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THE FUTURE NEXT 20 OF WORK

James E. Heppelmann
Tammy Hughes
Denis Pennel
Michael E. Porter
Martin Reeves
Enrico Sassoon
Olga Strietska-Ilina
Tiziano Treu
Kevin Whitaker

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Foreword

Gi Group has been celebrating its 20th year of activity in 2018. We would like to celebrate this anniversary in a special way by offering our staff, customers, institutions, and society at large a "gift" that can stimulate new perspectives. In fact, it urges us to look to the future with greater awareness and to face the next 20 years with commitment and energy.

We know very well that the world of work is profoundly changing due to factors such as: *technological innovation; organizational change strategies to optimize the use of resources and minimize environmental impact; transformation of organizations and people management; new professions and search for skills, and modernization of work regulations and rules*. However, it is not always clear how these factors and changes might influence people, organizations, and working relationships in the future. As also underlined by the 2018 World Economic Forum, the profound changes we are witnessing, if managed *wisely*, can in fact open the door to a new era of good work: fair employment and better life quality for everyone. *Skill mismatch* would grow instead, and greater social inequalities would rise, engendering national and international polarizations if the aforementioned changes are mishandled, thus widening the gaps in the specific skills that the world of work needs for developing.

We are aware that **today's actions shape the future**. Thus, it is important that **choices are made in an informed way**, i.e., following considerations built on studies and research coming from various disciplinary fields, providing us with a holistic view of reality.
Therefore, the **Gi Group** Foundation involved **12 international experts** from the academic or institutional world. The experts were asked to share their reflections on the possible evolution and transformation that will affect the world of work over the next 20 years. Their thoughts were systematized through a written contribution. These documents, enriched by the observations of our CEO Stefano Colli-Lanzi, created the book **"Next 20: The Future of Work"**, published by the **Gi Group Foundation** in collaboration with the most widespread and qualified management magazine, the *Harvard Business Review Italia*.

Let us then broaden our ability to look to the future and prepare for the changes that lie ahead by thoroughly reading about these scenarios.

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The development of labor in a changing world

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The development of labor in a changing world

First of all, **Gi Group**'s book bears an attractive and challenging title, *Next 20: The Future of Labor.* Actually, its collected contributions offer a much broader picture. It looks towards the future of the planet, society, politics, science, technology, economy, and business to focus on the great theme of labor from different perspectives. An expansive vision emerges where the dynamics of individuals and labor are observed critically through the lens of philosophy, anthropology, sociology, and ethics without excluding reflections from great religious thought. Reflecting on the future of labor, indeed, means questioning human society by observing the past and moving forward from the present and well into the future. This never dismisses the need to give substance to the emerging framework. In fact, here and now, we shall always act for the better, aiming at the best possible results.

The era we live in is unfolding before our eyes with continuous transformations and increasing speed. The central element, meaning the "root cause" of our time, is for many the exponential evolution of technologies, starting from the digital. It is not by chance that we refer to the changes and impact generated by digitization as a new industrial revolution, which would be the fourth industrial revolution according to some or the third to others. Such a revolution has positive and negative aspects, affects everyone, and leaves no one out. It is continuous, ubiquitous, and develops with increasing speed. The technological evolution always enables new scientific discoveries and generates new solutions by combining different technologies such as computer science and biochemistry, nanotechnology and big data, and new materials and sensors. Its impact on the economy and society is enormous.

However, its effect on businesses and labor, which are so wide-ranging and deep-rooted, have not been yet fully understood.

This book embraces many of these aspects with a wealth of contributions offered to the reader. It focuses on one of today's most debated topics: the present and future of work. The issues at stake in this book are nowadays questioned by many even though the answers have yet to be found. How will the new industrial revolution affect work? What impact will robotics, artificial intelligence, increasingly advanced computer science, the Internet of things, big data and analytics, as well as augmented reality and virtual reality have on people's jobs? How solid is the foundation of the commonly held thought that envisions the risk of massive labor substitution, both manual and ever more intellectual, with smart machines that are able to do more and better with less? Or should we think more optimistically in terms of support instead of substitution, of creating greater job opportunities as in previous industrial revolutions, of reinforcing and strengthening human capacities? Additionally, how will we face inevitable issues such as the increasingly accelerated obsolescence of skills? How will one respond to the growing demand for new professional skills, many of which will be needed in the coming years despite being unimaginable today? What emphasis should be given to training and retraining, beginning with a basic education, which must be rethought in terms of what we are witnessing? To these and other questions, this volume, which should be seen as a collective effort to read reality in the making, still offers some answers.

The essay by Luciano Floridi reminds us that as early as 1930, Keynes began to examine the future of work with surprising insights. The British economist arrived at the point of predicting that because of science and technology and the accumulation of adequately remunerated capital, the fundamental problem of survival would have been resolved in an unspecified but nevertheless defined time, thus neutralizing Genesis' condemnation to a life of hard work. Man, in his foolishness, could have slowed down the process at times but without blocking it. Moreover, with incredible foresight, he had already posed the question about the consequences of solving the economic problem: technological unemployment would follow. This has nothing to do with what is debated in today's contemporary terms

regarding the impact of artificial intelligence and robotics on work. Such things could only be imagined by science fiction, and indeed an excellent one. Alan Turing was at the beginning of his path, and the concept of computer had not even emerged. One had to face the outcomes from two points of view: less workers were required to produce enough goods and services, plus the occupation of people's free time after they were gradually put in a condition of working less or not at all.

Although welcome, the economic advancement that frees man from the biblical necessity of working has effects that are not always virtuous. The first effect is about the need to grant an income either way. The second involves occupying free time in a worthy way. One could say that these are secondary problems belonging to a future age that will have been liberated from Adam's chains. In reality, technology-driven unemployment can be transformed into free time only if the problem of income is resolved. Otherwise, individuals deprived of the dignity of work and means of subsistence would react with the worst social revolts ever recorded.

Hence, the apparent need to provide everyone with a minimum income that is independent of work. Yet this too entails a precondition. In fact, such an action requires a vigorous contrast to inequalities in order to provide enough wealth for redistribution and the appropriate forms of taxation that it allows.

Floridi underlines that, today, more than ever, addressing these potential problems is not just an intellectual exercise. A materially satisfied society that is nevertheless strongly displeased and frustrated by laziness and inactivity is the issue at stake here, with real risks of the genesis of an illiberal or even authoritarian democracy. There is not an automatic connection between economic growth and democracy, as shown in the case of China. Further, the prospect of a society liberated from the necessity of work, made content by adequate income, and capable of putting free time to good use is desirable but not granted. We should therefore carefully consider solutions regardless if their possibility seems distant. In fact, they may not be as out of reach as one might believe.

Beyond the more or less desirable and complex consequences, these technological developments are actually changing our lives and our work. Are they always positive and conscious? Or rather, are we being carried away by a dynamic evolution/involution that we neither understand nor control? Umberto Galimberti puts forth such a question. He thinks that we have actually and definitively entered the age of technics - the inevitable mark of our future - but that it has been done without awareness. In fact, we entered it with an old and inadequate mind, which makes us believe that we dominate technics. In reality, we have become a mere tool to make it work. Technics has become a purpose to be pursued in and of itself as, according to the Hegelian thought offered by Marx, money did. The latter was once a means for achieving goals but turned into a goal in itself.

The central role of technics, however, involves serious risks, such as dehumanizing man or making him lose the ability to judge the essence of his decisions. The loss of ethical perspective affects not only individuals but also the whole of society. It leads to depreciating the principles and values of responsibility. It deeply threatens democracy, because technics has become the ground of decision-making instead of a human society that communicates through politics and social ties. Therefore, we should regain control over a conscious development of technics. If this is still possible, we need to dominate it in order to not let it dominate us (and, according to Galimberti, this is not a given).

Daniel Goleman addresses these broad topics with a different take but with the same orientation. In this era of great economic and technological achievements and increasing prosperity for billions of people, conditions are also emerging for extremely damaging developments for humanity and the planet. Science and technology boast of ever more advanced and extraordinary conquests. Yet in exploiting its benefits, man reveals an excessive greed and an extraordinarily short-sighted vision. The case of climate change is, according to Goleman, absolutely paradigmatic. Short-term advantages are traded with resources to the point of pollution and scarcity. Such situations will punish the next generations.

Long-term evaluations easily give way to short-term interests. There, economic and political leadership concurs. While the first is obsessed with short-term profits, the other is only interested in consensus with a view long enough for the next elections. This hurts the planet, the capability of companies to generate sustainable development,

people gripped by productive mechanisms into insignificant or unrewarding work, and, above all, future generations. However, this approach can be reversed. Many companies are currently aiming at more than just the maximization of shareholders' revenue. Such companies care for people, communities, environmental protection, and the best use of resources. It is a new capitalism. This new capitalism requires leaders that are capable of compassion and imagination, as well as organizations capable of learning how to create shared value for all stakeholders. Sooner or later, further and further, every company will need to face these objectives and reconcile short- and long-term choices by putting people first.

Even Martin Reeves and Kevin Whitaker emphasize the need to develop the capacity of mastering organizations by leveraging machines, artificial intelligence, and algorithms while enhancing people's unique - at least so far - features of creative and intuitive thinking, such as imagination and causal inferences. Indeed, no one can even remotely question the power of current machines to already perform certain tasks much better than any person. Nevertheless, human skills allow for deciphering complex situations and taking consequent decisions independent of preset inputs, and this stands as the dominant feature of the man-machine relationship.

The *human + machine* equation therefore grows increasingly fruitful. It recognizes the substantial difference between roles in the context of rising ambiguity and turbulence of the external context. This is where political and social instability, value transformations, generational succession, and technological advancement come together to form an increasingly unmanageable tableau.

Like Goleman, Reeves and Whitaker emphasize the importance of simultaneously managing both the short- and long-term but with a meaning accentuation. In fact, actual machines allow for quick management of the short-term, giving people a very fast decision-making tool aimed at dealing with market demand changes. These microdecisions, though, need to be constantly framed in a much broader analysis. Leaders must continuously perform such analysis for capturing those movements and transformations, which are invisible on a small scale. These are disruptions that may appear sudden but in fact were accumulated over time can thus be foreseen and avoided.

A special case of human-machine collaboration is presented by Porter and Heppelman. It deals with the so-called new "augmented reality" devices.

The authors note the wide gap between the huge amount of available digital data and the physical world in which they are used. Such a divide between the real and the digital world hinders our ability to take advantage of the volume of information and indications generated by billions of intelligent and interconnected products. Augmented reality technologies, which apply digital data and images to the physical world, promise to fill this gap and set free untapped, exclusively human capabilities. Although still at its dawn, AR is destined to enter our personal and work habits. It will change our way of learning, deciding, and interacting with the physical world, thus changing the approach to customer service by companies, employee training, design and production of goods, value chain management, and, in essence, competition.

AR will therefore be the new interface between human beings and machines, and it will effectively connect the digital and the physical world.

Speed and continuity of innovation imposes complex and comprehensive investment choices. Ever more, companies operate for creating opportunities and synergies by collaborating with external realities, e.g., other companies and institutions such as universities and research centers. Chesbrough and colleagues define these practices as *open science* and *open innovation*. Their effects on organizations and people are increasingly pervasive. In the exchange of scientific information, as in the interaction between different businesses that look for solutions to their entrepreneurial needs, an open and collaborative approach in fact produces virtuous effects. These are able to generate not only external repercussions, new entrepreneurship, and new business but also rapid internal evolution. This is because they stimulate ideas, innovative solutions, and "intra-preneurship" among employees.

Rapid digital transformation allows and imposes an evolution of know-how and skills among workers. This makes it possible to continue working with the company, but it also generates new forms of entrepreneurship within the territory. Knowledge and skills can ideally be represented by a "T-shaped" professionalism, where the deepening of specific know-how joins the widening of a more general and visionary knowledge. This benefits both the individuals and the companies. Open innovation is therefore a virtuous process. Many companies, especially large ones, have already been using it for some quite

time (the study refers to specific examples of some important Italian companies). The advantages in terms of knowledge/skills growth, acceleration, and products/services innovation are demonstrable.

The collaborative factor is also the kernel of Heidi K. Gardner's contribution, who focuses more on the internal rather than the external of the organization. Instability and turbulence recalled above by Reeves and others are matched with the need to rely on professionals with specific, top-level skills to achieve the company's profitability targets in highly competitive markets. Such a two-folded necessity can be satisfied by creating highly collaborative teams, integrated into what the author defines as *smart collaboration*. This means the ability to work in a cohesive way to solve the most complex problems, possibly also in connection with the external (Chesbrough's *open innovation*). The challenge of collaboration is not easy. In fact, when improperly implemented and managed, it can damage the organization. However, collaboration is not even an optional or "nice to have" option. In a context increasingly characterized by technological advancement, the presence of artificial intelligence, and other sophisticated technologies, *smart collaboration* imposes itself as the only reasonable choice for the work of the future.

However, in reflections on the future of work, it is the question of the effective form and dimension of the relationship between man and the most advanced technologies that continues to stand out. As it is said, the so-called artificial intelligence hovers above all else. Whatever the development of the new industrial revolution may be in terms of more or less job destruction/creation, Olga Strietska-Ilina argues that one thing is certain: the advent of digitization provokes and will increasingly cause a major change in the kind of work that will be required and, therefore, in workers' skills. It is presumed that major changes will take place for the lower-skilled professions, but the question also concerns those of higher skill.

Further, the fact that the organizations able to count on the best skills will be much more likely to succeed does not seem to drive, at least today, an effort of redevelopment that one might accordingly expect.

The labor framework is undergoing a very rapid change. One should look at it not only in terms of threats but also opportunities. For instance, new forms of activities such as e-commerce (but also new skills for fighting climate change in the future) have in fact caught traditional activities off guard, whereas on the other hand, they have created entirely new professions with a likely positive net balance. This is at least true in numerical terms, because part of the new jobs are precarious or temporary and belong to the unskilled and underpaid area of labor. The issue, ever more evident, of the need to enable people to continuously evolve their own skills and remain in the labor market *(employability)* or ascend the social ladder is still on the table. This, especially bearing in mind that the rise of the average life and work experience will always lead to job changes and head towards one's ability to continuously train and self-educate throughout one's life span.

Additionally, in this context of generalized and pervasive changes and in preparing organizations to better manage the work of the future, we must also bear in mind the generational framework and specific characteristics of each of the four generations (so many today) concurrently present in companies. These sometimes share traits, but very often are rather different from each other. As Tammy Hughes points out, this is another challenge that needs to be addressed in order to avoid the risk of poorly applying management principles that are suitable for a consolidated group to an emergent one, such as that of the Millennials or of Generation Z. This, however, is also a great opportunity to circulate new and stimulating ideas in the melting pot of generational, gender, ethnic, and cultural diversity.

The set of trends analyzed in the variously cited contributions composes a framework for a strong shift in the working relationships of contemporary society. It calls for adjusting the regulatory legislation as quickly as possible. Such a task is far more complex than it appears. Clearly, technological and economic transformations progress at such a speed as to put legislation and contracting in a position of systematic delay vis-à-vis reality.

Indeed, Denis Pennel highlights the extent to which contextual factors have transformed the labor market, both in terms of work contracts and worker expectations. Permanent subordinate labor is no longer the norm. Rather, different forms and working models coexist today, which impose new needs due, for example, to: the rise of external forms of work; the growth of individual expectations in diverse working conditions; the end of traditional employment in "uniform" activities; the multiplication of discontinuous and variegated work paths, and the end of the static and predictable labor market, as well as the disappearance of its national borders.

Once again, skills become the key element on which people's development, remuneration, and opportunities are built. In a world where market demand changes constantly, the fact that companies can rely on an "extended" work force allows them to cope by choosing from a wider pool of talent for solving the *skill gap* problem more quickly. The way employees are hired and managed has changed under the perspective of *total talent management*. The role of intermediaries is destined to gain momentum as the demand for different forms of work relationships grow. These professionals will need to simplify them by reconciling flexibility and security.

The protection of these workers, as Pennel suggests, requires a modern rethinking of "guilds" that intermediate for labor by creating training, work conditions, and quality standards for various professions. Yet above all, it requires a new social pact in adapting labor regulation, reinventing social and health protection, developing economic work security, and imagining new career paths.

These tasks are increasingly urgent in the specific situation of today's Italy where, as Tiziano Treu reminds us, the regulatory system no longer corresponds to the actual reality. The variegated features of new jobs require a simplified regulation that encompasses an expanded negotiation space at different levels based on minimum standards of protection to be defined by agreement. However, Italy is far behind the need to reduce the legislation's more rigid aspects in favor of introducing forms of numerical and functional flexibility to be accompanied by new shock absorbers and active policies in the name of *flexicurity*.

Therefore, it is necessary to accelerate the regulatory review process by prioritizing the objectives of labor protection in whatever form it happens to take: the enhancement of workers' professionalism through training programs adjusted to the new necessities, and the individual participation of people in their own cultural and professional enrichment.

For this purpose, it will be crucial to enhance the role of employment agencies, as Stefano Colli Lanzi puts in great detail in the final essay of the book. In perspective, employment agencies are a key reality to ensure the best functioning of the market and the start to solve particularly critical points such as the mismatch of skills and talent shortage, generated by the new realities of the world of work. Agencies are in fact in a central position as they are able to map roles and skills, design and implement *flexicurity* solutions, direct candidates to the best combinations of supply and demand (even using AI tools) and contribute significantly to the growing needs for skills retraining.

Such are urgent and complex tasks, especially considering the economic and institutional context in which we live. The framework is characterized by situations of economic hardship that require new and careful welfare measures in compensating for the instabilities and turbulences that are extensively analyzed in the excellent essays that comprise this volume. ■

Enrico Sassoon

Enrico Sassoon graduated in Economics and Commerce (1973), Political Science (1980), and History (2010). He began his professional career at the Pirelli's research office (1974-1977). From 1977 to 2003, Sassoon worked for *Il Sole 24 Ore* in positions of increasing responsibility: Director of *Mondo Economico, L'Impresa*, and other newspapers; Group Scientific Director (1997-1998), and Web Director of *Il Sole 24 Ore* (2000-2001). From 1998 to 2006, he was CEO of the American Chamber of Commerce in Italy. Since 1996, he has been president of Global Trends (Research). He was Founder and Editor of the online journal *International Affairs*. Since 2006, he has been Director and Editor of the *Harvard Business Review Italia* (StrategiQs Edizioni). Sassoon has been President of The Ruling Companies since 2010. He has published over 2,000 articles in *Il Sole 24 Ore, Mondo Economico,* and other publications, as well as over 100 essays in academic journals and 8 books on economic topics.

Luciano Floridi

What human project for mature information societies?

In 1930, John Maynard Keynes published a masterpiece that should be compulsory reading for any educated person, a short essay entitled: *Economic Possibilities for our Grandchildren* (Keynes 1930, 1972)[1]. It was an attempt to see what life would be like if peace, prosperity, and techno-scientific developments were increasingly part of humanity's future. Of course, things went otherwise. The Great Depression begun in the same year, and World War II soon followed. In the subsequent decades other disasters, conflicts, and crises awaited humanity. The essay became a philosophical exercise that could collect dust in the libraries. Yet the fact that history took such terrible and tragic steps back does not in any way detract from Keynes' brilliant insights. And to a generation that never saw enemy tanks in the streets of Paris or Rome, and will celebrate the hundredth anniversary of the end of World War II, the essay has plenty of lessons to teach, especially about what we want to achieve in the future, our *human project*.

According to Keynes, roughly around the time of the Renaissance, techno-scientific development, capital growth, and the mechanism of compound interest determined a sudden change in history, after which the rate of improvement in standards of living begun to accelerate steadily and progressively.

If left undisturbed - Keynes knew very well that this conditional often was a counterfactual - these three factors are sufficient to solve

> the economic problem, [that is] *the struggle for subsistence*, […] the *primary, most pressing problem of the human race* - not only of the human race, but of the whole of the biological kingdom from the beginnings of life in its most primitive forms [my emphasis].

Keynes thought that the economic problem was not going to be eliminated for at least another hundred yeas, but also that progress towards its solution was incremental, resilient, and relentless. So he argued that the economic problem, despite its magnitude and significance, is not humanity's "permanent problem". He was right, at least in principle. Nature and human stupidity may of course make a wreckage of any attempt to solve the economic problem but - barring any major disaster either accidental or self-inflicted - safe and sustainable techno-science, sound economy, and decent politics will defy one day *Genesis* 3:17-19:

> Cursed is the ground because of you;
> through painful toil you will eat food from it
> all the days of your life.
> It will produce thorns and thistles for you,
> and you will eat the plants of the field.
> By the sweat of your brow
> you will eat your food.

Neutralizing the Genesis' curse is a good plan. In fact, it was always the plan. For *Genesis* 3:17-19 is nothing else than the first step in a de-bugging strategy that explicitly identifies the problem that needs to be fixed in Nature. Solving the economic problem has been part of the human project since day one. It was the plan when we invented the wheel and the plough.

It was still the plan even when we plundered, pillaged, killed, raped, and enslaved each other. For millennia we just did not have the necessary resources and often squandered whatever few of them we had painfully accumulated. We had to wait for the right breakthroughs in science, technology and capital and for the investment of billions of person-hours. These assets started paying off at the beginning of the modern era, leading to Keynes' reflections in the 30s.

By then, as Keynes wrote, there was

> no harm in making mild preparations for our destiny.

Solving the economic problem, however, is coupled to a second problem, which Keynes

1 All references are from the 1931 online version of (Keynes 1930) provided by Project Gutenberg, so pages are left unspecified. I am sure Keynes would have found such free access to information coherent with the philosophy of the essay.

with remarkable acumen, called "technological unemployment". This too has always been part of the human project:

> We are being afflicted with a new disease of which some readers may not yet have heard the name, but of which they will hear a great deal in the years to come - namely, *technological unemployment*. This means unemployment due to our discovery of means of economising the use of labour outrunning the pace at which we can find new uses for labour. But this is only a temporary phase of maladjustment. All this means in the long run *that mankind is solving its economic problem* [emphasis in the original text].

Recall that Keynes wrote this in 1930. Turing is only eighteen years old and has just failed to win a scholarship to Trinity College Cambridge (fortunately he will win one the following year to King's College, Keynes' college, as it happens). There is not even the idea of a computer, let alone any fear that computers may steal jobs. Robots are science fiction. Yet Keynes was prescient. **Figure 1** and **Figure 2** illustrate what the "discovery of means of economising the use of labour" has represented for the nature of employment since 1991. Agriculture is employing fewer and fewer people, and if jobs in industry are still growing globally, they are decreasing or stable in Developed Economies and the EU.

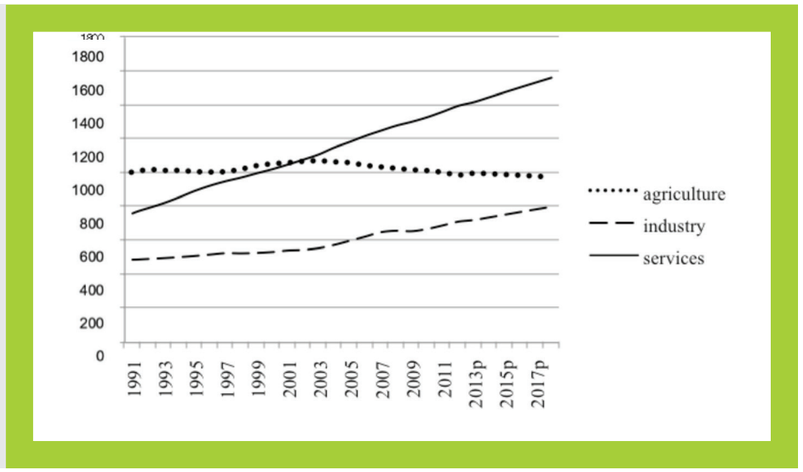

Figure 1. Total employment by sector globally (millions). P = projection.
Source: International Labour Organisation - Trends Econometric Models, October 2013.

The picture is even starker in the US (The Economist 18 January 2014), where the shares of employment in agriculture and manufacturing have declined sharply since the 1950s, to less than 2% and less than 10% respectively, with close to 90% of jobs to be found in services and government.

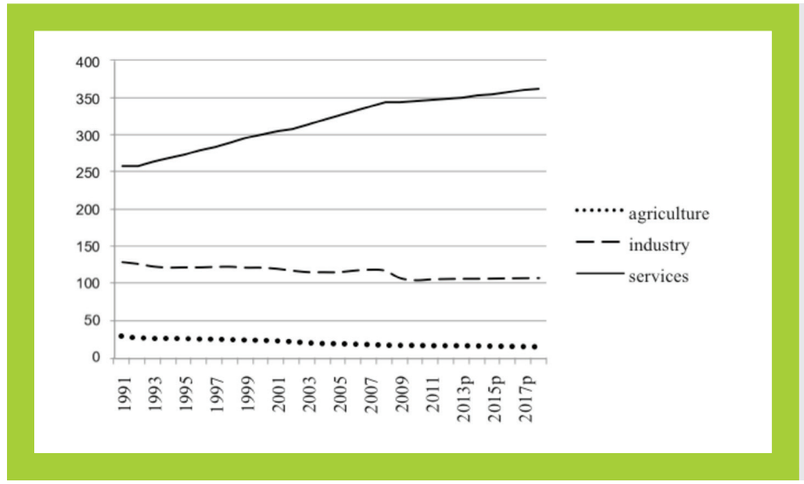

Figure 2. Total employment by sector in Developed Economies and EU (millions).
Source: International Labour Organisation - Trends Econometric Models, October 2013.

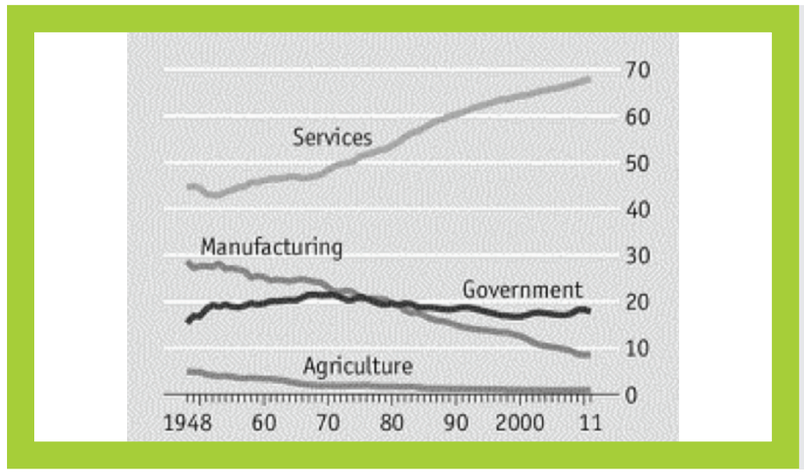

Figure 3 . US employment by sector, % of total employment.
Source: US Bureau of Labour Statistics, picture © *The Economist* (18 January 2014).

As Keynes expected, almost everybody is handling software, very few hardware, and almost nobody bioware. The amount of free time has been growing steadily. We live longer and are less poor.

Massive and fast shifts in the workforce from one sector to another in a matter of a few decades make "technological unemployment" a macroscopic issue but, following Keynes, we should not mistake this issue for the fundamental problem that needs to be addressed. For it is rather the welcome, if painful, evidence that the economic problem is being solved. It is a cost worth paying, although not without caution.

For there is a third problem envisaged by Keynes as the really permanent one and as a direct consequence of technological unemployment. It is a most significant component of the human project. Let me call it the problem of "leisure occupation":

> Thus we have been expressly evolved by nature - with all our impulses and deepest instincts - for the purpose of solving the economic problem. If the economic problem is solved, mankind will be deprived of its traditional purpose. […] Thus for the first time since his creation man will be faced with *his real, his permanent problem - how to use his freedom from pressing economic cares, how to occupy the leisure*, which science and compound interest will have won for him, to live wisely and agreeably and well [my emphasis].

Technological unemployment is what we have been planning all along, by relying on animals, other humans, science, technology, capital and compound interest. We have been trying to make ourselves redundant since time unmemorable so that we may be leisurely occupied. We have toiled hard in order not to toil anymore. But now that this historical opportunity is enjoyed by, or at least within reach for, a growing number of people during increasingly larger portions of their lives, we have been caught unprepared. Those of us who enjoy some free time are often awful investors of it. We waste it or kill it, seemingly oblivious of the titanic efforts and sacrifices made by past generations in order to place us in such fortunate circumstances. The old Adam does not know how to cope with his regained corner of paradise:

> It is a fearful problem for the ordinary person, with no special talents, to occupy himself, especially if he no longer has roots in the soil or in custom or in the beloved conventions of a traditional society.
> To judge from the behaviour and the achievements of the wealthy classes to-day in any quarter of the world, the outlook is very depressing! For these are, so to speak, our advance guard- those who are spying out the promised land for the rest of us and pitching their camp there. For they have most of them failed disastrously, so it seems to me - those who have an independent income but no associations or duties or ties - to solve the problem [of leisure occupation, my addition] which has been set them. I feel sure that with a little more experience we shall use the new-found bounty of nature quite differently from the way in which the rich use it to-day, and will map out for ourselves a plan of life quite otherwise than theirs. For many ages to come the old Adam will be so strong in us that everybody will need to do some work if he is to be contented. We shall do more things for ourselves than is usual with the rich to-day, only too glad to have small duties and tasks and routines. But beyond this, we shall endeavour to spread the bread thin on the butter - to make what work there is still to be done to be as widely shared as possible. Three-hour shifts or a fifteen-hour week may put off the problem for a great while. For three hours a day is quite enough to satisfy the old Adam in most of us!

In the leisure society, the risk is that there will be countless people bored and demotivated, undecided about what to do with their free time, their days at school, their weekends, their vacations, their bank holidays, their retirement. We may turn into "idle creatures" - as Flavius describes them in Shakespeare's *Julius Caesar* - who "being mechanical, […] ought not walk upon a labouring day"[2]. The mildly optimistic reply is that some of us will learn to live a life of leisure worth living (education is the key here), and those of us who will not will still be left with the opportunity of making the most of their leisure if they wish. Civilisation also means the freedom of being a couch potato. Unfortunately, two more problems will become increasingly pressing. Keynes does not discuss them in his essay, but they are clearly visible in our times.

In the long run, next century or next millennium, technological unemployment will turn into leisure occupation only if we will succeed in decoupling unemployment from lack of income, the consequent social unrest, and the related erosion of personal dignity, insofar as having a paid job is still seen in our present culture as synonymous with having a role in society. Call this the "resource problem". In other contexts, Keynes thought that solving the "resource problem" was possible and worth striving for. I agree unreservedly. A society in which a minimal degree of financial independence and social welfare is guaranteed to all citizens will finally shift the existential problem of purpose from disoccupation (unemployment) to inoccupation. But for this to occur, the problem of inequality will have to be solved[3]. For as long as our society is organised in such a way as to promote and privilege rare "local maxima", that is, few, immense accumulations of wealth, the leisure society will remain a utopia.

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2 Shakespeare, *Julius Caesar*, Act 1, Scene 1, 1-4.

3 For a short and very accessible criticism of inequality in the US the reader may wish to consult (Stiglitz 2011), and article published by the a Nobel prize-winner in economics Joseph Stiglitz in *Vanity Fair*. The article is discussed slightly more technically in (The Economist 11 April 2011), negatively, and in (The Economist 15 April 2011) positively. I agree with the latter.

A cynic may then see the growth in inequality as a way of saving the masses from having to deal with the truly permanent problem of existential purpose. In rhetorical and colourful terms: "make those idle creatures starve and they will not wonder about the meaning of life". It is a silly idea that nobody should entertain, given its inconsistency with social fairness, equality, and cohesion. The solution is a better design of the mechanisms that facilitate the distribution and circulation of wealth. In other words, the possibility of a leisure society is based on a re-design of the taxing system that minimises local maxima, as current debates on inequality and tax reform in the US testify.

There is then the "political problem". As "idle creatures" we may transform a potential "liberal and leisure society" into an actual "illiberal lazy society", in which the Biblical "painful toil" is replaced by shallow entertainment as the ultimate source of existential distraction. It may seem a merely philosophical point, or even a problem worth having. But underestimating the risk of political distraction means being less able to explain (and hence find an answer to) why a society's economic growth may not be followed by any liberal and democratic improvement. "Bread and games" (panem et circenses) has been a successful strategy of political appeasement and diversion whenever power has had the means to afford it. Today, this translates into a specific threshold in the growth of national GDP above which unemployment is not a problem, standard of living increases, hopes for a better life for oneself or at least one's children are kept alive if not fulfilled, social unrest is avoided, so democratic, liberal demands are postponed, and various forms of illiberalism can be ignored or tolerated. We know that in China this figure is around 7% annual growth.

Solving the economic problem through technological unemployment, sustainable growth and fair redistribution of wealth, in order to arrive at a liberal, democratic, leisure society, in which education helps people to use their time (stay in the educational system), make the most of it (high-qualified skills for the increasingly specialised jobs), and enjoy it (abilities to find occupations and appreciate one's leisure): this is the blueprint not for utopia but for the human project we have been pursuing for a long time and that is worth all of our efforts[4].

Authoritarians, fundamentalists, extremists, and radicals of all political and religious kind could not disagree more. This is a serious challenge, but not the challenge with which I would like to close this article, which is represented by an internal criticism that shares the same liberal and democratic roots endorsed by the human project and even some aspects of Keynes' analysis.

On March 13, 2014, speaking in Washington, D.C. at The American Enterprise Institute-a private, conservative and not-for-profit institution for public policy research - Bill Gates identified the same problem analysed in 1930 by Keynes:[5]

> **MR. GATES**: […] Software substitution, you know, whether it's for drivers or waiters or nurses or even, you know, whatever it is you do. […] It's progressing. And that's going to force us to rethink how these tax structures work in order to maximize employment, you know, given that, you know, capitalism in general, over time, will create more inequality and technology, over time, will reduce demand for jobs particularly at the lower end of the skill set. And so, you know, we have to adjust, and these things are coming fast. Twenty years from now, labor demand for lots of skill sets will be substantially lower, and I don't think people have that in their mental model.

Recall that almost 90% of the jobs in the US economy are in the service sector. Smart Information and Communications Technologies could easily create huge waves of unemployment. A killer app would refer to the number of jobs it would eliminate. So Gates is correct, although to anyone who read Keynes' essay, this is very old news. Both agree on identifying technological unemployment as a problem. But Gate's interpretation differs, so does his solution, and neither is convincing.

Gates treats technological unemployment as something that needs to be avoided at all costs. It is a philosophy that sees "painful toil" and not "leisure occupation" as humanity's destiny. Keynes had already replied to this view two generations ago:

> I believe that this is a wildly mistaken interpretation of what is happening to us. We are suffering, not from the rheumatics of old age, but from the growing-pains of over-rapid changes, from the painfulness of readjustment between one economic period and another. The increase of technical efficiency has been taking place faster than we can deal with the problem of labour absorption.

If you have the wrong human project in mind, you end up misinterpreting technological unemployment as a curse, when in fact the curse is rather that of having to eat your food "by the sweat of your brow".

4 The idea is consistent with what has been argued in economics by (Brynjolfsson and McAfee 2014). For a philosophical approach see (Floridi 2014).

5 The transcript can be found in (Gates 2014), the video with the whole interview is available online.

And once technological unemployment becomes *the* problem, then the solution become that of preventing it, or mitigating its consequences at all costs. So, coherently, Gates argues against raising the minimum wage and in favour of a shift from a progressive income tax to a progressive consumption tax:

> **MR. GATES**: […] I do think tax structures will have to move away from taxing payroll because society has a desire to have employment. Of all the inputs, you know, wood, coal plastic, cement, there's one that plays a special purpose, which is labor. And the fact that we've been able to tax labor as opposed to capital or consumption, you know, just shows that demand for labor was good relative to other things. Well, technology in general will make capital more attractive than labor over time. […]
>
> **MR. BROOKS**: So aligning the incentives in our economy to move away from taxing labor, moving to something like a progressive consumption tax is just a smart thing to do to stimulate - to have an economy that's better aligned?
>
> **MR. GATES**: Well, I think economists would have said that a progressive consumption tax is a better construct, you know, at any point in history. What I'm saying is that it's even more important as we go forward because it - the distortion - I want to distort in the favor of labor. And so not only will we not tax labor, things like the earned income tax credit, you know, when people say we should raise the minimum wage, I think, boy, you know, I know some economists disagree. But I think, boy, I worry about what that does to job creation. The idea that through the income tax credit you would end up with a certain minimum wage that you'd receive, that I understand better than potentially damping demand in the part of the labor spectrum that I'm most worried about. […] And the idea that consumption should be progressively taxed, I think that makes a lot of sense.

People have tried to do that by doing particular taxes on luxury goods, some things like that. That's very - not very effective. It's sort of picking favorites type things. But yes, consumption should be progressively taxed. And we should understand the consumption. Inequality of consumption is more an injustice than a number in a book is.

MR. BROOKS: So inequality of consumption is the real inequality we should be worried about. I suppose you'd also say that inequality of opportunity is that which is the greatest affront to dignity. I think I'm sort of paraphrasing.

MR. GATES: Yeah, no, I agree with that.

It makes sense to tax consumption progressively. Indeed, experts agree that, if properly designed, consumption taxes encourage savings and can contribute to economic growth. I would add that they may also shape consumption patterns that are more environmentally-friendly. For all these reasons, indirect consumption taxes, such as sales taxes or value added taxes, are very common in Europe and seem likely to increase. And they should be significantly progressive. But it seems strange to offer taxing consumption as an *alternative* to taxing income when a fine balance between the two is needed to take care not only of economic growth but also of a fairer welfare system and a much better redistribution of wealth. It is possible to reduce income inequality while boosting economic growth[6].

And both are necessary in order to move a step closer to the "leisure society" and the fulfilment of the human project. Keeping minimum wages so low that it may be preferable to hire human workers rather than robots, and taxing people only for what they consume rather than for what they earn and own, would damage technological innovation and fail to improve the human condition. ■

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6 (OECD Economic Policy 2012), Chapter 5, entitled: *"Reducing income inequality while boosting economic growth: Can it be done?"*. The answer is a qualified yes.

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Umberto Galimberti

Future in the age of nihilism[1]

The future has a characteristic that by now is known to all: we have entered the age of technics. But we have entered it with an old, inadequate line of thinking, assuming that technics is a tool in the hands of man. This was once true, but it no longer is. **Technics has become the subject of history, and man has become the agent of technical apparatuses.**

I aim to support this thesis.

Let us begin by saying that technics is in some way the essence of man, for the simple reason that man has no instinct. Instinct is a rigid response to stirrings (which pushes a cow towards a bale of hay, not towards a piece of meat). Man does not have rigid behaviors that function the same as animal **instincts**. In fact, man has impulses with an undefined goal. Even the incredibly well-known sexual instinct is in reality barely instinctive: when faced with sexual impulses, man can either devote himself to any and every perversion, or devote himself to a non-sexual goal and produce a work of art. Due to instinct, newborn animals already know what they have to do for their entire life. On the other hand, and precisely because we do not have instincts, we need **education** (ours lasts 20 years or even more today) and **institutions** to contain our freedom which, in reality, is an indeterminacy. It is unknowing what to do because of the lack of a rigorous instinctual code.

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1 Summary of *Prof. Umberto Galimberti*'s speech at the 47th National AIDP Congress, IL FUTURO OGGI - Naples, 25th and 26th May 2018 - published in the No. 186 / September 2018 of the magazine Direzione del Personale, quarterly information and culture of the Associazione Italiana per la Direzione del Personale - Italian Association for the Personnel Department -

From this point of view, man is the most unharmonious animal with nature. This had already been noted by great philosophers such as Plato, Thomas Aquinas, Kant, and Nietzsche.

In Protagoras, **Plato** wrote that Zeus told Epimetheus, whose name means *he who sees things with a slight delay*, to give each living being their own quality. Epimetheus distributed instinctual gifts to all the animals. He had nothing more to give when he came to the man, so Zeus repented and commissioned Prometheus, *he who sees things in advance*. Brother of Epimetheus, Prometheus, was to give man *his* virtue, which is precisely that of *seeing beforehand*. Thus, the **future** constitutes the man, as Hobbes noted in the seventeenth century when he said that if animals eat when they are hungry, the man is *famelicus famis futurae*. It means that he is hungry for future hunger, even if he has a full stomach he keeps busy to provide for his future needs because he knows that he will be hungry at a certain point in the future. This is the predictive dimension of man.

So why is technics the subject of history?

In 1807-10, Hegel wrote two very important theorems in a book on logic:

1. The wealth of nations is not given by goods (as Adam Smith had said 40 years earlier) because the goods are consumed. Rather, the wealth of nations is given by tools, because tools produce the goods.

2. When a phenomenon increases quantitatively, we not only have a quantitative increase but also a radical, qualitative variation in its landscape. A two-degree earthquake on the Mercalli scale goes unnoticed, while a nine-degree changes the landscape. If man does not notice this qualitative variation, then he moves through the new landscape with the same inadequate mentality as before. This is because he has not understood that the world has changed.

The first to apply Hegel's reasoning to economy was **Marx**, who warned that if money becomes the universal condition to satisfy any need and produce any good - if it increases quantitatively - then **money** is no longer a tool in the hands of man to achieve certain ends.

It rather becomes the primary goal. Satisfaction of needs and quantity of production will be then determined by such a primary goal. Hence, those that were the goals (satisfaction of needs - production of goods) become the tools to make money.

Likewise, if technics is the universal condition for accomplishing any purpose, it becomes the first purpose in itself, subordinating all the others to itself. Without technics, goals are dreams. **Entering the age of technics means that we must very rapidly review all our categories, starting with political categories, ethical, and so on.**

Political categories

Politics was conceived by Plato, who defined it as *techné basiliché* - the queen of technics: technics knows how things must be done, while politics instead decide "if" and "why" they should be done, thereby overpowering technics.

This is no longer the case today, as politics is no longer where decisions are made, nor does the economy that currently looks to technological resources to make its investments. **The place where decisions occur is the technics.** Naturally, technics does not target the progress or improvement of human conditions: it is a self-referential system that targets self-empowerment and development, regardless of the goals. What Nietzsche said about the will to power entirely applies to it: it wants itself. It does not open scenarios of salvation nor disclose horizons of meaning. It does not tell the truth. Technics works. Since its functioning has become planetary, we must realize that by now the decisions that were once made in politics, then in economy, will definitely be made in technics. Technics which, in turn, *threatens* democracy (indeed it has already come a long way) with **rhetoric**. This is because technics puts issues on the table that far exceed the average competence. Called upon to decide on issues for which we are incompetent (e.g. the opening of nuclear power plants, GMOs), we can only respond according to irrational criteria such as membership in a political party, a faith, trust, or fascination in an authoritative character or one seen frequently on TV. Yet democracy ceases precisely when it is based on irrational reasons and criteria, as Plato taught in his 34 dialogues, 14 of which are precisely against the sophists who obtain consensus through false syllogisms, playing to affections, and rhetorical effects.

Technics is the highest form of rationality ever achieved by history.

It is a rationality that is even stronger than the economy, which still has a touch of human passion for money, from which technics is completely exonerated. Technology considers money only as a tool. It is another element for carrying out experiments. **Technics is absolutely de-anthropologized and its logic is to reach the maximum goals with the least amount of means.** Everything else must be taken off the playing field, ousted. But it happens that man is also love, pain, imagination, and dreams. And so on. Thus in schools, the classroom topics that express a student's subjectivity are replaced by reading comprehension exercises. We go from knowing a boy to judging his performance, because technics is only concerned with performance rather than those who carry it out.

Ethical categories

Morality does not prescribe to technics, as is known.
Let us briefly review the **three moralities** of the Western world:

Christian morality, on which all European juridical order was organized, is a morality of intention. It concerns the interiority of men (establishing, for example, that man is guilty of a crime if he had intentions to commit it, etc.). However, technics is only concerned with the effects of man's actions, not his intentions. Knowing the intentions of Oppenheimer or Fermi serves nothing. Technics is only interested in knowing the effects of the atomic bomb.

The Kant's morality - *man must always be treated as an end, never as a means*. This was never achieved as it is a secular morality for everyone, even non-believers, because it is founded on reason alone. Yet even if this morality were to be implemented in the age of technics, the real question remains: is the protection of air, water, the biosphere... an end or a means at the service of man today? And we do not have an ethic that is also concerned with aspects of nature (polluting is not a reprehensible act like committing an assassination).

The Ethic of responsibility, put forth by Max Weber at the beginning of the 1900s, seeks the individual's response to the consequences of his actions. This is with an important parenthesis: *until the effects are predictable* - we are back to the beginning again... because science and technics do not produce predictable effects! Briefly consider how scientific research works: a researcher can study a genome for years with his/her goal being to find out as much as possible about how it works. If their research then shows something useful to humans, a result has been obtained, perhaps a new cure for cancer. But the researcher's goal was not cancer treatment! And the virtue of Prometheus? Today we are able to do much more than our ability to predict.
Technics proceeds and develops beyond our predictive capability, so we do not control it.

The problem then is no longer what we can do with technics, but what technics can do with us. So if we deny a smartphone to a child in third grade who asks for it, we exclude him/her from an aspect of socialization decided by technics! Today's technics decide our behaviors.

When did the age of technics begin?

Günther Anders, an American philosopher, student of Heidegger, and author of *The Outdatedness of Human Beings (Die Antiquiertheit des Menschen)* (Borighieri) argues that the logic of the age of technics was conceived in Nazism.

Let me explain this logic with an example. *The Hungarian journalist Gitta Sereny asked the director of the Treblinka extermination camp the same question 170 times: "What did you feel when you were doing what you did?". But* ***Franz Stangl*** *never answered. Günther Anders would hold that Franz did not respond because he was not tasked with feeling something. His work consisted of killing as many Jews as possible in order to free the camp before the arrival of a new convoy. Someone else had invented the method. He only performed it perfectly. He did his job well. Franz Stangl is not responsible for the content of his work, but for how it was done.*

In the age of technics, man is not evaluated for the content of his work, but for the way in which it is carried out.

When Günther Anders asked the American pilot who dropped the atomic bomb on Hiroshima: "What did you feel while you were dropping the bomb on the city?", he answered, "Nothing! It was my job". The aviator was good. He hit his mark, and he did the job. Is he responsible for the content of his work? No. What he does, does not depend on him. It is not he who decides. He only has to perform the prescribed actions. If he does not do it correctly, then it does not work. This is also the reason why relationships become dangerous at work: there are no more colleagues or comrades, but competitors who, if they are better than us, take our place. So if in the age of the society of discipline up to the 1960s, depression was based around the theme of guilt, today it is based on the theme of inadequacy: *either I can or cannot live up to the tasks assigned to me,* with the bar rising every year. *I am or am not always connected in order to be constantly updated.* Thus in Italy, 55% of Italians take psychotropic drugs and antidepressants every day.

Depression is based on a sense of inadequacy, and on the anxiety of not rising to the challenge of what is required, thus the risk of being put aside.

Can people live in these conditions?

Where control is not only exercised from above but also from peers. So if it is the *"how"* that counts, when you are at a counter and someone tells you "that is not part of my job", this means that you are facing another version of Franz Stangl who only carries out the tasks assigned to both him and his superiors, and who is never responsible for the consequences of his actions.

I would like to close with an excellent quote from **Heidegger**, who, being a Nazi philosopher, understood these things in advance. *What is disturbing is not that the world has translated into a single, huge technic-economic apparatus, but that we are not at all prepared for this radical transformation of the world. But what is even more disturbing is that we do not yet have an alternative thought beyond the thinking that only knows how to take count.* Our thinking can only calculate. Economic calculations. Technical calculations. And we no longer have an alternative thought, so how can we save ourselves from this situation? Heidegger concluded: *only God can save us.*

But it does not necessarily mean that… God intervenes in these scenarios. ■

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Why every organization needs an augmented reality strategy

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Why every organization needs an augmented reality strategy[1]

There is a fundamental disconnect between the wealth of digital data available to us and the physical world in which we apply it. While reality is three-dimensional, the rich data we now have to inform our decisions and actions remains trapped on two-dimensional pages and screens. This gulf between the real and digital worlds limits our ability to take advantage of the torrent of information and insights produced by billions of smart, connected products (SCPs) worldwide.

Augmented reality, a set of technologies that superimposes digital data and images on the physical world, promises to close this gap and release untapped and uniquely human capabilities. Though still in its infancy, AR is poised to enter the mainstream; according to one estimate, spending on AR technology will hit $60 billion in 2020. AR will affect companies in every industry and many other types of organizations, from universities to social enterprises. In the coming months and years, it will transform how we learn, make decisions, and interact with the physical world. It will also change how enterprises serve customers, train employees, design and create products, and manage their value chains, and, ultimately, how they compete.

In this article we describe what AR is, its evolving technology and applications, and why it is so important. Its significance will grow exponentially as SCPs proliferate, because it amplifies their power to create value and reshape competition.

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1 Article already published on *Harvard Business Review* November-December 2017.

AR will become the new interface between humans and machines, bridging the digital and physical worlds. While challenges in deploying it remain, pioneering organizations, such as Amazon, Facebook, General Electric, Mayo Clinic, and the U.S. Navy, are already implementing AR and seeing a major impact on quality and productivity. Here we provide a road map for how companies should deploy AR and explain the critical choices they will face in integrating it into strategy and operations.

What is augmented reality?

Isolated applications of AR have been around for decades, but only recently have the technologies required to unleash its potential become available. At the core, AR transforms volumes of data and analytics into images or animations that are overlaid on the real world. Today most AR applications are delivered through mobile devices, but increasingly delivery will shift to hands-free wearables such as head-mounted displays or smart glasses. Though many people are familiar with simple AR entertainment applications, such as Snapchat filters and the game Pokémon Go, AR is being applied in far more consequential ways in both consumer and business-to-business settings. For example, AR "heads-up" displays that put navigation, collision warning, and other information directly in drivers' line of sight are now available in dozens of car models. Wearable AR devices for factory workers that superimpose production-assembly or service instructions are being piloted at thousands of companies. AR is supplementing or replacing traditional manuals and training methods at an ever-faster pace.

More broadly, AR enables a new information-delivery paradigm, which we believe will have a profound impact on how data is structured, managed, and delivered on the internet. Though the web transformed how information is collected, transmitted, and accessed, its model for data storage and delivery - pages on flat screens - has major limits: It requires people to mentally translate 2-D information for use in a 3-D world. That isn't always easy, as anyone who has used a manual to fix an office copier knows. By superimposing digital information directly on real objects or environments, AR allows people to process the physical and digital simultaneously, eliminating the need to mentally bridge the two. That improves our ability to rapidly and accurately absorb information, make decisions, and execute required tasks quickly and efficiently.

AR displays in cars are a vivid illustration of this. Until recently, drivers using GPS navigation had to look at a map on a flat screen and then figure out how to apply it in the real world. To take the correct exit from a busy rotary, for example, the driver needed to shift his or her gaze between the road and the screen and mentally connect the image on the map to the proper turnoff.

AR heads-up displays lay navigational images directly over what the driver sees through the windshield. This reduces the mental effort of applying the information, prevents distraction, and minimizes driver error, freeing people to focus on the road. (For more on this, see the sidebar *"Enhancing Human Decision Making."*)

AR is making advances in consumer markets, but its emerging impact on human performance is even greater in industrial settings. Consider how Newport News Shipbuilding, which designs and builds U.S. Navy aircraft carriers, uses AR near the end of its manufacturing process to inspect a ship, marking for removal steel construction structures that are not part of the finished carrier. Historically, engineers had to constantly compare the actual ship with complex 2-D blueprints. But with AR, they can now see the final design superimposed on the ship, which reduces inspection time by 96% - from 36 hours to just 90 minutes. Overall, time savings of 25% or more are typical for manufacturing tasks using AR.

AR's key capabilities

As we've previously explained (see "How Smart, Connected Products Are Transforming Competition," HBR, November 2014), the SCPs spreading through our homes, workplaces, and factories allow users to monitor product operations and conditions in real time, control and customize product operations remotely, and optimize product performance using real-time data. And in some cases, intelligence and connectivity allow SCPs to be fully autonomous.

AR powerfully magnifies the value created by those capabilities. Specifically, it improves how users visualize and therefore access all the new monitoring data, how they receive and follow instructions and guidance on product operations, and even how they interact with and control the products themselves.

Visualize. AR applications provide a sort of X-ray vision, revealing internal features that would be difficult to see otherwise. At the medical device company AccuVein, for instance, AR technology converts the heat signature of a patient's veins into an image that is superimposed on the skin, making the veins easier for clinicians to locate. This dramatically improves the success rate of blood draws and other vascular procedures. AR more than triples the likelihood of a successful needle stick on the first try and reduces the need for "escalations" (calling for assistance, for example) by 45%.

Bosch Rexroth, a global provider of power units and controls used in manufacturing, uses an AR-enhanced visualization to demonstrate the design and capabilities of its smart, connected CytroPac hydraulic power unit. The AR application allows customers to see 3-D representations of the unit's internal pump and cooling options in multiple configurations and how subsystems fit together.

Instruct and guide. AR is already redefining instruction, training, and coaching. These critical functions, which improve workforce productivity, are inherently costly and labor-intensive and often deliver uneven results. Written instructions for assembly tasks, for instance, are frequently hard and time-consuming to follow. Standard instructional videos aren't interactive and can't adapt to individual learning needs. In-person training is expensive and requires students and teachers to meet at a common site, sometimes repeatedly. And if the equipment about which students are being taught isn't available, they may need extra training to transfer what they've learned to a real-world context.

AR addresses those issues by providing real-time, on-site, step-by-step visual guidance on tasks such as product assembly, machine operation, and warehouse picking. Complicated 2-D schematic representations of a procedure in a manual, for example, become interactive 3-D holograms that walk the user through the necessary processes. Little is left to the imagination or interpretation.

At Boeing, AR training has had a dramatic impact on the productivity and quality of complex aircraft manufacturing procedures. In one Boeing study, AR was used to guide trainees through the 50 steps required to assemble an aircraft wing section involving 30 parts. With the help of AR, trainees completed the work in 35% less time than trainees using traditional 2-D drawings and documentation. And the number of trainees with little or no experience who could perform the operation correctly the first time increased by 90%.

AR-enabled devices can also transmit what an on-site user is seeing to a remote expert, who can respond with immediate guidance. In effect, this instantly puts the expert at the user's side, regardless of location. This capability not only improves worker performance but substantially reduces costs - as Lee Company, which sells and services building systems, has discovered. It uses AR to help its field technicians with installations and repairs. A remote expert can see what the tech is viewing through his or her AR device, guide the tech through the work to be done, and even annotate the tech's view with instructions. Getting expert support from a central location in real time has increased Lee's tech utilization dramatically. And, by reducing the number of repeat visits, Lee saves more than $500 per technician per month in labor and travel costs. The company calculates a return of $20 on every dollar invested in AR.

Interact. Traditionally, people have used physical controls such as buttons, knobs, and, more recently, built-in touchscreens to interact with products. With the rise of SCPs, apps on mobile devices have increasingly replaced physical controls and allowed users to operate products remotely. AR takes the user interface to a whole new level.

A virtual control panel can be superimposed directly on the product and operated using an AR headset, hand gestures, and voice commands. Soon, users wearing smart glasses will be able to simply gaze at or point to a product to activate a virtual user interface and operate it. A worker wearing smart glasses, for instance, will be able to walk a line of factory machines, see their performance parameters, and adjust each machine without physically touching it.

The interact capability of AR is still nascent in commercial products but is revolutionary. Reality Editor, an AR app developed by the Fluid Interfaces group at MIT's Media Lab, provides a glimpse of how it is rapidly evolving. Reality Editor makes it easy to add an interactive AR experience to any SCP. With it, people can point a smartphone or a tablet at an SCP (or, eventually, look at it through smart glasses), "see" its digital interfaces and the capabilities that can be programmed, and link those capabilities to hand gestures or voice commands or even to another smart product. For example, Reality Editor can allow a user to see a smart light bulb's controls for color and intensity and set up voice commands like "bright" and "mood" to activate them. Or different settings of the bulb can be linked to buttons on a smart light switch the user can place anywhere that's convenient.

The technologies underpinning these capabilities are still emerging, but the accuracy of voice commands in noisy environments is improving, and advances in gesture and gaze tracking have been rapid. GE has already tested the use of voice commands in AR experiences that enable factory workers to perform complex wiring processes in wind turbines - and has achieved a 34% increase in productivity.

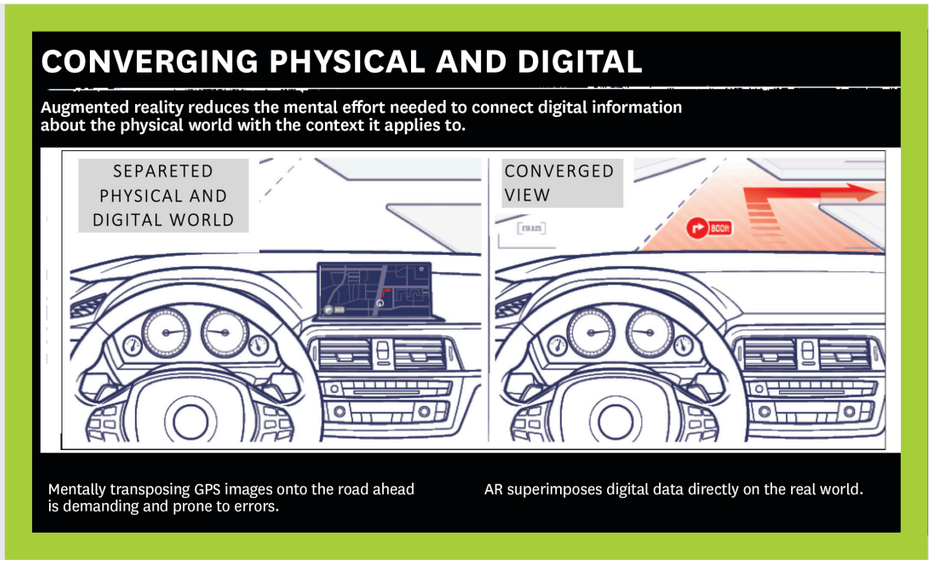


Figure 1. GPS solution "today" and "tomorrow" throughout the augmented reality.
Source: HRB italy November 2017 p. 16.

Combining AR and virtual reality

AR's well-known cousin, virtual reality, is a complementary but distinct technology. While AR superimposes digital information on the physical world, VR replaces physical reality with a computer-generated environment. Though VR is used mostly for entertainment applications, it can also replicate physical settings for training purposes. It is especially useful when the settings involved are hazardous or remote. Or, if the machinery required for training is not available, VR can immerse technicians in a virtual environment using holograms of the equipment. So when needed, VR adds a fourth capability - simulate - to AR's core capabilities of visualize, instruct, and interact.

AR will be far more widely applied in business than VR will. But in some circumstances, combining AR and VR will allow users to transcend distance (by simulating faraway locations), transcend time (by reproducing historical contexts or simulating possible future situations), and transcend scale (by allowing users to engage with environments that are either too small or too big to experience directly). What's more, bringing people together in shared virtual environments can enhance comprehension, teamwork, communication, and decision making.

Ford, for example, is using VR to create a virtual workshop where geographically dispersed engineers can collaborate in real time on holograms of vehicle prototypes. Participants can walk around and go inside these life-size 3-D holograms, working out how to refine design details such as the position of the steering wheel, the angle of the dashboard, and the location of instruments and controls without having to build an expensive physical prototype and get everyone to one location to examine it.

The U.S. Department of Homeland Security is going a step further by combining AR instructions with VR simulations to train personnel in responding to emergency situations such as explosions. This reduces costs and - in cases in which training in real environments would be dangerous - risk. The energy multinational BP overlays AR training procedures on VR simulations that replicate specific drilling conditions, like temperature, pressure, topography, and ocean currents, and that instruct teams on operations and help them practice coordinated emergency responses to disasters without high costs or risk.

How AR creates value

AR creates business value in two broad ways: first, by becoming part of products themselves, and second, by improving performance across the value chain - in product development, manufacturing, marketing, service, and numerous other areas.

AR as a product feature. The capabilities of AR play into the growing design focus on creating better user interfaces and ergonomics.

The way products convey important operational and safety information to users has increasingly become a point of differentiation (consider how mobile apps have supplemented or replaced embedded screens in products like Sonos audio players). AR is poised to rapidly improve such interfaces.

Dedicated AR heads-up displays, which have only recently been incorporated into automobiles, have been a key feature in elite military products, such as fighter jets, for years and have been adopted in commercial aircraft as well. These types of displays are too expensive and bulky to integrate into most products, but wearables such as smart glasses are a breakthrough interface with wide-ranging implications for all manufacturers. With smart glasses, a user can see an AR display on any product enabled to communicate with them.

If you view a kitchen oven through smart glasses, for example, you might see a virtual display that shows the baking temperature, the minutes remaining on the timer, and the recipe you are following. If you approach your car, an AR display might show you that it is locked, that the fuel tank is nearly full, and that the left-rear tire's pressure is low.

Because an AR user interface is purely software based and delivered via the cloud, it can be personalized and can continually evolve. The incremental cost of providing such an interface is low, and manufacturers also stand to save considerable amounts when traditional buttons, switches, and dials are removed. Every product manufacturer needs to carefully consider the disruptive impact that this next-generation interface may have on its offering and competitive positioning.

AR and the value chain. The effects of AR can already be seen across the value chain, but they are more advanced in some areas than in others. In general, visualize and instruct/guide applications are now having the greatest impact on companies' operations, while the interact capability is still emerging and in pilot testing.

Product development. Though engineers have been using computer-aided design (CAD) capabilities to create 3-D models for 30 years, they have been limited to interacting with those models through 2-D windows on their computer screens, which makes it harder for them to fully conceptualize designs. AR allows 3-D models to be superimposed on the physical world as holograms, enhancing engineers' ability to evaluate and improve designs. For example, a life-size 3-D hologram of a construction machine can be positioned on the ground, and engineers can walk around it, peer under and over it, and even go inside it to fully appreciate the sight lines and ergonomics of its design at full scale in its intended setting.

AR also lets engineers superimpose CAD models on physical prototypes to compare how well they match. Volkswagen is using this technique - which makes any difference between the latest design and the prototype visually obvious - to check alignment in digital design reviews. This improves the accuracy of the quality assurance process, in which engineers previously had to painstakingly compare 2-D drawings with prototypes, and makes it five to 10 times faster.

We expect that in the near future AR-enabled devices such as phones and smart glasses, with their embedded cameras, accelerometers, GPS, and other sensors, will increasingly inform product design by exposing when, where, and how users actually interact with the product - how often a certain repair sequence is initiated, for example. In this way the AR interface will become an important source of data.

Manufacturing. In manufacturing, processes are often complex, requiring hundreds or even thousands of steps, and mistakes are costly. As we've learned, AR can deliver just the right information the moment it's needed to factory workers on assembly lines, reducing errors, enhancing efficiency, and improving productivity.

In factories, AR can also capture information from automation and control systems, secondary sensors, and asset management systems and make visible important monitoring and diagnostic data about each machine or process. Seeing information such as efficiency and defect rates in context helps maintenance technicians understand problems and prompts factory workers to do proactive maintenance that may prevent costly downtime.

Iconics, which specializes in automation software for factories and buildings, has begun to integrate AR into its products' user interfaces. By attaching relevant information to the physical location where it will be best observed and understood, the AR interfaces enable more-efficient monitoring of machines and processes.

Logistics. Warehouse operations are estimated to account for about 20% of all logistics costs, while picking items from shelves represents up to 65% of warehouse costs. In most warehouses, workers still perform this task by consulting a paper list of things to collect and then searching for them. This method is slow and error-prone.

The logistics giant DHL and a growing number of other companies are using AR to enhance the efficiency and accuracy of the picking process.

AR instructions direct workers to the location of each product to be pulled and then suggest the best route to the next product. At DHL this approach has led to fewer errors, more-engaged workers, and productivity gains of 25%. The company is now rolling out AR-guided picking globally and testing how AR can enhance other types of warehouse operations, such as optimizing the position of goods and machines in layouts. Intel is also using AR in warehouses and has achieved a 29% reduction in picking time, with error rates falling to near zero. And the AR application is allowing new Intel workers to immediately achieve picking speeds 15% faster than those of workers who've had only traditional training.

Marketing and sales. AR is redefining the concept of showrooms and product demonstrations and transforming the customer experience. When customers can see virtually how products will look or function in a real setting before buying them, they have more-accurate expectations, more confidence about their purchase decisions, and greater product satisfaction. Down the road, AR may even reduce the need for brick-and-mortar stores and showrooms altogether.

When products can be configured with different features and options - which can make them difficult and costly to stock - AR is a particularly valuable marketing tool. The construction products company AZEK, for instance, uses AR to show contractors and consumers how its decking and paver products look in various colors and arrangements. Customers can also see the simulations in context: If you look at a house through a phone or a tablet, the AR app can add a deck onto it. The experience reduces any uncertainty customers might feel about their choices and shortens the sales cycle.

In e-commerce, AR applications are allowing online shoppers to download holograms of products. Wayfair and IKEA both offer libraries with thousands of 3-D product images and apps that integrate them into a view of an actual room, enabling customers to see how furniture and decor will look in their homes. IKEA also uses its app to collect important data about product preferences in different regions.

After-sales service. This is a function where AR shows huge potential to unlock the value-creating capabilities of SCPs.
AR assists technicians serving customers in the field in much the same way it helps workers in factories: by showing predictive analytics data generated by the product, visually guiding them through repairs in real time, and connecting them with remote experts who can help optimize procedures.
For example, an AR dashboard might reveal to a field technician that a specific machine part will most likely fail within a month, allowing the tech to preempt a problem for the customer by replacing it now.

At KPN, a European telecommunications service provider, field engineers conducting remote or on-site repairs use AR smart glasses to see a product's service-history data, diagnostics, and location-based information dashboards. These AR displays help them make better decisions about how to resolve issues, producing an 11% reduction in overall costs for service teams, a 17% decrease in work-error rates, and higher repair quality.

Xerox used AR to connect field engineers with experts instead of providing service manuals and telephone support. First-time fix rates increased by 67%, and the engineers' efficiency jumped by 20%. Meanwhile, the average time it took to resolve problems dropped by two hours, so staffing needs fell. Now Xerox is using AR to connect remote technical experts directly with customers. This has increased by 76% the rate at which technical problems are resolved by customers without any on-site help, cutting travel costs for Xerox and minimizing downtime for customers. Perhaps not surprisingly, Xerox has seen its customer satisfaction rates rise to 95%.

Human resources. Early AR adopters like DHL, the U.S. Navy, and Boeing have already discovered the power of delivering step-by-step visual worker training on demand through AR. AR allows instruction to be tailored to a particular worker's experience or to reflect the prevalence of particular errors. For example, if someone repeatedly makes the same kind of mistake, he can be required to use AR support until his work quality improves. At some companies, AR has reduced the training time for new employees in certain kinds of work to nearly zero and lowered the skill requirements for new hires.

This is especially advantageous for the package delivery company DHL, which faces surges in demand during peak seasons and is heavily dependent on the effective hiring and training of temporary workers. By providing real-time training and hands-on guidance on navigating warehouses and properly packing and sorting materials, AR has reduced DHL's need for traditional instructors and increased the onboarding speed for new employees.

AR and strategy

AR will have a widespread impact on how companies compete. As we've explained in our previous HBR articles, SCPs are changing the structure of almost all industries as well as the nature of competition within them - often expanding industry boundaries in the process. SCPs give rise to new strategic choices for manufacturers, ranging from what functionality to pursue and how to manage data rights and security, to whether to expand a company's scope of products and compete in smart systems.

The increasing penetration of AR, along with its power as the human interface with SCP technologies, raises some new strategic questions.

While the answers will reflect each company's business and unique circumstances, AR will become more and more integral to every firm's strategy.

Here are the essential questions companies face:

1. What is the range of AR opportunities in the industry, and in what sequence should they be pursued? Companies must weigh AR's potential impact on customers, product capabilities, and the value chain.

2. How will AR reinforce a company's product differentiation? AR opens up multiple differentiation paths. It can create companion experiences that expand the capabilities of products, give customers more information, and increase product loyalty. AR interfaces that enhance products' functionality or ease of use can be big differentiators, as can those that substantially improve product support, service, and uptime. And AR's capacity to provide new kinds of feedback on how customers use products can help companies uncover further opportunities for product differentiation. The right differentiation path will depend on a company's existing strategy; what competitors are doing; and the pace of technology advances, especially in hardware.

3. Where will AR have the greatest impact on cost reduction? AR enables new efficiencies that every firm must explore. As we've noted, it can significantly lower the cost of training, service, assembly, design, and other parts of the value chain. It can also substantially cut manufacturing costs by reducing the need for physical interfaces. Each company will need to prioritize AR-driven cost-reduction efforts in a way that's consistent with its strategic positioning. Firms with sophisticated products will need to capitalize on AR's superior and low-cost interface, while many commodity producers will focus on operational efficiencies across the value chain. In consumer industries and retail, marketing-related visualize applications are the most likely starting point. In manufacturing, instruct applications are achieving the most immediate payoff by addressing inefficiencies in engineering, production, and service. And AR's interact capability, though still emerging, will be important across all industries with products that have customization and complex control capabilities.

4. Should the company make AR design and deployment a core strength, or will outsourcing or partnering be sufficient? Many firms are scrambling to access the digital talent needed for AR development, which is in short supply. One skill in great demand is user experience or user interface (UX/UI) design. It's critical to present 3-D digital information in ways that make it easy to absorb and act on; companies want to avoid making a stunning but unhelpful AR experience that defeats its core purpose. Effective AR experiences also require the right content, so people who know how to create and manage it - another novel skill - are crucial too. Digital modeling capabilities and knowledge of how to apply them in AR applications are key as well.

Over time we expect companies to create teams dedicated to AR, just as they set up such teams to build and run websites in the 1990s and 2000s. Dedicated teams will be needed to establish the infrastructure that will allow this new medium to flourish and to develop and maintain the AR content. Many firms have started to build AR skills in-house, but few have mastered them yet.

Whether to hire and train AR employees or partner with specialty software and services companies is an open question for many. Some companies have no choice but to treat AR talent as a strategic asset and invest in acquiring and developing it, given AR's potentially large impact on competition in their business. However, if AR is important but not essential to competitive advantage, firms can partner with specialty software and services companies to leverage outside talent and technology.

The challenges, time, and cost involved in building the full set of AR technologies we have described are significant, and specialization always emerges in each component. In the early stages of AR, the number of technology and service suppliers has been limited, and companies have built internal capabilities. However, best-of-breed AR vendors with turnkey solutions are starting to appear, and it will become increasingly difficult for in-house efforts to keep up with them.

5. How will AR change communications with stakeholders? AR complements existing print and 2-D digital communication approaches and in some cases can replace them altogether. Yet we see AR as much more than just another communication channel. It is a fundamentally new means of engaging with people. Just consider the novel way it helps people absorb and act on information and instructions.

The web, which began as a way to share technical reports, ultimately transformed business, education, and social interaction. We expect that AR will do the same thing for communication - changing it in ways far beyond what we can envision today. Companies will need to think creatively about how they can use this nascent channel.

Deploying AR

AR applications are already being piloted and deployed in products and across the value chain, and their number and breadth will only grow.

Every company needs an implementation road map that lays out how the organization will start to capture the benefits of AR in its business while building the capabilities needed to expand its use. When determining the sequence and pace of adoption, companies must consider both the technical challenges and the organizational skills involved, which vary from context to context. Specifically, organizations need to address five key questions:

1. Which development capabilities will be required? Some AR experiences involve more complexity than others. Experiences that allow people to visualize products in different configurations or settings - like those created by IKEA, Wayfair, and AZEK - are a relatively easy place for companies to start. Consumers just need to be encouraged to download and launch AR apps, and only a mobile device is needed to use them.

Instruction applications, like the ones Boeing and GE employ in manufacturing, are more difficult to build and use. They require the capacity to develop and maintain dynamic 3-D digital content and often benefit greatly from the use of head-mounted displays or smart glasses, which are still in the early stages of development.

Apps that produce interactive experiences, which create significant value for both consumers and businesses, are the most challenging to develop. They also involve less-mature technology, such as voice or gesture recognition, and the need to integrate with software that controls SCPs. Most companies will start with static visualizations of 3-D models, but they should build the capability to move quickly into dynamic instructional experiences that have greater strategic impact.

2. How should organizations create digital content? Every AR experience, from the least to the most sophisticated, requires content. In some cases it's possible to repurpose existing digital content, such as product designs. Over time, however, more-complex, dynamic contextual experiences must be built from scratch, which requires specialized expertise. Simple applications, such as an AR-enhanced furniture catalog, may need only basic product representations. More-sophisticated business instruction applications, however, such as those used for machine repair, will require accurate and highly detailed digital product representations. Companies can create these by adapting CAD models used in product development or by using digitization techniques such as 3-D scanning. The most sophisticated AR experiences also need to tap real-time data streams from enterprise business systems, SCPs, or external data sources and integrate them into the content.

To prepare for broadening the AR portfolio, companies should take an inventory of existing 3-D digital assets in CAD and elsewhere and invest in digital modeling capabilities.

3. How will AR applications recognize the physical environment? To accurately superimpose digital information on the physical world, AR technologies must recognize what they're looking at. The simplest approach is to determine the location of the AR device using, say, GPS and show relevant information for that location without anchoring it to a specific object. This is known as an "unregistered" AR experience. Vehicle heads-up navigation displays typically work this way.

Higher-value "registered" experiences anchor information to specific objects. They can do this through markers, such as bar codes, logos, or labels, which are placed on the objects and scanned by the user with an AR device. A more powerful approach, however, uses technology that recognizes objects by comparing their shape to a catalog of 3-D models. This allows a maintenance technician, for example, to instantly recognize and interact with any type of equipment he or she is responsible for maintaining and to do so from any angle. While markers are a good starting point, shape-recognition technologies are advancing quickly, and organizations will need the capability to use them to tap into many of the highest-value AR applications.

4. What AR hardware is required? AR experiences aimed at broad consumer audiences have typically been designed for smartphones, taking advantage of their simplicity and ubiquity. For more-sophisticated experiences, companies use tablets, which offer larger screens, better graphics, and greater processing power. Since tablet penetration is lower, companies will often provide them to users. For certain high-value applications - notably those in aircraft and automobiles - manufacturers are building dedicated AR heads-up displays into their products - a costly approach.

Eventually, however, most AR applications for service, manufacturing, and even product interfaces will require head-mounted displays that free users' hands. This technology is currently both immature and expensive, but we expect that affordable smart glasses will become widely available in the next few years and will play a major part in releasing AR's full power. Microsoft, Google, and Apple now offer AR technologies optimized for their own devices. However, most organizations should take a cross-platform approach that allows AR experiences to be deployed across multiple brands of phones and tablets and should make sure they're ready for smart glasses when they arrive. (See *"The Battle of the Smart Glasses."*)

5. **Should you use a software-development or a content-publishing model?** Many early AR experiences have been delivered through stand-alone software applications that are downloaded, complete with digital content, to a phone or a tablet. This approach creates reliable, high-resolution experiences and allows organizations to make apps that don't require internet connectivity. The problem with this model is that any change to the AR experience requires software developers to rewrite the app, which can create expensive bottlenecks.

An emerging alternative uses commercial AR-publishing software to create AR content and host it in the cloud. The AR experience can then be downloaded on demand using a general-purpose app running on an AR device. Like website content, the AR content can be updated or supplemented without changing the software itself - an important benefit when large amounts of information and frequent content changes are involved. The content-publishing model will become common as more and more machines and products include real-time AR interaction and control. A content-publishing capability is essential to scaling AR up across the organization.

The broader impact

The digital revolution, with its SCPs and explosion of data, is unleashing productivity and unlocking value across the economy. Increasingly, the constraint is not a lack of data and knowledge but how to assimilate and act on them - in other words, the interface with humans. AR is emerging as a leading solution to this challenge.

At the same time, the rapid evolution of machine learning and automation is raising serious concerns about human opportunity. Will there be enough jobs for everyone, especially for people without advanced education and knowledge? In a world of artificial intelligence and robots, will humans become obsolete?

It is easy to conclude that new technology diminishes human opportunity. Yet new inventions have been replacing human labor for centuries, and they have led to growth in employment, not a decline. Technology has dramatically increased our productivity and our standard of living. It has given rise to new kinds of offerings that meet new needs and require new types of workers. Many of today's jobs involve products and services that did not even exist a hundred years ago. A lesson of history is that today's digital revolution will generate new waves of innovation and new kinds of work that we cannot yet imagine.

The role of humans in this future is misunderstood. People have unique strengths that machines and algorithms will not replicate anytime soon. We have sophisticated motor skills - well beyond what robots are capable of today - that allow us to do the subtle manipulation that's needed in, say, replacing a machine part or wiring a turbine. Even relatively less skilled work, such as drawing blood, pruning a garden, or repairing a flat tire, requires human dexterity and defies automation. Human cognition adapts instantaneously to novel situations; people easily adjust the way they interpret information, solve problems, exercise judgment, and take action to suit their circumstances. Humans have flexibility, imagination, intuition, and creative ability that for the foreseeable future are beyond the reach of any machine.

While the advances in artificial intelligence and robotics are impressive, we believe that combining the capabilities of machines with humans' distinctive strengths will lead to far greater productivity and more value creation than either could generate alone. What's needed to realize this opportunity is a powerful human interface that bridges the gap between the digital and physical worlds. We see AR as a historic innovation that provides this. It helps humans enhance their own capabilities by taking full advantage of new digital knowledge and machine capabilities. It will profoundly change training and skill development, allowing people to perform sophisticated work without protracted and expensive conventional instruction - a model that is inaccessible to so many today. AR, then, enables people to better tap into the digital revolution and all it has to offer.

EX

IN BRIEF

THE PROBLEM
While the physical world is three-dimensional, most data is trapped on 2-D screens and pages. This gulf between the real and digital worlds limits our ability to make the best use of the volumes of information available to us.

THE SOLUTION
Augmented reality solves this problem by superimposing digital images and data on real objects. By putting information directly into the context in which we'll apply it, AR speeds our ability to absorb and act on it.

THE OUTCOME
Pioneering organizations, including GE, Mayo Clinic, and the U.S. Navy, are using AR to improve productivity, quality, and training. By combining the strengths of humans and machines, AR will dramatically increase value creation.

ENHANCING HUMAN DECISION MAKING

At its core, the power of augmented reality grows out of the way humans process information. We access information through each of our five senses - but at different rates. Vision provides us with the most information by far: An estimated 80% to 90% of the information humans get is accessed through vision.

The ability to absorb and process information is limited by our mental capacity. The demand on this capacity is referred to as "cognitive load." Each mental task we undertake reduces the capacity available for other, simultaneous tasks.

Cognitive load depends on the mental effort required to process a given type of information. For example, reading instructions from a computer screen and acting on them creates a greater cognitive load than hearing those same instructions, because the letters must be translated into words and the words interpreted. Cognitive load also depends on "cognitive distance," or the gap between the form in which information is presented and the context in which it is applied.
Consider what happens when someone refers to a smartphone for directions while driving. The driver must consume the information from the screen, retain that information in working memory, translate the directions into the physical environment in front of him, and then act on those directions, all while operating the vehicle. There is significant cognitive distance between the digital information on the screen and the physical context in which information is applied. Dealing with this distance creates cognitive load.

The combination of the speed at which information is transmitted and absorbed and the cognitive distance involved in applying it lies at the root of the much-repeated phrase "A picture is worth a thousand words." When we look at the physical world, we absorb a huge amount and variety of information almost instantaneously. By the same token, an image or picture that superimposes information on the physical world, placing it in context for us, reduces cognitive distance and minimizes cognitive load.

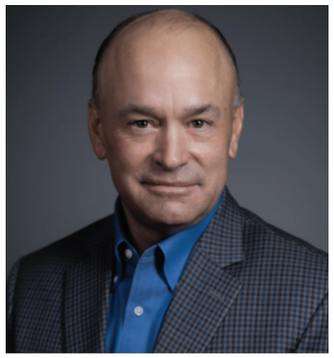
This explains why AR is so powerful. There is no better graphical user interface than the physical world we see around us when it is enhanced by a digital overlay of relevant data and guidance where and when they are needed. AR eliminates dependence on out-of-context and hard-to-process 2-D information on pages and screens while greatly improving our ability to understand and apply information in the real world. ■

Michael E. Porter

One of most influential management gurus of this century, **Michael E. Porter** is widely regarded as the Father of Corporate Strategy and Management. University professor at Harvard Business School, his ideas have been included in the curriculum of every prestigious business school of the world. He is responsible for building the foundation for modern business strategy courses. He has also served as the strategic adviser to many successful and leading U.S. companies and other international companies. Over the years, he has authored nineteen books and written over 125 articles on business competition, competitive strategy and advantage.

Some of his writings include, *"How Competitive Forces Shape Strategy"*, *"Competitive Strategy"*, *"Redefining Health Care: Creating Value-Based Competition On Result"*, and *"Strategy and the Internet"*. He has won many scholarly awards and honors including the Adam Smith Award of the National Association of Business Economists, the John Kenneth Galbraith Medal, the David A. Wells Prize in Economics from Harvard, and the Academy of Management's highest award for scholarly contributions to management. He is also an unprecedented seven-time winner of the McKinsey Award for the best Harvard Business Review article of the year.

James E. Heppelmann



James (Jim) E. Heppelmann is the president and chief executive officer (CEO) of PTC, responsible for driving the company's global business strategy and operations. Mr. Heppelmann has emerged as a driver and thought leader in industrial innovation.

Together with Harvard Professor Michael E. Porter, he has co-authored three highly influential articles regarding the transformational impact of the Internet of Things (IoT) on business, including *"How Smart, Connected Products are Transforming Competition"* (November 2014), *"How Smart, Connected Products are Transforming Companies"* (October 2015 Harvard Business Review) and *"Why Every Organization Needs an Augmented Reality Strategy"* (November 2017).

Mr. Heppelmann was named one of *"7 IoT Leaders to Watch in 2017"* by Hewlett Packard Enterprise and has previously been recognized as "IOT CEO of the Year" by PostScapes, *"Technology CEO of the Year"* by the Massachusetts Technology Leadership Council, and received the *"CAD Society Leadership Award"* for his work with the Internet of Things.

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Competing on the rate of learning

James E. Heppelmann
Tammy Hughes
Denis Pennel
Michael E. Porter
Martin Reeves
Enrico Sassoon
Olga Strietska-Ilina
Tiziano Treu
Kevin Whitaker

Martin Reeves
Kevin Whitaker

Competing on the rate of learning[1]

New technologies, particularly artificial intelligence, have the potential to propel the rate of learning in business to new heights - the volume and velocity of data have exploded, and algorithms can unlock complex *patterns* and insights with unprecedented speed. In an era of shrinking product life cycles and rapidly changing business models, the companies that are the first to decode new trends or emerging needs have the best chance to take advantage of them.

But learning at the speed of algorithms requires more than algorithms themselves. New technology can accelerate learning in individual process steps, but to create aggregate organizational learning and competitive advantage it must be complemented by organizational innovation. Moreover, slow-moving contextual shifts, driven by social, political, and economic forces, are becoming just as important to business as fast-moving technologies. To compete on the ability to learn, therefore, leaders must reinvent their organizations to leverage both human and machine capabilities synergistically in order to expand learning to both faster and slower timescales.

A brief history of learning organizations

In first-generation learning organizations, businesses learned how to execute existing processes more efficiently - best exemplified by the "experience curve."

1 Article already appeared on the BCG website on 28 August 2018, *https://www.bcg.com/publications/2018/competing-rate-learning.aspx*

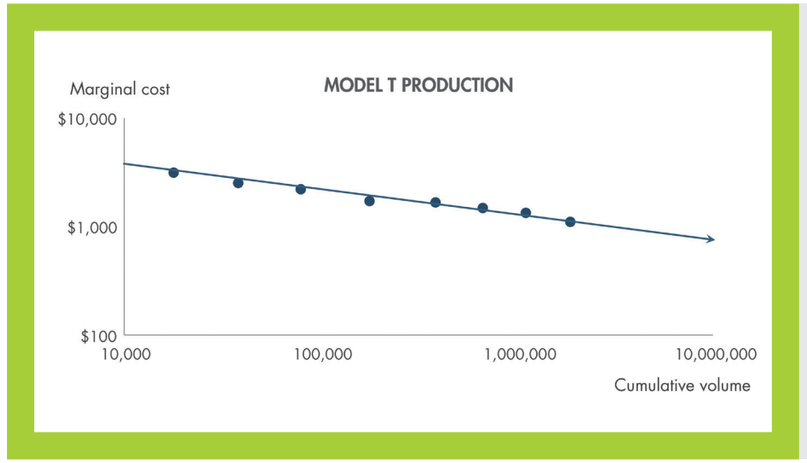

Figure 1. The Traditional Experience Curve.
Sources: Henderson (1974); BCG Henderson Institute.
Note: Covers 1909 -1916; costs in constant 1968 dollars.

As **Bruce Henderson observed half a century ago***, firms tend to reduce their costs at a constant and predictable rate as their cumulative experience increases. For example, in the early 20th century costs of the Model T consistently fell by about 25% every time the cumulative product volume doubled. (**Figure 1**)

In this model, learning was a game of continuous improvement aimed at reducing marginal costs. Competing on learning was essentially about building volume, and therefore experience, faster than competitors. This permitted a strategy of pricing for the anticipated value of learning and pursuing cost reductions systematically, using mechanisms such as statistical process control, kaizen, Six Sigma, and quality circles.

In recent years, a second-generation concept of learning came to the forefront: learning how to envision and create new products. In other words, companies must learn not only to descend experience curves but also to "jump" from one curve to another. (**Figure 2**)

This second dimension of learning has always existed in business, but its importance has grown. Technological innovation has compressed product life cycles, so new learning curves appear before old ones have fully played out - and firms must balance both dimensions of learning at the same time. For example, Netflix jumped from a DVD rental business to a streaming service to in-house content creation, while expanding to 190 countries, in less than a decade.

Today, a third phase of the learning game is beginning to unfold. Modern technologies, such as sensors, digital platforms, and AI,

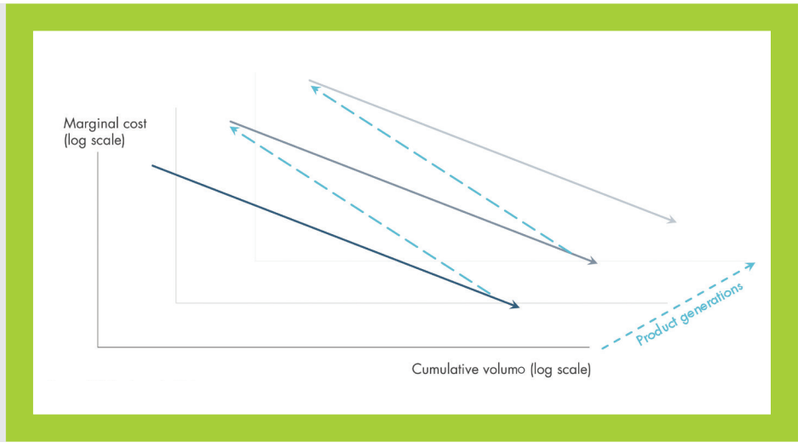

Figure 2. Jumping Between Experience Curves.
Source: BCG Henderson Institute.

promise to massively accelerate the rate at which information is generated, gathered, and processed. This potentially enables companies to operate at superhuman speed, learning about the market and reacting in seconds or even milliseconds.

Most businesses have woken up to the reality of time compression, but this is only half the picture. The range of timescales that need to be considered is being stretched in both directions.

At the same time, however, companies must also expand their learning abilities to consider *longer* timescales, as social, political, and economic shifts gradually reshape the business context. Most businesses have woken up to the reality of time compression, but this is only half the picture. The *range* of timescales that need to be considered is being stretched in both directions. A third-generation learning organization is one that can embrace this new reality - adopting algorithmic principles over shorter timescales while adapting to non-business forces that operate over longer ones.

To make this leap, businesses cannot rely on technological sophistication alone. Repeating a well-established historical pattern, evolution of the organizational model is needed to unlock the potential of new technologies. The original experience curve could be exploited only when new industrial technologies were complemented by organizational innovations like new factory layouts, redefined roles for workers (such as the assembly line), and new managerial approaches like quality circles and *kanban*.

In the same way, to build the third generation of learning organizations, leaders must reinvent the enterprise not only to *unlock* the potential of new technologies but also to *synergistically combine* the unique learning capabilities and timescale advantages of both humans and technology - in other words, to build effective "human + machine" machines.

"Autonomize" the organization to learn on algorithmic timescales

The most recent evolution of the learning game is driven in large part by new technologies. Digital platforms and IoT sensors make it possible to collect oceans of proprietary data in real time, offering the potential to extract differentiated insights. And AI algorithms can identify complex patterns that are unfathomable by humans at speeds that are unattainable by them.

To unlock the full learning potential of these technologies, however, leaders must rethink how their company operates. Traditional organizational hierarchies react slowly and have limited decision-making bandwidth. Even if you knew the optimal product selection, marketing strategy, and pricing for every customer in every second, could your current organization *act* on that information?

These timescales require a different model of the enterprise - one predicated on **autonomization** rather than hierarchy and management-centered decision making. Leading learning organizations achieve this by connecting data, AI algorithms, and automated execution in an integrated fashion with minimal human intervention. This "closed-loop algorithmic learning" process generates a virtuous cycle: more data makes algorithms more powerful, helping decision engines improve the firm's selection or fulfillment of products, thus increasing volume and generating yet more data. (**Figure 3**)

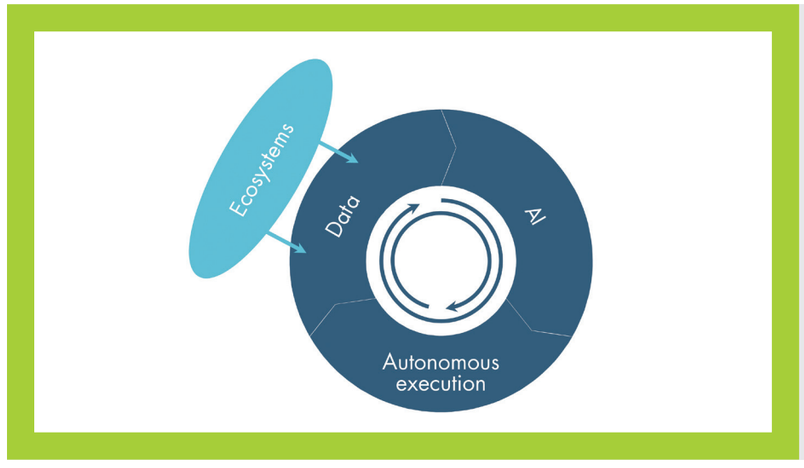

Figure 3. The Autonomous Learning Loop.
Source: BCG Henderson Institute.

And because these systems do not rely on manual decision making, they can act and learn at the speed of data rather than the speed of hierarchy. For example, Amazon organizes its dozens of data processing and interpretation systems in **a fully integrated web***, so new information from any part of the business (for instance, a sales increase of one product on its e-commerce platform) automatically cascades to other areas (inventory forecasting, pricing optimization, and so forth). This "hands off the wheel" approach allows Amazon to understand and act on new market information in real time.

Given the power of today's technologies, leaders should let machines do what they do best - and focus on the critical issues that require distinctly human capabilities.

Autonomous learning bypasses the managerial hierarchy that has traditionally defined companies. Instead, when properly designed, companies become "self-tuning" - sensing changes in the market immediately and responding on algorithmic timescales. This may be uncomfortable for executives who came of age in an era dominated by managerial decision making. But given the power of today's technologies, leaders should let machines do what they do best - and focus on the critical issues that require distinctly human capabilities.

Refocus Human Brains on High-Level Issues and Longer Timescales

Today's leaders are well aware of accelerating change and compressed cycle times. But they may not recognize the increasing importance of *longer* timescales. Corporate longevity is decreasing, and companies are falling from their competitive peaks faster than ever. By the time there are visible signs of deteriorating performance, **it is often too late to avoid rapid decline***. So multiyear horizons are increasingly relevant, and businesses need to be adaptive on *longer* timescales as well as shorter ones.

The longer-term factors that are reshaping business often come from beyond business:

- Political outcomes are becoming more unpredictable and disruptive.
- International institutions are becoming less stable.
- Social inequality continues to rise within nations.
- Shifting generational values are reshaping the nature of consumption.
- Social backlash to business is more frequent and larger in scale.
- Technology is changing the skills required of workers and the nature of work.

In more stable times, businesses might have been able to avoid focusing on slow-moving forces and instead treat them as constants.

In more stable times, businesses might have been able to avoid focusing on these slow-moving forces and instead treat them as constants. But as recent events have shown, these non-competitive issues are becoming both less predictable and more relevant to long-run company performance, demanding correspondingly more attention.

By simultaneously focusing on all timescales - from milliseconds to decades - companies can maximize their odds of survival and prosperity. Lawrence Slobodkin describes an **"optimal strategy of evolution"*** of biological systems in which species adapt progressively, using different mechanisms for different timescales: from rapid adaptations that are easily reversible (such as individual organisms changing their behavior) to slower responses that are more permanent (such as physiological adjustments and eventually evolutionary changes to their genetic code). Similarly, businesses need to learn and respond on multiple timescales. If a new offering in the market becomes more popular, they need to flexibly adapt to this at algorithmic speeds. But faced with a persistent trend or a major discontinuity, the company may need to change its fundamental DNA to serve a new purpose. The goal of learning on decade-long timescales is to understand and get ahead of the slow-moving trends that will reshape the business context.

Learning on longer timescales requires a very different approach, because even today's most advanced technologies cannot easily analyze slow-moving external forces. Whereas representations of AI in popular culture, such as Skynet or HAL 9000, often have the same reasoning capabilities that humans do, the AI applications in use today have much more specific and limited capabilities. They can identify *correlations* extremely powerfully, operating at much greater speed and complexity than humans can. But this approach requires a large quantity of relevant data - and history is most often a singular journey, not a repeated pattern.

Instead, **higher levels of reasoning*** are necessary to decode and shape these longer-term trends. These higher levels are *causal inference* (what happens when we act on a system) and *imagination* (what would happen if the system were different than observed in some significant way). Today's most common AI techniques, such as deep learning, cannot reason at these levels, which therefore remain firmly the domain of humans for now.

The third-generation learning organization is thus a "human + machine" machine, in which artificial and human intelligence are focused on their respective advantages. (**Figure 4**)

While machines collect data and find patterns at rapid speeds, humans concentrate on higher-order objectives. In addition to learning on longer timescales, these include:

- Defining the end goals of the human + machine system and reframing them as outcomes warrant.
- Maintaining the machines and setting guardrails. Because the outputs of today's machine-learning models are not readily explainable, this requires an indirect approach, including validation, stress-testing, and recalibration.
- Using imagination to envision new possibilities, such as novel products or business models.
- **Designing the integrated human + machine machine itself***, setting it up for success, and evolving it as new capabilities emerge.

How to compete on the rate of learning

Given the above challenges, how can leaders act strategically to gain an advantage through learning, fully leveraging the potential of new technologies?

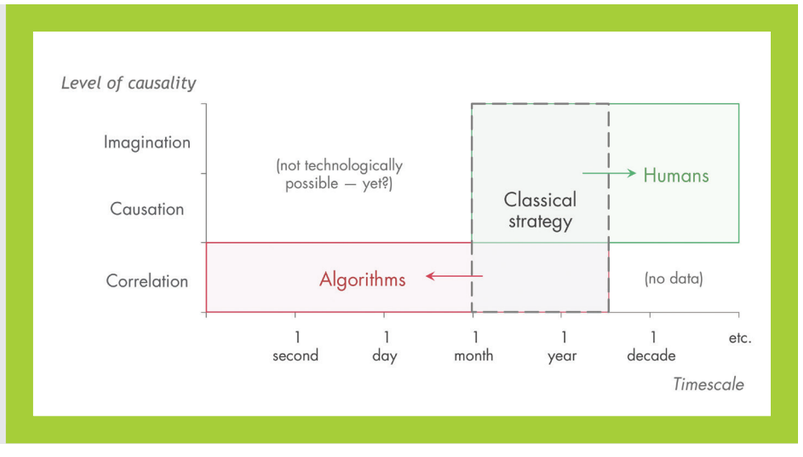

Figure 4. Learning Must Expand Across Timescales.
Sources: Pearl and Mackenzie, The Book of Why: The New Science of Cause and Effect, 2018. BCG Henderson Institute.

Invest in autonomous learning systems. Because AI algorithms can find highly complex patterns at rapid speeds, they are much more powerful when they are plugged into ecosystems that generate vast seas of proprietary data. Just as the traditional experience curve dictated that companies should prioritize volume in their investment and pricing strategies, today's companies should invest ahead of the curve in data acquisition. By creating proprietary ecosystems (for instance, through digital platforms or IoT solutions), they can learn about the market faster and use that information to improve their offerings.

For example, Uber and Lyft have invested heavily in platforms that connect drivers and riders, gathering proprietary data about all resulting transactions. By analyzing that data with advanced algorithms, they can improve their delivery (for example, routing efficiency or matching supply with demand) and create better products (for example, introducing new service models or expanding effectively to new locations). In turn, those advantages lead to more transactions in the future, ensuring more data in a virtuous cycle.

Design effective human-machine interfaces. There are still many tasks where humans are advantaged, such as nonrepeatable tasks or those involving empathy or higher-level reasoning. Therefore, at least for the foreseeable future, humans and AI must be able to integrate seamlessly. "Black-box" AI models are not necessarily productive in situ, since they do not allow humans to understand and trust outputs, and they may not be well-matched with human communication capabilities in terms of complexity and bandwidth.

Humans and AI must be able to integrate seamlessly.

For example, because of the emotional dimensions of health, patients expect to hear their diagnoses from human doctors rather than machines. AI provides insights **where it can do so better and faster*** - such as classifying potential diseases based on x-rays or other images - but diagnosis and treatment are intermediated by doctors, who add another level of review and communicate the findings to patients with care.

Embed autonomous learning structures throughout the enterprise. Self-executing decision loops are widely implemented in digital marketplaces. But they can be just as powerful when embedded in the administrative systems - like planning, information systems, and resource management - of the enterprise itself.

This involves reconceptualizing business as an intelligent, adaptive machine, one that embodies the same algorithmic principles as purely digital systems do. Organizational structures should be decentralized, with smaller units given autonomy to act, experiment,

and learn. Insights should flow up and across the organization, rather than just downward from executives, to accelerate learning. And resource reallocation should be a continual process that is seamlessly integrated into learning loops. By removing bottlenecks to action and embracing "organizational algorithmics," companies themselves can evolve more effectively and holistically.

For example, Alibaba has a flexible organizational structure that encourages units to act on their own when they identify a new opportunity. All aspects of the firm are subjected to market forces and adapted accordingly - even traditionally fixed features such as vision, which the company has reset several times in response to changing conditions. The result is a **"self-tuning enterprise"*** that is constantly experimenting, learning, and adapting to the market and the environment around it.

Measure and govern the business on all timescales.

As the learning capabilities of the organization evolve, traditional metrics and accountabilities should be extended to encourage adaptability on an expanded set of timescales. While the familiar metrics of business, such as quarterly revenues, cost, and profitability, remain essential, they need to be applied on shorter and shorter timescales and supplemented with learning metrics. For example, the operator of a digital marketplace might measure the "cycle time" of one interaction (how fast it can gather customer data, process it, and make a customized product offering), or assess whether the underlying economics of automated decisions are improving (considering the probability of a sale, pricing, execution time, and the value of new data).

Governance structures must also be augmented for shorter timescales, as traditional oversight methods may not be applicable. Before deployment, machines must be rigorously stress-tested for extreme situations, to make sure their autonomous action will not lead to undesirable emergent outcomes. Algorithms must be made explainable, if possible, so that their workings can be audited more effectively and people can trust their decisions. And in the long term, researchers should pursue causal algorithms to unlock new capabilities and respond better to changing conditions.

For example, the US Department of Defense is preparing a research effort to create **AI with "common sense"*,** which mimics human ingenuity.

Different approaches are also required on longer timescales. To understand the firm's fitness for the long term, traditional backward-looking performance metrics must be complemented with forward-looking measures. For example, we have shown that it is possible to **assess a company's vitality***, its capacity for future growth and reinvention. And leaders should stress-test their long-term plans with various internal and external scenarios, leveraging the power of imagination to raise awareness of circumstances that might threaten or present opportunities to the business.

The third generation of learning organizations presents an enormous opportunity. Companies can unleash both the power of technology for rapid learning and human ingenuity on longer timescales. But this will require leaders first to reimagine the organization and how it is managed. ■

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How open science and open innovation will change the world of work?

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How open science and open innovation will change the world of work?

Science and innovation has become more and more collaborative throughout the world, making knowledge more available and affordable to more individuals, and making new knowledge-based business endeavors highly scalable. At the same time, digital transformation has been driving a consistent development of the human capital to be skilled with capabilities aligned to the needs and requirements of the new jobs of digital economy. Open Science and Open Innovation have profoundly changed industries and business models. We will argue here that these two concepts are shaping the world of work as well.

Henry Chesbrough developed the 'Open Innovation' (OI) concept (2003a) as a new process for managing innovation. OI is based on purposively managed flows of knowledge across organizations for both pecuniary and non-pecuniary reasons, in line with their business models. The EU has embraced the OI concept at the policy level, and acknowledged that innovative solutions can come from a variety of actors, including not only corporations of any dimension, but also universities, research institutions, and people. Innovation policy has also embraced the Open Innovation Paradigm. In June 2015, the Commissioner for Research, Science and Innovation Carlos Moedas released the EU approach 'Open Science, Open Innovation, Open to the World': *"[a] new strategy that is fit for purpose for a world that is open, digital and global"* (Moedas, 2015). This new approach will be the guiding framework for the next seven year framework program, intended to invest 100 billion EUR in research funding across Europe.

In an open economy, data became a strategic asset.

Competitive advantage requires careful attention to the collection, organization, and distribution of data. To jumpstart this process, Open Science (OS) plays a major role in academic research and even more in industrial R&D (Perkmann and Walsh, 2007). OS involves the scientific process overall, including cooperation among researchers, data sharing, and wide dissemination of data and results[1]. Moreover, using collaborative tools and digital technologies, OS can gather the contributions of citizens and communities (De Marco and Di Minin, 2017). An open discussion and choice of strategic topics to explore, collaboration on data collection and analysis, and results dissemination aim at reducing time, efforts and costs of conducting research. Furthermore, benefiting from global external contribution OS would guarantee higher quality of research and methodology.

Similarly to OI processes, to unlock value from data and enable science-based innovation, OS requires innovative business models. However, the commercialization of innovation does not directly relate to more openness in science: OS can enable innovation, but cannot ensure that the knowledge openly generated gets effectively to the market (Chesbrough 2015; EC 2016a; De Marco and Di Minin 2017).

OS could even jeopardize innovation since science aims at advancing knowledge, science and technology *per se*, and the application of these advancements into innovative solutions - generating impact when commercialized - is not among science's scope.

While business models are central to this discourse, OS and OI are reshaping the role of individuals within organizations, and therefore they do have an immense impact on the world of work. Scholars have been proposing the idea of "T-shaped" professionals and innovators (Demirkan and Spohrern 2015): researchers and managers able to bridge different knowledge sources, across different sectors and actors, and recombine them in alignment with organizations' needs, contributing to more innovative cross-sectoral and cross-disciplinary projects (Hansen and von Oetinger, 2001; Chesbrough, 2012).

Companies are implementing OI to achieve wider access to knowledge; more differentiated products and services, generating new markets and are more suited to meet customers' and users' needs; access larger science- and knowledge-based cooperative networks; accelerate innovation processes through knowledge and assets integration (Chesbrough 2003a, 2006a; Chesbrough and Crowther 2006; Gassmann 2006; EC 2016a).

While OS generates the diffusion of new knowledge and enables its application in diversified field, OI allows the exploitation of this

1 In this view, Horizon 2020, the eight Framework Program for Research and Innovation, prescribes open access to the results of EU-funded research (EC 2016a).

knowledge into new markets, enabled by multiple actors involved (Chesbrough, 2003b). Indeed, in an OI scenario, the R&D process is not monopoly of large enterprises anymore, but involves multiple actors and loci from small companies and startups, to academic and research institutions, to individual citizens and communities (Chesbrough, 2015). This paper is focused on the Italian corporate scene, however it is important to mention that inevitably OS and OI are having a lasting impact on the way jobs are organized across all types of organizations. We developed the concept of Open Social Innovation, to describe how OI has been applied by foundations and humanitarian organizations (Chesbrough and Di Minin, 2014). Among many examples coming from the academic world, the case of Netval[2], the Italian Network of Technology Transfer of Universities and Public Research Organizations, is highly interesting. Professional training, networking and co-creation workshops are the main tools that Netval deploys to develop an active community of 68 offices working on knowledge and technology transfer across the academic world, institutions and foundations.

In order to exemplify how OI and OS are shaping jobs, we will here use the examples of two Italian companies that have embraced OI, the **Enel Group** and the **Loccioni Group**.

Enel is the Italian multinational leading integrated player in the power and gas markets, that embraced OI through a change in top management positions, when Francesco Starace in 2008 became CEO of Enel Green Power, a successful Enel's spinoff, and then of the Enel Group in 2014, when he hired Ernesto Ciorra as CIO (Chesbrough, 2016).

Loccioni is a family business that, over 50 years of activity, became a multinational company, global leader in the field of measurement systems. Loccioni is a 'knowledge company' intrinsically open. In terms of HR structure, the group has a flexible organization coupled with a clear governance of an OI that is 'open but controlled' through attentive selection of partners based on common values and interests tuned with the company's mission: "integrate ideas, people, and technologies to transform data into values" (Casprini *et al.*, 2017).

As the experiences of Loccioni and Enel show, OI effectiveness has been furtherly boosted by exploiting digital technologies. Enel, for example, set up a team to manage the Open Innovability platform[3] to crowdsource innovative solutions for sustainable development, also open to other companies' challenges and run in collaboration with Innocentive to access its significantly larger number of solvers. In the words of Alessia Sterpetti, Head of Open Innovation and Idea Factory at Enel, *"OI made us let down our guard and enhanced our trust towards the external environment: through crowdsourcing we are now able to look outside and ask for help"*. According to Ernesto Ciorra, digital technologies are enabling Enel to reshape the role of users and employees. In various situations across the world, Enel had been able to engage customers and employees in co-development exercises, where the final offering had been the result of such an interaction.

OI processes imply complex strategies governed through innovative business models, deemed to capture value from new technological opportunities, jobs and people's capabilities. Loccioni is the example of an OI strategy based on the orchestration of a collaborative ecosystem including clients, external partners, suppliers and universities (Di Minin *et al.*, 2016). In its Leaf community[4], created with Enel and Whirlpool in 2008, Loccioni explores the technical feasibility of environmentally sustainable solutions in collaboration with over 50 players across public institutions, research centers, universities, schools and companies. Co-creation workshops had been used by the company to engage potential customers as well as suppliers and other stakeholders into its new product development process. Co-development is not only focused on Loccioni's products, but also on the type of contribution expected by partners. A key example is human resources. Loccioni is located into the Marche region, quite far from the main industrial hubs of the country. The company prefers to hire local talent and to be extremely active into the local industrial ecosystem. A closer cooperation with local universities and research institutes had resulted into academic programs that are closer to Loccioni's human resources needs, and hence to a more effective recruitment of local employees.

Large enterprises (LEs) like Loccioni increasingly supports **intrapreneurship**: they foster entrepreneurial capabilities within the companies, training employees and encouraging their entrepreneurial attitude and ideas. Those can become projects developed within corporate business units and along the existing business models, or pursue new market through spinoff companies, in an outbound OI practice that allows LEs to build on internal knowledge that flows outside the organization. Throughout its history, Loccioni facilitated the establishment of 80 spinoff companies founded by former employees. Loccioni provides support in the start-up phase of its spinoff and is usually their first client: it *"does not offer seed investment to these young companies, it rather guarantees logistic support and cooperation to help them grow outside the group"* (Cristalli, CTO).

The spinoffs are usually closely connected to the mother company and generate new jobs and professional transformations.

2 *https://netval.it/netval-italian-network-of-technology-transfer-offices-of-universities-and-public-research-organizations/*

3 OI in Enel met the company mission of improving the sustainability of energy production and led the company to the "Open Innovability" concept, which combines OI with Sustainability (Chesbrough, 2016). *https://openinnovability.enel.com*

4 *https://www.loccioni.com/it/onde/leaf-community-life-energy-and-future/*

Former employees become entrepreneurs developing their own business and innovative idea, open new markets and contribute to innovation and growth creating new jobs.

As Loccioni's example shows, the spreading of OS and OI has direct effects on employment in terms of new jobs created, but also in terms of new typologies of jobs (EC 2016b) and organization of labor. New and more diffused knowledge allows the development of new tasks, whose application requires new skills and competences; this generates new types of jobs and professions that would, in turn, further enhance knowledge and innovation, opening the access to new markets. The Loccioni's case shows that companies need to govern such a complex, and not linear process. The company set up a permanent innovation taskforce, whose role is to orchestrate the distribution of resources to various OI initiatives, as well as to maintain an effective monitoring over implementation and results.

Turning now to the Enel case, it is worth noticing that the company has embraced a comprehensive view on Open Innovation. According to the leadership of the company, a proper implementation of OI impacts most parts of the organization. OI obviously permeates new product development and R&D investment, but also procurement, corporate relations, as well as human resources management. One of the first and successful attempts with OI had been Enel Green Power (EGP). This was an Enel spinoff established in 2008[5]. At that time, Enel wanted to diversify its business to enter the renewable energy. Since 2008, EGP growth to more than 3.6 thousand employees, operating in 30 countries with almost 1300 plants and, in 2016, it was absorbed back in the mother company. EGP is an example of an effective outbound OI strategy that allowed Enel to benefit from public incentives and venture capital investments into a smaller, more flexible and promising business (Chesbrough, 2016), that created new jobs in a new business segment at the edge of innovation technology trends.

The leadership of both Loccioni and Enel have experienced that in their diffused innovation value chain, SMEs, startups and large corporations are doomed to collaborate.

While collaborating with smaller actors, LEs benefit from their agility and access cutting edge technologies, knowledge and assets; small businesses use the collaboration with LEs as a validation mark of their technologies and assets, and an occasion to show their value added in catching market opportunities and develop disruptive innovation, chasing the latest trends of technology development. One of the main problem in the interaction with LE, is the slow responsiveness of big companies, unable to get to investment or collaboration decisions with the same speed of SMEs and start-ups.

In light of this problem, and not dissimilarly from Loccioni's approach, Enel has attempted to govern the distribution of people and resources across various OI activities by promoting and setting up internal technology communities. These are platforms focused on cutting edge technology areas, such as block chain, Artificial Intelligence, storage technologies. They are considered bottom-up and autonomous groups, capable of proposing and spending budget on innovation projects, as well as of setting up collaborations with external partners. The priority here was to cut to the bone the time and red-tape typical of large organizations, and to grant as much autonomy as possible to these communities.

These collaborations are focused on co-development, co-investment and procurement, but often end up in acquisitions or, even better, acquihiring through which the large company acquires the smaller one and hires its employees. The acquihiring allows LEs to avoid challenges of external assets integration and enact 'plug-and-play' strategies that keep the acquired organization working into the business it knows, following its agile and flexible nature but backed by a larger structure endowed with resources and capital that small firms usually lack. Very similar considerations stand valid for startups that seek the interest and funds of investors and larger companies, pursuing good exit strategies (Ansari, Garud and Kumaraswamy, 2016). In this scenario, the acquihiring from a LE usually represents a success: it provides development perspectives for innovation developed by the startups and for its employees.

5 Before that, the company was mainly integrating external technologies through other ventures acquisitions, e.g. Echelon Corporation in 2005.

Through the inbound OI practice of acquihiring, the LE acquires and integrates both startup's technology and knowledge.

To scout external ideas and technologies that meet internal business needs, Enel set up Innovation Hubs all over the world: in July 2018, 147 innovative projects had been developed and, out of those, 39 startups were developing and scaling up their business. As Sterpetti said *"this is a stimulus for innovation conducted in partnerships on innovative projects and technologies, and when something new is done, new skills are implied!"* This means that Enel supports the development of new skills of the startups it works with, but also the development of internal capabilities in order to make Enel able to collaborate with the external environment. Building on existing and external knowledge and skills, Enel employees have been adapting to the new needs of the company and *"reinvented themselves customizing their expe-rience to the new need of their roles and the new company open strategy"*, as Sterpetti said when introducing Enel's activity in creating new job positions and roles that require expertise on different strategic methodologies for innovation. In the last 18 months, Enel has implemented an agile transformation for which it needed agile coaches that learned new methodological approaches and spread them within the company to *"open the minds, enhance disruptiveness and open externally"*. The company has also pushed for *"open creativity"* workshops, according to Ciorra *"we need to go beyond our traditional logical thinking, and we need to be exposed to ways of processing information and ideas typical of artists and other creative professions!"*. The goal of these initiatives is to help employees to abandon dogmas typical of a large organization, and to once more empower intrapreneurship initiatives. In conclusion, we believe that, as companies are seizing OS and OI opportunities, the world of work is impacted on at least three levels. First of all, institutions (companies, research centers, intermediaries..) provide people involved in the innovation ecosystem with skills of collaboration and absorptive capacity, and make them operate in OI scenarios and become living interfaces of multiple disciplines and languages. Second, companies are setting up or taking part to platforms and communities. These settings become the foci of a more informal and distributed innovation process, and a much fuzzier and less stable division of labor. Thirdly, these platforms and communities empower profound changes at the individual level. Crowdsourcing, technology transfer, intrapreneurship and business model innovation highlights the role of people, and drive the rising of increasingly not-linear developments of professional careers. Workers seeking significant success need to show the above mentioned "T-shaped" attitude, with diversified skills applied across different disciplines and roles through a constant reshaping and reinvention of their own professionality. ■

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Henry W. Chesbrough

Open Innovation is a term coined by **Henry W. Chesbrough**, Professor and Faculty Director of the Garwood Center for Corporate Innovation at Haas School of Business, UC Berkeley and visiting Professor at ESADE Business School, Barcelona.
Occasionally, someone innovates the discipline of innovation. Professor Henry Chesbrough is one of those people. He is the first person to clearly define the new innovation strategy that is restructuring R&D worldwide - Open Innovation.
The Open Innovation paradigm seeks and develops new ideas found outside your own organization and licenses to others your own intellectual property.

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Daniel Goleman

The big picture. Leading for the long future[1]

My late uncle, Alvin Weinberg, was a nuclear physicist who often acted as the conscience of that sector. He was fired as director of Oak Ridge National Laboratory after twenty-five years in the job because he would not stop talking about the dangers of reactor safety and nuclear waste. He also, controversially, opposed using the type of reactor fuel that produces material for weapons[2].

Then, as founder of the Institute for Energy Analysis, he initiated one of the nation's pioneering R&D units on alternative energy - he was one of the first scientists to warn about the threat of CO_2 and global warming. Alvin once confided to me his ambivalence about for-profit companies running nuclear power plants; he feared that the profit motive would mean they cut safety measures - a premonition of what contributed to the Fukushima disaster in Japan[3].

Alvin was particularly troubled that the nuclear energy industry had never solved the problem of what to do with radioactive waste. He urged it to find a solution that would persist as long as the waste remained radioactive - such as an institution dedicated to guarding those stockpiles and keeping people safe from them over centuries or millennia[4].

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1 Chapter extracted from the book by *Daniel Goleman* - Focus (2013), Seventh part, *"The big picture. Leading for the long future"*.

2 Alvin Weinberg favored thorium-based reactors, because they are immune to Fukushima-type accidents; the spent fuel has a far shorter half-life than uranium and, unlike uranium, cannot become used in nuclear weapons. There is a movement to resurrect thorium reactors and replace uranium-based ones. See *http://www.the-weinberg-foundation.org/*.

3 I don't know if Alvin ever took that view as a public stand. As for me, I'd rather see our energy needs met by nonnuclear, noncoal, and nonpetroleum-based systems one day.

4 Alvin Weinberg, *"Social Institutions and Nuclear Energy,"* Science, July 7, 1972, p. 33.

Decisions with the long horizon in mind raise questions like, How will what we do today matter in a century, or in five hundred years? To the *grandchildren of our grandchildren's grandchildren?*
In that far future the specifics of our actions today may well fade like distant shadows of forgotten ancestors. What could have more lasting consequence are the norms we establish, the organizing principles for action that live on long after their originators have gone.
There are think tanks, as well as corporate and government groups, that deeply ponder possible future scenarios. Consider these projections for the world in 2025, made by the U.S. National Intelligence Council:[5]

- Ecological impacts of human activity will create scarcity of resources like farmable soil.

- The economic demand for energy, food, and water will outstrip readily available sources - water shortages loom soon.

- These trends will create shocks and disruptions to our lives, economies, and political systems.

When that report was delivered, the federal government ignored the results. There is no agency, office, or particular government position charged with acting for the long term. Instead politicians focus on the short term - what it takes to get reelected, particularly - with virtually no attention paid to what needs to be done now to protect future generations. For too many politicians saving their jobs commands more of their attention than saving the planet or the poor. But it's not just politicians - most of us prefer immediate solutions.
Cognitive psychologists find that people tend to favor now in decisions of all kinds - as in, I'll have the pie à la mode now, and maybe diet later. This pertains, too, to our goals."We attend to the present, what's needed for success now," says Elke Weber, the Columbia University cognitive scientist. "But this is bad for farsighted goals, which are not given the same priority in the mind. Future focus becomes a luxury, waiting for current needs to be taken care of first."
In 2003, New York mayor Michael Bloomberg decreed that smoking was banned in bars. His decision got huge opposition - bar owners said it would ruin their business; smokers hated it. He said, You might not like it, but you'll thank me in twenty years.
How long does it take before the public reaction becomes positive? Elke Weber looked at Bloomberg's smoking ban, among other such decisions, to answer that question: "We did case studies of how long it took for a change that was initially unpopular to become the new, accepted status quo.
Our data shows the range is nine to six months."

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5 National Intelligence Council, *"Global Trends 2025: A Transformed World,"* November 2008.

That smoking ban? "Even smokers liked it after a while," Weber adds.

"They got to enjoy hanging out with other smokers outdoors. And everyone likes that bars didn't reek of stale smoke."

Another case study: The provincial government of British Columbia imposed a tax on carbon emissions. It was revenue neutral: the fees collected were distributed among the province's citizens. At first there was tremendous opposition to the new tax. But after a while people liked getting their checks. Fifteen months later the tax was popular[6].

"Politicians are in charge of our welfare," says Weber. "They need to know people will thank them later for a hard decision now. It's like raising teenagers - sometimes thankless in the short term, but rewarding in the long."

Reshaping systems

Soon after Hurricane Sandy devastated large parts of the New York City area, I spoke with Jonathan F. P. Rose, a founder of the green community planning movement, who was writing a book that looks at cities as systems[7]. "We're at an inflection point about the belief that climate change is a serious long-term problem we must deal with," Rose said. "Sandy's worst hit was the Wall Street area. You don't hear any climate warming deniers down there these days. In the Wall Street culture a quarter is a long time away. But Sandy may have gotten them to think about a much longer time horizon.

"If we reduce our production of heat-trapping gases today, it would still take at least three hundred years for the climate to begin to cool, perhaps much longer," Rose added. "We have strong cognitive biases toward our present needs, and are weak thinkers about the long away future. But at least we're starting to recognize the degree to which we have put human and natural systems at risk.

What we need now is leadership. Great leaders must have the essential long view that a systems understanding brings."

Take business. Reinventing business for the long future could mean finding shared values supported by all stakeholders, from stock owners to employees and customers to communities where a company operates. Some call it "conscious capitalism," orienting a company's performance around benefiting all such stakeholders, not just aiming for quarterly numbers that please shareholders (and studies show that companies like Whole Foods and Zappos with this broader view actually do better on financials than their purely profit-oriented competitors)[8]. If a leader is to articulate such shared values effectively, he or she must first look within to find a genuinely heartfelt guiding vision. The alternative can be seen in the hollow mission statements espoused by executives but belied by their company's (or their own) actions.

Even leaders of great companies can suffer a blind spot for the long-term consequence if their time frame is too small. To be truly great, leaders need to expand their focus to a further horizon line, even beyond decades, while taking their systems understanding to a much finer focus. And their leadership needs to reshape systems themselves.

That brings to mind Paul Polman, CEO of Unilever, who surprised me when we were both members of a panel at the World Economic Forum in Davos, Switzerland. He took that opportunity to announce that Unilever had adopted the goal of cutting the company's environmental footprint in half by 2020 (this was in 2010, giving it a decade to get there).

That was laudable, but a little ho-hum: many socially responsible companies announce global warming goals like that[9].

But the next thing he said really shocked me: Unilever is committed to sourcing its raw agriculture material from small farms, aiming to link to half a million smallholders globally[10].

The farmers involved mainly grow tea, but the sourcing initiative will also include crops for cocoa, palm oil, vanilla, coconut sugar, and a variety of fruits and vegeta-

6 Both these could be case studies (but are not) out of Ronald Heifetz and Marty Linksy, *Leadership on the Line* (Boston: Harvard Business Review Press, 2002). Heifetz's theory of adaptive leadership urges leaders to take unpopular stances like these when they are for the public good - and suggests savvy ways to handle the inevitable resistance.

7 Jonathan Rose, *The Well-Tempered City*, should be published in 2014.

8 Jim Collins makes a similar argument in his classic work Good to Great (New York: HarperBusiness, 2001). What Collins calls "Level Five" leaders take the long view, creating sustainable change. They seek prosperity over decades, not just for the quarterly return; they involve many stakeholders - not just stockholders - and create pride and loyalty in employees. They inspire commitment with a compelling vision and the corporate equivalent of immense focus and willpower, while remaining humble themselves. These are the leaders, Collins argues, of companies that are not just good, but great.

9 An Accenture survey of 750 global CEOs found that more than 90 percent endorse sustainability as a company goal.
See *http://www.accenture.com/us-en/Pages/insight-unglobal-compact-reports.aspx*.

10 Unilever does not buy directly from the farmers, but rather buys through suppliers, and will expand its web of suppliers to include those with strong networks of small farms.

bles. The farms involved are in areas ranging from Africa to Southeast Asia and Latin America, with some in Indonesia, China, and India.
Unilever hopes not only to link these small farmers into their supply chain, but also to work with groups like Rainforest Alliance to help them upgrade their farming practices and so become reliable sources in global markets[11].
For Unilever, this diversification of its sourcing lowers risks in a turbulent world, where food security has come on the radar as a future issue. For the farmers, it means more income and a more certain future.
This redrawing of the supply chain, Polman pointed out, would have a range of benefits, from leaving more money in local farm communities to better health and schooling. The World Bank points to supporting smallholder farming as the most effective way to stimulate economic development and reduce poverty in rural areas[12].

"In emerging markets three out of four low-income people depend directly or indirectly on agriculture for their livelihoods," according to Cherie Tan, who heads this Unilever initiative on sourcing from small farms. Eighty-five percent of all farms worldwide are in this smallholder class, "so there are great opportunities," she adds.
If we see a company as little more than a machine for making money, we ignore its web of connections to the people who work there, the communities it operates in, its customers and clients, and society at large. Leaders with a wider view bring into focus these relationships, too.
While making money matters, of course, leaders with this enlarged aperture pay attention to how they make money, and so make choices differently. Their decisions operate by a logic that does not reduce to simple profit/loss calculations - it goes beyond the language of economics. They balance financial return with the public good[13].
In this view a good decision allows for present needs as well as those of a wider web of people - including future generations. Such leaders inspire: they articulate a larger common purpose that gives meaning and coherence to everyone's work and engage people emotionally through values that make people feel good about their work, that motivate, and that keep people on course.
Focusing on social needs can itself foster innovation, if combined with an expanded field of attention to what people need. Managers at the India division of a global consumer goods company saw village men bloodied by barbers using rusty razors, and so found ways to make new razors cheap enough that those villagers could afford them[14].
Such projects create organizational climates where work has meaning and engages people's passions. As for teams like the one that developed those cheap razors, their labor can more likely become "good work": where people are engaged, work with excellence, and find meaning in what they do.

Big-picture leaders

Imagine taking to scale what's been happening for years at Ben & Jerry's Ice Cream. One of its popular flavors, Chocolate Fudge Brownie, calls for brownies to be broken up into the ice cream. Ben & Jerry's gets its truckloads of these tasty cakes from the Greyston Bakery, located in a poverty-stricken neighborhood of the Bronx. The bakery trains and employs those who struggle to find work, including once-homeless parents who, with their families, now live in nearby low-cost housing. The bakery's motto: "We don't hire people to bake brownies. We bake brownies to hire people."
Such attitudes represent the kind of fresh thinking intractable dilemmas call for. But there's a hidden ingredient in any true solution: enhancing our attention and understanding - in ourselves, in others, in our communities and societies.
In the sense that leaders influence or guide people toward a shared goal, leadership is widely distributed. Whether within a family, on social media, or in an organization or society as a whole, we are all leaders in one way or another.
The good-enough leader operates within the givens of a system to benefit a single group, executing a mission as directed, taking on the problems of the day. In contrast, a great leader defines a mission, acts on many levels, and tackles the biggest problems. Great leaders do not settle for systems as they are, but see what they could become, and so work to transform them for the better, to benefit the widest circle.
Then there are those rare souls who shift beyond mere competence to wisdom, and so operate on behalf of society itself rather than a specific political group or business. They are free to think far, far ahead. Their aperture encompasses the welfare of humanity at large, not a single group; they see people as We, not as Us and Them. And they leave a legacy for future generations - these are the leaders we remember a century or more later. Think Jefferson and Lincoln, Gandhi and Mandela, Buddha and Jesus.
One of today's wicked messes is the paradox of the Anthropocene: human systems affect the global systems that support life in what seems to be headed for a slow-motion systems crash. Finding solutions

11 While this will mean better profits, exactly what these might be will vary from crop to crop and season to season.

12 World Bank, *"The Future of Small Farms: Synthesis Report,"* World Development Report 2008, *http://wdronline.worldbank.org/worldbank/a/nonwdrdetail/87*.

13 John Mackey, co-CEO of Whole Foods Market, has been the front-and-center spokesman for this view, which he sees as part of *"conscious capitalism"*. Mackey, for example, gets a salary only 14 times greater than that of the lowest-paid Whole Foods workers; the fish sold there are carefully chosen so they do not deplete ocean biodiversity - among a long list of other tenets. See John Mackey and Raj Sisodia, *Conscious Capitalism* (Boston: Harvard Business Review Press, 2013). The view has caught the zeitgeist. See, e.g., Rosabeth Moss Kanter, *"How Great Companies Think Differently,"* Harvard Business Review, November 2011, pp. 66-78.

14 The five-rupee blade isn't the least expensive in India, but it's at a level most can afford. Ellen Byron, *"Gillette's Latest Innovation in Razors: The 11-Cent Blade,"* Wall Street Journal, October 1, 2010.

requires Anthropocene thinking, understanding points of leverage within these systems dynamics so as to reset a course for a better future. This level of complexity adds to layers of others facing leaders today, as challenges escalate into messes.

For instance, through the health and ecological impacts of our lifestyle, the world's richest people are creating disproportionate pain for the world's poorest. We need to reinvent our economic systems themselves, factoring in human needs, not just economic growth.

Take the growing gap between very richest and most powerful and poorest worldwide. While the rich hold power, as we've seen this very status can blind them to the true conditions of the poor, leaving them indifferent to their suffering. Who, then, can speak truth to power?

"Civilizations should be judged not by how they treat people closest to power, but rather how they treat those furthest from power - whether in race, religion, gender, wealth, or class - as well as in time," says Larry Brilliant. "A great civilization would have compassion and love for them, too."

While the perks and pleasures of a robust economy are alluring, there are also the "diseases of civilization," like diabetes and heart disease, which are worsened by the rigors and stresses of the routines that make those lifestyles possible (plus, of course, by that economic marvel, junk food).

This problem intensifies as we fail in much of the world to make medical services equally available to all.

Then there are the perennial problems of inequities in education and access to opportunity; countries and cultures that privilege one elite group while repressing others; nations that are failing and devolving into warring fiefdoms - and on and on.

Problems of such complexity and urgency require an approach to problemsolving that integrates our self-awareness and how we act, and our empathy and compassion, with a nuanced understanding of the systems at play.

To begin to address such messes, we need leaders who focus on several systems: geopolitical, economic, and environmental, to name a few.

But sadly for the world, so many leaders are preoccupied with today's immediate problems that they lack bandwidth for the long-term challenges we face as a species[15].

15 Job levels seem to link roughly to time horizons, the late consultant Elliott Jacques argued. Jobs like salesclerk or police officer, he proposed, encourage thinking in a time horizon of one day to three months; foremen and small-business owners tend to think in terms of three months to a year. The CEOs of smaller companies and division heads of larger ones might think as far as ten years ahead. And CEOs of global companies should think decades ahead. See Art Kleiner, *"Elliott Jacques Levels with You,"* Strategy + Business, First Quarter, 2001.

Peter Senge, who teaches at the MIT Sloan School of Management, developed the "learning organization," which brings a systems understanding into companies[16]. "Essential to understanding systems is your time horizon," Senge told me. "If it's too short, you'll ignore essential feedback loops and come up with short-term fixes that won't work in the long run. But if that horizon is long enough, you'll have a chance of seeing more of the key systems at play."

"The bigger your horizon," adds Senge, "the bigger the system you can see."

But "transforming large-scale systems is hard," said Rebecca Henderson at an MIT meeting on global systems. Henderson teaches on ethics and the environment at Harvard Business School and uses a systems framework to seek solutions. For instance, recycling, she points out, represents "change at the margins," while abandoning fossil fuels altogether would represent a system shift.

Henderson, who teaches a surprisingly popular course at the business school on "reimagining capitalism," favors transparency that would accurately price say, CO_2 emissions.

That would cause markets to favor any means that lowers those emissions.

At the same MIT meeting on global systems where Henderson spoke, the Dalai Lama said, "We need to influence decision makers to pay attention to the issues that matter for humanity in the long run," like the environmental crisis and the inequity in income distribution - "not just their national interest."

"We have the capacity to think several centuries into the future," the Dalai Lama said, adding, "Start the task even if it will not be fulfilled within your lifetime. This generation has a responsibility to reshape the world. If we make an effort, it may be possible to achieve. Even if it seems hopeless now, never give up. Offer a positive vision, with enthusiasm and joy, and an optimistic outlook."

A triple focus might help us become successful, but toward what end? We must ask ourselves: in the service of what exactly are we using whatever talents we may have? If our focus serves only our personal ends - selfinterest, immediate reward, and our own small group - then in the long run all of us, as a species, are doomed.

The largest lens for our focus encompasses global systems; considers the needs of everyone, including the powerless and poor; and peers far ahead in time.

No matter what we are doing or what decision we are making, the Dalai Lama suggests these self-queries for checking our motivation:

Is it just for me, or for others?
For the benefit of the few, or the many?
For now, or for the future? ■

16 Peter Senge's best-known book is The Fifth Discipline: The Art and Practice of the Learning Organization (New York: Doubleday Business, 1990).

Daniel Goleman

Uncontested world authority on emotional intelligence, **Daniel Goleman**, thanks to his contributions in the field of psychology, has transformed the world of business and beyond. **Daniel Goleman** taught psychology at Harvard and he is a scientific collaborator of *"New York Times"*. He was nominated by the *Wall Street Journal* and the *Financial Times* one of the most influential *business thinkers* in the world. He is the author of many best sellers including *Emotional Intelligence and Focus: The Hidden Driver of Excellence*.

Daniel Goleman is co-director at the Rutgers University in the *Collaborative for Research on Emotional Intelligence in Organizations*, which encourages research in the academic world and among professionals of organizations: **www.eiconsortium.org.**

Daniel Goleman is a founding member of the board of directors of the *Mind and Life Institute*, which was born to organize meetings between the Dalai Lama and some scientists. Today it deals with a broad range of initiatives, including encouraging research on contemplatives methods: **www.mindandlife.org.**

Daniel Goleman was a co-founder of the *University of Illinois of Chicago of the Collaborative for Academic, Social and Emotional Learning*, which outlined the best guidelines for the practice of socio-emotional learning in schools and encourages research for the evaluation of programs: **www.casel.org.**

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Smart collaboration: the future of work

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Smart collaboration: the future of work

the world is increasingly volatile, uncertain, complex, and ambiguous (VUCA). Organizations need to be continually on the lookout for new market developments and competitive threats, identifying essential experts and nimbly forming and disbanding teams to help tackle those issues quickly. At the same time, however, this rapidly changing environment demands that professionals need to specialize equally quickly in order to stay at the cutting edge of knowledge in their domain.

These two clashing trends mean that experts need to team up, sometimes across other companies, to tackle problems within the organization and for customers that are more complicated than they could adequately address by working in their own silo. That's what I call *"smart collaboration."*

My research shows that when organizations get collaboration right by creatively and cohesively integrating the expertise of individual specialists to solve complex problems, they earn higher margins, attract and retain the best talent, inspire greater customer loyalty, and gain a competitive edge among industry heavyweights. Yet, collaborating across organizational siloes is often costly, messy, and risky. Unless you know *why* you're collaborating and *how* to do it effectively, it may not be *smart* at all.

For more than a decade, I have examined smart collaboration among organizational leaders while on the faculty at Harvard Business School and now at Harvard Law School. My research is based on millions of data records collected across multiple organizations, as well as statistical analyses, case studies, survey results and in-depth interviews.

Both quantitative and qualitative findings reveal that *smart collaboration* makes organizations more productive, more profitable, more efficient, and more attractive workplaces. In this article, I'll lay out the business case for *smart collaboration*, explain how to construct clear metrics that keep professionals accountable, and dig into the pivotal role that leaders - everyone from middle managers to c-suite executives - play in fostering *smart collaboration* while facing the future of work.

The business case for smart collaboration

Let's be clear: collaboration is neither a "soft" topic nor a "nice to have." Our empirical research clearly demonstrates the quantifiable upside of collaboration, including benefits for individuals, their organization, and their customers. In fact, collaboration is a means towards achieving the penultimate goal of solving complex, interesting problems - and the ultimate goal of giving organizations a strategic, sustainable, and profitable platform.

As the future of work evolves, collaboration will become increasingly necessary. Nearly all occupations will be enabled more and more by artificial intelligence and other technological advances. This shift makes the strictly human elements - empathy, judgment, creativity - all the more powerful. Because *smart collaboration* relies on these factors to produce much more than an algorithmic combination of inputs, it will to allow collaborative workers to stay relevant and collaborative companies to outperform their rivals.

What's critical, though, is that collaborative efforts need to be clearly targeted at specific, deliberate outcomes where collective effort is truly essential to address VUCA issues. Meetings held just for their own sake, or unfocused "collaborate more broadly" directives actually undermine performance, create bottlenecks, waste resources, and breed cynicism. Truly smart collaboration, however, produces myriad benefits, as we outline below:

Increased revenues and higher profits. While there are many feel-good arguments in favor of collaboration, the real justification for effective collaboration can be found in the bottom line. The financial incentives for organizations that foster *smart collaboration* across business units are impressive. In one company, when product development specialists teamed up across three different business units, revenue from their customers was 160% higher than the sum of their individual sales in the prior year. Profits climbed even faster. Why? They were able to offer more holistic solutions to more vexing problems, and the "owner" of those troubles was a higher-up *executive* with more spending power. Customers valued the integrated, sophisticated answers and were willing to pay. As the CFO of one Fortune 100 company told me, "Margins rise with complexity."

Have you run the numbers in your company? **Figure 1** shows how margins accumulate in one organization that provides multiple services to some of its customers. Delivering two services to a customer produces 5.7 times the profits of a single service. When five units teamed up to deliver a joint offering, profits jumped to a whopping 17.6 times those for the average service alone.

Increased customer loyalty and retention. Having access to multiple smart people can be a big deal for your customers. It conveys, first and foremost, that you value the relationship, and that you will pull in all the right resources to solve their business problems. Customer tend to stick with organizations in which their relationships that go deep and wide. In fact, the more *business units* serving a customer, the longer that customer remains with the organization, even if the lead salesperson changes. The relationship is even stronger when multi-expert teams span business units and when they serve multiple contacts within the customer's organization. Consider the risk of losing a customer when one of your key salespeople departs: results show that probability drops from 72 percent to 10 percent if the account is served by a pair of co-leaders, rather than a solo account handler.

Benefits accrue for collaborators, too. Aside from company-level benefits, collaboration enhances a specialist's ability to cultivate a reputation for providing high-value expertise to customer problems. As one *top executive* explained, "Professionals must actively seek out other experts and build their network for any chance of long-term success.

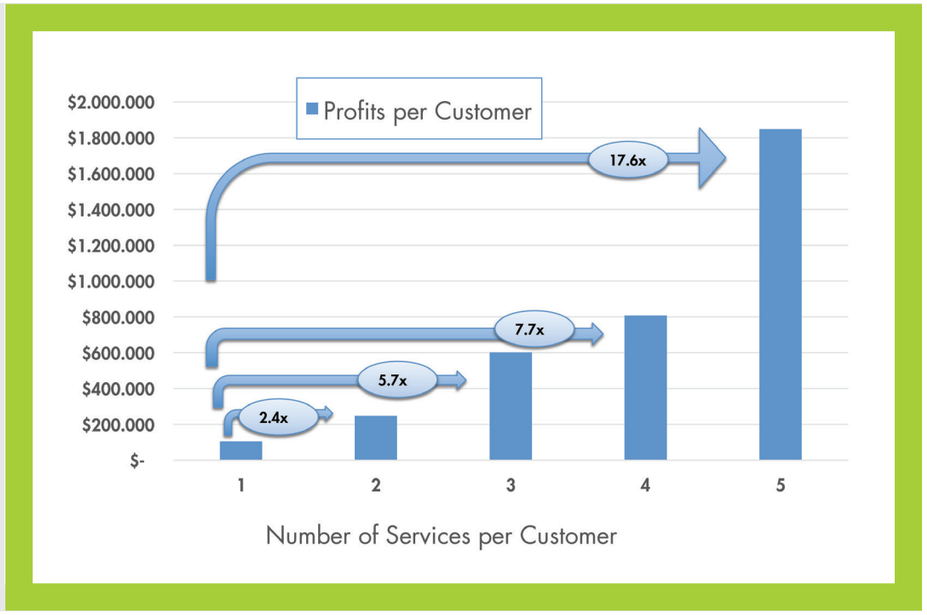

Figure1. Profit Impact of *Smart Collaboration*.

Customers increasingly demand that we take a holistic view of their business, and that's impossible with soloist mindset."

Figure 2 shows the network (and the ultimate business outcomes) of two coworkers who are nearly identical in terms of their demographic and professional characteristics. Each dot on the diagram represents a colleague in their organization, and the lines between them indicate that they've spent at least 15 hours that year working together on a specific customer project (not merely working on separate projects inside that customer).

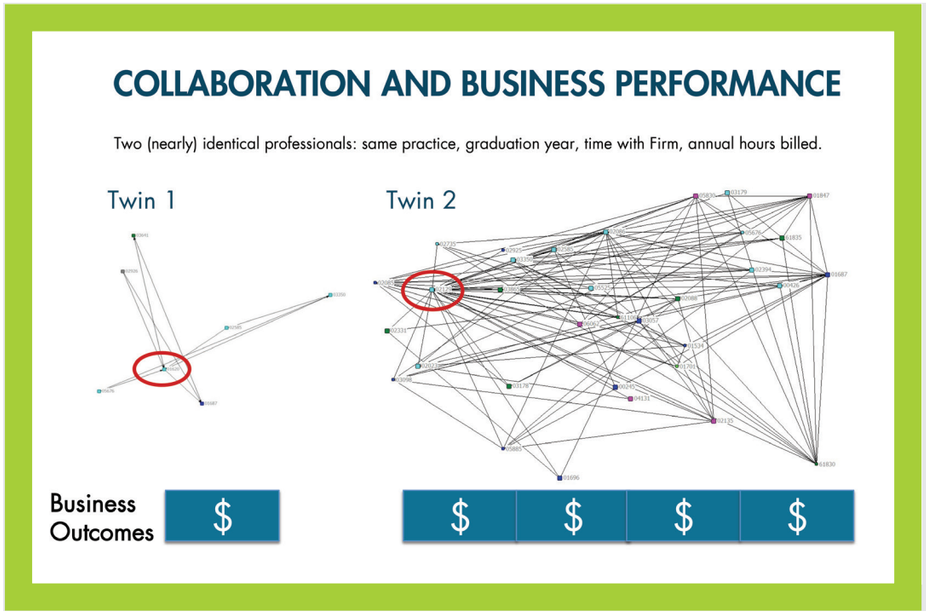

Figure 2. Collaboration and Business Performance.

While they worked the same number of hours overall, they spent their time differently. Twin 1 brought six other colleagues into projects he led, half of whom were from outside his own *business unit*. Twin 2, by contrast, involved more than 30 other colleagues in his work, two-thirds of whom were from outside his *business unit*. Ultimately, Twin 2's cross-department approach paid off: He generated more than four times higher revenues than Twin 1.

Figure 2 illustrates the lucrative, career-enhancing benefits of collaboration for professionals who actively engage in building their network and spending time collaborating alongside their colleagues.

Spot more sophisticated work. Multidisciplinary projects also help professionals learn how to identify more sophisticated work opportunities with the confidence that their colleagues will help them deliver high quality work.

As one *rainmaker* said, "The more brains we have inside the customer, the more we can spot opportunities to innovatively solve their problems." As professionals become more in tune with customer's business dilemmas holistically and quicker to seek insights from their colleagues, they are better equipped to provide well-reasoned, sophisticated solutions that actually work. And the best companies equip and empower their workers to build networks both inside and outside their organization so that they can leverage the very best expert, quickly and confidently.

More innovative outcomes. Collaboration produces more innovative outcomes - that is, solutions that are both novel and useful, and which therefore lead to long-term benefits for customers. Getting employees to collaborate across units makes it easier to spread and leverage technology and other kinds of investments, because adoption jumps once people understand how those tools are used elsewhere. Innovation differentiates an organization from the pack, generating higher profits in the near term and more sustainable competitive advantage in the long term.

Obstacles to smart collaboration

Considering the sort of value-added, sophisticated collaboration that customers want, why do professionals find it so difficult to see the potential benefits? One reason is that people confuse cross-selling with collaboration, and customers hate that approach because it is self-interested rather than customer-focused. Moreover, many professionals (think of typical salespeople or scientists) are simply not used to working in teams; they have had far more experience in competitive, individualistic settings.

Distrust of colleagues' *competence* is another obstacle, including concerns that colleagues won't uphold high enough levels of quality and responsiveness. In some companies, lack of *interpersonal* trust is even more pressing; some professionals worry that a colleague might take undue credit for success, hijack a relationship with a customer or higher-level executive, or exit the company with critical insights and know-how.

Another hurdle is that collaboration takes time. The financial rewards of collaboration, such as referrals from colleagues after working together, accrue slowly over time. But most of the costs and risks, such as locating an expert and accessing whether she's trustworthy, available and conflict-free, are borne right away. Fortunately, as professionals gain more experience with collaboration, the costs tend to fall because people discover how to collaborate more efficiently and effectively as they construct a set of reliable collaborators.

Establish accountability with clear metrics

The up-front investment costs to learning new skills and building relationships can be tricky to navigate and hard to know if you're getting it right, so professionals need ways to know they are on track - and to demonstrate progress to others, too.

The shift toward more collaborative behaviors requires vigilance and determination, and leaders set the tone for how well collaboration is received and executed. Clear metrics are critical both for accountability and signaling to professionals at all levels of the company about how collaboration is measured and rewarded. If you want to tie some portion of employees' financial rewards to collaboration - that is, to the *way* they achieve their objectives, rather than just the outcome themselves - then you need a credible, non-burdensome method of measuring their behaviors and holding them accountable. You need a system that can't be gamed, but also has teeth.

- Analyze your data. Measure and understand today's level of collaboration to set benchmarks, uncover areas of excellence, and find pockets of opportunity. A data-driven approach is not only more accurate and less biased than relying on individuals' perceptions, but also more convincingly demonstrates the quantifiable upside for *smart collaboration*.

- Set the overall company strategy and then provide guidance for groups and individuals to set their own objectives. Use a holistic strategic planning review to determine where to focus your organization's resources and attention. Your company's top performing individuals are smart and savvy, and a well-structured framework will give them a balance of autonomy and guidance to allow them to flourish. Over time, leaders can track progress, and celebrate even small wins in order to build momentum.

- Deploy performance management software that helps collaborators see work-in-progress, share knowledge about their projects, and push objectives to the appropriate resources. The right software, implemented thoroughly and actively supported by the highest-level leaders, can promote ownership, accountability, and transparency. In turn, this transparency helps foster a sense of common purpose by giving participants a deeper understanding of company issues and how various pieces intersect; it also aids learning as participants get exposure to others' ways of thinking - not simply their end results. Build objectives into performance review systems, but just as important: make them a living, breathing part of the organization's culture by recognizing and celebrating people who are making strides.

If rising stars are not collaborating effectively today, it's surely not because they're stupid or obstinate; it's often because you are holding them to the kinds of short-term metrics that work against collaboration. Investments in the collaboration take time to bear fruit, and you and

your leadership team are the only ones who have the authority to demand (and reward) institutional patience.

Leaders make collaboration happen

Promoting collaboration to benefit your organization is everyone's responsibility - but especially falls to formal leaders. Leaders who want to build a culture of collaboration must model the same collaborative behavior that they expect in others: contributing to colleague's work and sharing credit with those who participate in their own, for example. Here are some additional best practices for leaders to help foster effective collaboration:

Across the organization

Stop hiring jerks. Hire people who model collaborative behaviors. You can only build an organization where individuals invite their peers on joint projects if they trust each other.

Manage your talent at all levels. A robust, organization-wide talent management system gives leaders (and colleagues) reliable indicators of expertise and skill, which fosters competence trust across diverse educational backgrounds, degrees, and cultural norms. Further, programs designed for rising stars to rotate between departments or offices are some of the best ways to build bridges and establish networks of trust. Organizations need to invest in developing their leaders at all levels, through formal programs and informal *coaching*, so they can understand the larger business needs and be able to offer solutions that go broad and deep.

Showcase collaboration. Distribute "latest wins" to highlight big and little cross-unit success stories via email bursts. Or stage 20-minute *"road show"* presentations to allow employees to highlight their expertise and potential cross-practice collaborative opportunities. One company set up an internal "swat team" of highly experienced salespeople to accompany executives on customer lunches to help them probe for collaborative opportunities.

Within a team

Create an organization-wide approach for effective project launches. In McKinsey, for example, project leaders kick off every new engagement by briefing the team on the project objectives, and then clearly discussing how each person's piece fits into the bigger picture. Teams also spend some time getting to know each other's work styles, strengths, and development areas. This step is essential for aligning members' goals, helping them know where to turn with questions (which avoids the leader becoming the sole-source bottleneck), and allowing them to see how their specialty contributes to a bigger solution. Develop a template, train managers on how to use it, then give the system teeth: Withhold their expense code until they actually conduct the project launch.

Facilitate personal within-team interactions. People won't build relationships or feel the benefit of peer support unless they have the opportunity to interact during collaboration. Provide a travel budget that allows members some face-to-face time together - ideally, early in the project, when they need to establish trust. Throughout and at the end of the project, a modest celebration fund will encourage teams to focus on their wins. These interactions enhance members' sense of pride and accomplishment, boost morale, and build the "glue" that is the essence of a collaborative culture.

Embed explicit learning processes. Taking a cue from elite military units, the best team leaders use the time right before the celebration event to conduct a short after-action-review (AAR) to boost team members' learning from both mistakes and successes. AAR is a form of group reflection; participants review what was intended, what actually happened, why it happened, and what was learned. Critically, the intent is to learn rather than blame. Only this kind of low-risk reflection makes learning possible. As a leader, you should model this behavior, and hold your people accountable for doing it, too.

When it comes to fostering stronger, more efficient, more reliable collaboration within your organization, there is no "silver bullet." The prescriptions detailed above are only a starting point for developing a highly tailored, customized strategy that fits your organizational challenges.

Conclusion

Smart collaboration is an investment that takes time to generate returns. Clear evidence shows that those benefits do accrue for workers, their companies, and their customers when they collaborate across silos to tackle sophisticated issues. Customers' needs are shifting and the future of work is shifting; both trends are forcing organizational leaders to rethink how they extract value from the collective expertise of their solo specialists and push their organizations forward. Companies that kick-start a journey toward more collaborative, higher-value business solutions - and sustain the momentum till the benefits materialize - will emerge as the clear leaders with a sustainably successful future. ■

Heidi K. Gardner

Heidi K. Gardner, PhD, is a Distinguished Fellow at Harvard Law School's Center on the Legal Profession and Faculty Chair in Harvard's executive education courses. Previously she was a professor at Harvard Business School, a consultant with McKinsey & Company, and a Fulbright Fellow. Dr. Gardner's book *"Smart Collaboration: How Professionals and Their Firms Succeed by Breaking Down Silos"* was published by Harvard Business Press in 2017 and became a *Washington Post* bestseller. She has authored or co-authored more than sixty books, book chapters, case studies, and articles. Dr. Gardner earned a Master's degree from the London School of Economics and a PhD from London Business School. She has lived and worked on four continents. She was named by Thinkers 50 as a *Next Generation Business Guru*.

Tammy Hughes

Seriously, leaders, we have to be generationally-savvy

"People resemble their times more than they resemble their parents."
Arab proverb

When they were adolescents, how did your employees listen to the music of their era: radio, records, 8-tracks, audio cassettes, iPods, or streamed on-line? Is a turning point in their personal history the tragedy at Chernobyl, the end of Apartheid, or planes crashing into the World Trade Center? Do they prefer to work alone or on teams? Is their best work delivered at a quiet desk or in a bustling coffee house? Do they wear suits, hoodies and jeans, or muscle shirts?

If your company is like many these days, you probably are answering "all of the above." And, if you're like most of us, you probably think you understand and work fairly well with colleagues who share a similar history to yours. But perhaps you're more than a little confused about how to make a connection, communicate effectively, and work alongside staff members who, at times, seem to have grown up on a different planet!

Not that long ago, people from different generations were separated at work by rank and status. In more traditional organizations, the oldest employees filled executive positions, the middle-aged held mid-management jobs, and the youngest worked on the front lines. Because of the nature of work, we weren't all that likely to work on a daily basis with those in other age groups. My, how times have changed!

For the first time in modern history, workplace demographics now span four generations.

Twenty-five-year-old new hires today find themselves working side-by-side with colleagues forty years older than they are. And, **today's twenty-five-year-olds aren't like twenty-five-year-olds just twenty years ago**. Sure, they are experiencing the same season of life, but their generational thumbprints are radically different. Generational research shows us that attitudinal distinctions emerged from all four of the generations we'll explore in this chapter. Each generation has a mood and values all its own.

A few years ago, our founder, Claire Raines, took her 40 plus years of research and created a tool to help people figure out which generational values resonate most with them. Statistical analysis of our Values & Influence Assessment™ *(**http://www.generationsatwork.com/values-assessment**)* shows that not everyone is squarely representative of the generation they were born into. Other factors - such as ethnicity, regional influences, religion and education - may have weighed more heavily than the generation they were born into. Our research shows that a **staggering 40% of the population was born in one generation, but has the values and beliefs consistent with the way another has traditionally been described**. When we make assumptions about age and use that assumption to guide the way we work and communicate with colleagues and customers, we will likely be right only about 60% of the time. Not such great odds, right?

To be clear, assessing a person's generation is a good starting point. But be prepared to adjust when you pick up on cues that the person doesn't necessarily fit the profile for the generation they were born into. This is why we explore all four generations in this chapter. You may not have WWII-aged talent in your organization anymore, but you definitely have people with WWII values. And that's a really good thing.

While the mix of generations working side-by-side has potential to create challenges, navigating those challenges is pivotal. Hiring a generationally diverse mix - and making the mix really work for you - has fantastic ramifications. A 2018 study by Cloverpop shows that **decision-making teams that include a wide range of younger and older employees significantly outperform more narrowly young or old teams. These multi-generation teams are more likely to identify better choices and deliver results that meet or exceed expectation.**

Generations match - all around the globe

Regardless of who we are and where we grew up, the common features within generations cut across racial, ethnic, cultural and economic differences. **As unique as people's individual experiences may be, they share a place in history with all members of their generation.** All members of a generation have been influenced by the world events, music, technology, heroes and catastrophes that occurred during their most formative years.

So when - and where - were you born? Broadly speaking, a generation covers approximately two decades. A person's birthplace influences the generational timeframe.

In the US, many consider those people born between 1940 and 1960 Baby Boomers, even though the post-World War II boom in births began in 1946 and continued through 1964.

Since different countries have experienced similar influences at slightly different times, birth years for the generations vary somewhat, depending on country-specific political and economic events. For example, South African researcher Graeme Codrington extends the birth years for the Baby Boomers into the early 1970s based on the date of the National Party's assent to power. He says the South African Boomers made abolishing Apartheid a cause in much the way the U.S. Boomers embraced the civil rights movement.

The generations also tend to overlap. Most people who are born in the early or late years of each generation actually identify with a couple of generations, sharing some characteristics and similarities in how they view their world.

Around the world, we're different, yet very much alike! Regardless of birth country, a generation is a group of people who are "programmed" at the same time in history. For each of us, during our first, most formative years, we've been coded with data about what's right and wrong, good and bad, stylish and unstylish. Individuals in our own generation share knowledge about a common set of events and trends, headlines and heroes, music and mood, parenting style and education system.

In our digitally connected world today, much of that coding crosses political and geographic boundaries. Whether you were a Baby Boomer growing up in the 1960s in what was then the Soviet Union or in the United States, you were influenced significantly by the dawn of the space age. If you were a Generation Xer, you were likely impacted by the Challenger and Chernobyl disasters in 1986. If you're a Millennial, whether the Asian tsunami in 2004 or Hurricane Katrina in 2005 hit closest to your home, both influenced your relationship with your world.

Throughout the world, dozens of books have been written about marketing to and managing the different generations. In the U.S., the study of generational differences has been going on for more than forty years. In 2000, demographer David Foot analyzed the generations in Canada and reported on his work in the best-selling Boom, Bust and Echo. That same year, the Japanese Ministry of Education funded a research project on Japan's changing generations. At about the same time, South African Codrington began studying the generations in New Zealand, Mauritius, England, Russia, and South Africa.

What all these demographers have found is that, no matter what country people live in, the characteristics of the generations are, in general, similar. This is especially true for those who grew up in urban areas, were educated, and were exposed to international media.

Who are these generations?

The largest percentage of today's workforce, ***Millennials***, were born between approximately 1980 and 2000. They are the first generation to grow up fully immersed in the pool of digital technology. They are connected 24/7 to friends, parents, information and entertainment. They tend to have high expectations, clear goals, are willing to work hard and expect to have the support they need to achieve. As our fastest growing cohort, it's predicted that Millennials will make up 75% of the workforce within a decade.

Generation Xers were born between 1960 and 1980. They grew up during a time when the worldwide energy crisis sent global economies on a roller coaster ride. Many of their parents worked while they were growing up and they learned to be independent. They bring self-reliance into the workplace. They are willing to work hard, but they want a life beyond work.

Baby Boomers, born between 1940 and 1960, were taught to get along with others. They have been the primary force behind workplace practices like participative management, quality circles and teambuilding. And many Boomers are choosing to continue working during what have traditionally been considered retirement years.

Born before 1940, **World War II Generation** workers grew up in the wake of a worldwide economic depression. They excelled at making things last and recycling. They have a strong commitment to their families, their communities and their country. Their values and work ethic still influence policies and practices in the workplace.

MILLENNIALS

Strengths:

- Optimistic
- Propensity to multi-task
- Technologically savvy
- A global world view
- Goal- and achievement-oriented
- Believe in volunteerism and serving their communities
- People focus

Challenges for employees and managers:

- Need supervision and structure
- Need frequent feedback and check-ins
- Not as comfortable with losing
- I nexperienced - particularly in handling challenging "people issues" in the workplace
- View changing jobs as a natural process and part of their daily schedules
- Craft a sense of play and fun in the work atmosphere

What attracts, motivates and retains them?

- Managers who connect their actions to their personal and career goals
- The promise of working with other bright, creative people
- Having adequate time and flexibility to live the life they want
- Driven by Work-Life Blending [integrated]
- Approachable leaders who mentor them
- Regular opportunities to learn new things
- Making a difference in the world, and world of work
- Creating a positive work arena

GENERATION XERS

Strengths:

- Adaptable
- Technologically literate
- Independent
- Creative
- Expect to contribute
- Willing to buck the system
- Driven for efficiency
- Task focus

Challenges for employees and managers:

- Skeptical
- Distrust authority
- Less attracted to leadership positions
- Flexibility isn't a wish, it's a demand
- Don't play on teams organically well
- Morale issues if you don't have too many or purposeless meetings

What attracts, motivates and retains them?

- Give them accountability for results, but flexibility in the delivery
- Having very few rules
- Having the newest technology
- Being more informal than "corporate"
- Driven by Work-Life Balance [separation]
- Working smarter, not harder

BABY BOOMERS

Strengths:

- Committed to customer service
- Dedicated and willing to work long hours
- Good team members
- Optimistic
- Future-oriented
- A wealth of experience and knowledge
- People focus

Challenges for employees and managers:

- Uncomfortable with conflict
- Sometimes put process ahead of results
- Viewed as hypocritical, do what I say, not what I do
- Keeping things democratic and consensual

What attracts, motivates and retains them?

- Leaders who get them involved and show them how they can make a difference.
- Managers who value their opinion and recognize their contributions
- Being part of a productive team
- Recognition and vertical growth
- Personal growth

WORLD WAR II GENERATION

Strengths:

- Strong work ethic, willing to work long hours
- A wealth of experience
- Discipline
- Loyalty defined by tenure

- Believe in the "greater good"
- Focus and perseverance
- Stability
- See work as a privilege
- Task focus

Challenges for employees and managers:

- Reluctant to buck the system and speak up when they disagree
- Uncomfortable with conflict
- Not concerned with political-correctness
- Change resistance
- Quick to net things out, abrasive communication style

What attracts, motivates and retains them?

- Seeing how their actions affect the overall good of the organization
- Respect for their knowledge, experience and insights
- Rewards and awards for their perseverance and work ethic
- Quiet space to work

THE VIEW FROM EACH GENERATION'S WINDOW

	MILLENNIAL GENERATION	GENERATION X	BABY BOOM GENERATION	WWII GENERATION
OUTLOOK	Hopeful	Skeptical	Optimistic	Practical
WORK ETHIC	Ambitious	Balanced	Driven	Dedicated
VIEW OF AUTHORITY	Relaxed, Polite	Unimpressed	Love/Hate	Respectful
LEADERSHIP BY	Achievement, Pulling together	Competence	Consensus	Hierarchy
RELATIONSHIPS	Inclusive	Reluctant to Commit	Personal Gratification	Self-sacrifice
PERSPECTIVE	Civic-minded	Self-reliant	Team-oriented	Civic-minded
TURN-OFFS	Unfairness	Cliché, Hype	Political Incorrectness	Vulgarity

The newest generation, born after 2000, still waiting to step onto the stage in the world of work is referred to loosely as **Generation Z**. Generations usually get their "name" when the oldest are in their late teens. Currently, the oldest members of this generation are mostly in entry level positions at the bottom rung of the corporate ladders. While we can make some predictions about them, we won't have any solid workplace research about them for a few years. Leaders can be sure, though, they'll need to study and lead them in a slightly different manner to be effective.

GENERATION Z: 10 PREDICTIONS

1. In just the way Gen Xers felt they grew up in the shadow of the Baby Boom, Z's will feel like they're coming of age in the shadow of Millennials.

2. They'll learn from the school of hard knocks. Z's will be less doted upon and sheltered than Millennials were as children.

3. They will be more independent. This generation will learn to watch out for themselves and will be less collaborative than the generation before them.

4. They will be needed on the job market. Virtual learning consultant Adam Renfro, who studies Generation Z as students, says that 65 percent of them will work in jobs that don't even exist today.

5. Racial, ethnic, and gender boundaries will be invisible to them as groups once considered minorities become the majority.

6. They will be a less powerful generation than the Millennials.

7. They will be forced to develop thick skins as they deal with criticism from older generations.

8. They will rebel against the Millennial way.

9. They will live in a less youth-oriented, more adult-focused, world.

10. They will be saddled with economic responsibility for a huge aging population."

from "Claire Raines on 10 Predictions for Generation Z," by Claire Raines. AMACOM Books Blog. *https://amacombooks.wordpress.com/2013/03/14/claire-raines-on-10-predictions-for-generation-z/*

What the generations have in common

Working across generations, it's easy to identify differences between and among groups. However, it's important to recognize their similarities as well.

If we use a one-size-fits-all approach to leading all of the generations, we're likely to only resonate well with one segment. It's only natural to "go on auto-pilot" and communicate, contribute, and lead in a way that makes perfect sense to us.

Successful organizations are ensuring that company leaders not only understand these similarities but create work environments that support them. According to recent research conducted by the Center for Creative Leadership, employees across the generations agree that:

- Work is a vehicle for personal fulfillment and satisfaction, not just for a paycheck.
- Workplace culture is important.
- Being trusted to get the job done is the number one factor that defines job satisfaction.
- They need to feel valued by their employer to be happy in the job.
- They want flexibility in the workplace.
- Success is finding a company they can stay with for a long time.
- Professional development is the most valued form of recognition, even more so than pay raises and enhanced titles.

Keys to make your current and future generational tapestry thrive

Creating a climate of respect for differences throughout your organization is a critical foundation for bringing out the best in employees from each generation. Building upon shared values, attitudes and behaviors while reaching out in ways that are appropriate to each group will be the key to a manager's success both today and in the future of work. Company leaders would do well to follow **The Titanium Rule** which guides us to **Do unto others, keeping their preferences in mind!**

With the rapidly changing landscape and influence of technology, organizations will succeed when they create a work culture that encourages people from all generations to contribute from their strengths. When people have to spend energy turning off their natural style to conform with the mainstream, they lag behind on the productivity curve. **In order to get the best out of our talent, we must create organizational cultures where everyone contributes out of their strengths MOST of the time.** Sure, everyone needs to adapt and flex their style once in a while.

But, the organization really loses out when people flex their natural style all the time. At the end of the day, we don't get their best work either. With generational strengths, think of this like you do your dominant hand.

If you're naturally right-handed - but you realize everyone at the top of your organization, where you want to eventually be, is left-handed - you are likely to start using your left-hand. You're probably not very skillful with that left hand. It's likely that people could barely read what you might write. And you'd be fighting with your brain much of the day because it's wired for right-handedness.

Dominant hand research says that people with "true" ambidexterity only make up about one percent of the population. In order to get their best output, we need people to operate in ways that make sense to them.

Six principles for managing generations in the Next20

- **Know your company demographics - internally and externally.** Gather data about your current customers and target where you want to increase market share. Bather data and learn about your employees and consider how well your staff mirrors current and projected customers.
- **Be intentional about creating and responding to generational diversity.** Identify needed skill sets within the company and recruit new staff from across the generations. Seek out individuals from under-represented generations for work teams, boards and advisory groups.
- **Build on strengths.** The most effective mixed-generation work teams recognize the unique strengths of each individual. Successful companies find ways to bring out those strengths and help each individual develop his or her talents so they can reach their own potential and contribute in their own ways.
- **Offer options.** Recognize that people from a mix of generations have differing needs and preferences.
  Design your human resources strategies to meet varied employee needs. Offer a variety of benefits, flexible schedules, and an array of opportunities for professional growth and advancement.
- **Develop an understanding of and appreciation for generational differences and strengths.** Find ways to learn about your employees' needs, perspectives and interests and share that learning across the organization.
  Structure opportunities for less experienced employees from each generation to learn from their more experienced and knowledgeable colleagues, while tapping into the natural strengths that each brings.
- **Intentionally train people to communicate effectively across generations.** This just doesn't happen organically. Communication styles and levels of comfort with varied technologies differ from one generation to the next.
  Successful companies recognize those differences, employ an array of communication methods and teach employees how to reach out effectively to their colleagues and insure that their communication approaches are inclusive and welcoming. ■

Tammy Hughes

www.Generations at Work.com

Tammy Hughes is a dynamic facilitator, presenter and business leader with over two decades experience in a broad spectrum of organizations and industries around the globe. She launched her career at *Xerox Corporation*. Participants' response to Tammy as a *session leader* is overwhelmingly positive. She is fascinated by and knowledgeable about generational and values differences - and her passion permeates her style. She paints the research with fun, real-life stories from the workplace and her life. By working with participants to identify workable strategies, she facilitates dramatically increased business results. Tammy is the author of a White Paper, *"Born in One Generation, Thinking Like Another."* With Pat Heim, she is co-author of the third edition of *Hardball for Women* (Plume, 2015).

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Skills for jobs of tomorrow

Changes in the world of work, including increased digitalisation and automation, will have a profound impact on demand for skills, both in terms of quantity and quality. In the midst of the great uncertainty, one thing is certain: no matter whether the future technological advancement will bring more or less jobs, job tasks are going to change profoundly. New types of jobs and new forms of work engagement will also alter the nature and conditions of work. All these changes will require different sets of skills.

It is true however that disrupting changes have always been present and **technological change** is as old as our civilisation. Inventions and their diffusion are the essence of evolution of humankind. So what is so different now that causes heated discussions in the media, among politicians and a broader public?

Let's look into some history. One could imagine that the impact of a wheel invention in around 3500 BC must have been revolutionary for the transportation system and regional trade. However, it took the mankind around three hundred years until someone decided to use the wheel, originally invented for pottery, in chariots. It was not before another three thousand years that the compass was invented - another potentially revolutionary invention for navigation and thus trade. But then another twelve centuries were necessary before it was put in use! In a more recent history, the speed of diffusion of inventions into broader use was increasing exponentially: it took decades for the telephone to achieve a massive usage but less than five years in case of cellphones. Cellphones' penetration in developing countries quickly overtook the fixed line phones, still poorly diffused, and demonstrated one of the most impressive technological leapfrogging.

The accelerated pace of innovation and diffusion of technologies is the feature of current times. Digitalisation of industry, but also agriculture and services make the product life shorter and require the adjustment of design and related technological solutions, no matter whether we speak about car making or precision agriculture. Therefore industries will be increasingly thirsty for new skills. This certainly cannot be achieved purely by recruiting new workers. Effective skills upgrading, on- and off-the-job training of adults will become a source of comparative advantage for businesses, industries and economies.

Another feature of current changes is its **disruptive nature**. However, the invention of a steam engine or a sewing machine were big technological breakthroughs of the time, and were also hugely disruptive for labour markets destroying some jobs but creating many more new ones. Every wave of technological development has always been associated with discussions about potentially large jobs losses. And every wave turned out to destroy some jobs but eventually created many more new ones.
The question now remains open whether Artificial Intelligence (AI) is a real game changer capable of disrupting this longer term pattern.

Several studies suggest the current technological revolution (unlike evolution, the term points to its disruptive nature) could lead to substantial job displacement. Estimates of automatability of jobs vary widely ranging from around ten per cent to two-thirds. However, and importantly, such estimates refer to jobs that *could* be automated, rather than jobs that *will* be automated: technological adoption depends on economic and other considerations, as much as (if not more) on technical feasibility (ILO 2016).

There is no clear agreement in the current academic discussion about whether only routine tasks and thus jobs where they prevail may be displaced by technologies, or whether machine learning and AI allows for a potential displacement of any job, including high-skilled ones. In other words are jobs of low-wage assembly-line workers more susceptible for displacement than jobs of teachers, doctors and layers? And the answer is yes but it does not mean that high-skilled jobs are anyhow secured in future. If AI is indeed a real game changer, its ability to learn will eventually concern all skill levels. Much depends on how the workers are ready to embrace the new technological solutions for their own benefit becoming more productive and freeing time for new tasks in which machines cannot compete with humans. Future automation is unlikely to destroy complete occupations, but is likely to affect some jobs and tasks

within occupations with some jobs disappearing and others only changing.

Technological change however represents not only the challenge but also **an opportunity**. Some estimates suggest that one technology job creates four to five jobs indirectly across all income groups through multiplier effects, often in new occupations and industries. For instance, fears that e-commerce would destroy jobs of sales workers did not come true: their number grew but nature of tasks and skill needs changed. Furthermore, technological advancements go way beyond automation: additive manufacturing, innovation in infrastructure, Internet of Things, bioengineering, renewable energy generation, nanotechnology and many other technologies are all expected to generate jobs - directly or indirectly through supply chains and as the result of reinvestment of time saving and profits.

Jobs with higher digital content requiring strong digital skills are less susceptible for displacement. **Digitalisation** is reducing demand for routine and manual tasks while increasing demand for digital literacy, complex tasks and problem-solving. For instance, with growing digitalisation, jobs of librarians and translators have been predicted to disappear but what is rather happening is a change of these occupations: librarians become information clearance workers serving communities and translators turn into editors with high degree of digital skills' application in both cases. Technological change is likely to require workers in research and innovation (the so-called STEM - science, technology, engineering and mathematics) and those who can deploy technology projects requiring business leadership and management skills, and many more workers with technical and vocational skills to operate and maintain technologies.
Technological change also requires interdisciplinary thinking and training.

Also the jobs that require a human "touch" and interpersonal skills where workers have a comparative advantage over machines will continue being in demand, at least in the near future. Core skills, such as problem solving, critical thinking, team work, leadership, communication, initiative, coordination become a source of comparative advantage and an employment security mechanism that allows to transit between jobs, occupations and sectors.

Technological change however is only one of many global megatrends that shape skills demand. Over recent decades **increased trade integration** contributed to a greater specialisation of economies and firms focusing on particular tasks across global value chains. Outsourcing of labour intensive production tasks has resulted in the relocation of relatively lower skilled jobs from developed countries to low-wage economies. Developed economies have specialised on high-skilled tasks such as R&D, design, finance and after-sales services, while developing countries attracted many of the low-wage and low-skilled jobs (ILO-WTO, 2017). With technical advancement, some of off-shored production jobs may become more skill intensive and potentially more attractive for workers in high-income countries. It remains to be seen whether this trend will eventually lead to jobs' "reshoring" back to high-income countries. In case reshoring becomes a significant trend, developing countries will be faced with a new set of challenges, including the need to strengthen skills policies so that workers are employable in other activities (ILO 2016).

Changes in work organization and management practices have become embedded in modern human resource management and business models (lean and kaizen business models) since the 1980s. The changes emphasize high performance and engagement by workers through mechanisms such as teamwork, multiskilling and problem-solving. A related concept of continuous improvement and discussions about the needs of the knowledge economy brought about the concept of learning organisation.

New technologies, global value chains, a call for a better work-life balance and volatile market demand have also spurred **a growing share of non-standard forms of employment**, increasing involvement of temporary, casual, oversees, on-call employees and external contractors for specific projects, virtual and gig economy workers. Their overall importance has increased over the past few decades in both industrialized and developing countries, and across economic sectors and occupations (ILO 2016a). Furthermore, job "hopping", or frequent change of jobs, becomes a norm.
For instance, according to the Bureau of Labour Statistics, an average US worker holds around 12 jobs by age of 50 and this number is growing.

Lifetime careers in stable employment are likely to remain in the past. These trends point to a new reality where workers are increasingly left in charge of their own skills upgrading and retraining for new qualifications. In future, **financial incentives** and access to training funds along with social and income security **directed to individuals** will be critical for managing employment transitions in times of change.

At the same time, **training opportunities offered by employers** are key for enabling businesses to introduce new technologies, increase workers' productivity to successfully compete on global markets. That is why evidence that training provision in workplaces shows a decreasing trend is a worrying signal.

The World Bank Enterprise survey shows that only around one third of firms offer training to their workforce. The ILO research found that firms that rely heavily on non-standard forms of employment tend to underinvest in training, both for temporary and permanent employees (ILO 2016a). Instead of identifying market needs and nurturing internal firm-specific skills, firms "buy" skills from the market, eventually limiting the ability to respond to changing market demand. Incentives for employers to provide and for workers to participate in training become therefore an urgent priority.

Climate change and environmental degradation requires a transition toward a more sustainable pattern of economic growth which will generate new jobs, cause some job losses and alter skills composition of many jobs. The ILO projects the net employment effect from transition to a low-carbon and resource-efficient economy being positive, with around 18 million new jobs expected by 2030 as a result of the decarbonisation of energy use and energy efficiency measures alone (ILO, 2018). Recycling, repair, remanufacturing, and sustainable agriculture also will generate many jobs. However, some job losses are inevitable in the extraction industry and high-emitting manufacturing.

Skills development in workplaces and government support for workers' retraining in this context will become central. Adapting competency standards and training programmes for current qualifications and jobs (e.g. green plumber, green electricians) will have to be coupled with adapting higher education to spur green technologies and innovation. Environmental awareness training at all levels of education from pre-primary to adult learning can truly push the climate change agenda to a new level.

Skills supply is tightly linked to **labour supply and demographic trends**. Aging has been a prevailing trend in developed economies where shrinking workforce and a shortfall of labour have become a fast approaching reality. Aging is expected to sustain the growing demand for care workers. Training measures to support workers' retention, including technology related training for older workers and training combined with other support measures for women, may help to at least partially resolve the shortage in a longer run.

Migration is another possible solution, and the increase of workers' mobility in future appears inevitable. Most of the increase in the workforce in future is expected in Sub-Saharan Africa and Southern Asia, regions where school attainment are lagging behind. This will be causing a surplus of low-skilled workers and a shortage of medium- and higher-skilled workers. Some redistribution of labour with various levels of skills across the globe is unavoidable. ILO estimates that currently there are 150 million migrant workers (44% are women) constituting 4.4% of workers globally (ILO, 2015). Levels of over qualification among migrant workers is usually much higher than among domestic workforce pointing to challenges in recognising skills and experience across countries. This also means a significant level of "brain waste", i.e. having to work in jobs below the level of qualification, and reduced economic benefits from migrant labour. Increasing emphasis on validation and recognition of skills could make cross-border migration more attractive in the eyes of prospective migrants.

New technologies as well as other global trends open new opportunities, especially for developing countries, to enter new, fast-growing sectors and catch up with more advanced economies. At the same time, they are affecting the functioning of labour markets with far-reaching consequences for the number of jobs, their quality and the diversity of opportunities they offer (ILO, 2018). Skills availability or deficiency can be defining for how well societies and economies can adjust to the disruptive and continuous changes. **Skills development has a two-fold function.** First, as **a buffer** which helps to avoid high social costs, improve distributional effects of gains from technology and global trade, mitigate unemployment and social inequality.

Second, as **an enabler** of transition and change itself by contributing to workers' productivity and capacity of enterprises to implement new technologies, introduce new products and services. If skills are not available,

they become a major barrier for business capabilities to adapt and implement changes.

The magnitude and speed of changes will mean frequent switching between jobs and occupations. The pervasive change will place a high premium on meta-skills, such as the ability to learn and to embrace change, adaptability, agility and stress resistance. Work in the future will require not only cognitive but also non-cognitive skills. Good basic skills (literacy, including digital literary, numeracy) are crucial for any further learning and so is the quality of initial education. But the era of frontloading skills for a single qualification that defines a lifetime career is definitely over. In future, training systems will need to be flexible and allow workers to continue learning throughout their careers (ILO, 2018a).

At the ILO, in the framework of the Future of Work Initiative, we see **a lifelong learning approach** that is human-centred and rights-based, with incentives for learning (e.g. individual learning accounts, credits and tax breaks) and co-funded by the private and public sectors. Training measures that ensure that young people as well as adult workers are equipped with the package of skills, soft and hard, will have to be combined with career guidance and job matching services and with social protection mechanisms to allow for work interruption and sustained income (ILO, 2018b). To turn the pain dictated by the current changes into a gain from which everybody can benefit, we need a shift to lifelong learning and the new social contract between all those involved in the world of work - public and private sectors, employers and workers, education and training designers and providers. ■

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Denis Pennel

How will diverse forms of work evolve in the future?

Rapid technology changes, demographics, diversity, globalisation, new production models and the rise of the on-demand economy are some of the structural shifts that are currently reshaping the world of work. As a consequence, labour markets have never been so diverse, both in terms of labour contracts and workers' expectations. A broad societal transformation is needed to fully reap the benefits of an extended workforce and create open, sustainable and inclusive labour markets.

While the world of work in the 20th century was largely dominated by the white male breadwinner, today's workforce got increasingly more diverse as women, immigrants, older workers, students or people with disabilities entered the labour market. They all have different expectations about the way they want to work and thus look for working arrangements that meet their life choices or constraints. According to the International Labour Organisation (ILO), only 27% of the global working population works under an open-ended, full-time contract. Being a permanent employee is no longer the norm!

Looking at an average organization, we might expect the following contractual breakdown: some 60 percent of the staff will be working under a full-time, open-ended contract, while the rest, a significant minority, will hold a diverse range of work relationships. About 10 percent will be part-time or teleworkers, another 5 percent will be agency workers and a further 10 percent are likely to be employed under fixed-term contracts, undertaking a specific project of a determinate duration. The remaining 15 percent will most probably be made up of consultants, freelancers and interim managers, many of whom work remotely and are rarely, if ever, present in the office.

The end of work as we knew it

The diversity of forms of work that we observe today in labour markets does not only result from the increased individualisation of expectations about work. Our economy has become mainly service-oriented, with a newly emerging model of mass-customised production.

People expect tailor-made and round the clock services and they are prepared to pay for it. In many countries, up to 50 percent of people work in jobs with hours outside the standard 9-5, Monday to Friday, schedule. Digitalisation has helped allowing for alternative working models; further dematerializing the workplace and challenging the key components of work. Work is no longer a place to go but a task to perform.

Being able to rely on an extended workforce is a strategic step that enables organisations to adjust to changing demand, fish in a global talent pool and quickly supplement any internal skills gaps. It is estimated that there are over 1.4 billion mobile workers around the world today. In the United States for example, freelancers are predicted to become the workforce majority within a decade, with nearly 50 percent of millennial workers already freelancing, according to a survey conducted by the on-line talent platform Upwork and the Freelancers Union[1].

The new world of work can thus be pictured by the following patterns:

- A wide variety of employment situations;
- The rise of new forms of work outside the employment relationship;
- Growing individual expectations and diverse working conditions;
- The end of unified workplaces, times and activities;
- The emergence of multifaceted and discontinuous career paths;
- Increasing interconnections between work and private life;
- The end of static and predictable labour markets;
- Fading boundaries between national labour markets.

Our perception of the labour market is however still shaped the way that it was in the 1960s, in the age of industrialisation and mass society, with a predominance of wage-earners and permanent full-time contracts, coupled with command-and-control relationships between workers and employers. In this model, a permanent and loyal employee enjoyed a stable and sustainable professional situation in exchange for his skills and time. Teamwork, regular hours, advancement based on seniority, secured and negotiated wages; all ensured that employees were treated in exactly the same way. This culture of paternalism and loyalty has given way to a more detached, mutual self-interest that is often more transient.

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1 "Freelancing in America: 2017".

Choice, wages and opportunities are dictated by skills, not tenure. Workers entering the job market now consider personal development opportunities and the company's reputation as far more important motivation factors in taking a job, than the job itself or the proposed salary. They are willing to leave an employer that has disappointed them by not respecting their values. The concept of career is changing, moving from corporate ladder to lattice ladder, from linear career to protean one.

Reinventing HR services

Dealing with an extended workforce, its diverse contractual arrangements and expectations, changes the way in which organisations hire and manage talent. Many turn to Total Talent Management to administer their staffing needs and ensure they find the right talent for the project, no matter how the person is classified or where in the world they live. Total Talent Management is best suited to cyclical businesses that likely have a constant need for new and emerging skills in order to remain innovative and ahead of the curve.

New solutions such as interim management, freelance platforms and payrolling are already in use to support companies in their workforce management. It can be embraced in a number of different ways: some companies work through an agency or organisation specialised in the process, while others go for it alone and take advantage of advancing technologies to enter into direct partnerships with independents or freelancers.
This new, extended range of human resources services can be summarised in four words: **Buy**, **Borrow**, **Rent and Share** (**Figure 1**).

Companies can either buy talent in a permanent way (direct, open-ended contracts), borrow talent for a time limited employment relationship (fixed-term, agency work, interim management etc.), rent them as a contract for services (independent contractor, free-lancers or crowdworkers) but also share workers with other companies via job sharing or pooling of employers. Managing the acquisition and engagement of talent in a holistic way offers a host of benefits: companies can find the right person for a specific role, irrespective of geography; there is no need to onboard or integrate full-time workers for projects that don't need a full time resource; and organisations can be flexible and competitive by retaining talent in function of project needs.

An increasing role for labour market intermediation

With the increasing demand for diverse forms of work and the need for different HR services, we can expect labour market intermediaries and triangular forms of employment relationships to further develop in the future. As the core of the recruitment business will no longer simply be about matching skills with vacancies, but also about matching people with organisations and matching people's work patterns with their expectations, labour market intermediaries can play a key role in simplifying the complexity.

In the new world of work, labour market intermediation will also enable reconciling flexibility and security. The temporary agency work sector has been the cradle of *"flexicurity"*. Not only it has allowed employers to adapt their workforce needs to production variations or shortages of skills, it has for long provided job seekers with a stepping stone to permanent employment, a way to acquire new skills or simply a way to better work life balance. The agency work sector has also pioneered in developing portable rights - training, health insurance, pension - for agency workers via collective bargaining. Individual workers will increasingly seek to join similar types of structures whose primary purpose is to provide them with stable *"homes"* and secure their rights as they move from job to job.

The rise of digital platforms, as new forms of labour market intermediation, further challenges the traditional social partnership model for both workers and employers. Work contracts are becoming less relational and more transactional, with wages paid not for time spent but for results delivered. In short, work is becoming a commodity.

The solution to reconcile individualism with collectivism and ensure a win-win situation for everyone might actually lie in the past.

Figure 1. Total Talent Management.
Source: World Employment Confederation.

During the Middle Age, the *"guilds"* (i.e. crafts' associations) were labour market intermediaries organising training, working conditions and quality standards of professions. Also looking at the pre-Industrial Revolution employment model, most workers were self-employed (e.g. farmers, shopkeepers, artisans) but belonged to professional associations and local communities that provided means for them to find jobs, share learning and skills and meet with peers. The 21st century world of work has to reinvent and modernise these professional associations to take on the "life maintenance" role that has been played by direct employers, using new expertise and technologies available. Social networks like LinkedIn or Facebook are in a way recreating a lack of social interaction and identification.

No future of work without Social Innovation!

The inexorable evolution towards diverse forms of work requires more than adapting the way we consider and organize work at individual and organization levels. It entails a broader societal transformation. Modern labour markets should not only fully recognise the need for diverse forms of work but they should also create a level playing field between all types of work contracts in order to avoid inequality with regard to labour costs, social contributions and access to the labour market.

Levels of workers' social protection and rights still differ greatly around the world and only 45 percent of the global population is effectively covered by at least one social protection benefit.[2] When they are in place however, these protections and rights have usually been hard won and built over time. The majority of systems reached maturity in the mid-20th century and were linked closely to the workplace and employment status. This model is outmoded. For flexible workers, the attachment of rights and protections to one employer makes no sense. Social benefits such as health, pension, sick pay, holiday pay and training entitlements need to be attached to them as individuals and portable as they navigate their way through the labour market. They also need to be easily transferrable so that people can be sure of their individual security and worker's rights at each stage in their working life - regardless of their work status or employer. Labour market security must be favoured over job security (**Figure 2**).

The social structure that underpins the way that we organise, classify, support and regulate work must be completely overhauled. Innovative solutions are needed to:

- Modernise labour laws to ensure legal certainty with regard to new work and employment relationships;
- Reinvent health and social protection to ensure portability and transferability of rights;

2 ILO Report on World Social Protection - 2017.

Figure 2. The New Social Deal.
Source: World Employment Confederation.

- Develop economic and work security, assured through reasonable expectation of employment continuity and unemployment/retirement schemes;
- Envision new career path and upward mobility through smoother transitions in the labour market.

Social innovation will allow companies to remain agile and prosper, confident in the knowledge that they can attract and retain a workforce with the relevant skills sets. It will enable individuals to find meaningful and decent work throughout their working lives. It will strengthen labour markets by securing transitions, driving growth in the economy.

The march towards more freedom and flexibility results in a decoupling of job and work. In the future, more and more people might be jobless but not workless. The *one-size-fits-all approach* is no longer applicable anymore. By embracing the new attitudes to life and work and by fostering the diversity that already exists in our labour markets, we have the chance to start over and create a sustainable, futureproof job market for the 21st century. This is a huge challenge for governments, management and workforce, and can only be achieved through dialogue. It is urgent that we start tackle this issue here and now if we are to ensure strong labour market participation and flourishing economies. ■

Denis Pennel

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Tiziano Treu

The new role of labor law, active policies and welfare

1. The recent reforms: continuity and misalignments

The last few years have seen a succession of reforms in many countries and several attempts of adapting the rules of labor built in the last century to the world of the future.

Already the 1997 European *guidelines* pointed at easing certain rigidities of traditional legislation on employment relationships. It therefore introduced both numerical and functional forms of flexibility, even if variously regulated. At the same time, safety net systems and active labor market policies were called for in order to "offset" the risks of flexibilty with security measures.

As summarized in the *"flexicurity"* formula, these *guidelines* were the main inspiration for labor policies in EU countries.

In Italy's case, the path of the reforms was particularly rough over those 20 years. Its course was marked by contradictory interventions under various governmental orientations and pressures exerted by the social partners.

However, as I pointed out elsewhere, elements of continuity that are consistent with the above-mentioned European *policy* line were not lacking, albeit weakened by breakages and inconsistencies that have negatively impacted, especially in the application phases of the reforms[1].

1 T. Treu, *Gli elementi di continuità nelle riforme del lavoro fino al Jobs Act (The elements of continuity in labor reforms up to the Jobs Act)*, in *L'Annuario del lavoro* (Yearbook of work), 2015, p. 247 ff.

The most significant line of continuity was in having partially displaced and partially integrated the traditional work protections focused on the individual work relationship by giving importance to protections and security on the labor market.

The two most significant misalignments with respect to the European guidelines concern the provisional delay of an organic and substantially universal system of safety nets (realized only through the 2015 Job Act) as well as the traditional weaknesses of the employment services and active labor policies. Such weaknesses have not been fixed yet.

2. Delays and distances from Europe

The break in the economic crisis has found our legal system lagging behind the European *flexicurity* trends. The Jobs Act recovered this delay, but only partially, with rather conflicting solutions regarding the rules of *flexicurity*, which have in fact been questioned by the current government.

On the other hand, our system still lacks adequate tools to deal with the management of increasingly mobile and complex labor markets. Further, it serves structural delays on other sides, little, or nothing affected by the reforms. I refer, *primarily*, to training systems. These have long been inadequate, even for the last century's industrialization needs. Moreover, they are out of sync with the labor market's current demands.

The gap from other European systems has long been clear in industrial relations, because Italy is the only country that lacks such regulatory legislation and that is driven by means of contractual rules defined by the social partners. Over the past decades of relatively continuous economic growth, this regulatory shortcoming has not prevented the system's operation nor its intense contractual activity sustained by a practice of union unity (which is however covered by recurrent conflicts).

This structure has been challenged, as and more, than other aspects of the social system, by the new economic context.

As a result, Industrial Relations are directly vulnerable to the global competitive pressures that changed power relations between social actors. Besides, in the case of Italy, relations between the actors are by no means (barely) protected by regulatory defenses.

It can be easily said that Italy has painstakingly completed a process of partial adaptation of its rules of work and Industrial Relations with a time lag in comparison to other European countries with which it closely confronted. Similar situations are found in other public policies sectors and are, in my opinion, one of the factors for the country's weak competitiveness.

Regarding work, such weakness is aggravated by the fact that recently introduced innovations were both partial and precarious, due to the persistent contrasts between regulators (of the state and the regions) and the weak implementation of many essential aspects, such as we can see from the relocation contract.

These delays, today take on a particular weight. As everyone recognize, the transformations of the productive context and world competition put a strain on traditional social and economic systems, even in countries where they had consolidated.

3. European reforms and social nationalism

We are at the beginning of an era shift. Italy is equipped (and often not even adequately) with tools meant for the previous economic and social cycle, now being overcome[2].

The difficulties in facing the new regulatory challenges are exacerbated by the fragility of our economic system. For years, this system has been weighed down by low productivity, high public debt, and increasing inequalities that undermine social cohesion and political stability.

The search for a new regulatory system that is suitable to digital work features in the global society is launched in all European countries (and not only). Unlike the past, such research takes place in the absence, or near absence, of European *guidelines* shared on a national basis.

The research bears witness to growing divergences between countries in labor policies and rules, and generally in economic policies.

We are in the presence of a resurgent nationalism, which is even social. This resurgence is fueled by frequent interventions of national legislators in various areas of work and welfare.

The transformations of work and business that affected every country are not the only test for the efficacy of these national choices. These also need to pass through competition against different systems, especially those of Asian countries which pursue strategies far from our models, and not just in terms of work.

2 I developed comparative considerations on these issues in my report for the World Congress of the International Society for Labor and Social Security Law (ISLSSL) in Turin, September 4-7, 2018, *www.islssltorino2018.org.*; and also *Employment for a sustainable society: What is to be done?*, in relation to ILERA World Congress report in Seoul, July 23-27, 2018, in the process of being published.

The search for new work regulations and policies is challenging. Because the transformations of the economic and social context on which these policies and regulations act are so deep that little adjustments of the existing to solve the new problems are not enough. Not only are individual aspects of the regulations under discussion but also the very foundations and aims of labor law.

Moreover, the tiles of the new work mosaic are only partially defined and themselves variable.

Generally speaking, the aims and functions of labor law are more articulated than those of workers protection, which is typical of its history. Thus, it is not easy to recombine them. Our subject, with its various protagonists and increasingly multiple levels of regulation, is called to satisfy more complex material and immaterial needs than those of industrial workers.

Workers' protection needs continue to be fundamental. However, they are already spontaneously articulating themselves to answer the new needs and conditions of both the various types of work (subordinate, autonomous, and less defined or mixed content) and productive contexts in which they take place.

These general observations on the role of labor law must be applied to the critical points in the economic and social systems, taking into account the national positioning within the international context. Work regulations and policies can positively affect the country's functionality system by providing useful and practical solutions. This is now also recognized by international organizations that were once quite negative about the impact of regulation on the performance of the economy and the labor market. And they note that the effectiveness and impact of measures depend on the aims and techniques of regulatory and administrative interventions[3].

Yet, it is beneficial to remember that legal regulations and policies are only one of the influencing factors on occupational performance. Many are the variables involved. They concern the national and ever-increasing supranational economic and social context in which they are positioned. Jointly, they include public institutions' policies and social actor's strategies. Ultimately they depend on the model of development pursued and practiced in the various countries.

4. Technological innovation and labor polarization

Our country shows signs of delay when it comes to the technological achievements of the most advanced countries.

3 See: OECD Employment Outlook 2012, chap. 2, *What makes labor markets resilient during recessions?*

This means that the new technologies' negative impact on employment does not fully affect Italy. The necessary recovery of these delays, however, is bound to increase pressure on companies and employment. It will do so differently based on each type of company and work.

International research (OECD and World Bank) confirms that the jobs most exposed to the risk of technological unemployment are routinary ones. These include not only manual but also white-collar jobs, whereas the jobs with more advanced and diversified professional content and skill show greater resilience. These indications support the tendency towards the polarization of labor market and the risks that this entails for workers' conditions. They also stress the urgency not only to increase investment in training, but to finalize them more closely to the innovation of production systems and work organization. In today's varying productive and technological context, strengthening people's professional identity is the first form of protection and work support.

Even companies must renew their organization by becoming more open towards new workers in order to valorize, rather than waste, the enrichment that training brings to work inside the companies.

All analyses show different trends, also undefined, in the relationships between self-employment and subordinate work and, indeed, in the content of autonomy and dependence within individual working relationships. Which obviously reflects on the contents of the regulation.

Technological and labor market transformations have an equally profound impact on social security institutions or, to use international terminology, *social protection*.

The fragmentation and polarization of jobs are reflected in all the institutions and on the structure of welfare itself[4]. These factors are combined with the conditioning coming from the scarcity of resources. The resources are not absolutely scarce, because the costs for public welfare do not show drastic reductions, however they are, related to the growing needs of the population inducted (but not only) by the progressive increase in life expectancy.

A decisive test for economic policies and regulation is caused by the spread of digital technologies in all production facilities. If the impact on the amount of employment is uncertain for now, then it is still certain that they will profoundly influence forms of work.

4 See in greater length: *Sustainable social security,* a report for the EISS Conference in Venice, October 11-12, 2018.

The particularities of the jobs affected by these technologies are such as to alter the fundamental parameters indentifying the subordinate work, starting from the time and place of the performance to affect, in an unprecedented way, the relationships between the parties, in particular the powers traditionally attributed to the employer-employment relationship.

5. Digital work and safeguard modulation

The impact is uncertain because the ways in which digital tools operate, starting from the "platforms" to organize work, are themselves diversified and variable over time.

It is not a coincidence that their spread has triggered an actual, whole series of analyses and hypotheses among operators and institutions of all systems: from judges and jurists, to the legislator, even in Anglo-Saxon countries where intervening in the matter of labor is more reluctant.

Initial reactions of jurisprudence show how it is difficult to enforce the traditional self-employment and subordinate employment classification criteria to the various forms of activity based on the platform. Again, they urgently ask which regulation is needed to guarantee adequate conditions for the subjects employed in these new occupations[5].

It is essential that the identification of the safeguards applicable to new jobs takes into account both the needs of the people and of the various companies. Additionally, it needs to be based on reliable criteria to avoid falling into arbitrariness.

Collective negotiation can conduct an important role on various levels, which is the best instrument for testing the most suitable solutions and safeguards. It can do that if it can grasp the effective needs of protection and promotion of these workers by taking advantage of the legal system spaces and the gaps inside the traditional categories.

The contractual instrument was proposed rather than the law to identify safeguards for the so-called *Riders*: a way that could be pursued for other platform-based work cases[6]. The comparative analyses on the subject provide a more general reference on possible evolutions for future work regulations. The need to take into account job variability and the functional needs of the companies leads to the enhancement of the basic *standards*, beginning with those defined by the ILO as a common regulation for all jobs. This common base of rights characterizes a social status of jobs, of all jobs, which must be distinguished

5 T. Treu, *Rimedi e fattispecie a confronto con i lavori della Gig economy (Solutions, safeguards, and circumstances: Reflections from work in the Gig Economy)*, in progress Dir., 2017, p. 367 ff.

6 See among all: M. Faioli, *Il lavoro nella Gig Economy (Work in the Gig Economy)*, a position paper from *www.CNEL.it*

from general citizenship rights. Proposals from various parties advanced to overcome the boundaries between work and non-work, and to link the rights of social citizenship not to the workers' status but directly to those of citizens. These proposals were criticized in different ways due to the dangerous implications on identity and functions of both labor rights and welfare.

As I have argued in another work, labor right would be deprived of its role, losing its redistributive character and its responsibility. That way, it would finish disconnecting from work relationships and the labor market, which instead requires it to be regulated with specific instruments[7].

6. Government of transitions and participation in development

A parallel evolution concerns active policies and labor market services. The increased mobility and variability of jobs, as well as of the productive organizations, require even a leap of scale; because in the new context it is no longer necessary only episodic interventions on the individual moments of these policies, especially for the employment and for the relocation of the unemployed people. It concerns equipping themselves with new legal and managerial solutions for governing job transitions that will tend to be recurrent in the course of working life.

The goal is to test these tools, which will grow in quality through training. We had to show how to make the continuity of the work paths possible even through work changes.

Best practice points out that job transition support should not be directed only to the unemployed. Rather, it should be enforced during employment in order to anticipate changes and corporate crises. Effective results imply the involvement of the companies themselves in policies of enhancement and professional retraining of workers (OECD, *Employment Outlook*, 2018).

These practices report a further change in the regulation of employment relations. Labor legislation will not only guarantee basic levels of protection but will also take on the task of enhancing workers' professionalism and individuals participation in their enrichment, as well as the quality of company life.

An evolution in this sense would greatly enrich the aims of labor legislation, which would add the function of promoting workers' personal skills to traditional productive tasks.

Indeed, full development of this perspective implies changes to the general approach of individual and collective relationships within the company, orienting them in a participatory dimension. The forms of this participation do not necessarily coincide with the institutionalized ones of German co-management, but will have to adapt to the new conditions of the flexible enterprise and smart work.

In this broader perspective, one can hypothesize with a bit of optimism that labor legislation can become an instrument capable of contributing to the efficiency of the company and the market[8].

This objective would imply a further change of our subject matter and of working relationships, including the collective ones. The task of balancing the interests and the opposing (or nonequivalent) values of labor and the company, would be implemented after the need/utility to promote both of them. A common development towards the sustainability of growth and distributive justice would be its perspective.

Furthermore, the increased mobility and variability of both jobs and productive organizations require our subject to be able to govern transitions between different jobs, that increasingly characterize work paths.

In this respect, labor legislation becomes an institution that can make the labor market economically and socially more efficient. Our subject matter has new aims: optimizing every job opportunity, including the subordinated, autonomous, associative, and service, as well as socially relevant jobs that the market penalizes because of being unable to evaluate them. On the other hand, it will have the task of improving the quality of human capital by providing support for professional continuity in job and inter-job mobility.

In the new economic context, labor legislation will have to be more closely coordinated with welfare. The welfare institutions will be decisive to compensate for the weaknesses of the labor market: with social safety nets more able

7 T. Treu, *Il diritto del lavoro: realtà e possibilità (Labor legislation: Reality and possibility)*, ADL, 2000, spec. p. 504 ff.

8 P. Davies, *Lavoro subordinato e lavoro autonomo* (Subordinate work and self-employment), Dir. Rel. Ind., 2000, p. 208.

to support the work placement processes, with parental leave to make periods of inactivity for personal reasons (not only parenting, illness or accidents but also professional retraining) useful; tax-reduced services to people aimed at facilitating work-life balance, as well as professional and geographical mobility. In this way, welfare benefits integrate labor policies to support them in the difficult task of combating insecurity and favoring quality jobs.

7. Welfare institutions towards universalism

The features of current jobs alter public welfare foundations in its various manifestations, from social security to retirement benefits, because these were built in the last century on the assumption of a continuous development and stable and homogeneous work.

Although public welfare spending remains at a high level in most European countries, its historic function of promoting social cohesion and equality is being questioned on various fronts. Its original, standardized plant does not cover broad sections of workers and citizens, who are excluded from its original sphere of intervention. And it no longer reflects either the change in needs and risks throughout the several stages of personal and family life, nor the increasingly personalized features of these risks and needs.

The historical system inadequacy is particularly marked in Italy in those sectors of welfare - such as social security and social safety nets - that depend directly on work. This occurs because they are tied up, both in terms of funding and performance, to the destiny of work and production facilities. This dependence has been made evident on the structural level by the adoption of the contributory or insurance method, which has historical roots, but which has become general over time due to the need to guarantee the financial balance of these sectors. It is strengthened by the categorical corporate system that is rooted in our country and overseen by joint management by collective representatives of trade unions and business associations.

The limits of these characteristics of the historical welfare are accentuated in the Italian case by the distortions caused by a stratified regulation over time and very uncoordinated, as well as by the implementation weaknesses of the various systems. Both of these factors undermine the redistributive aims of welfare increasing inequalities within the system.

Attempts to correct these distortions and to overcome the design of our labor system date back to at least the 1997 Onofri Commission. Yet the resistance of the social actors to overcome the categorical system hindered the structural reform projects, such as those of that time, despite differently sized adjustments of the traditional system over the following 20 years[9]. Significant reforms towards the rationalization and universalization of social safety nets have been approved in recent years and culminated in the implementation decrees of the Jobs Act (22,148/2015).

This legislation has extended the action of safety nets, both to support employed and unemployed people, to an increasingly large audience of workers, including those of SMEs. The new social insurance for employment (NASPI) now includes almost all 97.2% of permanent workers, and 89.4% of fixed-term workers, which were largely excluded in the past.

This universal extension of the safety nets had to deal with the labor market's altered economic scenario being much more turbulent than in the '90s, and with the scarcity of financial resources; these elements have also induced more solid countries than ours to reduce the duration and level of income protection.

The clear novelty of this recent legislation, which aligns it with the European indications of flexicurity, has not (yet) been reflected in the effectiveness of implementation, both due to the weakness of the tools and organizational resources dedicated to training and services for the employment and, on an institutional level, for the persistence of competing jurisdictions on the subject matter between regions and the State.
This jurisdiction competition hinders the building of a true national system, not only of social safety nets but also of all labor policies.

The social security reform approved in 1995 ensured the long-term financial sustainability of the system. In recent years, the contributory system has undergone a series of adjustments aimed at correcting certain distortions, e.g. those of privileged social security systems. Nevertheless, not all changes were consistent with the logic of this system, especially where they introduced rigid thresholds for retirement, instead of the flexibility guaranteed by the contribution method set up in 1995.

9 See: *La riforma del welfare: Dieci anni dopo la Commissione Onofri (Welfare reform: Ten years after the Onofri Commission)*, in the collected writings edited by L. Guerzoni, il Mulino, 2008.

Above all, these partial corrections have proven inadequate to offset downward trend and insufficiency of the social security coverage offered by the system. This is induced by convergent factors such as the delay, especially for young people, to enter the regular labor market; such factors include the intermittent nature of many paid careers, not just for young people, and more generally, low wage levels and dynamism.

Actually, a system that wants to respect the social, as well as financial sustainability of the pension system can only be achieved by modifying the contributive logic and integrating it with a solidaristic logic, that is, with interventions financed not only by contributions on business and work, but by general taxation[10].

This is an indication consistent with our Constitution that in art. 38 sets the goal of a two-dimensional universalistic welfare: the first that must guarantee citizens unable to work and without necessary means to live, the right to social support and assistance; second one which establishes the right of workers to receive adequate means for their life when specific conditions of need occur (injury, illness, disability, old age or involuntary unemployment).

At the first objective, the various forms of social security or features of social welfare allocation are typically funded by the tax authorities. These are institutions that should be rationalized and standardized in a universal allowance for all citizens in need.

Adherence to the second part of Article 38 of the Constitution requires that the contributory social security does not fall below a level deemed appropriate to the worker's life demands.

The modalities proposed to pursue this result were different. A bipartisan bill, also presented by the writer, has provided for the integration of the contributory pension with a fixed sum to be paid by the general tax to guarantee an adequate income for the beneficiary workers[11].

A similar reference is present in the government-trade union protocol of September 28, 2016 which among the reform measures of the contributory system, proposes to evaluate the introduction of a contributory pension insurance, linked to the years of contributions and the age of leaving work, in order to guarantee the adequacy of medium-low pensions.

10 I developed this thesis on *Sustainable social security*, cit.

11 AS 1958, March 9, 2010.

In this context, one needs to reconsider the financing of these mixed systems. They cannot rely solely on worker and employer contributions but on different tax entries. For example, VAT, as experienced in France, or specifically targeted levies such as the financing of non-self-sufficiency *(long-term care)* in Germany.

In reality, the economic crisis has increased the pressure on the entire welfare system and has accentuated the difficulty of combating the current widespread phenomena of poverty, which now also involves large sections of workers.
To intervene on these phenomena, in Italy as in almost all European countries, various forms of minimum income support have been introduced (in Italy the so-called REI)[12].

This selective welfare solution, conditioned to beneficiary implementation measures, was considered more viable for the costs and less exposed to welfarism and basic income or citizenship measures, so far widely proposed, but with little to no practice.

Many underline the serious risks of basic income. In fact, its introduction implies "a resignation about the lack of work".
On the other hand, it involves renouncing involvement with the overall challenges posed by poverty. A more or less substantial monetary transfer cannot replace the commitment to personally assist people to get out of poverty[13].

The effectiveness of such interventions presupposes an ability to manage and organize personal services and the assessment of situations of need involving how to cope with the demands of individuals, which is decisive for their success. All of this, though, on average is scarce in our PA. The set of similar measures (MRIs) introduced over recent past years in various local offices has confirmed the difficulty of their implementation and suggests maintaining gradual experimentation far from the perspective of citizenship income.

8. Rules for trade union legislation

Contrasting pressures affected the Italian contractual system in the period of the crisis. This has marked a non-linear evolution. Again, one records a legislative activity that is unusual for our tradition on industrial relations, with partly different results.

12 For a comparative picture of these forms of basic income, see: volume edited by F. Bassanini, T. Treu, V. Spini, *Nuove (e vecchie) povertà: quale risposta? (New (and old) poverty: What is the answer?) Reddito d'inclusione, reddito di cittadinanza e oltre (Inclusion income, basic income, and beyond)*, Fondazione ASTRID and Circolo Rosselli, 2018.

13 The statements are by L. Pennacchi, *Lavoro e innovazione per un nuovo umanesimo (Work and innovation for a new humanism)*, in L. Pennacchi, R. Sanna, (edited), *Lavoro e innovazione per riformare il capitalismo (Work and innovation to reform capitalism)*, EDIESSE, 2018; and see: F. Marhold's report on the new forms of social security at the 2018 ISLSSL World Congress in Turin, as cited above.

Some of them, Article 8 Law 148, disrupted the balance of the system. Others, e.g. the recent financial laws, favored work negotiation by incentivizing mechanisms such as result bonuses and company welfare. Last, the recognition of a "legal equivalence" between national negotiation and company agreements, strongly limited wage negotiation in the public sector (Article 51 Decree 81/2015).

In this triggering context, the social partners have concluded a series of inter-confederal agreements, aimed at defining the rules of the system, concerning in particular the measure of representativeness and the relationships between the contractual levels.

The repeated attempts to clarify these rules indicate the difficulty of the parties to find effective operational balances. However, they have helped to reduce the possible destructuring impact of the legislative guidelines and to maintain both the defensive role of the national contract and a certain, yet partial, control of decentralization. It is not a coincidence that the appeal to the derogation opportunities offered by Article 8 of Law 148, as to the bargaining in derogation permitted by national contracts, was contained in circumscribed hypotheses of particular gravity, normally as a necessary measure to obtain guarantees to safeguard employment.

It can be assumed that in the Italian situation the decentralization is still "ordered and not decontractualized", unlike other Mediterranean countries.

Despite this, the balance of the Italian contractual structure remains fragile, partly because of the rules agreed by the parties at the central level, due to their private nature, they are supported only by the cohesion and authority of the protagonists themselves, who are not always sufficient to guarantee the application of these rules in various categories and territories. Furthermore, the resilience of the system is called into question by the pressure of the external context and by the fragmentation of both the union and employer groups, which have undermined their once intact strength from within. Actually, the low institutionalization of Italian industrial relations has worked well enough in relatively stable periods and of union unity. However, this proves to be increasingly less able to withstand the turbulence of the global economy, the recurring tensions between the trade union confederations, and the difficult relations with the entrepreneurial associations that are themselves fragmented and divided.

The awareness of these problems has induced a lot of doctrine and even the same trade unions, traditionally[14] opposed to trade union legislation, to consider the intervention of the legislator, albeit light and supportive of the rules agreed between the social parties.

The thematic area on which the agreements between the parties are more consolidated, concerns the criteria for measuring union representation at the national level, whereby a legislative transposition action is foreseeable. Consensus has also recently grown based on the urgency of providing similar criteria for entrepreneurial associations.

On the other hand, reservations remain persistent about a legislative intervention that regulates the negotiating structure not only because the matter is traditionally owned by the competence of the parties, but also because such legislation would present the risk of tightening the system and compromising its now more than ever necessary ability to adapt to variable context conditions[15].

More respectful of the collective autonomy would be an intervention that did not establish *ex lege* the contractual hierarchy but that recognizes the competence of the national contractors to coordinate the system. Such coordination defines objects and conditions of effectiveness with respect to lower levels of negotiation according to the organized decentralization model. This has always been preferred by the parties (not only Italian), it specifically allows for a real efficacy of the decentralization organization rules agreed upon between national actors, independently from the second-level negotiations.

Such a solution would be similar to Law 165/2001, which was adopted for public workers and that allows the national contract to identify the second-level negotiation space, defined restrictively as "integrative".

Legislative feasibility on the general efficacy of national contracts remains problematic due to the obstacle still represented by Article 39 of the Italian Constitution. This provides for an extension procedure *erga omnes* that has long proven to be outdated. This obstacle does not work for company negotiation. Therefore, hypotheses have been proposed of legislation aimed at regulating the formation and effectiveness of company agreements.

On the other hand, trade unions envisaged an alternative solution that distinguishes it from previous *erga omnes* proposals.

14 See: T. Treu, *Contrattazione e rappresentanza*, in *Salari, Produttività (Negotiation and representation in wages and productivity)*, cit., p. 350 ff.

15 On these themes, see writings by: P. Sestito, C. Dell'Aringa, M. Carrieri, G. Olini, T. Treu, in *Salari, produttività, diseguaglianze (Wages, productivity, and inequality)*, edited by C. Dell'Aringa, C. Lucifora, T. Treu, il Mulino, 2017.

In fact, it does not propose to extend by law the effectiveness to the entirety of collective contracts but to operate on wages only, or rather, on the basic salary levels set by category contracts. This makes them a minimum wage guarantee for the categories and qualifications of workers. This operation could be justified by the implementation of the proportional and sufficient remuneration principle established by Article 36 of the Constitution, thus avoiding objections pursuant to Article 39.

9. Prospective considerations

The research trails outlined here should be explored with reflections and proposals free not only from the ideological conditioning of the past, but from contingent and short-term stresses, because as we have seen, the changes taking place touch the system's key points and they require fine-tuning of the safeguards and regulatory interventions beyond the traditional classification schemes.

The mixed features of new digital jobs may request a reduction and simplification of the regulatory content, especially those of detail, in order to expand the contractual regulation space. On the other hand, simplification may entail the valorization of some minimum standards of protection, starting with salaries that also constitute the common social base of all jobs according to international sources.

In this context of modular regulations, the various forms of soft law can take on an integrative and orientation role useful to promote improvement standards in individual and collective work relationships, in particular by favoring the forms direct participation of workers. Here too, the French legislator's indication is significant in that it refers to corporate social responsibility as a criterion for the management of platform-based work (Article L. 7342-1 Code du Travail).

The promotional orientation has been present in our labor legislation for a long time but it must be rethought to extend its use in both collective and personal relationships. First, we must consider forms of support for collective activity in different companies compared to the historical ones of the Workers' Statute. The aim is to strengthen wage negotiation that is now significantly undermined and to promote forms of worker participation, this can be done both directly and mediated by their representatives, with the attribution of powers to intervene in the organization of work and with the necessary definition of responsibilities.

Secondly, the individual aspect of the research must strengthen promotional interventions on work quality. Here, it refers not to the single relationship but to the person who is involved in it.

As mentioned, training is a decisive intervention.

The goal here is to tackle the structural setting of training. Such an objective prioritizes work relationships as a tool for strengthening people's ability to guide their work life among individual choices and to participate actively to collective events.

Active labor policies are also called to carry out more complex tasks than those carried out in the past: the task not only of encouraging the meeting between supply and demand of individual jobs, but also of supporting job opportunities in the various moments of life and foster the continuity of the commitment even in the diversity of job positions.

With this approach, the various solutions of active policies - continuous training, economic aid and services to support employment transitions - can establish dynamic connections, or rather, a real horizontal connective tissue among the different professional positions in which individuals will have to move in the rough geography of new jobs.

Better than traditional safeguards, the set of these solutions will compensate for the instability of individual positions. It will ensure sustainability for the flexibility and uncertainty that these safeguards cannot counteract. ■

Tiziano Treu

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Stefano Colli-Lanzi

Employment agencies: a decisive turning point for market evolution

The acceleration of change is a key element of our time. This element challenges organizations that need to define how to competitively cope with a global talent market that never stops evolving.

Six contextual factors can be identified as the main **"drivers of change": technological breakthroughs**, the evolving **demographic composition of the world population, shifts in global economic power** between developed and developing countries, the **scarcity of natural resources and climate change, new attitudes and individual preferences**, and the **definition of new rules and regulations**.

The **development and growing adoption of automation, robotics, artificial intelligence, the Internet of Things (IoT), augmented reality, SMAC solutions** (Social, Analytics, Mobile, Cloud), and **3D printing** are driving market evolution. At the same time, these change organizational models and practices[1] by transforming the relationships between organizations and people[2] and the skills companies need to develop on the market. All of this innovates both the characteristics and the number of professions demanded by companies[3]. History shows that technological innovations have always given rise to extensive transformation in employment and its sectors. However, this has also always produced opportunities for new growth through the creation of new jobs.

1 The WEF (2018) predicts that by 2022, more than half of all companies will significantly modify production and distribution methodologies by changing the composition of their value chain and shifting the geographical base of their operations. Furthermore, the democratization of work will promote greater active participation in the company by individuals, including relationships based on projects rather than roles.

2 This is in terms of psychological contracts, type of contract, and length of work relationships.

3 Following the adoption of new technological solutions, from now until 2030, 75 to 375 million people will need to change professions, learn new skills, or enhance their education to find work (McKinsey, 2017). Furthermore, more than half of young people now attending elementary school will perform jobs that still do not exist and in 10 years, almost half of the jobs known today will no longer exist (*Deloitte*, 2018).

Until now, the capacity for creation and innovation through the development of new skills has always been greater than the destruction of jobs. The World Economic Forum (WEF, 2018) supports this positive vision. WEF estimates that 75 million jobs are expected to disappear after 2022 due to automation and technology, which will however create 133 million new roles that are more appropriate for the new division of labor between people, machines, and algorithms.

The **second driver** of change is the **shifting demographic composition of the global population**. The United Nations predicts that the world's population will increase from 7.6 billion today to 9.8 billion in 2050[4]. Half of the population growth will be concentrated in nine countries (India, Nigeria, the Democratic Republic of Congo, Pakistan, Ethiopia, the United Republic of Tanzania, the United States of America, Uganda, and Indonesia). Further, the population of 26 African countries will double. In an increasing number of countries, fertility rates remain below the minimum replacement level of 2.1 children per woman (86 countries, 46% of the world population). This fertility rate is related to population aging. In fact, it has been observed that the average age in emerging countries is 25-30 years old, whereas this average in developed countries is 35-45 years. Europe has already witnessed the surpassing impact of a population over 65 years compared to youth under 15 (18% vs. 15%)[5] while globally, people of at least 80 years of age are expected to triple from 137 to 425 million between now and 2050. Population aging will increase the demand for medical, hospital, and nursing care. This process will exert a great deal of pressure on countries' healthcare, pension, and social security systems. The data presented also allows us to imagine the extent in which migration and immigration[6] will profoundly impact the world of work and economic development. Countries will be "forced" to understand how to effectively manage and integrate these populations while trying to avoid the emergence of internal and cross-border socio-political tensions.

The **third driver** is represented by **shifts in global economic power** between developed and developing countries. Since the start of this millennium, emerging economies (E7: China, India, Brazil, Mexico, Russia, Indonesia and Turkey) have consistently recorded

4 Data gathered from: *https://www.un.org/development/desa/en/news/population/world-population-prospects-2017.html*

5 Data gathered from: *https://www.statista.com/statistics/265759/world-population-by-age-and-region*

6 Regarding migratory flows, just think that 850 million new workers are expected to arrive from Africa by 2050 (*Deloitte*, 2018).

better economic performances in terms of real growth of Gross Domestic Product (GDP) compared to their counterparts in developed countries. According to PricewaterhouseCoopers (PwC, 2018), the E7 will exceed the G7[7] by 2020 in terms of economic power and will grow at an average annual real rate of 3.5% against 1.6% of G7 countries. By 2050, the E7 will represent 50% of total GDP. These profound changes in terms of global economic power are likely to create geopolitical tensions (wars, isolationism, etc.) that will affect the mobility of the labor force because it will generate strong migratory flows of refugees[8]. The masses of people flowing from beyond borders also tends to feed suspicions and fears when it comes to job opportunities. On one hand, there is in fact a rise in the unskilled labor force available for jobs, which non-foreign workers consider "unattractive". A labor force with lower proficiency may also be willing to accept less protective forms of contracts. On the other hand, a workforce with a higher level of proficiency and language skills is also growing and is able to open companies up to new markets.

The acceleration of economic growth also entails an environmental cost in terms of **pollution**, **resource scarcity**, **and climate change**. The economic recovery will result in higher levels of carbon dioxide emissions[9]. The air breathed by 9 out of 10 people in the world is polluted, and its indicators exceed what is recommended for health standards. This comes with worrying repercussions in terms of disease and mortality. The transition to sustainable energy is still very limited and has not been growing fast enough. In fact, sustainable energy only contributes to 11% of global energy generation.

Pollution is linked to the issue of environmental degradation. Over 75% of the earth's surface is already degraded, and this percentage could reach 90% by 2050[10]. Soil degradation and climate change are expected to reduce world crop yields by 10% before 2050. This may mean halving the agricultural production of countries such as India, China, and sub-Saharan Africa[11].

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7 The G7 is represented by the USA, the UK, Canada, France, Germany, Italy, and Japan.

8 In turn, the refugee crisis defines a situation of profound political and social tension in Europe.

9 In 2017, CO_2 emissions in Italy increased by 3.2% compared to the previous year. This is nearly double the average 1.8% European increase, ranking Italy at 10.7% of all CO_2 emissions in Europe. Data gathered from *Il Sole 24 Ore: https://www.ilsole24ore.com/art/impresa-e-territori/2018-05-04/co2-emissioni-crescita-italia-32percento-e-europa-18percento–184020. shtml? uuid = AE0r4yiE*

10 The degradation of a surface equal to half that of the European Union (i.e., 4.18 million km², where Africa and Asia are the worst affected continents) occurs every year. Suffice it to say that around 30% of the world's land is covered by forests, but at least two thirds of it is in a state of degradation. The United Nations 2018 World Water Development Report estimates that 1.8 billion people are currently affected by soil degradation/desertification and drought. These issues are therefore categorized as the "natural disasters" with the worst impact in terms of mortality and socioeconomic weight on GDP per capita.

11 Data gathered from: *http://europa.eu/rapid/press-release_IP-18-4202_en.htm*

Estimates show that by 2050, up to 700 million people will be displaced due to problems related to resource scarcity. Indeed, we are exploiting the land equivalent of 1.7 planets to meet the current natural resource needs. The cost of this imbalance has become increasingly tangible: deforestation, the loss of biodiversity, the reduction of available fresh water, an increased percentage of carbon dioxide in the air fueling climate change that results in global warming, the progressive melting of glaciers, changes in monsoons, rising sea levels, and the intensification of droughts and floods. Resource scarcity and climate change are two key elements in global power conflicts.

The **fifth driver** of change is represented by **new individual attitudes and preferences**. Technology permeates daily reality, transforms the mode of consumption and, in many cases, allows for disconnecting from the workplace by making it possible to work anywhere at any time. Technological hyperconnection negatively affects individuals' ability to stay focused and concentrated. Moreover, as Tammy Hughes has already highlighted in this book, four generations share the same work environment. These workers tend to approach life, relationships, and duties very differently, and companies are thus called to an increasingly diversified management. In 2025, 75% of the workforce will be composed of millennials. These young people think that seven months in a company is already a sign of "loyalty" and expect to pursue between 10 and 12 jobs before the age of 38 (Deloitte, 2017; 2018).
Millennials seek a challenging and meaningful professional experience that allows them to have a *lifestyle which is coherent with their individual "desires."* This also means an *integration of work and non-work interests that strengthens their employability*, and when they do not find these qualities, they tend to look for new work challenges.

New labor norms and rules represent the **sixth driver** of change. New technologies and consumer behavior, accelerated market transformation, and diverse individual preferences have expanded the talent management continuum. This expands employers' opportunity to define a "multi-channel" workforce strategy mix: full- or part-time conventional employees, fixed-term, agency workers, independent, self-employed, freelance, and crowd workers, as well as robots. As described by Denis Pennel, organizations evaluate the construction of working relationships from the perspective of Total Talent Management. They choose between purchasing, borrowing, renting, and sharing professionalism and talents.
Tiziano Treu and the same Pennel show how this growing impact of different contractual methods requires a new evolution of labor, welfare, and social policies. The goal is to shift the ownership of rights from the workplace to the individual worker while handling the development of social security networks and economic-fiscal incentives for guaranteeing *flexicurity*. Such a process is achieved through the synergistic action of the State, companies, private operators, and workers.

All these forces result in a fast and unpredictable labor market transformation. They also lead to a physiological disappearance of certain professions in favor of the more or less profound transformation of others and the creation of new ones.
The following **Table 1** demonstrates the WEF vision (2018).

Stable Roles	New Roles	Redundant Roles
Managing Directors and Chief Executives	Data Analysts and Scientists*	Data Entry Clerks
General and Operations Managers*	AI and Machine Learning Specialists	Accounting, Bookkeeping and Payroll Clerks
Software and Applications Developers and Analysts*	General and Operations Managers*	Administrative and Executive Secretaries
Data Analysts and Scientists*	Big Data Specialists	Assembly and Factory Workers
Sales and Marketing Professionals*	Digital Transformation Specialists	Client Information and Customer Service Workers*
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Sales and Marketing Professionals*	Business Services and Administration Managers
Human Resources Specialists	New Technology Specialists	Accountants and Auditors
Financial and Investment Advisers	Organizational Development Specialists*	Material-Recording and Stock-Keeping Clerks
Database and Network Professionals	Software and Applications Developers and Analysts*	General and Operations Managers*
Supply Chain and Logistics Specialists	Information Technology Services	Postal Service Clerks
Risk Management Specialists	Process Automation Specialists	Financial Analysts
Information Security Analysts*	Innovation Professionals	Cashiers and Ticket Clerks
Management and Organization Analysts	Information Security Analysts*	Mechanics and Machinery Repairers
Electrotechnology Engineers	Ecommerce and Social Media Specialists	Telemarketers
Organizational Development Specialists*	User Experience and Human-Machine Interaction Designers	Electronics and Telecommunications Installers and Repairers
Chemical Processing Plant Operators	Training and Development Specialists	Bank Tellers and Related Clerks
University and Higher Education Teachers	Robotics Specialists and Engineers	Car, Van and Motorcycle Drivers
Compliance Officers	People and Culture Specialists	Sales and Purchasing Agents and Brokers
Energy and Petroleum Engineers	Client Information and Customer Service Workers*	Door-To-Door Sales Workers, News and Street Vendors, and Related Workers
Robotics Specialists and Engineers	Service and Solutions Designers	Statistical, Finance and Insurance Clerks
Petroleum and Natural Gas Refining Plant Operators	Digital Marketing and Strategy Specialists	Lawyers

Table 1. Evolution of roles in the near future.
Source: WEF (2018) p. 9.

Skills as a fundamental element for the future of work

The current changes which will increasingly affect the working world are deep, broad, accelerated, and unpredictable. These changes also introduce complexity and uncertainty by urging all the involved actors in the market to undertake a radical **cultural change** with regard to work and its relations, organization, and protection. This change requires:

- people to exercise greater work proactivity by cultivating their professionalism throughout their work life;

- companies to become learning organizations that are capable of integrating their short-term policies with medium- to long-term ones, promoting smart collaboration both internally and externally, bolstering attention to the well-being of people (diversified management solutions, active involvement, welfare, professional development), and by supporting them in coping with work transitions (assessment, training, coaching, outplacement);

- political actors to promote interventions in favor of work flexibility, increasingly responsive training paths in line with market dynamics, financed training interventions for continuous skills updating, and active and welfare policies able to support workers during transitions by guaranteeing individual "portable" rights.

In order to face the challenges posed by this increasingly volatile, uncertain, complex, and ambiguous market, companies need the collaboration of ***qualified people***. The latter have an inclination and implement the ***knowledge***, ***skills*** (know-how), and ***behaviors*** (conduct) necessary to carry out their tasks by identifying with the ***values*** that characterize the specific organizational context.

People's skills become a determining factor in companies' capacity for development. The continuous evolution of the context and its challenges alter the skills market over time. The WEF (2018) summarizes the current and following year's demand for skills. (**Table 2**)

Today, 2018	Trending, 2022	Declining, 2022
Analytical thinking and innovation	Analytical thinking and innovation	Manual dexterity, endurance and precision
Complex problem-solving	Active learning and learning strategies	Memory, verbal, auditory and spatial abilities
Critical thinking and analysis	Creativity, originality and initiative	Management of financial, material resources
Active learning and learning strategies	Technology design and programming	Technology installation and maintenance
Creativity, originality and initiative	Critical thinking and analysis	Reading, writing, math and active listening
Attention to detail, trustworthiness	Complex problem-solving	Management of personnel
Emotional intelligence	Leadership and social influence	Quality control and safety awareness
Reasoning, problem-solving and ideation	Emotional intelligence	Coordination and time management
Leadership and social influence	Reasoning, problem-solving and ideation	Visual, auditory and speech abilities
Coordination and time management	Systems analysis and evaluation	Technology use, monitoring and control

Table 2. Evolution of skills in the near future.
Source: WEF (2018) p. 12.

The disruptive effect of certain drivers of change on the evolution of work leads to limited availability or even unavailability of specific technical and soft skills, which the market needs ***(skill shortages)***. Thus, finding the right person for a specific job or role becomes ever more difficult for companies. This is due to a misalignment among the individuals' skillset and the skills needed to respond to market demands or guide its change. The misalignment is mainly due to a lack of candidates, insufficient experience, or shortcomings in the required technical and soft skills, given the technical term skill mismatch. A ***skill mismatch*** generates the phenomenon of vacant job positions within companies, that is to say, positions that cannot be filled because people with the desired skills and work experience cannot be found. Therefore, the market lacks the talent needed for undertaking certain tasks and filling specific roles ***(talent shortage)***. Lack of talent produces very negative effects for companies in terms of their ability to effectively respond to their customers' requests, productivity and competitiveness, innovation capacity, turnover, and reduction of employee motivation and engagement. All of these elements have a strategic impact on companies' development.

In order to effectively respond to the talent shortage, **companies tend to intervene in three areas: *work models*** (redesign of roles and career path development; enhancement of collaboration among business lines and teamwork strengthening; use of contingent workforce; work activity outsourcing and apprenticeships; development of open innovation; creation of business networks), ***attraction and inclusion of talents*** (corporate branding; expansion of recruiting; support requests to intermediaries and specialized partners; sharing of talents between companies; collaboration with schools, educational institutions, universities for creating training courses that better fit the needs of the market, or work-study integration pathways [level I, II, or III apprenticeships and combined school/work experiences]); ***management of human resources and development of skills*** (increased autonomy and professional accountability; smart working; assessment; management by objectives (MBO) to foster collaboration inside and outside the company; training activities; mentoring; coaching; professional retraining courses; job rotation; national and international mobility).

The role of Human Resources (HR) functions in the future working world

Given the need to combine labor supply and demand, skills and rewards, and people and machine, **HR Functions** will play a fundamental role in the working world of the future. HR will be asked to:

- **design new organizational models** to tackle market developments and corporate diversity, ***thus contributing to the construction of the company strategy*** by interpreting the signs of change in the external and internal context, **integrating technology** into HR practices to optimize processes, and **using analytics appropriately** to guide the internal and external operating decisions;
- **practice expertise on labor supply and demand** and **HR management solutions** to define the strategic planning of staff and collaborators, identifying the most suitable solutions to ***develop the company's human capital*** (skills strengthening and updating), defining the ***most effective contractual form*** to manage the relationship, ***ensuring full compliance with regulations***, supporting change and promoting the creation of a corporate ***achievement-oriented culture***;
- **manage talent through marketing levers** by integrating HR solutions to ***attract***, ***retain***, and ***motivate*** people by setting and guiding ***total reward*** policies that take diversity into account and focus on the balance between well-being and performance;
- **navigate the paradoxes** governing the tensions between potentially conflicting needs (e.g. strategy/operation, personal well-being/efficiency, change/stability, and analysis/synthesis).

The new working world will bring continuous challenges regarding such complex and strategic issues. Therefore, HR managers will increasingly need to use quality partners specialized in the world of work to resolve the talent shortage, thereby allowing a company to have an available group of people with the skills and experience necessary to do the job when needed and when the market requires. These are **intermediaries in the working world**, mainly including **Employment agencies (known as Agenzie per il lavoro - APL - in Italy)**.

The role of Employment agencies and Gi Group

Employment agencies are centers of expertise that **allow for**:

- **work** *(enabling work)* by taking on the role of social integrators and providing employment opportunities that give people back a sense of hope;
- **adaptation** *(enabling adaptation)* by generating agility and mutual trust among stakeholders and facilitating mobility and work transitions, as well as encouraging skills upgrading;
- **security** *(enabling security)* by ensuring the identification of the right talent for the company, supporting an increase in company competitiveness, and making "portable" labor rights available;
- **prosperity** *(enabling prosperity)* by driving economic growth, participating in the reduction of unemployment, promoting the inclusion of people in the world of work, and increasing employment income.

Forty-three million people find a job via agency work every year, while employment agencies represent 1.7% of the working population worldwide. Employment agencies introduce over 14 million young people to the world of work each year.

They also help five million companies cope with the increasingly volatile market and support about three million people throughout their working lives (WEC, 2018).

The evolution of labor will continue to unfold in ways that are not even imaginable today, let alone in the future. No regulatory upheaval can stop such a phenomenon. Companies are going to deal with more and more complex requirements of greater flexibility and will respond by seeking new matches between work contracts and diversified staff management. Meanwhile, individuals will need to learn how to continuously upgrade their skills and effectively manage the increasingly frequent changes regarding the role of work and/or the company. Precisely for this reason, the Agencies' role in matching labor supply and demand is destined to grow and become more relevant in the future.

Intermediaries are ***labor market experts*** because they have developed knowledge and skills about the labor market and its context. Companies and people ask them to provide an "ecosystem" of services and solutions aimed at sustaining flexibility and supporting companies during the identification, recruitment, selection, management, retraining, and outplacement of candidates. Intermediaries are thus ***work solutions designers***. Further, the intermediaries will support people in the entry, adaptation, and transition phase between jobs ***(candidate management)***. Finally, they will be called on to develop training proposals in line with current and future market needs ***(skills development support)***. (**Figure 1**)

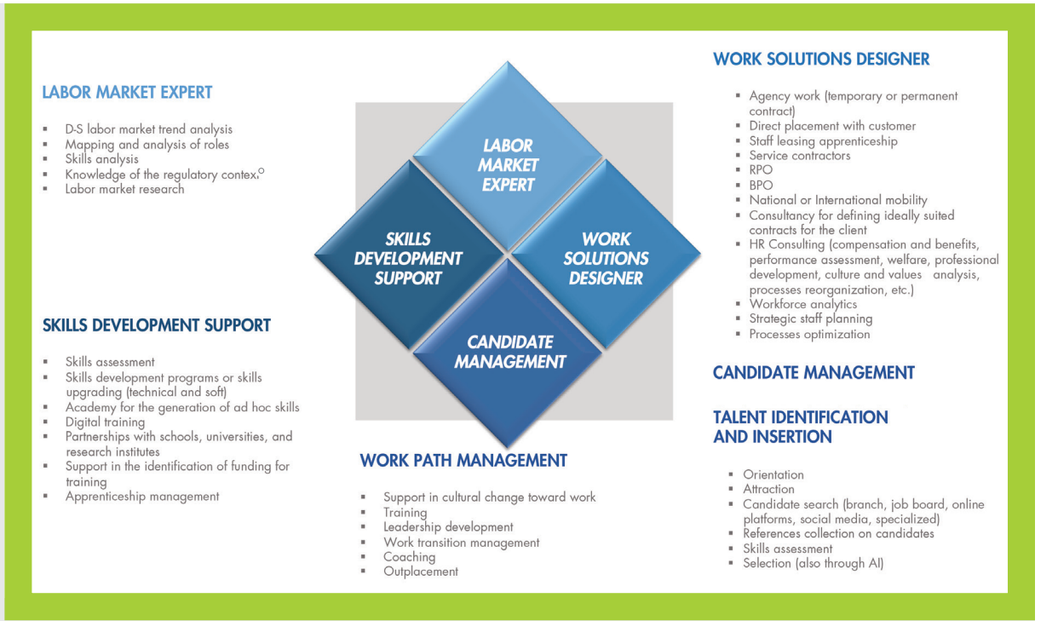

Figure 1. Employment agencies' services aimed at facilitating the overcoming of the Talent Shortage.
Source: Our elaborations.

In this context of great evolution, **Gi Group** is and will continue to play an increasingly fundamental role. We started as a small local company in 1998. **After 20 years, we are a multinational labor company that is present in 58 countries** (27 of which with a direct presence). **We serve more than 20,000 corporate clients through 500 branches.** In 2018, thanks to the work and the passion of our staff (over 4,300), we have achieved over two billion in turnover.

The group will continue along the path taken 20 years ago as a global provider of flexible HR solutions. We will do so with a single goal in mind that has been the same since our establishment in 1998: ***"Through our services, we want to contribute, as a key player and on a global basis, to the evolution of the labor market and to emphasize the personal and social value of work"***. Therefore, we seek to generate value by identifying and meeting the increasingly complex demands of companies and candidates.

We are convinced that the needs and desires of individuals evolve and change, yet never run out. Future work will not diminish while demanding a transformation that will be increasingly recurrent, fast, uneven, and disruptive. Machines and individuals (men and women, young and older people, Italians and non-Italians) will work side by side in the world of tomorrow. They will leverage their specific skills to generate value on the market. Jobs will be smarter, and it will be possible to reduce work times. Facing the possibility of flexible labor solutions, companies will promote management through a Total Reward perspective (rewards, professional development, welfare, work environment) that takes diversity into account. The State must overcome its inefficiencies in supporting transition periods from one occupation to another. It should provide active welfare policies while also learning from foreign best practices in order to offer security, stable minimum income, healthcare, and social security.

Throughout this future scenario, the *"dream"* guiding the **Gi Group** is to be recognized as the main global actor that is able to satisfy the world market by matching the different needs of people and companies. We want to achieve such a goal by balancing, on one hand, passion and enthusiasm for work, and on the other, labor dynamism and the market. In order to make this dream a reality, we put candidates first and mentor them towards making a difference during their working life (by acknowledging themselves as *"builders of cathedrals and not stone cutters"*). We want to respond effectively to the needs of global companies through an integrated *value proposition*.

This dream, which sees us able to generate competitive advantages both on the side of the candidate and the company, can come true only if **Gi Group** people are motivated and engaged in the company and their tasks, and are able to learn quickly while remaining on a path of continuous education. ■

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Stefano Colli-Lanzi

Stefano Colli-Lanzi graduated in Business Administration with honors and dissertation recommended for publication at the Bocconi University in Milan. After his studies, he devoted himself to corporate consultancy for roughly 10 years by working for Bersani-Vitale and Arca Merchant. Such extensive and significant experience yielded interest, respect, and passion for the business system. At the same time, he also developed teaching experience in Business Administration at both the Carlo Cattaneo University (LIUC) of Castellanza and Bocconi University. He started his entrepreneurial path in 1998 by founding *Générale Industrielle Italia*, which is today's **Gi Group**. Since then, the company has been growing step by step. **Gi Group** is now present in 58 countries (27 with a direct presence) in Europe, America, and Asia. **Gi Group** operates in the fields of temporary, permanent, and professional staffing, as well as search and selection, executive search, outsourcing, outplacement, HR consulting, and training. **Stefano Colli-Lanzi** is also Professor of Business Administration at Cattolica University in Milan and President of the Centro Culturale di Milano (Cultural Center of Milan). Colli-Lanzi is married with five children, three of which are foster children. He is also a passionate golfer.

Summary

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