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weconomy

COLLABORATIVE ENTERPRISE MAGAZINE

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12

ROBOT
Is automation collaborative?

The future
is still
human-made

Open

Free

Infinite

Perpetual
Beta
Collective
Magazine

Made in LAMBRATE

12

ROBOT
IS AUTOMATION
COLLABORATIVE?

The 12th Making Weconomy journal paints a picture of the possible relationships that humans may have with technology. It explores the topic in 2 dimensions: the social impact of technological change and its effect on the business world. The journal concludes with a section on the exhibition Posthuman (Milan Design Week 2017). This issue, in dealing with this topic, does not and cannot be in anyway exhaustive. On the contrary, its goal is to provide different points of view to start a conversation to invite humans to further explore.

The future
is still
human-made

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INDICE

WHY

THE POWER OF DISQUIET
CAN IT REPROGRAM US TO BE EVEN
MORE HUMAN?

Machines both excite us and scare us for the unforeseen ramifications that they could have for our personal, social and working lives on various levels. They intrigue and disquiet us, making us feel inadequate compared to them, that we cannot tame and channel all that tantalising power. Yet the unease that this era brings could prove a fantastic source of energy, if harnessed, to shape how we reinvent ourselves, to help us rethink ourselves as people and communities on any level: our family, the company we work at and for, and the society we live in.

Had you asked me 5 years ago what I knew about machines, I would just have mentioned some sci-fi films or, at best, a few editions of "Ghost in the Shell". Latterly, as a designer and service architect, I have had to grapple with what human-machine partnerships actually mean, besides the world of interfaces.

But first, let's get the terminology straight. By "machines", we mean algorithms, androids, robots, cognitive computers, new and increasingly automatic, sophisticated and intelligent systems and technologies. The team is growing. Soon, we shall have new "colleagues and teammates", and it's time to start understanding what impact they will have on our experience – as designers, users and components of business systems where machines will have an increasing role and perhaps even a dedicated HR function. Burgeoning technology, though, does not always bring burgeoning awareness. I believe we urgently need to develop a critical and, especially, design-based way of thinking about this.

We have moved from the postmodern to the post-human. The "postmodern" concept evoked the feeling of being in a radically new era that shared little with anything that had gone before. What can "post-human" mean if not that the coming era will exclude us? Will things keep going without us? What "thing" can exist without us? And what will become of us? Will we go extinct? Or will we just become "obsolete", as Günther Anders predicted? So many questions. Truth or post-truth? What stance shall we take – disinterestedly waiting or on sceptical alert?

Who is right – those who say machines constrain us or those who claim they empower us?
Humans have certainly always tried to improve themselves – and not just their understanding of the world and their familiarity with it. Knowledge was the first means of empowerment, the first self-transformation. Ships were removable prostheses, like eyeglasses and binoculars, often pointed forward then raised to see what we thought we had already read about somewhere. And these prosthetic extensions offered things and opened up worlds that were beyond the natural human apparatus, breaking down our natural limits (of calculation, vision, precision, power, speed, organisation and more). Not to mention that "ear attach-

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Strategist & Manager of Design
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ment" we can't live without, which has had a screen for a while now, too – and has effectively become a remote control for reality! Who is right – those who say machines create jobs or those who say they replace them? When the first trains started puffing through the English countryside, people talked of jobs being destroyed. In fact, every technology wipes out obsolete jobs and replaces them with highly qualified ones. It's called "creative destruction". The problem is you can't ask farm labourers or Amazon packing-line workers to suddenly go and program the robots that have replaced them. If you count how many young people do new jobs in the digital world, there are more of them than there are taxi drivers who have lost or could lose their jobs. The problem is that taxi drivers struggle to find new work afterwards. **That is a social dilemma.**

Who is right – those who say machines magnify our skills or those who say they magnify our errors?
Machines have the power to boost our skills, free up our time and make us faster. AI systems can help doctors interpret diagnostic images by reading them much faster, easing the load on radiologists and, happily for us, extending patients' lives. But machines magnify not only our positive traits but also our negative ones and, therefore, our errors. In October 2016, the pound:dollar exchange rate plummeted to 1.1841, a 31-year low. That was probably due to a "fat-finger" error: a freak order caused by human error, magnified by the algorithms, which quickly misinterpreted

the market trend as a result. Imagine the potential for good and for error on all levels. **That poses us an ethical dilemma.**

Who is right – those who claim machines help us learn new things or those who say they isolate and insulate us from reality?
Algorithms spoil us. They create personalised playlists; they suggest songs and clothes based on our tastes, on what we might like. We are in a bubble, perceiving only a stream filtered by the system that personalises the search results on websites that record our behaviour history and keep offering us the same information or type of content. The upshot? Isolation in our cultural or ideological bubble. Notable examples include personalised Google search and personalised Facebook news. What's more, if we mediate our senses through technological environments (imagine designing a customer experience where we have a whirl on a merry-go-round using VR technology), how does our experience of reality change? We grow as people through our experience; if we constrain or fail to broaden it, we constrain our way of thinking. **That is an anthropological dilemma.**

Who is right – those who say machines will always depend on the humans who design them or those who claim they will become emancipated as a new species apart from humans?
That is an ethical and a philosophical dilemma.

Will they save the world or destroy it?

The bee population is in dramatic decline – without bees, the world ecosystem would collapse – and many researchers have begun to consider how we can save the world. Some Japanese and Polish researchers are developing miniature drones to support bees in their main task of pollinating flowers, thus enabling plants to reproduce.

Meanwhile, in January 2015, Stephen Hawking, Elon Musk and dozens of AI experts signed an open letter calling for more research into the social impact of AI. Society has much to gain from AI, they said, but practical studies into its impact are needed to help avoid some potential pitfalls.

That is a social and political dilemma.

What is true, and what is false? What is right, and what is wrong?

And all those questions we have no answer for, no single truth.

Listening to the thinking of the various journalists, futurologists, educators and techno start-uppers who grace this 12th edition of the Weconomy journal, which is dedicated to this theme, is not enough. But it's a start. We must get back into the habit of asking awkward questions and understanding, in depth, AI's impact and what to do about it; we need to understand what the machines can do – or, rather, what they can't. Because what they can't do makes us more human.

So, what CAN'T a machine do?

Think, have insight, explain itself, put two and two together, be moved, create original connections and, perhaps the most vital of all, create life. Not yet, at least… Rather than engage in a futile struggle with the machines, we should invest in collaborating with them, where the human factor is developed, honed and enhanced.

People will have to look to the traits that make them irreplaceable. Take creativity, for example, the ability to generate unexpected original connections, to pro-

duce new ideas, solutions and perspectives. To do so, of course, we shall increasingly need to invest in new approaches to education and learning that teach not the solutions but how to solve problems. We must inculcate new mindsets, sensibilities and responsibilities in the new generations who will do jobs that we cannot yet imagine, in those who need to reinvent a trade for themselves, and in those who must help groups of people at all social and corporate levels to reimagine themselves in a future-turned-present.

It's about valuing "human skills" (resilience and creativity, intuition and critical thinking, …), because human thought has yet to achieve its potential depth and breadth. In other words, we can mould diverse elements into one, we can discover analogies and formulate hypotheses intuitively, and so on. [Daniele Magazzeni's example, which I heard in one of his lectures on the development of underwater machines is entirely apt here – see page 68]. Remember, it is much more than a calculating or decision-making machine, for it integrates and combines a wealth of experience that machines can never acquire, like desire, emotions and traditions. Machines cannot synthesise that. Clearly, there are topics and specific skills that will have to figure more prominently in school and university curricula. Educating people in a new mindset, a new way of looking after themselves, may well be given greater priority.

Essentially, I believe that an underlying attitude will be key, even before our skills come into play: we must not conceive of ourselves in terms of the automata or machines, highly sophisticated as they may be, that will increasingly throng the milieux of our lives. We must look to develop an original array of benchmarks – many, yes; varied, yes; but on multiple levels, too.

Being human does not mean being less or more than a machine; it's about being different. Looking after ourselves will necessarily be a collaborative task, maybe even a community one. People, that is, will need not

only to come together (as a simple "sum" of their parts, talents, capabilities, etc.) but also to enrich themselves with others' ideas in an act of cross-fertilisation.
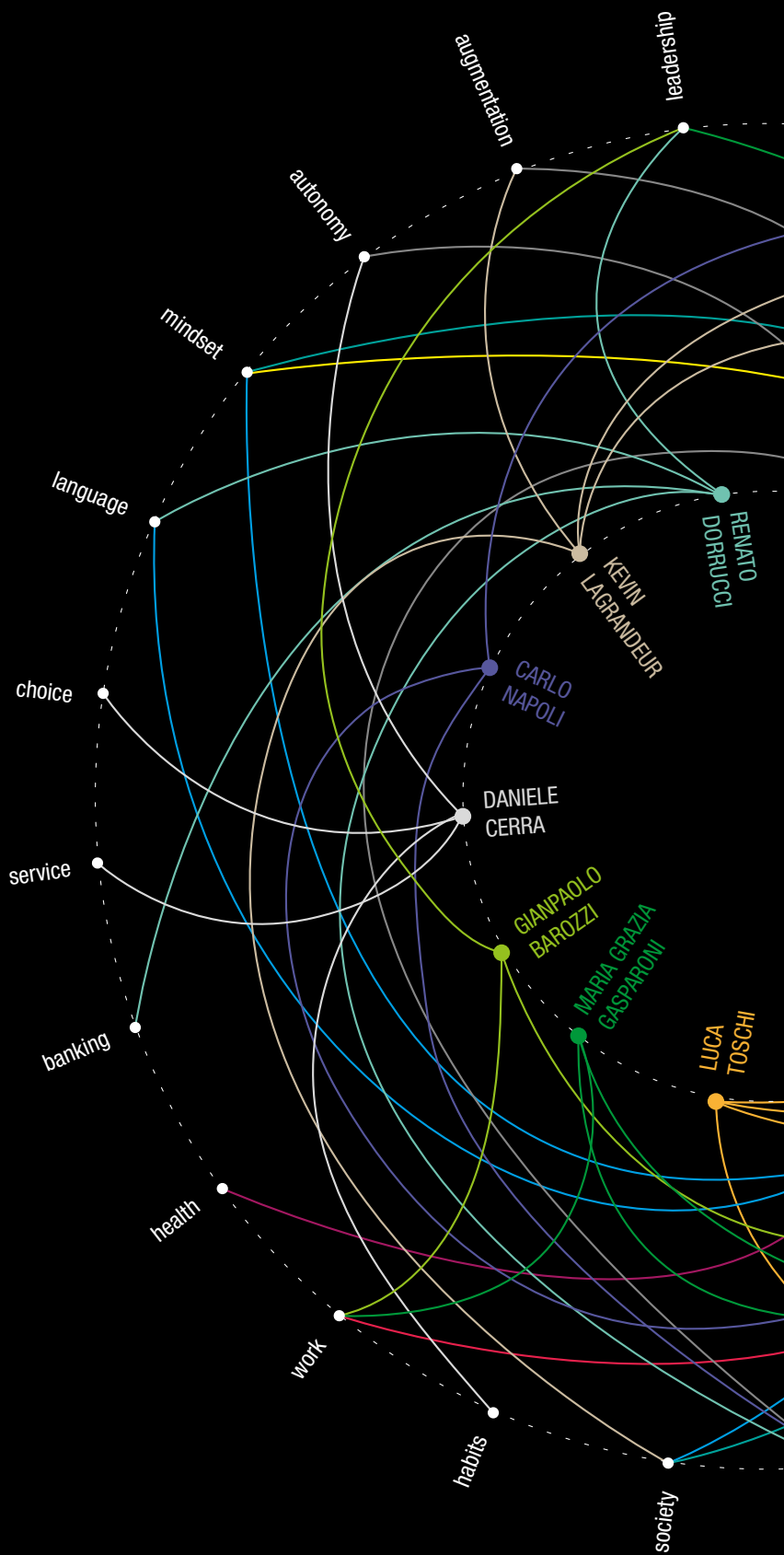
We must not forget that only humans can draw a distinction that is so obvious that we often lose sight of how clear and, above all, fundamental it is: the distinction between reality and fiction, between reality and desire, between the real and the possible.
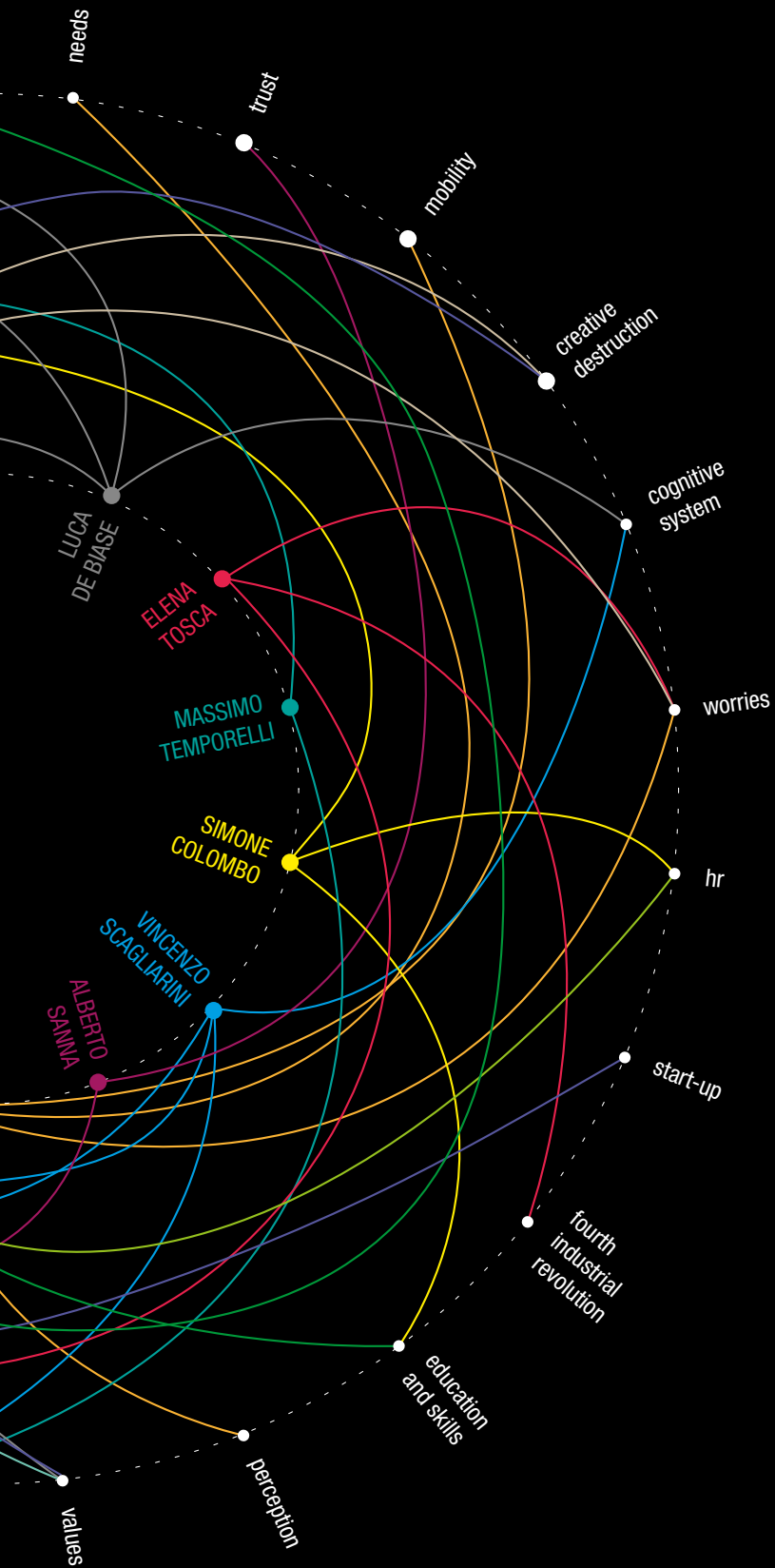
Let us use the disquiet we feel, then, to stir ourselves and others around us to become aware, to become informed and to make plans and take effective action to change things. The disquiet we feel today – as mums, dads, colleagues, bosses, entrepreneurs (people) – is an extraordinary driving force that makes us unique as a species. It is that attitude of being "prototypes", of changing ourselves and reprogramming ourselves that has enabled us to evolve and survive. Let us transform disquiet into motivation, into plans that will help us form our own personal perspective on reality. It is the only firm ground we have to stand on.

This journal offers a range of viewpoints by bioengineers, scientists, philosophers, philologists, anthropologists, sociologists, futurologists, entrepreneurs, managers, journalists, designers and artists.
I am grateful to the over 25 authors for sharing their ideas with us. Have a listen to the 9 interviews with international experts, as well.

Enjoy this issue, and as one contributor says, have a good future!

needs
trust
mobility
creative destruction
cognitive system
worries
hr
start-up
fourth industrial revolution
education and skills
perception
values

LUCA DE BIASE
ELENA TOSCA
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ALBERTO SANNA

ROBOT FAQs

IMAGINARY DIALOGUE ABOUT THE FUTURE RELATIONSHIP BETWEEN HUMANS & TECH

Hasta la vista, baby.

That quote probably won't mean much unless you're a millennial or maybe a Gen-Xer. But this isn't about the Terminator. The term "robot" is used to encapsulate those technologies that, at least in the collective imagination, can support and empower humans or replace and oppress them, now and in the future.

Optimists vs pessimists, then. But aren't robots supposed to help us?

Etymologically speaking, yes: the word robot comes from the Czech robota, meaning "forced labour", implying machines that do what they're told, quickly and efficiently, without complaining. In reality, though, this concept has always been viewed with suspicion and painted with dystopian overtones. Even the brother of the man who invented the word, the writer Karel Čapek, used the idea for a play that he was working on, R.U.R., and… well, let's just say it didn't end that well for the humans after the robot rebellion.

Pessimism triumphs, then…

In the entertainment world, yes. Even in journalism, sometimes. Dystopian futures and apocalyptic scenarios seem to intrigue us more than scientifically accurate depictions. Reality (for now, at least), is more mundane. The world we live in is already awash with robotics and artificial intelligence (AI) – self-parking cars, robots for cleaning the house, digital assistants constantly listening out for commands, and services that relieve us from the burden of deciding what to watch on the box tonight. And those are just the obvious things; there are many more, lurking away. The AI revolution is already here in some way; we just haven't realised yet.

It doesn't seem very revolutionary to me…

Let's just say that the process has begun slowly but is now accelerating and will continue to in the near future. As an academic and research discipline, AI began in the mid 20th century. It's had its ups and downs. But we're now starting to see the effects of that research, thanks not least to the increased investment over the last twenty years. To those not directly involved, it may seem that little or nothing is happening, that this isn't much of a revolution, for our imagination has always been fed by images from sci-fi films and books that somehow inform our future but overdramatise, desensitising us to the less obvious changes.

But besides Google Assistant, the robots that clean our homes, and the algorithms that recommend what to watch, why should we care about all this?

There's rather more to it than that… Just talking about these issues is important – studying the effects that these technologies are having on society, on our cognitive and learning processes, on our buying behaviour, on our language, on how we make choices. Various dynamics and disciplines are involved, from ethics to anthropology, from sociology to philology. And then there are all the implications for the business world: from worries about unemployment as robot usage grows to the digitalisation of working relationships to Industry 4.0.

You said the magic word! Well, two words. What's that about, and where does it come from?

Industry 4.0? That's the application of new production technologies to get operators, machines and tools working together smoothly, allied to new IT and technical infrastructure to integrate the systems. (For more, see Wikipedia.) Essentially, it means making the machinery used in business more "intelligent" and collaborative. And it's quite clear what's behind this revolution: technology, a driver that's changing all our lives, not just factory workers'. Think about the phone you're using to record this interview. The technology trajectory that has created these products and seen them take over markets is the same that is launching the Industry 4.0 revolution: ever-greater computing power at lower prices, ever-faster communications, huge quantities of data, and the development of AI – these are the ingredients that are both selling smartphones and transforming the world of industry.

But it's not just about technology, I hope…

Absolutely not! After all, as Joe Kaeser (President and CEO, Siemens AG) said at the World Economic Forum 2018 "the Fourth Industrial Revolution is not just about technology or business; it's about society". As we've said, we use the inevitable filter of technology and digitalisation to discuss how organisational models, collaborative dynamics, scouting and selection processes, business mechanisms and the managerial dimension are changing and evolving.

So, to come full circle, we needn't worry about a future of people on the dole and factories full of robots?

Well, technology has clearly replaced humans in some tasks down the years. And it still can. Equally clearly, though, it has also created an ocean of new jobs. There are and always will be tasks that only human minds can do or fields that would profit hugely from silicon-carbon cooperation.
It is those two factors that we should focus on. Which disciplines will still need people? Which skills will allow them to beat the machines? And which collaborative forms and dynamics will emerge from human-machine interactions? That's what we want to concentrate on. For a clearer picture, just read the journal.

BETA

NE(x)TWORKING

INFO/INDIE/INTER

OOPS, OR, OK

CO

FEEDBACK

ROBOT

HR

LOCAL

DESIGN

QUID NOVI

GAMIFICATION

MANAGEMENT

EMPOWERMENT

AUTO

POP

N A R

SOCIETY

Society has always metamorphosed and been influenced by new scientific and technical discoveries. With today's increasingly rapid and radical changes, certain technologies could end up creating their own social levels and redefining the relationship between man and machine.

BUSINESS

It is no longer clear whether robots will replace people or vice versa. In the meantime, it will be useful to try to pinpoint the challenges that will have to be faced in educating and training future workers. What kind of people (and technologies) will the companies of the future have? How will they work together?

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Society

Wikipedia, the free encyclopaedia, describes 'society' as "a group of people involved in persistent social interaction, or a large social group sharing the same geographical or social territory, typically subject to the same political authority and dominant cultural expectations". Society has been conceived of in many different ways, from Comte to Giddens via, for example, Weber, Marx and Spencer. Seeking a single definition would be futile. But it is generally accepted that societies change and evolve over time, influencing the individuals who comprise them and being influenced by them, in turn – as in Comte's social dynamics or MacIver's network of social relations in constant flux.

But who are these individuals? Usually, we'd mean humans only. But nowadays, as Donna Haraway has written, "the realities of modern life include a relationship between people and technology so intimate that it's no longer possible to tell where we end and machines begin".

So are we living in a society that counts digital entities or cyborgs as individuals? That might be a little premature. Certainly, though, "technology is not neutral. We're inside of what we make, and it's inside of us" (Haraway again). It becomes hard, then, to think of technology as an independent external agent. That does not mean, though, that we should start contemplating a present or near future without humans. We need to be able to view technology as a partner on the same level as humans that integrates with us and augments or transforms our unique, defining human qualities, making us partially transcend our humanity, giving us access to a posthuman dimension, to a dichotomous dimension that augments our capabilities while somehow acting increasingly as a reality filter.

But are we ready? Can we already overcome the inevitable resistance and accept that we might lose something? Is our society moving fast enough in terms of rules, the law, investments, and behaviour patterns as regards automation and artificial intelligence? Who is right: Mark Zuckerberg or Elon Musk? Will a trend towards new algorithmic and logical social models usher in a more prosperous or a poorer and more dangerous future for humanity? How are the social, economic and political dynamics changing, and how will they change in the future? And those questions are in no way enough. Not least because, when the machines stop merely answering and can choose which questions to ask themselves, then we shall certainly be able to tackle the subject in the round. The most interesting questions, here too, are those that we have not yet imagined.

BELIEVE IT

THE VALUES OF ROBOTS?
HUMANS CHOOSE THEM

You're telling Sole 24 Ore readers about the future of work. Is it a race against the machines and with the machines to innovate and compete better?
The idea that machines are competing with humans is rather absurd; humans design and build them, after all. So, if anything, it's humans who are competing with each other, partly through making machines with certain capabilities and development potential. Undoubtedly, some jobs and roles tend to be replaced by machines that can do them faster. This happens more often in some periods of history – like now – than others. We can ask ourselves how humans can react and prepare proactively for what this trend will bring. First, of course, we need understand it. Certainly, innovation often springs from the ability to see an unexpected opportunity in a recent technology, thus changing an organisation or economic arena enough to enable another technological step forward. But this doesn't mean that tech-development dynamics are independent of our human value system, of our organisational and interpretative capacities, of our focus on process-efficiency or product-quality goals. Humans are always there at the bottom of it somehow. All this is not about humans competing against machines; rather, it pits humans' judgement systems against one another.

If we struggle to collaborate among ourselves, might we do better with machines (of greater or lesser intelligence)?
This is precisely the point. How can people recognise the value of collaborating and reconcile it to the benefit that they hope to gain from competing? Undoubtedly, the value systems needed to make this choice are embodied in rule systems that guide behaviour. It's worth remembering that part of the rules is embodied in the machines, which "teach" them via their interface to the humans who use them. The rules that facilitate collaboration, such as those encouraging "open innovation", are embodied in operating formats that prompt people to exchange information and ideas in order to generate innovation opportunities that are unlike those created inside individual organisations.

What do you think about machines that can think (or claim to)?
Of course, we need to agree what "thinking" means. What should a thinking machine be able to do? Analyse data, understand feelings, generate new machines, and take decisions without human intervention? For now, machines analyse data and learn, in a certain sense, within specific knowledge domains. They cannot do everything else, though, or they do it strictly following the blueprint that their human designers gave them: rather than thinking, machines extend the thinking of the humans who designed them.
Experience can help us understand better. Take the machines that invest automatically on the stock market, for example. They certainly analyse vast amounts of data. They certainly take decisions without seeking human intervention every time. Clearly, they know nothing of feelings; on the contrary, they are used precisely to take some human emotion out of investment decisions. Their ability to think is what their designers have instilled in them, no more, no less. They are "au-

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Innovation journalist and writer

tonomous" in that they access and process an amount of data that no human could, so they make decisions much faster. That is what their intellectual autonomy amounts to. And it's not be sniffed at. But their function is precisely to extend and magnify the flaws – and virtues – in the thinking processes of those who designed and implemented them. Those who make these machines have a real responsibility.

BELIEVE IT

ALGORITHMS AND NATURE
HUMAN BEINGS AS TECHNOLOGICAL ANIMALS

Anyone who works in or thinks about robotics and artificial intelligence (AI) should bear in mind that these technologies are just the latest and most sophisticated step in a long human journey made of tangible and intangible tools, hardware and software. It began with splintered flint, with the earliest primordial fires, with writing and language and has continued relentlessly into the four recent industrial revolutions. The fourth is upon us right now, as we take our first steps hand in hand with robots (hardware) and talk with artificially intelligent systems (software).

Talking about robotics and AI should make us (re)consider our relationship with technology. My position on this issue is quite extreme. It often elicits criticism and disconcerts people, but I cannot not say it, because it underpins all my thinking about technology and therefore about robotics and AI, as well.

This is where I'm coming from. I smile whenever I hear or read "humans and nature" or, even more so, "humans and technology". Maybe we're forgetting that humans are monkeys, animals, so we are already part of nature, like a tree, a flower or a butterfly. Would you ever dream of writing an article called "Flowers and nature"? Flowers ARE nature, just as humans are. That says it all for the flower, but for humans there's more: humans are also technology. Or rather, on closer inspection, humans are more technology than biology, more culture than nature. Our species is the result of a successful, dynamic and ongoing co-evolution involving our body, biology and technology, a dialogue between nature and culture. Those who deny or downplay this are also denying or downplaying humanity. Many people see our burgeoning use of technology as dehumanising; I say the opposite: technology is humanising.

We may be loath to admit it (and somewhat disorientated when we do), but we love technologically, we communicate technologically, and we eat technologically; we always have. Our entire human experience is very much mediated by artificial and cultural tools, the product of our intimate relationship with technology. Look around you and you'll see that you live in an artificial, cultural, technological environment. There's not much nature there. That applies to the future, too; the more technology we use, the more human we shall be. Using social media and smartphones today and technologies like AI, deep learning, machine learning, and humanoid and industrial robots tomorrow is a powerful way to assert a sense of belonging to our species. Our species has always lived on change and innovation, and although it is natural (biologically speaking), it bases its existence on the artificial, technology and culture. Robots and AI, then, mustn't alarm us; rather, we must embrace them attentively and with enthusiasm. But that's not all.

In my professional life 4.0, as co-founder of TheFab-Lab, a digital-fabrication lab in Milan and soon Turin, too, I work with robots every day and am starting to use the first artificially intelligent software. In parallel with my digital-entrepreneurship efforts, I am also trying to find time to spread the word about these sub-

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President and co-founder
The FabLab

jects, so I am often on TV, on the radio or in lecture halls explaining how the new technologies will change our lives.

Although rooted in the world of digital start-ups and science, my thesis is never just technical. For neither I nor my (often generalist) audience care much about tech for its own sake; what is interesting is to grasp the import of what is happening. Robotics and AI, much more than other technologies invented so far, are fascinating because they offer so much scope for reflecting about ourselves, our human nature, and what makes us homo sapiens. The more we study and read about AI, the more we can understand how a healthy mind, a healthy homo sapiens, works or should work. My months of studying and reading about the algorithms that will control the future have taught me two key rules that will have to apply to us humans, too, given that the most brilliant scientists of our age are trying to teach them to the machines that I term intelligent.

Rule no.1 is about data, big data in particular. We humans must collect lots of data from different parts of the "world". Our eyes, ears and fingertips must receive the constant stimulus of new data. We must break out of the known. We must eat, smell and touch other cultures – disciplinary, geographical, linguistic cultures. After a vertical-training phase, we must give a wide berth to ourselves and those like us. We must quit the ivory towers where everything works. We must learn to reckon with error, continually.

Rule no.2 is about the lack of certainties. We must experience our mind and our thoughts (products of the mind) as one of the many releases that we shall install in our brain (hardware) over time. We mustn't become attached to our ideas and thoughts. We must learn to respect others' minds and try to understand if some of those we meet are swifter than our own at grasping and predicting reality. If they are, we must learn to emulate them. We must surpass ourselves, without being surpassed.

Have a good future!

BELIEVE IT

THE FUTURE OF HUMANITY
THE STORY OF AN INTIMATE TECHNO-RELATIONSHIP

Futurists tend to exaggerate, overestimating the change that's heading our way. Most likely there will be no new species, no destructive post-human scenario, no sci-fi movie style acceleration of evolution. However, what we can say or even predict with certainty is that the way we interact with the world and with the machines of the future will change. Human beings will remain so, but their relationship with objects will be deeper, a kind technological intimacy.

I use the term technological intimacy to define all those types of relationships that, through connections, additions and implementations, will help people to enhance their activities and capacities, both at work and in their personal lives.

Of course, we are I am not talking about a new species of cyborg with human minds and technological bodies. The idea that the human mind can be removed and downloaded into digital structures ignores the fact that we do not know exactly what the mind itself is made of and where it is located within the body.

However, it should be said that notions of electronic adaptations at the brain level are not that far from reality. Some researchers have already been able to use technology to implant memories in the brains of rats. These types of procedures could bring big benefits to human beings, such as the digital "reinstallation" of the memory of Alzheimer's patients. However, it's not hard to imagine dystopian undercurrents to such a sce-nario if instead of using real memories false ones were implanted. What if we were to remember events that never happened and someone else could manipulate our principles and beliefs? The experiment is now only conceptual, but it is not necessarily that far from possibly coming to pass.

On the work front, the partnership with machines that can interact and work side-by-side with employees to cooperate is already part of our world. It is no accident that it is now very fashionable to talk about cobots, robots developed to physically interact with humans in a shared workspace. We are increasingly involved in technologically intimate relationships with digital tools without which we are decreasingly able to work.

But the development of this technological intimacy we are talking about could have very wide-ranging, and possibly dark societal implications. One example could be the emergence of a new leadership made up of a privileged elite of individuals who, due to their high purchasing power, would be able to extend their physical and mental abilities at will. What would a society be like if only people who could afford it have the opportunity to learn everything they want at the speed of a download? What kind of society would be one in which the rich become more powerful, increasing the gap between those with plenty and those who have nothing? The harbingers of such a scenario are already apparent. This is the real problem: we need to start thinking about consciously choosing to adopt

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technology that offers everyone the chance to experience these "upgrades". And if the darker possibilities came to pass, what jobs would people do who cannot supplement their own biological characteristics with artificial elements?

The issue of automation and machines replacing people at work is already a source of increasing anxiety. However, if we look at the economic conditions at the turn of the 19th and 20th centuries, we find an almost carbon copy of the modern era, with the explosion of new technologies and the emergence of new types of industries that initially led to the loss of many jobs. Twenty-five years later, when people had invented new activities and developed new ideas to exploit that industrial potential, new jobs were created for those same people. This concept is called "creative destruction". Jobs will be destroyed, but other, newer, more innovative, more useful ones are created as the result of the development of new technologies.

And this is what we should focus on. Today we cannot even imagine the types of jobs that might exist 20 to 25 years from now. After all, 25 years ago would we have been able to imagine the existence of SEO Specialists, bloggers, drone operators, or digital undertakers? So, what can we expect in 25 years? What is certain is that humanity won't be obsolete. It will only need to reinvent itself, as it always has, perhaps this time trying to work a little more closely with robotic and robotised colleagues.

BELIEVE IT

SELF-DRIVING CARS?
TOOLS FOR REINVENTING HOW WE USE SPACE AND TIME

Self-driving cars will reduce accidents and improve safety, but we don't trust them yet. That is one of the findings of the study by the Center for Generative Communication (CfGC, www.csl.unifi.it, Florence university's centre for research into the social impact of automation processes) at the International Robotics Festival in Pisa, in September 2017.

For many years now, CfGC researchers have been systematically studying the desirable, possible and dangerous social consequences of the advent of robots and the unavoidable yet essential role of automation systems in our everyday lives. They have been observing, analysing and testing out the new technologies; a hands-on approach is key, to avoid being distracted by abstruse abstract debates. There are two main objectives: 1. to meet the needs and demands of society, business and the institutions to encourage a people-centred kind of innovation that builds on the knowledge of each direct and indirect social stakeholder; 2. to investigate the design culture – and the ends and values that it embraces – that is powering the advent of such an automated world.

Studying self-driving cars is a central plank of the research, given their potential impact on how transport and our living environment are being reinvented.
The question about self-driving cars in particular is: "are we looking to use them (and so are we developing them) only to improve our existing transport model? Or do we see technological innovation as a historic, if not epoch-making, opportunity for a wholesale rethink and redesign of the system that has determined our use of space and time in our socio-economic life?"

This last question impacts on – or at least ought to – the myriad transport-related apps already out there and the big data that underpin them. Among other things. The array of international studies on consumer perceptions of the advent of the self-driving car, then, offers an unclear and decidedly unreassuring picture.

According to the USA Consumer Technology Association, many Americans are enthusiastic about them. A June 2016 study showed that over 62% of consumers would be prepared to replace their car with a driverless vehicle, while 70+% would be interested in trying one out, at least. These optimistic results contrast with surveys by the American Automobile Association and the Pew Research Center. The AAA reports that over 80% of interviewees would not feel safe in a driverless car, and only 34% would share the road with one; according to the Pew, 56% of respondents wouldn't want to ride in an autonomous vehicle. The main concern emerging from the surveys is that passengers would be impotently dependent on the car. Nevertheless, the rush to bring driverless vehicles to market seems to be continuing unabated, and by 2025, the market is expected to be worth over 83 billion dollars (Frost & Sullivan).

The CfGC study at the International Robotics Festival in Pisa last September explores this scenario.
97% of respondents said they knew about self-driving cars and believed that, if used more widely, those vehicles could improve road safety and change our transport system for the better – but only if we can build a fully integrated and automated system. 66% believed that self-driving cars could help to reduce human er-

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ror. 10%, though, thought them potentially dangerous because of the risk of losing control of your vehicle. But most respondents said they weren't yet ready to take their eyes off the road, as they did not trust the car to drive itself. Above all, though, what emerges from this study (and others) is that only a handful of interviewees raised the issue of what this universally acknowledged revolutionary prospect is fundamentally about. Very few people – designers, developers or users – considered the possibility of a radical rethink of their time and space and how they get around. What shall we do in transit if we don't have to drive? Where shall we go if we can go anywhere and more easily? How will our goals change, in everyday life and at work? What kind of social and economic model are we heading towards? There is a strong suspicion that we are changing everything and yet nothing – just making things more efficient.

If we focus increasingly on the prevailing model of "X as a service", of replacing owned goods with services supplied exactly when needed, then the automotive market is certainly offering a gradual yet profound transformation. But where is it going, socially and economically? Above all, what does "quality" mean?

Such a far-reaching reinvention of time and spaces, both public and private, cannot but have a systemic impact. But what system are we talking about? At least, technologies like that need to be developed by different people with the broadest range of skills and knowledge, so that we reinvent not only the technology but also, and moreover, the entire socio-economic model, and without further ado. Yet we don't see the need, despite the situation in which our planet and its inhabitants find themselves.

Indeed, innovation makes sense only if it is geared to building communities. Only this approach can transform the increasingly complex contexts in which we live into resources.

Meanwhile, as we wait for the future to arrive, why not console yourself with a lovely sex robot? For, as the CfGC survey observes, what are they but domestic appliances like any other?

WECONOMY INSIGHT

THE INTELLIGENCE OF THINGS
NEW LANGUAGES AND MENTAL MAPS

I'm late, and I haven't done the shopping yet. I find a nearby supermarket on Google Maps. I set the route, and the app tells me that the shop is closing, and I wouldn't get there in time, so I pick another that's further away but opens till later. A mundane task – buying something for dinner – has been altered by an algorithm, which has analysed and offered useful information. I could have found out myself, but it would have taken time: remembering the grocery store opening hours, working out the shortest routes, and hoping to arrive before closing time. I've saved time and effort. It didn't need a robot or technologies like virtual reality: it's artificial intelligence (AI) applied to the little things – small beer compared with the robots at Boston Dynamics, which can actually do backflips. But it still took some sophisticated technologies to make Maps work so smoothly there. To respond to our searches, Google's servers employ over 100 levels of abstraction: they assess, learn and help us choose. They look at the world and give us a broader view.

We could stick our neck out and say – at this point in the development cycle – that AI is useful when it provides an interaction (the software's idea to tell us that the shop was closing) in place of a static result (the list of supermarkets in order of distance). In other words, Maps understands needs that go beyond the mere execution of a task.

It's not quite as simple as that, but it helps us navigate between the polarised views of sceptics and fans – those who think machines will always be stupid and those who foresee a future where robots will be so intelligent that they will become our masters.

Luciano Floridi, in an article in online magazine Aeon entitled "Should we be afraid of AI?", takes a different perspective. Instead of stumbling into the error of attributing human traits like ingenuity or ambition to machines, he begins from the consideration that we are no longer the only species that can read, produce and interpret information. If we understand the progress that the algorithms have made in that direction, everything changes. So, the most urgent of the various problems that we should consider is this: how can we go further and avoid being mere passive users of ever more sophisticated technologies that seem to be spiralling out of our control?

Much of the trading on Wall Street is done by automatic software systems that decide when the time is right to buy or sell. We accept that without undue concern, until something goes wrong. Indeed, on 10 October 2017, the technology rumour mill 9to5Mac.com published an unconfirmed story that Google might be buying Apple; the news was then echoed by the Dow-Jones agency. Accordingly, the algorithms bought Apple stock, and the share price rose. It's a small example of the unforeseen consequences of an automaton acting without human interaction.

If we are getting used to living with algorithms that make decisions for us (it's too late to turn back now), what we can do to work with these systems? Let's go

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Community manager Content Specialist
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back to the thought we started with: AI in everyday life augments our perception of the world around us. And most of the big technology players are designing "open" services for us to interact with. Amazon's Alexa (the system behind Echo, the virtual assistant), for example, allows us to extend its Skills. These are new ways of interacting with humans. For instance, a Fitbit wearable device can interact with Echo, allowing these two objects to exploit the information we share. We can configure the first device to send information about our sleep quality to the virtual assistant, which we have taught to suggest when to go to bed and, maybe, to turn off the TV and the lights if we stayed up late the night before.

But now that objects can "talk", what has changed? Language has always been a humanist concern; it has helped to create stories (linear sequences of causes and effects). To fully understand the technologies that are using AI, though, we need to start thinking outside one of our usual boxes: we should look beyond the textual dimension and become language designers, mapping all the possible answers to a given question and inventing relevant questions to drive dialogues. Which will be "artificial" in the way they occur but still human at the point when they are imagined.

WECONOMY
INSIGHT

THE SUPERMARKET OF THE IMPOSSIBLE
OR WHY IT IS IMPORTANT TO STILL BE AMAZED

200 grams of Polish Azerbaijani, a bag of accelerated learning and a handful of future predictions, please. The supermarket of the impossible is open to all.

Those of us who are lucky enough to live in technologically advanced countries have become accustomed by now to a new socio-technological norm: what was once mere science fiction is now part of an everyday reality that is no longer surprising, where the exceptional has become the expected. Who, indeed, marvels about being able to watch – live – what is happening at home even when we're on the other side of the planet? Who doesn't take their satnav app for granted when finding their way around? And who doesn't save and instantly share their memories as multimedia assets (photos and videos) that are searchable by keyword or by the names of those in the picture?

Even the judicious mix of robotics and intelligent algorithms is now a mundane fact of life. While a drone now makes a decidedly passé birthday present for the younger generation, businessmen can increasingly be seen darting through the streets in the business districts on electric monowheels worthy of *Back to the future*, to say nothing of how "indispensable" cleaning robots have now become.
Not only does all this seem absolutely normal to us but we have even got used to the exponentially accelerating pace of this stream of changes of anthropological import (see the Weconomy article on the extinction

of homo sapiens) and how they impact on us and our society.

The continual, ever-faster reshaping of the parameters of everyday life is prompting us to develop cognitive models better suited to the present, which differ from those of the recent past, for interacting with and negotiating the world and the people around us in a way that is so dynamic as to appear unexpectedly inhuman sometimes.

Previously, our emotions were triggered and our rational thought processes were channelled by what we knew and by our acquired models of meaning. On the London orbital, for example, if the person sitting on the right in a car overtaking me is watching a film on their tablet, I'm alarmed until I see the French number plate, whereupon I heave a sigh of relief. But our way of decoding what happens to us is now increasingly bound up with how we process the technologically possible scenarios, even if we don't realise what they are. (I think, with a certain insouciance, for instance, that the car overtaking me will be self-driving; it doesn't crash into me; fine… on we go.) It's almost as if we are gradually moving away from reality into some sci-fi world where, even if we don't understand the laws of physics, well, no matter, that's just how it is.

After several years as a preserve of the select few, today's supermarket of the impossible is finally open to

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everyone, for virtually nothing, and will be forever (not insignificantly). Indeed, to follow a conversation between an Azeri and a Pole, each speaking their own language, all you do is download a free app. Equally, buying hours of artificial super intelligence to boost your company's learning capacity without hiring gurus or consultants just takes a couple of clicks and a few hundred euros. And predicting customer behaviour with great accuracy, building chatbots to provide impeccable service 24/7 for every customer, monitoring threats to all the ATMs in an entire country in real time is all on special offer in the plug-and-play department, as we can see from the shelves full of artificial intelligence (AI) "as a service" options from tech giants like Amazon, Google and IBM. And certainly no one will marvel if the next flyer offers an anthropomorphic robot bodyguard, a full medical with an artificial doctor, a singing course with a virtual vocal coach, or a printer for foods compatible with our DNA.

But this ever-less incredible and dazzling supermarket harbours a much less visible but probably more potent risk than the debatable loss of jobs "as we think of them today" to robots and AI. That is the risk of becoming accustomed, or rather inured, to what should actually amaze and disconcert us, to what should pique – not atrophy – our desire to understand, to think critically, to ask informed questions about the world around us, and to retain our faculty to decide for ourselves. The day we cease to be alarmed when our phone presents us an advert for the birthday present we'd like from our friends and to ask ourselves "why are these services free?" will be the day we give up an aspect of our humanity as fundamental as the privacy of our own thoughts. Not only that, we shall also have blindly gifted a much, much more intelligent machine the right both to guide our decision-making (by showing us only the options selected by those who control that intelligence) and to take the value it wants from us.

No artificial intelligence is as fearsome as the gradual, unconscious abdication of human intelligence. No mind-boggling technology must be allowed to distract us so much from our humanity as to leave us emotionally apathetic and rationally uncritical.

BUSINESS
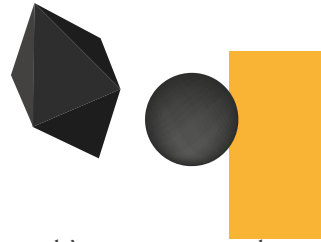
"The question of whether a computer can think is no more interesting than the question of whether a submarine can swim" (Edsger Dijkstra). Although this quote from the brilliant Dutch computer scientist highlights the futility of speculating if machines can think, the question of how close the new technologies are getting to replicating human thought is rearing its head increasingly often these days – how well can a robot replace a biological mind in creative and intellectual work, too? The business and management world could soon have a full-scale revolution on its hands.

With these scenarios in mind, perhaps it makes sense to refer to enterprise in a wider sense, as an action subject to risk or with an unpredictable outcome. For the kind of enterprise that we are talking about is certainly "an organization that provides goods and services" (Wikipedia), but it also a punt on the future of a world – the world of work – that even now must reckon with complex dynamics that are still uncertain and even unknown.

Technological progress over the centuries has transformed human activities, in a transition from craftspeople's aprons to manual workers' blue collars and on to the white collars of office staff. What next? Perhaps the white-collar workers are mutating into hoodie-wearing computer programmers. And one day, maybe, we shall categorise workers based not on their collars but on their protocols (electronic ones, that is).

But even if we don't yet know if the robots will come and 'steal' our jobs or if we shall have cobots to support us in our work, we can begin to ask ourselves what challenges will need to be faced to educate and train future workers (human workers, of course). Which skills will need to be inculcated – or invented – to avoid falling behind the thinking machines that are faster, more powerful and, maybe one day, more intelligent than us? How will businesses change the way they organise themselves?

"What does it mean to be human in a world that is increasingly standardised?" (Hendrik-Jan Grievink) could be a question that we'll have to ask ourselves more and more often.

BELIEVE IT

ROBOT: FRIEND OR FOE?
THE FOURTH INDUSTRIAL REVOLUTION

The history of technology has always been punctuated by moments of alarm. Every major innovation has disrupted a status quo and changed the job market significantly.

Looking way back with the benefit of hindsight at what has happened from the industrial revolution to the present day, we can say that technology has undoubtedly created a wealth of employment opportunities.

Progress has seen people replaced in repetitive, dangerous and low-value tasks. Innovation and new technologies have improved productivity and made products and services cheaper in every sector, from agriculture to industry and services to high-tech.

The general effect has been to boost professionalism and competence in the workforce, by freeing people from low-added-value tasks to gain more sophisticated skills.

But we know that the new always makes us nervous, especially when we are not ready for it.

First steam power, then automation, then computers and the internet; now the new "monsters" are the IoT, digitalisation and industry 4.0.

But, as The Economist commented in 2015, "Once it was the Luddites, who destroyed the new textile machines to stop them being used; now it is the shop workers, worried about automatic tills, and tomorrow it will be the taxi drivers, fearing the advent of self-driving cars". And yet these phenomena were, and still are, bearers of new wealth and opportunity for the working world.

The feeling of being under threat very often comes from a sense of not being up to the new situation.

In particular, while we're on the subject of professions, the skills needed to do jobs that are being replaced by machines and technologies certainly soon become obsolete and worthless.

But since skills have a life cycle, we must replace them with new ones to reflect what the new situation demands.

In early 2017, Manpower Group, the multinational world leader in strategic human-resources solutions, published their "Skills revolution" report, a study of how the technology revolution is impacting on the world of work. It states that the workforce will becoming increasingly polarised, between those who are ready to tackle the new challenges and those who lack the right skills and are in a precarious position.

If technological progress is hard to rein in, then, the role of leaders and organisations is to invest in their people by making them more resilient (to face and adapt to change and to the unforeseen) and eager to learn new skills.

But that's not all. Robots will most probably also replace humans on some specific tasks even if they don't take over the entire job.

Humans will still be able to make a difference, we can rest assured at least for a while, with their creativity, emotional intelligence and cognitive flexibility. With those skills, people will be able to create new machines and new robots rather than be replaced by them.

Keiju Matsushima, one of the world's leading experts

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Director of the Masters degree in Mechatronics & Management (MEMA)
at the Business School at LIUC (Carlo Cattaneo University)
Director of the "Careers management" course at LIUC

on robotics and the Internet of Things, says in a recent article, "digitalisation has the potential to help us change human occupations for the better, to reduce the drudgery, to create new value while reducing unemployment and doing something about social injustice, to solve problems like ageing, staff shortages, and environmental and energy constraints".

No particular alarmism, then, just a sharp focus on investing in training, on adapting people's skills to the new world where robots and artificial intelligence will be our friends, not our foes.

BELIEVE IT

BANKS AND TRAINING...
IN THE (NASCENT) ROBOT AGE

Fintech, if such we can term the application of digital technologies to the various branches of the financial industry, is radically changing the banks' business model. The innovations of the last few years have impacted on banks as the ubiquity of the internet and social media impacted on publishing in the early 2000s. Banks are eagerly and systematically adopting digital to automate their industrial processes and in customer service, in customer care, and in their customer advisory services. They are gradually bring in bots to improve their response speed and capacity along with increasingly sophisticated tools for analysing financial big data. These developments have profound effects on a bank's identity, its organisational model and how it deals with its customers.

Until a few years ago, we thought that digital would open up new possibilities in customer relations, in a multichannel approach. Now, however, we have an omnichannel relationship with digital that is all about continuity, immediacy, speed and a quest for the personalisation that customers seek in all their consumption experiences. Chatting with a bot to monitor your investments, sifting an increasingly diversified and meaningful mass of data to weigh up your decisions, and using any financial service 24/7 has an impact not only on the customer relationship but also on the bank staff, their roles and how they operate.

We are transitioning from the typical verticalised silo structure (which is stronger in banking than in other sectors, partly because the different businesses are separated by law, with different internal functions) to the need to develop temporary, horizontal, multidisciplinary, cross-function, collaborative ways of project working. Performance metrics are changing, too. It's no longer enough to maintain a balance between efficiency and effectiveness: you need to constantly push for speed, the decisive new variable that trumps all others. In this new digital "robotic" era, businesses need to help their people acquire a new mindset that enables them to follow the new rules of the game. But for a bank (or any other business) to earn people's attention and interest, to engage them and persuade them to buy into a new mindset and new behaviours, it must make the effort to speak the nascent digital language and to embrace the way people now expect new content and knowledge to be presented.

The digital language of training must be fast and visual, applied and immediate, pragmatic and contingent on the need for new knowledge. It must be akin to and recognisable in the lingos that we speak, hear and see every day. This language also enables a new way of learning specific to the new generations. We have applied it at Intesa Sanpaolo in a radical, systematic way, with new digital platforms that distribute and offer knowledge through text-mining techniques that enhance the semantic accuracy of search, and recommendation algorithms to suggest what each colleague would benefit from knowing, in a drive to provide an increasingly personalised offering. We firmly believe that training is also a service and, as such, cannot clash with the features and quality of the services that we all seek and use on the market, in the commercial relationships and expe-

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Intesa Sanpaolo

riences that we have. This kind of knowledge (just in time, just enough, just for me, anytime and anywhere) has no hierarchies; it creates no links, it is not systemic, and it doesn't facilitate interpretation. But it is the only kind of knowledge that people in companies find useful and are ready to embrace.

So it becomes important to integrate orientation services and guidance constantly into the training: giving people contextual references (especially for the new generations) to understand where they are, how to decode different situations and find meaning and significance in their work at the company. Managers are key to this objective. They need to interpret the context, to encourage partnership (without fear of losing control of their resources in the old sense), mapping out the road ahead and following it tenaciously together with their people, while also trying out new solutions. Digitalisation and its applications (robotics, fintech, big financial data) invert the paradigm, then, of a bank that promotes itself as an institution, as it opens up to a new journey where the bank anticipates what customers expect from the experience of dealing with it. These expectations are largely determined by the digitalisation of all the services and by the arrival of the robot era. This also has a profound impact on the bank's business and on how it empowers and supports its people to rise to their own challenges, each in their own role. For behind any bot is always a person who can program it; beyond the ability to process and recognise the data is always a person who can devise interpretative models and make a choice. A

service, in all its forms, always involves a person and, therefore, their story.

BELIEVE IT

MOVING BEYOND THE UTOPIA-DYSTOPIA DICHOTOMY
DESIGNING THE FUTURE: AN URGENT CALL TO ARMS FOR HR

There is no doubt we are experiencing another social, economic and industrial revolution through digital technologies. There are similarities and differences compared to the previous revolutions of this kind: we find positive and negative perspectives, we have early adopters and scared skeptics, we see winners and victims at all levels. We had them when we asked ourselves fundamental questions in the Renaissance, when the steam engine led to the creation of huge factories, when electricity and electronics deeply changed them. This revolution is also once again impacting one of the most fundamental and human activities: "work". What we do and how we do it, which distinctively makes us human and is critical to our quality of life. The difference today is the speed at which change is happening and the exponential acceleration of the disruption it causes.

Should we be scared or cheerful in facing this change? "History does not repeat itself, but it often rhymes" Mark Twain said. What we learn from the past is that1:
- Employment in some sectors can decline sharply, but new jobs created elsewhere absorb those that have been displaced.
- Employment shifts is going to be painful.
- Technology creates more jobs than it destroys, including some we can't imagine at the outset.
- Technology raises productivity growth, which in turn boosts demand and creates jobs.
- We all work less and play more thanks to technology.
For each aspect of the emerging digital technology we can find studies praising their positive impact on our lives and research painting dark portraits of our future.

Yet, today change is impacting large parts of our society across the planet and it is moving much faster than people's ability to cope with it and even their ability to understand it and its consequences. In one of his last books – Retrotopia2 – sociologist and philosopher Zygmunt Bauman pointed out that for the first time in the modern era the future is no longer associated with progress, but with regression. Our utopian impulse is redirected towards the "space of collective memory", "remodeled at will" to provide people with a safe refuge to their concerns and fears.

We lack ideas and vision about the future to guide our actions today. The general feeling at all levels is that change is happening at the speed of light and nobody is on the driving seat. Nobody seems to be able to provide the lens through which people can interpret their present and future. We are funding studies and analyses, pictures and projections, but we haven't initiated a serious and fruitful conversation about the revolution we are facing yet. We need to stop asking ourselves "what it is" and start looking into "what we can do about it", to leverage the change and actively design the next phase of our evolution. Today we have very few leaders, institutions and movements doing it, leaving the vast majority of people alone confronted with this large scale stupefying fast disruption.
This is not a simple think tank for famous minds held

Gianpaolo Barozzi
Sr. Director HR
Cisco

in a nice location and fueled by good food and optimistic mood.

<mark>We need to review the "social contract" that is at the foundation of our Western society as we know it. Corporations, citizens, governments, organizations need to meet to redesign how "work" is defined, distributed, compensated. How education is structured and provided to get ready for this new world.</mark>

HR has a unique opportunity to be driving these conversations. No other function within the corporate environment is uniquely positioned at the intersection between the business models and the people making them happen. No other team is interacting at the same depth with the society, academia and institutions, no other function has the sole objective to provide the environment to manage, motivate, engage people.

All other functions view the digital disruption through their own business-lens, they care about the implications and impact for their own objectives, <mark>HR is the only one having the charter to address change by placing the redefinition of work as such, the relationship between employers, employees, society and the educational sector at the core of its interventions.</mark>

This is a historical and critical call to arms for HR organizations:
- to drive business leaders to put the redefinition of the "social contract" (with their employees and the society as a whole) on top of their agenda;

- to engage employees in the dialogue about their future work experience
- to create a lead in conversations with the administration in defining the wider policy changes needed to shape and support the new contract;
- to partner with educational institutions in recreating education to prepare and develop people for the new reality we are building.

<mark>HR teams need to rethink the structure and operating principles of the enterprise as we know it, need to redefine themselves from the ground up, questioning what the „H" stands for in this new world of human and machine interactions.</mark>

It's time to move beyond the paralyzing Utopia-Dystopia dichotomy: as always the future is ours to design and HR is called to be the engine and leader of this activity. Will we be at the height of the expectation?

[1] McKinsey Global Institute, *Five lessons from history on AI, automation, and employment*, Nov 2017.

[2] Zygmunt Bauman, *Retrotopia*, Cambridge, 2017.

BELIEVE IT

PROGRESS OR DEVELOPMENT?
WHAT CAN WE DO TO GET THE BEST
FROM TECHNOLOGY?

It is difficult, and probably fruitless, to try and set ourselves up as futurologists and attempt to predict what will happen in the relatively near future. It is better, rather, to equip ourselves to construct that future. We don't need to venture into devising more or less fantastic scenarios to observe that technology, of whatever kind, is inherently neither good nor bad. On its own, it is simply an instrument, a tool of the trade, that can produce different results according to how its maker uses it. This is equally true, of course, for automation and artificial intelligence; it is understandable that fears may arise regarding their use, but this is not a good reason for not acquainting ourselves with them and striving to discover how to manage and use them in the best way possible.

I tend towards cautious optimism about the future of these technologies. Looking back to the past to help envisage what might happen in the future may not give us any guarantees, but it does give us a lead. Drawing on history, we see that many – if not all – new technologies gave rise to concern, but when put to the test they undeniably led to development, and at times facilitated progress, revealing such concern to be unwarranted. In other words, these Luddite fears ultimately proved baseless. I am confident that, by and large, things will continue in this way. Of course, some professions will swiftly become obsolete, but that doesn't seem such a huge problem to my mind. I doubt that all those who, like myself, work in the energy sector mourn the passing of the romantic but outdated lamplighter profession.

Today, as in other times of rapid advance, we find ourselves at a point where, rather than asking ourselves what the actual meaning of technology is, we would be better discussing – as Pier Paolo Pasolini so perceptively did – the difference between development and progress. In order for technology to bring progress, the central role not just of mankind, but of the entire social and ecological context to which humans belong, must be reaffirmed.

I don't know whether, in the future, it might be possible to create synthetic or cybernetic organisms – as we may choose to call them. I am certain, however, of the fact that the equilibrium between our species and other species and with the ecosystem in general, and the interaction between humans ourselves, are things that we cannot replace with purely artificial or synthetic relationships. We are a relational species. Once technology is able to help us not only live in equilibrium with the environment, but also fully express that relational quality, then it will have reached its full potential.

Some contemporary thinkers warn us of the risks of new technologies. In a Wired interview, reported in the Cambridge News, physicist Stephen Hawking expresses outright his fear that artificial intelligence may eventually self-replicate and replace the human race. It is an interesting theory. But even much less extreme situations suffice to let us recognize the risk of what we might call uncontrolled technology. To give a simple, but nonetheless actual example, consider the case of accidents involving cars with driver-assistance systems that are due to the human's complete reliance on this type of driving, without taking into account that these (scarcely) intelligent systems are not yet capable of substituting human vigilance.

This, for me, is the umpteenth striking example of how

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Head of Open Innovation
Culture and Project
Enel

a technology that is potentially useful in its own right, may lead to catastrophic outcomes if used incorrectly. This observation remains valid irrespective of the technology's level of development. There will always be a threshold beyond which the role of mankind is irreplaceable.

Such dysfunctions aside, it nonetheless seems to me that, on a day-to-day basis, we are slowly learning to live in interaction with machines in a fairly naturally manner. Thanks to innovation, we can do many of the things we have always done – make travel reservations, buy and read a book, draft texts such as this one, order a pizza, find an address, write to a friend – but in a different way. In the future, technology will also enable us to do new things that we cannot even imagine today, just as – at one time – no-one could imagine doing without lamplighters.

In the industrial world, technology also makes solutions accessible that in the past were only possible in theory. A fairly simple example is that of 3D printing. Today, this technique makes it possible to construct objects with shapes that were previously impossible to achieve in practice, or too expensive to put into effect. In this way, solutions that were once consigned to designers' imaginations can now, for example, improve the performance, reliability and useful life of facilities or machinery, thus ensuring a positive impact in both economic and environmental terms.

The technology of 3D printing, however, only became useful once a suitable practical application had been defined. New technologies often emerge initially as little more than an amusing pastime. Useful applications must then be conceived and created. This is an exciting intellectual challenge, which starts with examining the new technology in depth, first imagining and then working out what might be possible, and finally proceeding to actual experimentation and application.

For this reason, in ENEL we have, amongst other things, implemented cross-cutting communities that intersect with the various lines of business and that are aimed at better understanding the role of new technologies in our profession – a role that should be considered from more than purely technical and economical points of view. Once again, it is essential to bear in mind that mankind and the equilibrium of the social and environmental context in which we exist must always play a central role – otherwise we are not dealing with progress, but merely with development. This is what my experience in ENEL has taught me. The aim must be to work towards improving living conditions on this planet. The question I must always ask myself is: "Is this truly real progress for humankind and for the planet?" If the answer is "yes", then I carry on; if the answer is "no", it is my duty to seek other paths. We can picture these paths with our imagination; but with technology we can actually advance along them.

BELIEVE IT

AWARENESS ENGINEERING
AND OTHER HEALTH-TECH CHALLENGES

As a health-sector professional, what is your take on robotics and digital technology? What has changed for hospitals in the last 5-10 years?
I see robotics and digital technology as necessary developments for society and, perhaps more so, for the healthcare system and the health world in general, too.

What has changed in the last 5 years is essentially the enabling technologies – those technologies that will bring a robotics and IT revolution in the future, even if their impact is not visible yet.

And these enabling technologies are not exclusively about robotics. There are also, for example, the IoT, 5G, the cloud and edge computing; put together, these components will integrate robotics and IT in a complete ecosystem, or rather workflow, of health processes from a physical and digital perspective.

How can increasingly autonomous and automated new technologies change the approach to the patient?
This is a fascinating question. I firmly believe that the approach to the patient must not change. All the technologies must become part of the process to facilitate and enhance the relationships among doctors, nurses, pharmacists and patients, to provide more tools for all caregivers in general to work effectively and efficiently with service users. This relationship must be strongly empathetic with a holistic vision of the person, based on more than just the technological tools that enable interactions with them.

How are these technological developments changing how hospitals work? How, in your view, are collaborative models in the health sector being revolutionised?
Collaboration is one of the biggest benefits that technology can bring to the workplace. Individual professionals no longer have to contend with a fragmented patchwork of pooled information: they can share all the data and cooperate in all the processes affecting the patient with a continuity that only IT traceability can provide.

Healthcare processes, don't forget, are inevitably based on contributions from numerous specialists working on different shifts and from many competencies and specialties dealing directly with the patient. A technology platform that enables this integrated effort with great precision is the best way to ensure an efficient, effective intervention that can even be carried out jointly from various locations, regardless of where the patient happens to be at the time.

Your work needs a great deal of sensitivity, I'd say, as trust is crucial in your arena. How can introducing a technology layer between patients and healthcare workers affect this balance?
Trust is absolutely key. There are two kinds: the healthcare professional's trust in the technology and the patient's trust in the symbiosis between the technology and the professional. With that in mind, we have developed a discipline called awareness engineering. This helps us to oversee all the interventions

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and all the decisions, deliberately agreed with the patient, that must be transparently the province of the doctors, nurses and healthcare workers.

Doctors and nurses are the hub of the healthcare system. Awareness engineering gives them a clearer sense of the amount of information and knowledge needed (and which they would otherwise be unable to handle) and helps them to interact more effectively with the patient (who knows that oversight of the medical knowledge is in the hands of a human assisted by technology).

Equally, it is vital for both that the data is managed robustly enough in the digital and robotic infrastructure to inspire trust in the system and that the technology serves the doctor-patient relationship without getting in the way and creating a barrier between the two.

Can you describe some of your projects that have made particular use of AI / automation technology, etc? Which aspects of the health sector (e.g. the doctor-patient relationship) have the technologies influenced and changed?

I work on research projects that look out for future activities to build prototypes for, to help understand what role these technologies might actually have. I can outline a few projects that have had and will increasingly continue to have an impact in several areas of the hospital. First, the "intelligent trolley" is useful for carrying out various tasks with the patient safely, ensuring that medicines, diagnostic tests and vital signs are managed correctly. Second, and on a completely different note, we have brought robots into the operating theatre, which have already changed the skillsets that doctors need to perform surgical procedures.

And the third project is about "social robotics": we use little anthropomorphic robots in paediatrics to teach the children to comply more effectively with their treatment plans. For example, kids with type-1 diabetes need to understand their condition and what they need to do in terms of eating, taking medication and using medical devices to measure their glucose levels; the aim is to educate and motivate.

These three types of research project lay the foundations for developing many others that will improve empathy, logistics, and information for patients, all on several fronts: in hospital departments, in operating theatres and in dealings with service users.

[1.] TEDx Talk about Awareness engineering:
https://goo.gl/fPxEyk

Link Center for Advanced Technology in Health and Wellbeing:
https://goo.gl/v86NFN

WECONOMY INSIGHT

ATTITUDES FOR THE FUTURE
THE COURAGE OF FEELING LIKE
EVOLVING PROTOTYPES

I am lucky enough to have regular contact with people who ask themselves awkward questions and take time to reflect on them; sometimes they find answers, sometimes not. Occasionally, someone I meet at a workshop or in a class asks me a few questions; others occur to me while driving with my family (whereupon I promptly take a wrong turning). The trickiest ones are: what jobs will we all be doing in the future? What new skills will they require? How can we prepare?

A few ideas have come to me "in the field"; others, by reading and listening to those who have already thought it through. Yesterday in the car, while taking the wrong exit from the ring road, I surprised myself by suggesting to my daughter, a recent graduate in animal welfare, that she learn the old and increasingly rare craft of blacksmithing. It's tough, difficult work. It's also dying out, but it will always need the professional skill and empathy of a human (help, the robots are coming!), even as it evolves through the use of technology and new materials. She had already thought of that.

Actually, we were both swimming against the tide, because according to the latest World Economic Forum in Davos, 65% of today's primary-school children will grow up to do jobs that don't yet exist. We can only try to imagine these jobs, for reality will always end up surpassing what little our minds can conjure. But the most interesting observation, for me, is that during their lifetime, these children will have at least two or three different occupations. So, is versatility one of the key skills to inculcate in a global market where everything will keep changing? I suspect so. Our know-how will count, for sure – the "new jobs", from memory-augmentation surgeons to "new science" ethicists, to cite Fast Future's recent study. But what will count for even more will be the ability to learn new things independently, the courage to see yourself as a prototype and a work in progress, the ability to generate utility in your arena in different ways and different roles. Generation Z in business, then, will bring new vertical skills, in a stimulating and inevitable dialogue with previous generations. Their challenge, besides continuing to be employable (that goes for everyone), will be to apply horizontal skills in new ways, and certainly with different approaches and languages from today's, in different cultural and generational situations.

But how can companies train people to be versatile? How do you feed their desire to be entrepreneurs of themselves in a process of self-maintenance?
I know; I would say this, wouldn't I: but training is vital.

David Tuffley, a lecturer in applied ethics and socio-technical studies at Griffith University, offered some advice in the Washington Post: "We need to change

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the way we approach problems and solve them, by focusing on teamwork, on the ability to think outside the box. The ability to bring attention to a laser-like focus and drill down to the essence of a subject, to achieve real results, will be crucial". Add to that a critical spirit, agility, listening, creative dissonance that feeds on diversity and constructive consonance to create a new amalgam that encourages a more fertile decision-making process. That's all very well, but in my view, it's not enough unless the company vision and values are articulated first via clear, impassioned storytelling in the language of the existing culture to make it all click and to plant the seeds of the future culture. A clear direction, then, but above all an organisation that is ready to encourage the necessary commitment, that is consistent, free of contradictions, and has the time and space to learn, to teach itself and to experiment. An environment where those who strive to learn to do things differently, to do new things, can find an equally fluid and fertile milieu – to ensure that they do not beat a swift retreat, stung, disappointed and digging their heels in all the harder, ready to take refuge in their rear-view mirror.

These ideas are ill-formed, I know. I take comfort in the thought that I am reflecting on a reality that maybe hasn't arrived yet, but when it does, it will amaze us. As always.

WECONOMY INSIGHT

THE COGNITIVE COMPANY
NEW HUMANS?

Distilling developments down into definitions to frame the times we live in would be an anachronistic and even harmful thing to do. Actually, though, the definition of the "cognitive era", that of artificial intelligence, robotics or machine learning, offers a springboard for a series of insights into how people are living in this new epoch. In Bauman's terms, the cognitive era is one of the manifestations of our postmodern milieu's "compulsion to liquefy, melt, morph and extract". This tendency can be observed in all the contexts in which humans shape the world: in business, education and art, in scientific research, in our interactions with others and with the environment, in our freedom as individuals and consumers. But if this liquefying effect also impacts on our cognitive structures, then the consequences become disruptive and the transformation even more profound. This is a step change: after the information society and then the knowledge society, we are now moving into the new cognitive society.

The question is: are we equipped for it? Michael Porter thinks not. He explained why in his speech at the WOBI in Milan (November 2017), citing cases that illustrate how technology has advanced beyond our ability to understand it. The world has changed, and we are still the same old human beings. Digitalisation has extended our cognitive capacity, but without fundamentally altering it. If we think about how we learn, we can safely say that, on one hand, there is a being who knows (the human), who acquires new cognition

of something (or "finds the right track" – the etymology of "to learn") via mental action; on the other, a collection of entities waits to be transformed into new cognitions. Now, though, there are also entities that can acquire new notions and are programmed to do so (machine learning). Our cognitive structures seem ill-suited to grasp this development.

The risk for humans – as professionals, students, consumers or just ordinary citizens – is overwhelm, confusion, defensiveness and exclusion. We are facing an urgent new challenge that also impacts on how, as a society, from schools to businesses, we educate, train and support people. The artificial and natural worlds are coming together in the nano-dimension, leading to a physical–digital connection between humans and robots, and allowing us to imagine new scenarios (such as the recent bionic-hand transplant at the Gemelli hospital in Rome, enabling the patient not just to manipulate but also to sense what they touch). And people today are already chatting with Plum on Facebook messenger to save money or answering job adverts with "cognitive video interviews" via the Talview platform. Doctors and patients are communicating using IBM's Watson system to diagnose diseases and establish prognoses, and e-consumers are using Autodesk apps to solve customer-service problems. Interacting with these systems radically changes the way we form judgements about what is true or false, right or wrong, beautiful or ugly, trustworthy or otherwise. Thus logic, ethics and aesthetics change, too, enabling us to expe-

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rience and interact with the world in all the possible arenas. But liquefying our cognitive structures does not (yet, at least!) let us synthesise, solidify or implant a new form of knowing. Porter is right: we are still the same, and human beings are not going to change any time soon. But liquefied logic, ethics and aesthetics may produce a useful new approach for us humans who live (and will live) in the cognitive era.

Postmodernity brings us face to face with a new world (the cognitive world) where judgements of what is right, true and beautiful are made with a single, instantaneous, essential act. If we think of ourselves as consumers, the change is in the interface for interacting with the digital twins of the products we buy. Let's imagine, for example, that we're playing tennis with a racket that can record the impact points, their effects, the spins imparted to the ball, and the direction of our shots. Through a user-friendly interface, we interact with a system that aggregates the data collected, analyses our playing style, and suggests how we can improve our shot-making, train better, move differently, and adapt our approach. This "digital twin" of the racket in our hand lets us embark on a journey of improvement and monitor our progress against it. The cognitive era promises to give our efforts a boost (whether in sport or at work, the principle is the same). But we need to embrace this era, to choose to play according to its rules, to decide to generate the data needed to make it work, to share that data and make it public, and to be ready to change (if necessary) how we recognise truth,

bestow trust, or thrill to beauty. We all need, from our schooldays through to adult education, to develop the skills that transcend and liquefy the disciplines of our knowledge to embrace life, in all its manifestations. The World Health Organization calls them life skills; the World Economic Forum, a new literacy. They are not "new" skills but a different way of using old ones, where we learn to deploy them simultaneously and to move from one to another with ease: critical thinking, curiosity and initiative; collaboration, communication and gaining efficiency; experimentation, creativity and problem solving. We humans can reinvent ourselves and become better in the cognitive era only if we grow together at the same time – in our ability to understand, in our desire to forge positive relationships, and in our will to find new, more effective ways of working in and on our world.

FUTURE STORIES

ROBOTISED CONTENT
ARTIFICIAL STUPIDITY

Artificial stupidity.
Dunces reading content generated by the ultimate dunce… Ever since they began doing the rounds in companies that flaunt their AI (artificial-intelligence) credentials, machines have managed to lead even the shrewdest managers up the garden path more than a few times. AI is in vogue. Automated content is right there in the mainstream, backed by unprecedented storytelling and puffed up by journalists needing some cheap sensationalism. (As the great Karl Kraus wrote, "A journalist is someone with no ideas but with an ability to express them"). No one suspects that it's pure marketing, and no one takes the trouble to go into it properly. And yet they should. Science has not yet come close to understanding or explaining human intelligence, let alone simulating it. Nearly everyone goes gaga for the "complex" individual intelligences that work for specific tasks, but we should re-examine the great psychologist and cognitivist Howard Gardner's multiple human intelligences to grasp what we're made of. As I've been saying for years to anyone who'll listen, stupid humans will take orders from equally stupid machines passed off as intelligent, with all the risks that entails. Meanwhile, though, something significant is happening in automation.

Automated content.
"Can algorithms write your content?" asks Future-content, a consulting company. Sure they can, but

how? I tried Articoolo – the robot journalist (OK, a piece of software) by an Israeli start-up that helps with online-content generation – on a very simple topic: Roger Federer's 2017. The 80-word piece came back in 5 seconds flat.
I didn't expect anything Pulitzer-prizeworthy, but I didn't expect a dry, zipless dirge, either; #fail. Anyway, that's where the wind is blowing: automated content is quick, cheap and (on a superficial level) does the job. Automated Insights, to give you an idea, produces over 1,000 articles a month for clients like Microsoft and Yahoo.

Automated business.
If consumers are outsourcing, or rather delegating, their decision-making and actions to machines, are we now witnessing the advent of automated business – of a shift from e-commerce to a-commerce? Automated warehouses, predictive deliveries, apps to facilitate finding, choosing, buying and selling products or handling the financial side, digital and voice assistants helping us with our shopping experiences, with personalised product design and much more besides: the implications are, and will continue to be, considerable. It's all about automated convenience.

Automated monopoly.
Monopolisation through automation. Every piece

Thomas Bialas
Futurologist

of content that we consume also consumes our data. Every click, every "like" reveals something about us. When you read something on a Kindle, Kindle is also "reading" you. The same goes for Netflix. Not to mention WeChat, which knows its users much better than PayPal, Uber or Facebook itself, with all the content and services provided there.

All told, the mega platforms with their algorithms and analytics know us increasingly well, and the inevitable consequence is monopolisation. Facebook, Google and Alibaba are investing billions in the media sector (streaming, video, music and payments, too) in an attempt to control the targeted supply of commercial and business content. What's more, if you ask Alexa by Amazon Echo to find you a flight, it doesn't matter whether you know which app or source Alexa is using. Content and app suppliers, therefore, are losing their power (if Amazon changes supplier from one day to the next, users probably wouldn't even notice). Reliable sources? Simply irrelevant when there's a dominant voice interface.

Automated selection.
There are already 130 Silicon Valley start-ups classed as people-analytics specialists, according to CB Insights. They cover a whole spectrum, but they are all about abandoning (what they consider) obsolete discretionary selection criteria and "doctored" CVs with misleading skills and experience in favour of aptitude

parameters that measure true ability. It doesn't matter then whether you're a Cambridge graduate or simply a home help. The die is cast, and the data doesn't lie, although maybe the algorithm can't see further than the end of its own analytical nose, for many companies also owe their success to their team's "elective affinities" or discretionary alchemy.

I could go on forever, but I've run out of space. Bye.

FINAL LAP

HUMAN-DRIVEN TECHNOLOGY
AND THE IMPACTS OF YOUR CHOICES

Nicola Favini
DG,
Manager of Communities
Logotel

Thinking takes time; quality time, or in other words a space for reflection in which to intensify our observation of facts and elements, which must then be connected in order to formulate learning and new behaviours. When we don't have time, we go by intuition. Intuition is brilliant, but also messy because it is more fallible. But we are in the age of "errare humanum est" – to err is human! We extol the poetics of error as a springboard for knowledge and progress. How is it possible to innovate without making mistakes? Learning how to think takes its own time. Learning is also based on direct experience, or in other words on being able to count on the fact that if I take a decision today, I will see its consequences tomorrow, and by comparing input and output (apart from context analysis and its variations) I can figure out how to improve my decisions. Peter Senge wrote that many people make decisions but then do not reap their results. He was fed up with managers who change jobs from time to time, without ever being able to complete the learning curves that would demonstrate the link between their decisions and the consequences of those decisions. Consequences, said Senge, are not solely direct. Often, causes emerge in an indirect and systematic way. In order to understand the consequences of our own decisions, it is necessary to extend both the dimensional spectrum and the temporal spectrum of the impacts. This requires time. But if I don't see the results, I don't learn.

This introduction is only useful if I now add a "so what" linked to the topic of this blog issue: the role of humans in the scenario of intelligent machines. We sing the praises of machines that learn to comprehend. Machines that are able to interpret oceans of information and select the best options within a matter of seconds. Unlike machines, humans are able to understand and be conscious of the error they are making. My observations are simple and perhaps naïve. Technological progress is an exponential curve that has now become precipitous and rapid. Our learning, however, is much slower. It is slower because we are immersed in a flux that is changing, and therefore we advance by means of intuition and expectation at best. Undoubtedly we have lost the means to assimilate and evaluate the consequences arising from innovation. Television was a technology that we assimilated in the space of one generation. Fifteen years after the sudden growth of the internet, criticisms are mounting against those who founded it, and today we can see its detrimental misleading effect. In 2001, the concept of "wisdom of the crowd" already existed with reference to the internet, and today a quick look around social media suffices to grasp the positivism of this assertion. They say "it wasn't meant to be like this". Our learning is also slow because we have less and less quality time for interpreting and learning, or at the very least for exercising our faculties of critical thought.

We are like parents who must take on the profession of teacher. Our children grow up too quickly and hasten the problems and applications of technology. Today, an 11-year-old asks questions a 16-year-old would have asked a decade ago. The question often arises unexpectedly during a family dinner. The parent is unprepared and tired. They try to understand the context, but have forgotten how to ask intelligent questions. The generation gap puts them in a falsely superior and asynchronous position. A conflict arises, which, because of fatigue, often leads to compromises and choices that only fill the need for a peaceful life and for following fashion. The teacher gives up and adapts to the flow. They take decisions without being a critical participant. Their powers of thought? They don't use them. Their experience? They have none on the subject – everything is new! And family counsellors? Often they are just other parents who are caught in the same trap, or worse are budding consultants with well-structured ideas formed in the – often superficial – classrooms of social media and contemporary debate. I am competing with a 16-year-old YouTuber!

Is it the same for managers? Beware of imagining the impact of our decisions in this historical moment. A manager is like a teacher who must explore the new problems and not just take on a "me too" stance. We are experiencing many technologies and many decisions for the first time. We are unprepared. For that reason, our role today is even more critical. Human-driven technology may provide the solution.

MAGAZINE CONTINUES HERE
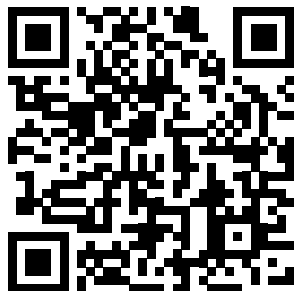
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