and environmental effects of smartphones. He decides not to write a report, but to make a better version himself. One of the design criteria is that users must be able to repair and upgrade their smartphone autonomously. As we speak some few dozen people are employed at his company and 60,000 telephones have been sold. The company has almost the same number of Twitter followers, newsletter members and Facebook friends and involves them in the next steps for improving the telephone and making it more honest.

- In Amersfoort, a lady has started a repairs café for the mentally disabled, as a voluntary worker. She works as a family consultant, and colour and style consultant and has a small catering business. She makes clothes as a hobby. Every Monday afternoon she now combines her profsessions and hobbies – she runs a low-tech workshop with sewing machines among other things. The lady does this because she loves people and needs to express her creativity, but she wouldn't mind getting more participants.

- An advocate of CSR, sustainability and the circular economy is getting increasingly interested in bio-based materials. In 2011 he buys a 3D printer so that he can start production in-house. That comes out to be the big leap forward. In 2014 he presents a 3D-printed bio-based cocktail dress at the Dutch Design Week, more exhibitions followed and now, along with a partner, he has made a start with The Circular Building– a living lab for the circular economy on Strijp-S.

The arsenal

So, there is no blueprint for the maker. But there is an arsenal of relevant skills, clustered into new tech, individual initiative and connectivity. With the progression of technology, this arsenal will also change. For instance, 4D printing is about to make a breakthrough; the circularity appears to be a promising profession. The figure shows an important part of the skills, with the notion that tomorrow something will already have to be added or removed.

Programming, 3D drawing and basic materials knowledge are roughly the starting conditions for the new maker techniques. Together they form a kind of technical literacy: the ability to understand and make designs and instructions. As a starting point, this enables you to comprehend the basics of the technology around you and helps you to exchange ideas and designs at a basic level with other makers.

Rapid prototyping and hacking are perhaps the ultimate maker competences. Rapid prototyping is the quick realisation of the first version of an idea, in order to be able to experience, test and present it to others for improvement. Idea? Do it. And then carry on, in an iterative process. It ensures faster innovation, faster market access and quicker learning than working from a “grand design”. Hacking means breaking open a piece of technology, in order to modify it yourself. We know it from the computer world: breaking open codes. And for instance the Fairphone can be seen as a hacker’s reaction to the iPhone. We have never seen the inside of the latter and we also don’t know the raw materials and their (shady) origin. The Fairphone is completely transparent: it can be dismantled, is traceable and you can adapt it yourself.

A maker can only have a healthy economic existence if he is able to **develop his own value chains**, from suppliers, colleague makers and project partners up to the market and the consumer. Considering the small-scale and hands-on characteristics of the maker movement, more can be learned from a good contractor than from an MBA. This is entrepreneurship at the shop floor level, and this is just the skill that is still vital for city dwellers who do not commit themselves to technology. Is is the basis for an existence as a producer-entrepreneur instead of a consumer-employee.

mill

BASIC
OLD TECH

CNC

bio tech

NEW
NICHES

circularity

weld

nano tech

solder

CAD
design

NEW TECH

programming

3D-
scanning

arduino

3D-
printing

robotics

interdisciplinary
communication

hacking

user
centered
design

rapid
prototyping

researching

co-
creation

operating in
a network

experimenting

value chain
development

PERSONAL
INITIATIVE

CONNEC-
TIVITY

in touch
with market

proposition
and enterprise

online learning
and exchange

continous
self development

Autodidact

Just about every maker is an autodidact. Of course, a lot of makers start with a basis (Higher Technical School, work experience, art school, etc.), but the maker's profession that he will eventually carry out is something that they have developed themselves. The training for "cutting-templates- from-polystyrene- with-a-robot arm" doesn't exist, but the maker and his company do. This is the key to the Third Individual Revolution: develop your own profession.

Many established parties are not used to this yet. How do you construct the curriculum for this? How do you set up your R&D department for it? There is a big gulf between the skills and the self-development of the makers and the institutes where the revolution has yet to begin. Businesses demand "ready-made graduates", educational institutions indicate that this is now utopian. Large companies are now looking for collaboration with designers and start-ups in order to beef up the tempo and to catch up on new developments. It is no coincidence that makerspaces are phoned ever more frequently by educational institutions (all levels), large companies and aldermen. Those parties want to learn to understand the maker movement and take away lessons for their own domains.

3. Next economy

On to the next economy

The economy is changing quickly and the scenarios describing the destination vary. There is a movement of new hopeful models with the shared and circular economy at the forefront. There is a movement of global shifts, driven by the scarcity of raw materials and new competing economies. There are sustainability scenarios based on large-scale and efficiency and there are also scenarios based on intricacy and self-sufficiency. The Netherlands has still to discover its stance in all this. From a knowledge to a designer economy? Or reshoring and producing again yourself? Which sustainability strategy?

Three dominant trends are emerging from this tangle of futuristic images. Firstly the exponential growth of technological possibilities, best illustrated by Moore's law: since 1965 the speed of our chips doubles every two years. We can now see the same boost in new tech and materials technology. Secondly, certainties in the employment market are decreasing: we are getting more flexible at great speed. This is praised by highly educated cosmopolitans but is seen as a threat by the executing professions. Thirdly, there is the emergence of the so-called *glocalisation* – knowledge is increasingly becoming available on a global scale and at the same time the local context is getting more and more important. Together with sustainability ambitions, these three socio-economic developments form the three pillars of a *next economy,* which will crystallize out in the coming decades. This happens most of all in the city, after all that is the focal point of the economy and society.

In the Atlas of Cities, Paul Knox defines four different functions of a city, all inspired by the large concentration of people, power, economy, stimuli and ideas. Namely: initiating social changes, mobilising parties, developing innovations and taking vital decisions. The next economy needs these roles. Compare this with the internet that makes information globally accessible, but the development of which is geographically concentrated - in Silicon Valley, East London, Berlin, around Eindhoven, along the Amsterdam Knowledge Mile or in the Game Garden of Utrecht.

Each city will have to define its stance at a basic level with respect to the dominant trends and some cities will develop into a real hot spot. The degree to which this will happen depends on the one hand on the urban DNA, and on the other hand on the ability to embrace the next economy.

The maker movement as best practice

And then the really good news: with the maker movement the city already has a *best practice* in-house. Makers naturally realise the new economy. While policy makers, captains of industry and science see the developments coming at them, makers are already operating in the middle of it all. They accelerate the technological developments themselves, they make their businesses more flexible themselves and they glocalise their chains themselves. And that is just what makes this movement so interesting. The next economy is in full operation, right under your nose. And what are the answers to all those socio-economic trends? Entrepreneurship, new production chains and continual, independent learning. These are the drivers behind the maker skills; this is what the city can and must focus its attention on.

Makers operate mainly outside the established parties. People are a maker in their free time or as a self-employed person, they seldom do it as an employee of a large company and usually never as a public servant. So the skills of the next economy have not yet penetrated into the established order. This is becoming increasingly more widely recognised and overtures between makers and the establishment are slowly commencing.

The first experiments with makers are taking place in education; opportunities for technical education and 21st century skills are seen, however educational institutions find it difficult to cope with the openness and autonomy that goes with the maker movement. Especially the intermediate vocacional education, the logical level for the good maker-producer, is still fully focused on fixed curricula and employee-ship. Experiments on autonomous development, such as Studio MOiO in Leiden and SkillCity in Rotterdam mainly operate alongside the existing system.

Industry sees especially the innovative power of the maker movement, and here too collaboration is in its early days. Heijmans and Roosengaarde probably form the best known corporate-makers duet of the past few years; incubators such as Yes!Delft and CIC, that established itself in Rotterdam this year, are developing programmes to connect corporates and start-ups. This will enable industry to attract the *eagerness,* ideas and open-innovation skills. Rotterdam wants to boost this kind of cross-over in the harbour, the Eindhoven region is crowned the cleverest in the world because it already happens there.

Maker characteristics are slowly emerging in the public space. The best known example might be the 3D printed canal premises in Amsterdam. In the “makers-area” Merwe-Vierhavens, Rotterdam is creating a testing ground for the public space; Eindhoven provides space for makers on the old Philips premises Strijp S and Strijp R. Apart from a few exceptions, most examples can be regarded just a new wave of gentrification - a makers profile can give an urban area new appeal. The step still to be taken is turning the public space into an experimentation area for makers, so that they can produce new solutions and interventions.

TRENDS

COPING

SKILLS

NEW TECH

NEW VALUE CHAINS

LIFELONG LEARNING

EXPONENTIAL TECHNOLOGICAL GROWTH

GLOCALIZATION ACCRUES

JOB SECURITY DIMINISHES

(SMALL SCALE) ENTREPRENEURSHIP)

CONNECTIVITY

PERSONAL INITIATIVE

4. City

For the city dwellers

How can a city provide facilities for its inhabitants in the Third Individual Revolution? By making interventions that are focused on people, their opportunities and their degrees of freedom. Some ten years ago, The Rise of the Creative Class determined thought on urban development. While Florida wrote mainly about creative people in an open and tolerant context, most cities translated this into policy for buildings and sectors. It seems that now the Third Industrial Revolution of Rifkin is becoming just as dominant and we don't want to make the same mistake again. At its core, an Urban Agenda should be an City Dweller Agenda.

The city of the next economy ensures that all its inhabitants are able to develop a basic level, by not only fostering the new skills in niches but also through offering them on numerous different fronts. That is simply the basis for a **healthy city.** The next economy city also ensures that there are no impediments for the autonomous development of the makers. No annoying partitions in education, between sectors and certainly not between "economy" and "neighbourhood". This is the **open city,** which also opens up the possibilities of data, public space and market entry for its makers. Finally, the city of the next economy involves the makers and their skills in social assignments and the development of new business opportunities. Their way of working is necessary for tackling the wicked problems and the economic future. This is the **making city.**

Clearly, not all these issues are strictly governmental, but they affect public, private and civil society. In order to embrace the new economy and to give city dwellers the main role, each city would in any case have to meet the following criteria:

1. **A permanent role for making in primary education.** So that each child learns to experiment and discover that it is perfectly capable of making something itself. A logical application of the Techniek Pact 2020 would be that every primary school collaborates with a makerspace.

2. **Pilot projects DIY curriculum,** in which Middle level/Higher level applied education (MBO/HBO) students are able to compile their own portfolio of subjects – across all training schemes, including externally with makerspaces and businesses and preferably personally coached by a maker or entrepreneur.

3. **Re-branding technology** in education and the employment market, by redefining the profession together with makers. From dirty, dull and dangerous to entrepreneurial, innovative and promising. Not by campaigns, but by actually filling in the subject differently.

4. **Makerspaces in the neighbourhood,** so making doesn't remain a niche in a separate part of the city, but all city dwellers get the opportunity to delve into it. Makers bring skills to the neighbourhood, accompanied by entrepreneurial dynamics, independence and possibly new capital.

5. **Open up whatever can be opened.** Offer makers in the city public space, data and available materials so that the city itself can quickly become their resource, product, studio and customer.

6. **New hybrid business cases.** Develop collaborations and joint ventures between corporates and autonomous makers, in order to accelerate innovations. Moreover, make use of their *blue collar* mentality in order to involve the street and the shop floor with innovation.

7. **Makers for public assignments.** Makers have a special resolving power to offer – designing and tangible. Make use of this by placing challenges or by setting dedicated teams to work. Or, take your wicked problems to the fablab, experiment with and develop the proper skills yourself.

8. **Makers in the board room.** Technological growth, increased flexibility and glocalisation go faster than do planning processes and the development of new curricula or business strategies. So the future must immediately come and sit at the table, if you don't want to miss the mark. So, phone a visionary from the maker movement.

Conducting a revolution

The Third Individual Revolution is meant for and led by city dwellers, and it is crucial. It does not mean that everyone has to become a full-blooded maker, that everything has to come out of a 3D printer or that there should be a makerspace at every street corner. It means that every city dweller gets a chance to develop himself towards an independent existence in the next economy. Some will produce the next Ultimaker, others will simply be better able to maintain themselves. Operating more freely, standing stronger and thinking more entrepreneurial than they do in the current, just not fitting frameworks.

There is no blueprint for conducting the revolution and that would moreover conflict with its nature. The making city will develop itself along the same lines as the development of the makers' products and businesses. By experimenting and making prototypes; heads forwards, trying out, errors are allowed. There is no grand design, it is all about daring. *Cities don't take shelter when it rains,* wrote the poet Joseph Brodsky.