The startup ecosystem

From founders to investors, and from research to business ideas, discover how an entire ecosystem drives new entrepreneurship and supports sustainable development.

This is a text extract from the magazine sarfatti25 issue 4, 2024

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Academic year opening ceremony 2024-2025

Mind the future by Francesco Billari

The 21st century will be the century of Universities. Knowledge will therefore have to be put at the service of progress, building a future that is sustainable and inclusive for all. This was the focus of Rector Francesco Billari's inauguration speech for the 2024-2025 Academic Year on November 9th. The ceremony featured PresidentAndrea Sironi, Bocconi Alumni Community President Silvia Candiani, along with guest speaker Ajay Banga, 14th President of theWorld Bank.

Text:

The 21st century is the university century. Let me say this loud and clear, and repeat it: the 21st century is the university century. During the Opening Ceremony of Bocconi's Academic Year, I would like to explain why universities are at the center of the future of humanity, today more than ever, and how our University is equipping itself to face the next three quarters of this century as a leading player. Worldwide, we currently have the largest number of young people in the history of humanity. According to UN forecasts, the years between 2027 and 2030 will be the only time in human history during which there will be more than two billion people under the age of 20.

From then onwards, this number will begin to fall, yet always remaining around the levels reached at the beginning of this century. For the sake of our future, all these young people will have to go to school, as already outlined in the Sustainable Development Goals. In addition, the majority of them must be able to realistically aspire to attend a university. This is not an unattainable idea. If we look at OECD countries, nearly half of young people have already obtained a university degree (47.4% of people aged 25-34 in 2022). This is the first time in history that this has happened.

And it is not just the OECD, the richest countries. A perhaps surprising figure is that – according to estimates by Vienna's Wittgenstein Centre for Demography and Global Human Capital – we are at nearly one quarter worldwide (23.8% of people aged 25-34 in 2020). The same center forecasts future scenarios, combining generational turnover and the expansion of the educational system. Even considering an average development scenario, at the end of the 21st century more than half of the world's young people will have a post-secondary level of education (53.4% of people aged 25-34 in 2100). This is a real revolution. Universities will be at the center of the future of companies, the most advanced institutions and humanity as a whole. Only countries and societies that invest in the development of universities, higher education and research – putting the mat the center of policies in both the short and long term – will prosper.

Universities will also play a key role in promoting greater circulation of talent. The growth of young populations in many parts of the world represents an extraordinary opportunity for countries that will be able to integrate these talented students into their education and business systems. European universities must have the courage to be increasingly more open to students from all over the world, for a true global impact.With this appeal, the finest universities will have additional responsibilities: to continue serving not only their own communities and countries, but also those of new students. And they will have to do so with education that has a global footprint on campuses bursting with life, where networks of strong relationships are developed that last for increasingly longer lifetimes. Only in-person education can contribute to the development of behavioral, emotional and social skills, which are too important to be defined only as "soft skills". As growing research on the subject has shown – recently summarized by French economists Yann Algan and

Elise Huillery – the future of education depends crucially on the socioemotional skills of young people. These are skills such as self-esteem, growth mindset, self-control, trust and cooperation, which can be optimally developed in typical campus interactions.

Socioemotional skills are fundamental because they provide a triple dividend:
1. they facilitate the learning in general, also improving academic achievement;
2. they improve professional prospects and career advancement;
3. they enhance individual wellbeing, with a positive impact on health and on society overall.

With the prospects of further increases in life expectancy, in a world characterized by rapid technological change and the continuous evolution of labor market needs, universities will also have to become reference points for lifelong learning, both reskilling and upskilling. The ability to adapt, learn new skills and reinvent oneself professionally has become essential in a context where technological innovations quickly make many skills obsolete. Therefore, universities will no longer be just places of higher education for young people, but centers that are open to all generations, offering programs that meet the needs of anyone who has to update their skills to keep making a difference. Universities will thus play a crucial role in building bridges between generations.They must be able to connect the wealth of experience and knowledge of the older generations with the energy, innovation and creativity of the new generations. This intergenerational exchange will be key to addressing global challenges, sharing experiences and co-creating innovative solutions.

Research and technological innovation that arise from – and are created around – academia will be decisive in the university century. They will play a decisive role for our future in addressing the world's complex challenges. Research and technological have always played this role throughout the history of humanity, with a fundamental impact on the medium- and long-term development of human capital levels and the spread of schooling. Leading research universities will have to play a key role in this. In a series of studies, economist Philippe Aghion has shown that leading universities – especially when in constant dialogue with the private sector and industry – are capable of generating innovation, promoting technological growth and strengthening the economic fabric of societies. Aghion shows the significant impact of scientific research on the productivity and economic dynamism of a country. This impact does not work against the central role of universities in reducing inequalities through the provision of quality education that is accessible to talented youth.

The Draghi Report on the Future of European Competitiveness also underlines the central role of academia and research in promoting competitiveness and economic growth. On the subject of competitiveness in particular, the Report emphasizes the importance of cuttingedge research that can lead to breakthrough innovations. For Draghi, a European approach is essential to accelerate research and innovation through non-dispersed contributions at the national level: public support at the EU level for research is only 0.05% of GDP, compared to 0.65% at the US federal level (2021 data). A European approach can build on past successes, such as the European Research Council (ERC), an institution that has brought together the best of research in Europe and beyond, attracting several non-EU member countries, and has helped attract the most innovative researchers. This process has overlapped with national funding at higher levels of ambition, constituting a sort of "28th state" for research, similar to the one evoked for other purposes by Enrico Letta in the Report "Much More Than a Market: Speed, Security, Solidarity. Empowering the single market to deliver a sustainable future and prosperity for all EU citizens". It is a bottom-up process in which panels of experts judge scientific projects sent spontaneously, without specific content constraints.

The Draghi Report recommends doubling the resources allocated to the ERC and an extension of the same approach to entire institutions (i.e. “ERC for Institutions”). It also encourages “EU Chairs” to be funded at universities in order to attract, retain and build an ecosystem around top scholars. This is a desirable direction, in line with the objective of Europe being at the forefront in the university century.

The Interview

Alumnus of the year by Michele Chicco

Davide Serra, named Bocconi Alumnus of the Year 2024, talks about his years at the University and addresses young Bocconians: "You are on a launchpad.What counts is meritocracy and competitiveness, not the numbers on your social media account. I received a lot and I want to give back to support those who have the abilities but not always the possibilities"

Text:

"More Real Life and Less Anxiety: AI Won't Beat Us"

Twice a day at the gym, then head down studying for six or seven hours: Davide Serra entered Bocconi as a professional volleyball player. A short career in the A2 division and the celebration of his team's promotion to A1, the top league, before seeking his place in the world driven by Mario Monti's lessons and his years of study abroad. 53 years old, he graduated in Business Administration in 1995. "I was the first in my family to have the opportunity to go to college. I had only one duty: do my best," recalls the founder and CEO of Algebris Investment, named Bocconi Alumnus of the Year in 2024.

What advice would you give to young Davide?
First of all, to live as much as possible in the real world. I was a boy-scout member and a volleyball player, today I would be a young person who does physical workout, studies, strives to succeed while living in the real world and competing with his peers in a healthy way. Many studies say that young people spend too much time comparing each other in the virtual world and this generates anxiety and devastating mental disorders. But it's not your numbers on the Instagram account that make the difference: Bocconi is a great launching pad for one's professional trajectory and one of the few veritably meritocratic academic experiences you can have in Italy, because it is international, which is not a given for Italy, and is competitive in a constructive way.

Your time at the University was when your idea of finance was formed. What has changed in these thirty years?
I admit that in my first three years at Bocconi I couldn't fully understand what finance was. I only understood it through in-depth studying and international exchange programs. The first year I went to Norway and met a professor who had helped the Swedish central bank fend off George Soros, who in 1994, after attacking the pound and the Bank of England, had tried the same with the Swedish krona. There I decided I wanted to study finance because I understood that it was a game: there was a subject who "attacked" and one who had to go on the defense. Up until then the subject had been very abstract for me. At the time the good thing was the connection with people: you had to understand the opponent's tactics, like players on the field. Today the game has changed, in my opinion for the worse, because 60-70% of global volumes are made by algorithms that undermine capital allocation strategies, and turn investors like me into Jedi survivors, like in Star Wars. We are resisting here with our name and we are convinced that the technology empire, which has the upper hand today, will lose over the long term.

You had a long traditional career, then in 2006 you founded Algebris. Did Bocconi foster your entrepreneurial spirit?
I'll be honest: no. In my day, as students we dreamt of joining Morgan Stanley, Goldman or McKinsey: they paid more and, as people said, they let you fly business class. The decision to become an entrepreneur came when, after having had professional success, I felt the desire to create my own corporate culture: the American one, although perfect in terms

of meritocracy and professionalism, has always seemed a bit arid to me. I wanted to show that you can be a group of good guys and win. Now my greatest achievement is knowing that there are Bocconi students whose aspiration is coming to work at Algebris.

In these thirty years, finance has become increasingly central to people. Will its impact increase in the future?

Yes, because finance is the only discipline that connects generations in a very concrete way. Today we are here, for example, thanks to the savings made by mom, dad, grandparents... At the same time, we can borrow money from the future that we don't have available now, asking for a mortgage to build our idea of independence. Finance is the fruit of the past, it lives in the present and connects to the future. Mario Monti explained it to me when I was in my first year at Bocconi with the concept of intergenerational taxation: government debt falling on the shoulders of future generations.

What value will artificial intelligence have in the financial industry?

As a kid I was one of the best at programming in Excel and I always used the latest technological tools available. Now I ask my people to be "supergeeks", but to date artificial intelligence hasn't done anything that we haven't already tried before. Our world is complex and we use machine learning to read data, but the union between the best technological tools and the best human brain is still decisive. With the unbalanced view of technology we have now, we create anxiety in new generations: technology is only one of the tools, you have to be calm and critical; humans must continue to evolve. This is why the education system must be at the forefront.

We need to work on education and training.

To me this is crucial. It strikes me to meet people who at 25 do not yet have the basics of financial education, a definition of what money is, how a central bank works or the difference between a BTP bond, an investment fund or a company's stock. I believe that financial education, even minimal, is fundamental for personal awareness and greater understanding of the reality that surrounds us, and exposes us less to the risk of being manipulated by those who make false promises, especially on important issues such as economic ones.

You engage in philanthropic projects: why is it important for entrepreneurs to get involved?

My Anglo-Saxon culture and my Italian heart have made three pillars very clear to me: commitment to family, work and society, with the duty to do well. In my family I was the first who had the chance to study and this has instilled in me a great sense of responsibility. Today, I think it is right to give back part of what I have earned. I do it with two projects: with the Hakuna Matata Foundation, we help 8,000 orphaned children in Tanzania with education and healthcare projects; in Italy with Bocconi, we finance scholarships for students who have the potential to emerge but perhaps not the economic means. Thirty years ago, my scholarship was my grandmother: I like knowing that I can give the same opportunity to someone else.

Climate change

The Green Transition for Widespread Change by Michele Chicco

We must act quickly on decarbonization to interrupt the global warming trend. "Forward-looking adaptation and mitigation policies are needed," says Valentina Bosetti, who is calling for acceleration in permits and long-term policies. These measures, as underlined by Italo Colantone, "should not generate costs with which only certain categories of people are burdened."

Text:

Records are meant to be broken, but when it comes to climate, they are likely to be shortlived. According to Copernicus, the European information service that observes climate change, it is "very likely" that 2024 will be the hottest year ever - breaking the record set only a year ago after decades of monitoring. Scientists reveal that, from January to July, global temperatures were 0.70 degrees Celsius higher than the 1991-2020 average, and 0.27 degrees higher than those recorded in the same months in 2023. It is an anomaly for which it is "increasingly likely that 2024 will be the hottest year on record", unless there is a sudden and unexpected drop in temperatures in the latter part of the year.

"It is a trend that we have been observing for some time," Valentina Bosetti, Professor of Environmental and Climate Change Economics at Bocconi University, points out unsurprised. She explains further: "This year we felt the effect of El Niño, a meteorological phenomenon that - every two to seven years - impacts the climate primarily on the American continent and has a domino effect also on the European one, influencing temperatures and leading to more extreme rainfall. The data from Copernicus confirms that September 2023 through August 2024 was the hottest year ever recorded for the planet." To interrupt the trend, Bosetti highlights that "long-term policies and investments are needed to harness the synergies between mitigation and adaptation as much as possible", underlining the need to accelerate decarbonization and be resilient towards these changes in the climate that we are bound to witness anyway.

"Investments in infrastructure that are capable of reducing energy demand or bringing clean energy to a new generation, while - at the same time - taking into account the urgency to protect ourselves from the negative effects of climate change, will bring about greater benefits. Economic resources, she assures, are not the bottleneck; many clean technologies are economically convenient and the private sector is mobilizing."

"Making the permit process more efficient," says the professor, "along with a system of clear, ethical and longterm policies, is vital." Looking outside Europe, trade will have a greater impact on environmental policies in the coming years because "what other countries do for the environment - their national climate policy choices - will be increasingly affected by the presence of environmental tariffs. One clear example is the Carbon Border Adjustment Mechanism, a European Union proposal aimed at leveling production costs by imposing tariffs on imports from countries with loose climate policies."

Bosetti observes, that in an effort to also bring forward the decisions of competitor-nations, "in Europe it is necessary to always keep mitigation in mind and consider the transition as a possibility for change that goes beyond climate change." "On the production side, it includes reducing the raw materials used, as well as rethinking the supply chain to minimize pollutants throughout. On the demand side, it includes helping people reduce their own demand for raw materials and energy as much as possible." The professor calls attention to the green transition, stating that "it is an opportunity to realize that our economic system is integrated and dependent on nature, and must set as its objective the collective wellbeing of not only this generation, but also that of future ones."

Those who develop public policies must be able to make breakthrough decisions without leaving people feeling defeated. “We should try to enact measures that do not generate costs with which only certain categories of people are burdened, instead trying to distribute them in a more widespread and progressive way throughout all of society,” explains Italo Colantone, Associate Professor in the Department of Social and Political Sciences at Bocconi University. It is not an easy task for those who want to quickly achieve ambitious emission reduction targets.

“Milan’s Area B offers interesting insights into how green policies can generate strong social and political opposition,” illustrates the professor, using the example of the decision made by the municipality of Milan to create a large, limited traffic zone within the city to prevent circulation of the most polluting cars, therefore those with more miles. “A survey of Milan residents found that, among those who had to change their cars due to the restriction, more were likely to vote Lega - the party that had most strongly opposed the measure. A classic example of a regressive environmental policy is that of Area B, the low-traffic zone, affecting the less fortunate the most: those with older, more polluting cars often cannot afford to buy a newer one. The carbon tax is another example of a regressive measure: it uniformly increases the cost of fuel for everyone, but tends to have a greater impact on those with less disposable income.”

So, what is there to do? Firstly, Colantone suggests, “effective and easily accessible compensatory measures should be provided, when - for example - one is required to change their car. The communication strategy then needs to be revamped, so that climate-friendly measures are better understood and more likely to be accepted. It is a choice that would be very easy to put into practice, at no cost.

Besides environmental sustainability, it is necessary to evaluate the political sustainability of the actions that are implemented.When environmental measures result in significant groups of underdogs, the next elections may head in the favor of political parties that oppose such policies, which will therefore not be sustainable over time.”

The green transition, Colantone suggests, should be “as just and sustainable as possible”. An interesting aspect has emerged from a new paper on which the same professor is working: “Those with a professional interest in developing the green economy are more inclined to support green policies - not only high-level engineers or technicians, but also those in roles with less experience.” Moreover, even the workers potentially most disadvantaged by environmental policies - highlights Colantone - “tend to oppose them less in contexts where the positive effects of the green transition are more visible, such as - for example - in the regions that have a strong disposition for clean energy production, because the green transition generates widespread benefits.” From a communicative perspective, this is the most important lesson for those who are tasked with convincing others to accept even the most difficult decisions: “It is important to emphasize the opportunities within everyone’s reach as a result from the green transition, underscoring its inclusive aspects as much as possible.”

Box: the initiative

AdaptAction@School is the initiative of Università Bocconi in collaboration with Factanza Media dedicated to high school students. Participants will develop awareness campaigns on environmental issues.

AdaptAction: Learn How to Adapt by Andrea Costa

A Bocconi idea to disseminate science and create awareness about the challenges facing the planet.

Text:

Imagine an interactive space where questions come to life and imagining solutions to global problems becomes possible. This is AdaptAction - Connecting solutions for climate change, an interactive experience within the MEETmeTonight 2024 science outreach event designed to engage and inspire visitors for a more sustainable future. The exhibit will be available for visitors again after the event in the Bocconi campus while the content will be repurposed for high school students as part of the AdaptAction@School orientation initiative. As a matter of fact, an integral part of our university's mission is to bring knowledge out of our lecture rooms into the city and within society, and this is all the more true when it comes to addressing issues of such importance to the younger generations. AdaptAction is a concentration of innovation and research dedicated to climate change adaptation, divided into four macro-themes.

CITIES: redesigning urban spaces

How are cities evolving to become more resilient? New sustainable mobility solutions and urban regeneration interventions that aim to achieve ESG (Environmental, Social, Governance) goals by redesigning metropolises to adapt to climate change.

AGRICULTURE: rethinking livestock and crop supply chains

Traditional agriculture has a significant impact on the environment and society. Regenerative agriculture and a more sustainable food supply chain can become powerful tools for climate change mitigation and adaptation.

SYNERGIES: redefining international collaboration

Addressing climate change requires multilateral strategies. Countries and institutions can work together to establish common ground and shared goals, promoting globally coordinated actions.

IMPACTS: redesigning environmental policy measurement tools

What are the effects of human activities on the environment, economy and society? Innovative tools for measuring the benefits and risks of the transition to a sustainable future.

Inside AdaptAction, visitors have the opportunity to explore cutting-edge research through an interactive exhibit prepared with contributions from:

- Valentina Bosetti, professor of Environmental and Climate Change Economics;
- Gianmarco Ottaviano, holder of the Boroli Chair in European Studies;
- Edoardo Croci, coordinator of the Green Economy Observatory and director of the Sustainable Urban Regeneration Lab;
- Vitaliano Fiorillo, director of the Agribusiness lab;
- and Fabrizio Zerbini, director of the Mobius lab.

Visitors can move freely through the exhibition space, creating customized paths to discover the most relevant data and innovative research. Using their smartphones, everyone can interact with exhibit elements to view digital content such as videos, infographics, and images that deal with complex topics while making them accessible and easy to understand. This technology turns personal screens into dynamic interfaces that enhance the learning experience and encourage a collective view of issues.

One of the most fascinating aspects of AdaptAction is the digital platform created specifically for the exhibit space. This platform collects visitor interactions and multimedia content, creating a living ecosystem that will continue to grow and engage audiences long after the event is over. This is made possible through collaboration with design company Logotel, Limiteazero, and Factanza, a media company known for its commitment to making information accessible to younger generations. AdaptAction is not just a journey through information; it is an experience designed to leave a deep impression. It captures the visitor on an emotional level through powerful questions that invite reflection on possible future scenarios and individual actions; on the other hand, it provides a clear picture of interactions between different fields, highlighting the interdisciplinary nature of Bocconi research.

Box: The platform

How can we adapt to the challenges of climate change? How do we take action to mitigate its effects? How do we visualize a shared and desirable future? AdaptAction is the interactive space designed by Bocconi University to reflect on these issues from the work and studies of its researchers.

Boards of Directors Hear the Call of the Wild by Ariela Caglio

Companiesmust begin to consider the environment as a real stakeholder, not just a resource to be exploited at no cost. It should be considered an interested party to be remunerated with a specific allocation, as proposed by research by Bocconi and AllianceManchester Business School

Text:

In the dominant business paradigm, nature is seen as a "free provider" of resources and services. It is precisely because of this short-sighted vision, which considers nature as a resource at no cost, that our demands continue to exceed the limits of sustainable management of the climate and natural resources. But nature is a central cog in the processes of corporate value creation and in the engine of the global economy. According to an analysis by S&P Global Sustainable1, as many as 85%of the largest companies in the S&P Global 1200 Index show a significant reliance on nature for their operations. Climate regulation, raw materials, water cycles, pollination: $58 trillion of the world's GDP depend directly on nature.

To take climate change seriously and promote the regeneration of ecosystems in business strategies and decision-making processes, a radical change of perspective is needed. Businesses need to stop seeing nature as an entity to be exploited and start seeing it as a stakeholder whose rights and wellbeing deserve the same attention as investors, consumers, employees and other 'human' stakeholders. Including nature among the stakeholders of a company means recognizing its rights, its intrinsic value and providing fair remuneration for its contribution to business processes according to a regenerative and "naturepositive" approach.

Some pioneering companies, such as Patagonia, Alstria and Faith-in-Nature, have begun to adopt this practice. Initiatives such as the "green dividend" or assigning a vote to nature on Boards of Directors represent innovative approaches to give a voice to a stakeholder that - despite having a fundamental role in the business world - has so far remained silent.

This is also the spirit of new disclosure rules, such as the European Sustainability Reporting Standards (ESRS) and the IFRS sustainability standards (IFRS S1 and S2), which aim to improve transparency on how companies assess and communicate their environmental and climate impacts and risks. However, the adoption of specific standards and metrics for ESG issues risks fragmenting the rationale, separating the economicfinancial dimension from environmental and social considerations. A more integrated approach is needed that considers nature, climate and economic results as interconnected elements, incorporating these dimensions and their tradeoffs into the evaluation of corporate performance and managerial decisionmaking processes.

To do so, through the "Calculating Sustainability" study conducted with Paolo Quattrone and Sarah Russo of the AllianceManchester Business School, a new solution is being proposed and tested: the "Sustainable Value Table" (SVT). This is a new way of calculating the value generated and distributed by companies, linking it to the Sustainable Development Goals (SDGs). The SVT begins with a Value-Added Income Statement and includes nature among the stakeholders to be remunerated, allocating part of the value created by the company to a specific provision to "compensate" nature. The value assigned to nature is expressed in economic and financial terms and can therefore be compared with the value allocated to other stakeholders, such as employees and creditors, according to a concept of fairness. In this way, accounting gives nature visibility and a 'voice'. This allocation aims to repair any damage related to climate change and support the regeneration of ecosystems. Adopting a regenerative approach in business strategies is not just about avoiding harm or limiting negative impacts. It means actively contributing

to the restoration of ecosystems and climate resilience. By integrating the 17 SDGs, the SVT helps business decisionmakers understand how to allocate the value created to restore and strengthen the resilience of ecosystems and socioeconomic systems. Alperia represents a concrete case that demonstrates how this approach can be put into practice.

The SVT is more than just an accounting tool: it is a proposal that invites a deeper reflection on the processes of value creation and distribution. As with nature, visibility and a voice should also be given to other emerging stakeholders - such as future generations - in corporate financial statements. This can be done by adopting a dynamic and inclusive vision of value generation and distribution processes that reflects the interdependencies between nature, climate and society and between past, present and future choices.

Box: The research centre

Bocconi Centre for Research on Geography, Resources, Environment Energy & Networks (GREEN) aims to conduct and promote research at the intersection of the spatial of socioeconomic phenomena and of climate change, transportation, environmental policy and energy markets.

The Eyes from Space That Help Save Earth by Simonetta Di Pippo

Satellite observations are essential, today and in the future, tomonitor the 55 climate variables that are essential for planetary health. Butmore satellites in orbitmeanmore space junk, which is why the space economymust become increasingly circular

Text:

Over 52 degrees Celsius in New Delhi. The Indian capital is gasping for air, water is running out. This was the headline of ANSA, the Italian press agency, on 29 May 2024. It was the culmination of a succession of heat waves recorded in the previous weeks. In 2020, the American writer Kim Stanley Robinson published a novel that opens exactly like that, with a lethal heat wave hitting India, and an incipit that needs no further elaboration: “It was getting hotter”. The book is titled The Ministry for the Future.

But what only a few years ago would have seemed like science fiction to most people is now really happening: reality and science fiction are getting mixed. In fact, we have known for some time that the challenge that humanity faces with respect to climate change is difficult to overcome, and that we must use all the options made available by technology and innovation on a global scale to be able to hope that we can prevail. And even if now the effects of climate change are clear to everyone, and above all increasingly extreme climate events, it has been known for quite some time that temperatures were increasing and efforts and solutions needed to be put in place. It is no coincidence that the creation of the IPCC, the Intergovernmental Panel on Climate Change, dates back to 1998, the year in which the WMO (the World Meteorological Organization) and UNEP (the UN Environment Program) jointly created it. Thus a quarter of a century ago. The main purpose of the IPCC is to provide regular assessments of the state of the plane; the latest report, called AR6 (Sixth Report), was published in March 2023.

When in 2007 the IPCC together with former US Vice President Al Gore was awarded the Nobel Peace Prize, it was already churning out increasingly alarming data on the state of the climate and the mitigation and adaptation actions to be implemented. According to NOAA (the US agency that deals with oceans and the atmosphere), the month of July 2024 was not only the hottest ever, but also the 14th consecutive month to have set record temperatures. It becomes imperative to understand promptly what is happening to the Earth’s climate and this is where satellites and the space economy come to our aid. The WMO has in fact established 55 essential climate variables that need to be monitored to understand what is happening to the Earth system, and over half can be monitored in a precise, replicable, reliable and continuous way only from space.

Understanding in order to act, this should be the motto of all of us to be able to implement those global protection and mitigation mechanisms that seem so urgent. Global challenges have to be dealt with by global approaches. But understanding is only one side of the coin, the other is to intervene at the source to reduce anthropogenic GHG (greenhouse gas) emissions, and when this is not possible, develop technologies that can lead to a balanced absorption of carbon emissions, with the goal of achieving net zero by 2050. Therefore, sustainable socio-economic development can be accelerated and/or supported by the use of space technologies. And if we look at the long-term sustainability of space activities, we cannot fail to consider that as the number of satellites in orbit increases, the amount of debris also increases and space orbits start to get clogged. Therefore, we increasingly talk about space ecology and space environmentalism. As a derivation, there is work on a very recent concept, which we at the Space Economy Evolution lab (SEELab) have fully embraced: the concept of a circular space economy, which encompasses both planetary sustainability obtained thanks to space and the sustainability of the space industry.

The circular space economy is based on the concept of the circular economy on Earth, which, among other peculiarities, seeks to maximize efficiency in the use of material resources. If we go back to when this definition was coined, we can see that it was born after 2010, that is, around the same time the definition of the space economy - proposed by the OECD in 2012 - took hold. Talking about a circular space economy is instead a novelty, as the idea has only been emerging lately. If we want to save the planet, we need satellites. Increasingly, space will push us towards responsible behavior, on Earth and in space, because this is a time when reality surpasses fantasy.

Box: The libguide

To improve education and awareness on one of the biggest challenges of our times, Bocconi Library provided a Libguide about Climate change.

Networks

Unlocking Innovation by Andrea Costa

It can be done by increasing intrafirmcollaboration in R&D. This is the finding of a new study by Giuseppe Soda that explores the effects of carefully balancing researchers' abilities and tasks.

Text:

Researchers and technicians working in R&D departments who are moderately suited to their assigned tasks and projects are more likely to seek advice from other projects, fostering a culture of innovation and cross-pollination of ideas. This kind of moderate imperfection in assigning people to innovative projects could be the key to unlocking greater creativity and efficiency in R&D environments, as Giuseppe Soda of Bocconi's Department of Management and Technology argues in a new paper written with Manuel Gomez-Solorzano of Tilburg University in the Netherlands and Marco Furlotti of Nottingham Trent University in the UK.

The authors begin by introducing the concept of the person-task fit (PTF), defined as the extent to which an individual's abilities and the task of the project to which the individual is assigned match.

They then conducted an in-depth analysis of 766 knowledge-sharing interactions among 93 scientists at the R&D center of a major pharmaceutical company with a strong focus on in-house R&D. the methodology involved detailed surveys and statistical models to investigate how PTF influences the likelihood of seeking cross-project advice, taking into account various individual and project-specific factors.

Results show that researchers with a moderate PTF are likely to be the most proactive in seeking advice from their peers in different projects. This balance means they are familiar enough with their own tasks to be competent yet open enough to explore new knowledge from other projects. Researchers with either too high or too low a PTF tend to stick within their own project boundaries, missing out on valuable external insights. For R&D managers, the implications are clear: staffing projects with a mix of expertise levels can significantly enhance innovation. By not always aiming for the perfect fit, managers can encourage more dynamic knowledge exchange. As Giuseppe Soda notes, "R&D managers who aim to promote knowledge transfer across projects may want to staff their projects also with some researchers who are less than ideally matched to the project in terms of abilities and technical expertise".

These findings are far from theoretical. "Our study offers a fresh perspective on how R&D activities should be organized to maximize knowledge exchange and innovation," Soda adds. "By focusing on the fit between task demands and individual abilities, we highlight a crucial factor that R&D managers can leverage to drive better outcomes". R&D managers could aim for moderate levels of person-task fit when assigning researchers to projects. This approach encourages them to seek diverse perspectives, leading to more innovative solutions. Besides, providing autonomy to researchers to explore beyond their immediate tasks will boost the likelihood of cross-project advice seeking.

This study provides a roadmap for R&D managers looking to foster a more collaborative and innovative environment. By understanding and applying the principles of optimal person-task fit, organizations can break down silos and encourage a richer exchange of ideas. The right mix of expertise and task alignment not only enhances individual performance but also drives the collective creativity essential for groundbreaking discoveries.

Box: The paper

The organization of R&D work and knowledge search in intrafirm networks, by Manuel Gomez-Solorzano, Giuseppe Soda, Marco Furlotti.

Political philosophy

It's our fault, too by Giunia Gatta

Taking responsibility collectively for societal discrimination and historical wrongs, rather than rejecting guilt as individuals because we are not directly responsible, means looking at the fate of others as injustice, not as simple misfortune.

Text:

Are white US citizens guilty for any enduring racism in their institutions? Many would say: no! Especially in the case of those who fought against racial injustice and for civil rights over the years. Yet many black activists do tend to attribute guilt indiscriminately to whites as a whole. What happens if we listen to their accusations? In political philosophy and public debate the concept of guilt is unpopular. Nietzsche and the aspiration to the secularization of politics make us suspicious towards this notion. We prefer to talk about responsibility and look at the future rather than the past. However, my research on the claims of African Americans in the US context, and before that on the typology of guilt offered by Karl Jaspers in his attempt to bring his fellow Germans to reflect upon WWII and the Holocaust, have brought me to reassess the political value of guilt, and the value of listening to the claims of those who have been marginalized or victimized.

What happens if instead of rushing to personally exempt ourselves from guilt, we try to take these claims seriously and look critically at the structures of power that caused them? Perhaps we would notice institutional configurations and practices that systematically favored us, even when we were convinced that our successes were simply the product of our own talent and hard work. Perhaps we would see the place where we were born, our citizenship, the color of our skin, maybe our family background, as something that was quite instrumental in our achievements. Is it our fault?

Again, instinctively we would think not. Either we really think that we deserve everything we have, or perhaps we admit to ourselves that we are lucky, but not guilty. The fate of others, who do seem to fare worse than us, is a matter of misfortune rather than injustice. But how do those others see their fate compared to ours? Can we blame them if they think they are victims of injustice rather than misfortune? My intuition, in the wake of a political theorist I hold dear, Judith Shklar, is that leaving ground to the thought that something is the product of injustice rather than misfortune opens the space of political action, and of work against injustice. Looking at injustice as also our fault, as something we need to redress, something we have to fight against, is a fundamental instrument for shared social, political, and economic progress.

This rejection of injustice, and taking seriously the accusations of guilt moved by those who always find themselves on the losing side of the social and political game, has important implications at the political level, domestically, but especially internationally. It is a civic and political responsibility for all of us to understand how the world has come to its current shape: how did the process of decolonization take place? By which criteria the European colonial powers drew the borders of the countries they colonized?Which promises have remained unfulfilled? And we can ascertain some kind of guilt in the decolonization process, what steps should be to redress eventual wrongs? Do specific colonial powers owe reparations to their former colonies? Should there be focused investments in particular areas? Should a favorable immigration scheme be implemented?

Jaspers's typology of guilt again comes to our rescue. He distinguishes three types of guilt: legal guilt, the kind adjudicated in tribunals, which indeed cannot but be personal and attributed according to the rule of law, political guilt, which falls onto every citizen for the actions of their state, moral guilt, which calls on everyone to actively fight against injustice,

and metaphysical guilt, which calls us to do so even at the cost of our own lives. These expanding circles of guilt draw a normative horizon that is impossible to fulfill completely, but also a path towards justice that is worth pursuing.

Box: The paper

“There Is a Corpse in the Room”: On Political Guilt and Reparation of the Past, by Giunia Gatta.

Environmental sustainability

Actions speak louder than words by Hannes Wagner

Family-owned firmsmay not talkmuch about sustainability, but a research shows they're quietly taking significant steps to reduce carbon emissions outperforming larger companies in crucial environmental areas.

In today's world, climate change is at the forefront of global concerns. Companies are being pushed to adopt environmentally sustainable practices, but do family controlled businesses respond in the same way as public companies with wide ownership? In a study with I. J. Alexander Dyck, Karl V. Lins, Lukas Roth and Mitch Towner, we examine this important question by analyzing the environmental performance of 3,832 firms across 35 countries, focusing particularly on carbon emissions as a key measure of sustainability.

Family-controlled companies play amajor role in the global economy, and their approach to environmental sustainability is significant. The general assumption has been that family owned businesses are less committed to environmental goals compared to their publicly held counterparts. However, our findings paint amore nuanced picture.

One of the most important metrics of environmental performance is carbon emissions, given their direct link to climate change.We found that family-controlled firms performat least as well, and in some cases even better, than widely held companies when it comes to managing carbon emissions. This is especially evident in countries where the threat of future regulatory tightening on emissions is high. These firms seem to be keenly aware of the long-term risks posed by climate change to their business and act accordingly, especially in industries where carbon emissions are amaterial risk.

In fact, in countries withweak climate regulations, family firms are often ahead of the curve, emitting up to 20% less carbon than widely held firms. This suggests that family businesses, which often plan with future generations in mind, are particularly sensitive to existential risks like climate change. They are proactive in reducing their emissions to avoid potential future penalties, indicating a strong commitment to long-term environmental sustainability.

While family firms take real action on the ground, they are notably less focused on disclosing environmental policies andmetrics. Compared to public companies, family controlled firms are less likely to publicly declare their environmental policies or set qualitative targets. This is in line with the "low-disclosure" approach taken by prominent family-controlled firms like Berkshire Hathaway, where Warren Buffett famously noted that while they act sustainably, they don't waste time preparing extensive reports for public scrutiny.

This may explain why family firms often perform poorly on qualitative environmental metrics, which focus more on disclosure and commitments rather than actual performance. In the broader Environmental, Social, and Governance (ESG) ratings, family firms tend to underperform because these ratings often give significant weight to public statements regarding a company's environmental policy - an area where family companies tend to remain silent.

The discrepancy between actual performance and public disclosure could be due to the unique structure of family firms. With families often having significant control over the business and holding key management positions, they don't face the same external pressures from investors tha twidely traded companies have to publicize their environmental strategies. Unlike public companies, where management may feel the need to respond to investor demands for transparency, family firms often prioritize actions over

words. Their focus is on managing real risks - like carbon emissions - rather than engaging inwhat could be perceived as a public relations exercise.

Our study offers a new interpretation of the environmental sustainability of family-controlled companies. Contrary to previous research suggesting that family firms lag in environmental performance, we find that theymanage critical sustainability risks, particularly carbon emissions, very well. What they lack in public disclosure, they make up for with real and impactful actions. For family firms, reducing carbon emissions is not just good business - it's a way to ensure the longevity of their enterprise for future generations.

As global warming continues to pose challenges to global businesses, the role of family firms in mitigating environmental risk will likely grow in importance. Their ability to act decisively, without the constraints of quarterly reporting or external investors' pressures, may give thema unique advantage in navigating the long-term challenges posed by climate change.

Box: The paper

Family-Controlled Firms and Environmental Sustainability: All Bite and No Bark by I. J. Alexander Dyck Karl V. Lins, Lukas Roth, Mitch Towner, HannesWagner.

Europe

Innovation and competitiveness: at what price? by Daniel Gros

In his 300-page report on The Future of European Competitiveness, Mario Draghi argues that European enterprises are caught in a 'middle tech trap', a term coined in a joint report of the IEP@BU and two other institutions.

Text:

The report on The Future of European Competitiveness presented by Mario Draghi provides a clarion call for economic reforms to stop Europe's relative decline. This short comment cannot do justice to the report with over 300 pages of supporting material. We will concentrate just on two key messages regarding innovation and investment.

The starting point of the report is the weakness of innovation in the EU, and the report lays out the wellknown lamentable state of Europe's high-tech industries. Draghi recognizes that European enterprises are caught in a 'middle tech trap', a term coined by a joint report of the Institute for European Policymaking at Bocconi with other institutes in France and Germany. Most large EU companies are in the middle tech sectors and remain there because this is the field they know. Radical, breakthrough innovation is much weaker in Europe.

Draghi proposes a number of small, but significant steps that should strengthen innovation, like the creation of a European equivalent to the US Defense Advanced Research Project Agency (DARPA) that has been credited with fostering key innovations like the internet. However, EU companies are relatively strong in cleantech innovation. The report thus concentrates on the threat to the EU clean tech industry from China. It recommends, rightly, and courageously, abandoning sectors like solar panel manufacturing, where the Chinese cost advantage is too big - even if that advantage was due to subsidies.

But it considers the automotive industry too important to be exposed to unfettered Chinese competition. It recommends a mixture of tariffs and measures to ensure that Chinese investment in this sector leads to a transfer of technology. The report says: "The latter can be achieved by requiring foreign companies that want to produce in Europe to enter into joint ventures with local companies." This is exactly the approach China has used for a long time and which the EU has always criticized.

After discussing these and other challenges like decarbonization and high energy prices, the report concludes that: "a minimum annual additional investment of EUR 750 to 800 billion is needed, based on the latest Commission estimates, corresponding to 4.4- 4.7% of EU GDP in 2023". This part has attracted the most attention, but it is also the least convincing. Even the 300 pages of supporting material provide little explanation of how the Commission arrived at this magnitude. Why this amount would be needed in addition to the existing investment, and what concrete projects should be financed. The report does not say directly that the 800 billion euro annually should be financed by the EU through common debt, only that private financing will not be sufficient, and that common public debt would be desirable. But the message that has caught on is naturally the figure as can be seen in the headline of the Financial Times.

Moreover, it is very much debatable whether Europe needs more investment as opposed to investment in different sectors. A recent report by IEP Bocconi shows that investment in the EU is higher as a share of GDP than in the US. It thus does not make sense to call for a large increase in investment without specifying what kind of investment is missing.

The main EU-US difference is expenditure on research and development (R&D), which is much stronger in the US because US high-tech companies spend so much more.

It would of course be ideal if European enterprises were to increase their investments in high tech by hundreds of billions of euros. But there is no indication in the report how this could be achieved. More public support for research and development which is advocated in the part of innovation would certainly be useful. But EU financing for R&D amounts to about 10 billion annually, even doubling it would do little to cover the gap in private R&D spending. In this crucial aspect, there is little connection between the parts of the report dealing with Europe's innovation lag and the call for huge increases in investment.

The Bocconi investment report also shows that the return on investment is higher in the US, again not indicating a need for more investment in the EU. The low return in the EU might be due to inefficiencies in the bank-centric nature of EU capital markets (plural because each Member State has a separate one). The calls for a capital market union and to foster more equity investment are thus well taken. But the benefit would be in terms of the quality of investment, rather than its quantity.

It is a pity that the 800 billion euro figure is likely to distract attention from the many other important ideas and proposals of the landmark report. But much progress could be achieved if its concrete ideas on fostering innovation without requiring huge sums were to be adopted.

Cover story

Startups those veritable boosters of innovation by Andrea Fosfuri

There are three reasons why startups backed by venture capital foster an innovation ecosystem: they offer employment opportunities that are lacking in incumbent firms, they are by nature the right place for experimenting with new business ideas, and contribute to increasing the level of competition inmarkets and industries.

Text:

2022 was a strong year for the Italian startup ecosystem, with approximately €2 billion in venture capital investment–a record high for the sector. However, 2023 marked a slowdown due to broader macroeconomic trends. This notwithstanding, recent years have seen a significant leap compared to the pre- COVID era, when investments barely reached half a billion euros. This is encouraging, not only because venture capital typically flows to companies that have a high potential for scaling and growth, but also because extensive research in entrepreneurial finance shows that venture capital has a substantially positive impact on the performance of investee companies, beyond just providing financial resources. However, Italy's total venture capital investment is still less than one-fifth of that in France or Germany, and lower than smaller economies like Sweden, the Netherlands, or Spain.

There are at least three reasons, identified by empirical research, that are critical for fostering an environment with more startups–particularly those that are targets for venture capital. These startups typically have innovative value propositions, are often backed by technological solutions, and have the potential to grow significantly or even disrupt their markets. First, while startups represent a small share of overall employment at the national level, research shows that new firms are a major driver of net employment growth. For a country like Italy, innovative startups could provide professional opportunities that are often unavailable in large corporations and might help curb the migration of talent. Anecdotal evidence from university students suggests that working in a startup is becoming an increasingly popular aspiration and a well-regarded career path.

Second, startups provide a natural environment for experimentation. Despite the potential drawbacks of high rates of failure, startups serve as a key mechanism for testing new business ideas and innovative solutions. Research has shown that the innovation ecosystem has shifted - large corporations are less often the initiators of novel ideas, although they still hold a significant advantage in exploiting and commercializing them. What has emerged is a division of innovative labor: startups initiate the innovation process and frequently pass it on to larger, established firms that acquire or collaborate with them. This trend is even more pronounced for innovations at the cutting edge of science, known as deep tech. Deep-tech innovations are often seen as potential solutions to some of humanity's most pressing challenges, such as addressing climate change through advancements in energy storage, carbon sequestration, and alternative fuels. Research has demonstrated that startups hold a significant advantage in transforming scientific discoveries made by universities and research organizations into innovations that are both more original and more widely applicable than those developed by established firms.

Interestingly, in a recent paper I co-authored in Research Policy, I show that while Europe is capable of producing frontier research, it lags behind the U.S. in turning scientific advances into innovation, partly due to a less developed startup ecosystem. Third, startups are a powerful force for creative destruction. With their innovative, transformative, disruptive solutions, they challenge the status quo in markets and industries, increasing pressure on established incumbents and raising the level of competition. This is especially

important in light of the growing trend toward market concentration in many industries across economies.

A good example is Ornikar, a French startup which about ten years ago entered the heavily regulated and uncompetitive market of traditional driving schools. By 2021, it had raised €120 million in a Series C venture-capital round and captured one-third of the market of drivers taking the French traffic regulation test.

Research shows that a vibrant startup ecosystem is essential for the creation, growth, and success of startups. Universities and research institutions serve as sources of scientific advancement and talent, while incubators and accelerators play a vital role in nurturing innovative startups during the early stages of their development. Public support through grants and subsidies, combined with a favorable regulatory and legal environment that reduces setup costs, is positively correlated with an increase in the number of new ventures. However, for startups to scale and thrive, research indicates that key factors are access to a diverse range of investors across the various stages of a startup's lifecycle, along with a large potential market demand and an active venture acquisition market. To foster more innovative, market-changing startups, a comprehensive set of policy measures must be implemented, by adopting a holistic approach.

Box: The accelerator

B4i selects the most innovative ideas and the startups with the greatest potential to help them grow and succeed by investing the experience, knowledge, time and resources of the wider Bocconi community.

Box: The paper

ERC Science and Invention: Does ERC Break Free from the EU Paradox? by Nagar J.P., Breschi S., Fosfuri A.

Italy, a young innovation ecosystem by Gimede Gigante

With VC investments of around €870 million in the first half of 2024 (+26% compared to 2023), Italy is making great strides. However, today it is at the point where France was eight years ago and Spain three years ago. In 2025, fintech companies will be the ones driving the Italian startup sector.

Text:

Global venture capital investments reached $94.3 billion in the second quarter of 2024. The Americas contributed $58.3 billion, of which $55.6 billion came from the United States, while Europe attracted $17.8 billion and Asia $17.4 billion. Despite this, venture capital operations remained weak, particularly in Europe and Asia (KPMG, 2024). Nearly ten companies obtained financing of over 1 billion dollars, more than double compared to the previous quarter. Artificial Intelligence continues to be the most attractive sector for investors, due to the high costs required by the development of advanced models and the interests of large technology companies. Regulation, such as the approval of the AI Act passed by the European Union, is also taking a central role (KPMG, 2024).

In Q3 2024, venture capital investments are expected to remain stable, with AI and cleantech continuing to be priority sectors. The IPO market could also see a slight increase, but a significant recovery is only forecasted for 2025. The startup ecosystem, which is growing strongly in Europe, is now valued at $60 billion in Italy. However, its development remains younger than in other European countries: Italy is at the stage where Spain was 3-4 years ago, and France 8 years ago, but is following a similar, or even a slightly more advanced, growth trajectory (Dealroom 2024).

Total venture capital investments, with reference to the first half of 2024 and considering Italian startups and foreign startups with Italian founders, reached €870 million, a +26% increase compared to the same period in 2023, despite a reduction in the number of funding rounds. This indicates a greater concentration of capital on a smaller number of operations, suggesting a more selective approach by investors (Intesa Sanpaolo Innovation Center, 2024).

In summary, the Italian venture capital market in 2024 shows signs of near-maturity, with a growing focus on the quality of operations and a more strategic distribution of capital, in line with global trends in the sector.

Looking ahead to 2025: fintech startups will bedriving growth In Italy, the digital assets market is expected to be much larger than in 2024, with a projected growth of +15.38% in 2025. The number of digital payment users is expected to reach 40.91 million by 2028. Key fintech trends include digital payments, online investing, digital fundraising, digital assets, and neobanks, with innovations such as artificial intelligence and blockchain driving growth (Statista, 2024). Investing in fintech startups in Italy in 2025 represents a tremendous opportunity for investors. With the support of the National Recovery and Resilience Plan (PNRR, the Italian acronym), the fintech sector is set to be at the heart of the country's digital transition. The €300 million fund for digitalization and innovation provides significant support to the growing ecosystem, enabling the development of new technologies and simplifying the management of operations for SMEs and consumers.

Despite the recent market correction, the sector continues to grow thanks to more prudent management and the search for sustainable profit growth. In Italy, this trend is evident, with digital assets markets expected to boom and the growth of digital payments and neobanks that are transforming the financial landscape.

In addition, key regions such as Lombardy are emerging as hubs for financial innovation, thanks to initiatives such as those of ICE SDA Bocconi, which serve companies active

in different sectors that want to discover how to improve their innovation capacity, and its European FS Tech Hub, an innovation hub devoted to fintech, so as to support the development of the digital economy.

Investing in fintech therefore means not only participating in the digital transformation of the financial industry, but also supporting the economic growth of the country, while benefiting from a favorable regulatory and financial environment.

The five rules of the startup investor by Massimo Della Ragione

When choosing which innovative startups to direct their capital towards, venture capitalists and their colleagues look at the quality of the team, the potential for scalability, the need for additional capital in the future, the quality of the shareholder base and, clearly, how much the startup's proposal addresses the needs of the market.

Text:

After five years of experience at B4i – Bocconi for innovation, I wanted to share some considerations on the investors' perspective in investing in startups. When dealing with startups, we are talking about very early stage investors with a strong appetite for risk and a specific mindset in assessing opportunities. In general, I would say that these investors are looking, not necessarily in hierarchical order, at the following elements with a highly disciplined attitude:

1. Market need addressed by the business proposition;
2. Quality of the team;
3. Scalability of the business proposition;
4. Pragmatic assessment of the financial support required before the next round of equity financing;
5. Quality of the shareholder base.

1. Market need addressed by the business proposition

The first element of assessment is the size of the potential market whose needs the business proposition is expected to address. The first level of analysis can be limited to the domestic market (e.g. Italy) or a specific product or segment of clients. Ultimately the analysis will evolve to include broader segments of potential clients or an international expansion. Investors naturally devote more time and effort when the proposition has sizeable upside.

2. Quality of the team

The second element of assessment is the quality of the team. The team must have diverse competencies and skills: leadership, vision, tech, finance, operations, execution and marketing. Investors do not like a team too concentrated on one professional (usually the founder). As a result, investors like diverse and highly motivated teams. The most recurrent point of attention is the level of motivation: teams which are not fully dedicated to the enterprise are always a "no go" for investors. Finally, a team with professionals who are flexible and open minded is very appreciated. The road to success requires a lot of flexibility: professionals and entrepreneurs who are too dogmatic or opinionated usually are a concern for investors as the right recipe for the execution of the plan requires a lot of flexibility and ability to adapt to changing market and business conditions.

3. Scalability of the business proposition

Investors spend a lot of time understanding the scalability of the business. Once they are comfortable with the viability and sustainability of the business proposition, investors assess the conditions that allow the team to upscale the business with limited additional headcount and financial investment. Usually, startups with extensive headcount absorption and heavy capital intensity (marketing expenses, Capex etc. etc.) are considered a big question mark for investors.

4. Pragmatic assessment of the financial support required by the startup before the next round of equity financing

The fourth element is the assessment of the downside scenario. In the early stages of an enterprise, a lot of things can and will actually go wrong: it is the nature of these initiatives. On the one hand, people are naturally inclined to assess the upside of any initiative. On the other, sophisticated investors are very careful at assessing what could be a downside scenario and the likelihood that something could go wrong: less clients than expected, inflation which can affect the cost base, new competitors, regulatory hurdles, etc. etc. When potential investors make their assessment, they also assess the possibility that more capital could be required down the road and the risk of being massively diluted in case the "cash call" exceeds their expected commitment.

5. Quality of the shareholder base

Finally, the quality of the shareholder base plays an important role. The presence of professionals with a strong reputation in the industry, the presence of a core investor (even a private investor) which can offer stand-by equity and support in case of financial stress, a simple shareholder base (too many cooks are not appreciated) can reassure investors at the time of the investment. The rate of success for startups is in the single-digit (2-3%) likelihood area. The numbers are strongly suggesting that an important element of luck is also required to hit the investment that turns out to be a unicorn (a one-billion dollar startup).

Flashka, the AI that helps you study by Valentina Gatti

The platform lets students upload their study materials and get explanations, flashcards and even quizzes to test their preparation, as Bocconi alumnus and co-founder David Djokovic explains.

Text:

Making the studying experience more interactive and effective through artificial intelligence: this is the mission of Flashka, a startup founded in 2023 in Tallinn, the capital of Estonia, by Bocconi and Politecnico students. “We started the company because in our student life we felt we needed a tool that would make our study experience more efficient and thought of using artificial intelligence for this purpose,” says Flashka’s CEO and co-founder, David Djokovic, a Bocconi alumnus of BIEM (Bachelor in International Economics and Management). “The university environment was very formative for me in terms of structure and ambition so as to have a mindset that aims high and is not easily satisfied.

Bocconi’s international environment and approach was also very helpful”, Djokovic points out. On Flashka, students can upload books and study materials in pdf format and interact with them to obtain explanations, flashcards and quizzes, being followed from start to finish in their learning journey. So much so that the majority of its users feel more confident of their preparation after using it. The startup started with the simple idea of generating flashcards (digital cards that support memorization) out of pdfs, thus making a common but slow practice more efficient. Flashka has since evolved, identifying other problems encountered by students, either personally by cofounders or emerging from dialogue with student users. “Our platform follows the student from the understanding to the application of knowledge, by horizontally expanding the applications on the platform,’ Djokovic explains.

The flashka.ai website is already in use in 56 countries and available in 20 languages. Today it has over 23,000 users, with a 30% month-onmonth user growth, and this without any paid marketing activity. The platform has a freemium business model: membership is free up to a maximum of 50 interactions per day with artificial intelligence. Beyond that, one can buy a monthly subscription for $7.90 or an annual one for $48. The main challenge for Flashka was precisely understanding user behavior on the platform. “There are different students and study methods, so it was complex to understand who we were addressing. The type of user has an impact on product retention”, says Flashka’s CEO.

The startup was supported by B4i, Bocconi University’s accelerator, which invested a standard €50,000 ticket into the budding company. “They gave us office space, offered workshops and legal advice with their lawyers. We worked in their space and did checkpoints every two weeks, to establish what kind of support we needed, as part of the 4-month acceleration path. Now they continue to support us in whatever we might need: consulting and the sharing of connections and opportunities”, Djokovic concludes.

Box: The libguide

The Bocconi Library’s guide to better understand the start-ups and their environment.

A videogame to learn how to love maths by Valentina Gatti

Math Legacy, the startup founded by Fausto Capriotti and Christian Pulieri and incubated by B4i, teaches mathematics in a simple and fun way.

Text:

Why would you rather play your favorite video game for four hours straight rather than do math exercises? The question was the starting premise for the entrepreneurial bet behind Math Legacy, an Italian startup founded in June 2023 in Maruggio, near Taranto, by Fausto Capriotti and Christian Pulieri, CEO and CTO, respectively, of the fledgling firm. The startup's mission is "to help millions of students around the world love mathematics", says the CEO. Math Legacy is an app that transforms math exercises into multi-level video games, replicating the mechanics of video games, so students have fun, get feedback and feel part of something bigger than themselves. "Users are the guardians of mathematics, called to take care of Maffy, which embodies the essence of math in our universe. It's a ball of energy that behaves like a Tamagotchi, so it gets sick if the user doesn't do math exercises," says Pulieri.

The app, available for Android and iOS, operates according to a freemium model. It has a free section, but to unlock all the features you need a subscription. Potential customers are individual students, schools, companies. Schools also have access to the teacher platform, where teachers can see scores and give assignments, and pay a lower price by purchasing a bundle of licenses. Companies can include Math Legacy in welfare plans for employees' children, sponsor in-person events in schools and donate the app to institutions, thus investing in the attainment of UN Sustainable Development Goals (SDGs) #3 (Health and Well-Being), #4 (Education), and #5 (Gender Equality). In fact, the startup contributes to the mental health of young people because it reduces students' anxiety in dealing with mathematics; it enables a 22.6% improvement in math skills in a month and a half of use and promotes gender equality. Eventually, the video game will also tell the stories of women in mathematics, who will act as role models for female students.

In July 2024, Math Legacy received two prestigious awards: the Professionalism Award given by Rotary and the 2024 Myllennium Award in the MySocialImpact category. Today Math Legacy depends on the work of around ten collaborators, including developers, marketers and game designers.

Fundraising was the main challenge for the startup. So far Math Legacy has obtained €30,000 euros from B4i (Bocconi for Innovation) as part of its incubation path and another €30,000 from FuturED, the EduTech accelerator of Italian investment bank CDP (Cassa Depositi e Prestiti), with which it undertook a new acceleration path in March 2024. The first incubator to believe in Math Legacy was Bocconi, which offered the startup pre-acceleration and acceleration paths between February and June 2023 and between September 2023 and January 2024, respectively.

"B4i helped us a lot in the change of mindset from product creators to entrepreneurs. The developer wakes up in the morning thinking about features to develop or bugs to solve, while the entrepreneur thinks about revenues, which are the lifeblood of the company. Bocconi's incubator also supported us in managing projects and networking with many other great entrepreneurial realities. For us it was very stimulating to come into contact with startups at a similar stage of development, not only to learn, but also, more simply, to feel less alone", concludes Pulieri.

The laws of talent attraction by Felix Poege

Where large corporations dominate a district, startups struggle to attract skilled professionals in local labor markets, having to offer salaries up to 10% higher for key roles. Understanding the dynamics of competition for talent is essential for creating a thriving startup ecosystem.

Text:

Where to start a career is a hot topic for recent graduates and professionals alike. Is it better to dive into the dynamic, fastpaced world of startups, where close-knit teams are the norm and every day brings a new, exciting challenge? Or should one opt for the stability, high salaries, and clear career paths that large, established companies offer? As a result, startups and large firms are constantly battling to attract top talent, each offering its own set of advantages.

From the perspective of startups, sustaining this competition for talent can be difficult, as it implies tough choices. Startups seeking to hire critical talent often choose to locate in "tech clusters" that feature developed labor markets for technical, sales, and managerial staff. Unfortunately, these typically arise where there is a significant presence of large firms. Conversely, extensive hiring by large firms can prove too much of a good thing.

In our research, we argue that as startups are forced into a competition for talent with large firms, they struggle to reach the growth phase. We investigate this phenomenon using online job advertisements of more than 140,000 startups founded since 2010 in the United States. While startups initially consist of a founding team and a set of early employees joining the fledgling company via informal networks, once a startup tries to grow larger, it enters formal labor markets – including job advertisements, as reflected in our data. We assign startups and large firms to local labor markets, as defined by commuting patterns. We then study how changes in hiring by large firms within these labor markets affect the salaries offered by startups and their overall growth.

We find that when large firms increase local hiring by a typical amount in the data, this forces startups to offer significantly higher salaries - up to 10% more for crucial roles - while reducing their expected growth by over a third. Such a "crowding out" effect is particularly pronounced in critical areas like management, STEM, and sales.

We further explored which types of firms pose the greatest competitive threat to startups in labor markets. Large firms with very similar business models may be the most dangerous, as they rely on the same specialists and attempt to poach them from each other. On the other hand, large firms may prove beneficial to similar startups, either by providing ideas, tools, training, financing, or even exit options. To investigate this, we assigned a proximity score between small and large firms based on the text of their business descriptions. Indeed, the crowding out effect for startups is weaker – but still present – if large firms in the local labor market are more similar. This suggests that large firms do not create labor market "kill zones" and that a more specialized local economy would alleviate some of the adverse effects of labor market crowding.

For entrepreneurs, business leaders, and policymakers alike, understanding the dynamics of competition for talent is crucial for successful growth in order to build a thriving startup ecosystem. Our results provide a first indication of how regions can better balance the presence of large firms with the needs of their entrepreneurial community. For example, regional policymakers frequently seek to attract large firms with tax breaks and other incentives, and we show that they face a tradeoff in doing so. Large firms can increase agglomeration economies in a region, but crowding might diminish or even reverse these benefits. Focusing on specialization and policies that improve employee mobility, such as non-enforcement of employee noncompete agreements, might diminish crowding. Our

research presents a cautionary tale for startups and offers insights into how startups can navigate the talent war.

Box: The paper

Competing for Talent: Large Firms and Startup Growth, by James E. Bessen, Felix Poege, Ronja Röttger.

Sensors that smell the air to detect signs of fire by Valentina Gatti

From the experience of wildfires in Calabria was born SLY, the Italian-American startup founded by Kseniya Lenarciak, Max Lenarciak and Davide De Marchi and accelerated by Bocconi for Innovation.

Text:

Enhance resilience through the detection and mitigation of wildfires and thus help humanity adapt to the realities of climate change. This is the mission of SLY, an Italian-American startup founded in February 2023 by Kseniya Lenarciak, Max Lenarciak and Davide De Marchi. SLY offers organizations a monitoring system that allows them to quickly and accurately detect all fires and industrial gas leaks, thanks to sensor tracking of anomalous gases present in the air. Sensors, once positioned in a forest or risk area, provide early warning about the initial stages of a fire or gas leak, so that alerts are sent to users within minutes via the Treeage software platform.

SLY is based in Santa Caterina dello Ionio, near Catanzaro, and also has offices in Milan, Rome and San Francisco. Kseniya Lenarciak, the CEO, explains the choice of Calabria as location for her startup like this: “We had gone to visit relatives in Italy, but we got stuck there due to the Covid lockdown. In Calabria wildfires are a big problem. We also experienced a fire on our agricultural land. We set up SLY to address the issue.” In Italy they were able to tap into the world-class engineering talent. SLY and its engineers over the course of a year and a half have created a state-of-the-art, commerciallyready platform.

The SLY solution is sold in Italy, Europe, North America and is getting early traction in South America. “Our goal is to bring our technology to new markets as quickly as possible and make it scalable, also taking advantage of the fact that two of the co-founders come from Canada. Furthermore, wildfires are a global problem, not just an Italian one,” says Lenarciak. Its major vertical being targeted is infrastructure operators such as electric utilities and gas pipelines. The downside of working with these large enterprises is that they are relatively slow decision makers. “But for us time is of the essence: the longer it takes to do something, the more money we burn. Building relationships also takes time, so our sales cycle is long,” remarks the CEO of SLY. Thanks to the versatility of the Treeage platform, the startup also deploys solutions for public and private landowners who have a shorter sales cycle: SLY sells to these channels via their existing service providers such as systems integrators.

To overcome the difficulty of a B2B business that needs to demonstrate proof of traction, SLY was able to count on the support of B4i (Bocconi for innovation) accelerator, which invested in SLY in April 2023. “B4i helped us with its extraordinary network, opening the doors to large Italian companies to whom we were introduced and who then became customers. The incubator also provided us with commercial advice, invested in the startup and helped us close our first round of fundraising,” says Ms Lenarciak. The startup closed its first capital increase in December 2023, financed by B4i, Zero (CDP’s cleantech accelerator), and the European Regional Development Fund for Calabria. “The capital raised has been critical for us to pay the salaries of our engineers,” she says. The startup is currently in capital raising mode again, because it needs to expand, create a sales network and continue to invest in its innovative technology.

Tech Europe Foundation established by Ezio Renda

Based on the three pillars of basic research, entrepreneurship and open innovation, TEF was established at the initiative of its founding members Politecnico di Milano, Bocconi University, ION and FSI. The Milan Chamber of Commerce is its first sponsor.

Text:

Anon-profit foundation promoted by its founding members Fondazione Politecnico di Milano, Bocconi University, ION and FSI, the Tech Europe Foundation (TEF) has been established in Milan. TEF's goal is to create an ecosystem that fosters collaboration between academic research, companies and startups, integrating entrepreneurial development with scientific innovation. The Foundation aims to establish an open environment where scientists, companies and startups can collaborate and grow together, helping to consolidate Milan as a center of excellence for technological and entrepreneurial innovation. The project represents a virtuous example of public-private collaboration, with the aim of transforming Milan into one of Europe's leading tech hubs.

TEF focuses on fundamental research and creating a critical mass of new companies in the deep tech sector, based on scientific discoveries and technological innovations. Ferruccio Resta (Politecnico) and Alberto Grando (Bocconi) will be TEF's President and Vice President respectively for the next three years, leveraging the expertise and labs of the two founding universities. The Foundation will operate according to three main pillars: funding basic research, scouting and supporting startups, and open innovation services for companies. The project will be based at Parco dei Gasometri in Milan's Bovisa district, undergoing an important urban regeneration designed by Renzo Piano.

When fully operational, 1,000 startups will be hosted annually. TEF has an initial fund of more than €100 million and has already launched a fundraising campaign. The Chamber of Commerce of Milano Monza Brianza Lodi has already contributed €50 million, and the goal is to raise additional funds to reach €1 billion by 2030.

"The establishment of TEF represents an extraordinary opportunity to strengthen the competitiveness of Europe and Italy on the global innovation landscape," said Bocconi Rector Francesco Billari. "TEF will be a strategic platform to attract talent and develop new technologies. Bocconi will contribute with its economic-financial, legal and entrepreneurial knowhow – supporting the development of new skills and growth opportunities for young companies – and in computational sciences and artificial intelligence. TEF will contribute to the development of Milan as the European capital of talent and innovation with a strong social impact and an impact on the financial system."

"Support of fundamental research, the startup ecosystem and open innovation promote a virtuous cycle that strengthens business competitiveness and drives innovation. Universities play a central role, providing advanced knowledge and specialized talent that help companies reduce development costs and accelerate innovation. Taking advantage of these discoveries, startups create competition, incentivizing companies to invest in new technologies. Thanks to open innovation, an evolutionary process is established for the benefit of the entire economic system," commented Andrea Pignataro, Founder and CEO of ION.

"We imagined TEF as a long-term generational project with the ambition of creating thousands of new technology startups to counter the chronic demographic problem at Italian companies," commented Maurizio Tamagnini, CEO of FSI. "Our goal is to keep our young scientist-entrepreneurs in Italy to convert the many innovative ideas produced into the companies of tomorrow, and allow Italy to maintain and strengthen its world leadership in family-run industrial capitalism."

“Strengthened by the important results achieved in recent years as an attractive and competitive innovation ecosystem, Milan is ready to establish itself as a global tech hub, able to compete with the large international metropolises,” said Carlo Sangalli, President of the Chamber of Commerce of Milano Monza Brianza Lodi. “TEF is the way to face this challenge. As a Chamber of Commerce we are very proud to take part in this initiative with the experience we have consolidated over the years promoting an innovation paradigm accessible to all companies, as well as through policies supporting startups and innovative companies. We want to make our contribution to building a project that will allow us to further enhance the great wealth of talents, knowhow, entrepreneurial spirit and virtuous contaminations that have made our local area so great.”

Changed by women

More young women to fight gender bias in algorithms by Camillo Papini

The CEO of Almawave, Valeria Sandei, encourages girls and young women to pursue a kind of education that does not neglect scientific subjects. Because we need the right tools to deal with an increasingly tech future and avoid the effects of an AI created only by men.

Text:

Valeria Sandei started in the world of consulting at 27 years old, dealing with industrial, financial and organizational transformation and "in that moment I realized that I was not only in a position to learn and execute but also and above all to build strategic paths for clients," recalls the current CEO of Almawave. "The challenge was learning to make decisions, to put my signature on projects that needed conveying. Of course, study, in-depth analysis and an approach that I would define as all-round curious and interdisciplinary are needed, but in particular you need to maintain your own interpretation and go beyond classic narratives," adds Ms Sandei.

After an internship at JP Morgan in private banking and her start at Accenture with a focus on finance, today she deals with new technologies at the helm of her company specialized in data and artificial intelligence, part of Almaviva group. And going beyond the classic narratives serves to frame new technologies in a broader context because "there is a lot of talk about Generative AI but we need to think about its development in tandem with other systems, for example industrial, governance or related to safety and security. It is important to first imagine what the potential and consequences of this kind of AI are," Sandei is keen to point out. She works to apply AI solutions to the smart cities of the future, but also knows well that everything is based on data and their quality and interpretation.

"If codes and algorithms are written mostly by men, this can lead to bias, i.e. data distortion due to the prejudices of the human beings who devise them. If these erroneous data are then used, they will not be able to contribute to give a truthful vision of reality, and won't solve, for example, the gender gap." remarks the executive. In fact, she recommends to young women (but also to young men) to also train for science in their education. "We have an increasingly technological future ahead of us, so it's better to have a kind of education in place that offers the tools that make an impact," she says. Starting from a classical high school diploma, Sandei studied at the music conservatory, participated in international language competitions in Latin America and also had an experience at the NASA summer camp, before starting her Bocconi program in Economics of Financial Markets in Milan.

"Once I entered the University, I approached finance for the first time in my life and I really liked it. But above all I understood that it was my path and that my humanistic background could bring an added value," underlines Sandei. So do you feel like a role model today? "It's hard to think or be aware of that when you're focused on your dayto- day work, on management and the goals of the business. In those moments you don't realize that you can be an inspiration for someone else," replies Sandei. "However, receiving the Golden Apple award from the Marisa Bellisario Foundation in 2023 has put me face to face with the fact that my career can be of inspiration to other people, in particular for young women."

The CEO of Almawave has experienced many crucial turning points in her professional life. One of the most important was listing her company on the stock exchange in 2021, "the result of a path I arrived at along with my team, with the strength of the different experiences previously gained in various areas of the business, including M&A, marketing, product development and internationalization. All accompanied by concentration and commitment, which allow both progress in the world of work and the fight against gender

prejudices," concludes Sandei. "I have never felt affected by prejudice. There must have been some, as it often happens, but I believe that prejudices can be fought with personal commitment to the job. In this way, it cannot sway your path."

Box: Changed by women

We began by collecting the stories of 99 Alumnae in a book and we transformed them into Changed by Women: a multiplatform project that strives to empower women both by sharing their testimonials and by launching the Women Fund to support future female students.

International law

A divided world by Ezio Renda

Niccolò Zugliani, Post-Doc Researcher at Bocconi, analyzes how countries handle neutrality during the conflict in Ukraine. He explores whether the law of neutrality still applies when deciding to support a country under attack, with a focus on the supply of arms to Ukraine.

Text:

In the global geopolitical context, the war in Ukraine has brought to the fore complex legal and moral questions regarding international law and the legitimacy of actions taken by countries not directly involved in the conflict. While the bombings, battles and human tragedies dominate the headlines, another significant combat is being fought in the background: the legal and diplomatic battle over the relevance of the law of neutrality in the 21st century.

Neutrality is an institution of "classical" international law, still in principle binding on states, which requires that third states to an international armed conflict refrain from intervention, avoiding any action that might favor one of the belligerent states. Neutrality is hard to square with the UN Charter, which instead allows backing a country that is the victim of an aggression. In the absence of any harmonization between these two regimes of international law, it is unclear what rules bind states when one of the belligerents is clearly a victim of aggression, as is the case of Ukraine.

Against this backdrop Niccolò Zugliani, Post-Doc Researcher at Bocconi University, in his article published in the European Journal of International Law, explores the actions of states during the conflict in Ukraine, focusing on the supply of arms to Ukraine, in order to clarify whether neutrality law is still applicable when an armed conflict is a consequence of an act of aggression.

Among the many prohibitions placed by neutrality law on non-belligerent states is the ban on supplying arms to countries at war. Despite the prohibition, many states are supporting Ukraine in various ways, including by supplying weapons and military equipment. The same states have in no way attempted to justify such conduct, ostensibly incompatible with neutrality, by invoking the existence of exceptions to its rules. At the same time, Russia has never formally accused these states of violating neutrality obligations. This raises an important question: in cases like the invasion of Ukraine, is the law of neutrality still applicable?

Zugliani suggests that "neutrality, as it has been considered for centuries, may no longer be applicable in modern conflicts, if acts of aggression are clearly identifiable and condemnable." Indeed, the Ukrainian experience may indicate a transition to a legal concept of "non-belligerence," understood as an intermediate status between belligerence and neutrality. Such a status, long criticized by scholars and still generally considered groundless, in the Ukrainian case is in practice supported, according to Zugliani, in the behavior of countries, which is a necessary element for the creation of new rules of customary international law. This analysis provides a new perspective on the international law regarding armed conflict, which would allow third states to provide support to a victim of aggression without being considered directly involved in the conflict. At a time when the international community is increasingly polarized and conflicts tend to get ever more complex, Zugliani's work invites us to reflect on the role of neutrality and the role states can and should play when dealing with international crises.

The debate is open, and the answers are not simple, but one thing is certain: decisions made today will set precedents that could influence the management of future conflicts

for decades to come. Zugliani's argument challenges us to rethink our beliefs about how states should behave in a world where the lines between aggressor and victim are sometimes blurred, and offers insight for policymakers and diplomats called upon to make decisions in an increasingly complex and interconnected global context. The road to a new understanding of neutrality law is still long and winding, but, as the Ukrainian experience shows, it can no longer be ignored.

Box: The paper

The Supply of Weapons to a Victim of Aggression: The Law of Neutrality in Light of the Conflict in Ukraine, by Niccolò Zugliani.

Pension system

It's a matter of horizontal equity by Simone Ghislandi

The life expectancy at age 65 of a manager is four years higher than that of a blue-collar worker: this is the socioeconomic gradient, which acts regressively on pensions, redistributing resources from lower to higher social strata. Expanding the list of debilitating jobs that warrant early retirement might be an antidote.

Text:

There is an extensive scientific literature showing that, regardless of the methods used or the countries considered, belonging to a lower social class (alternatively measured as education level, income or occupational type) means having a higher likelihood of developing more or less debilitating diseases and lower life expectancy levels. This is what the literature refers to as the "socioeconomic gradient".

The existence of the socioeconomic gradient has important implications for the definition of social policies. One dimension that starts being considered in this context is the horizontal equity (i.e. equity between socioeconomic classes within the same generation) related to a contributory pension system. In these cases, equal years of contributions and retirement age can result in lower rates of return for those with lower life expectancy: early mortality compared to the average means that the worker receives less than expected in terms of pension returns. In other words, the socioeconomic gradient would have a regressive effect on the pension system, effectively redistributing resources from the lower to the upper end of the social scale.

Precisely based on these considerations and thanks to the Visit INPS program, which allowed us to access registry data of Italian workers, we aimed to measure the socioeconomic gradient in Italy, linking it to occupational category and income (Ghislandi and Scotti, Visitinps Working Paper, 2022). We find strong evidence of a socioeconomic gradient in all these dimensions.

Regarding occupation, we find for example, that for men, the life expectancy at age 65 for a manager is about 4 years higher than for machine operator or assembly line worker. Or that the difference in life expectancy between an architect and a security service worker is 5 years. As for women, although the gradient is clearly visible, the data are not very informative, mainly due to the low female participation in the labor market, especially in high occupational positions, in the generation considered.

The same conclusions can be drawn even when considering income. Indeed, there is a significant gradient among men, manifesting as a difference in life expectancy between the rich and the poor of about 4.5 to 5 years. In this dimension, however, data allowed us to be more specific and to assess also the evolution of the gradient over time. By comparing cohorts born in the 1930s with those born in the 1950s, two important aspects can be observed. Firstly, it is evident that average life expectancy increases over time for every income class and for both women and men. This means that mortality is progressively shifting toward older age groups. At the same time, the shift in mortality toward older ages is more pronounced among higher-income classes, resulting in an increasing longevity gap between different classes over time. Despite a general improvement in living and health conditions for Italians, we have also witnessed a widening gap between the health of the higher and lower income groups.

If the socioeconomic gradient is a common feature in many economically advanced countries, the issue of horizontal equity in the pension system is not just an Italian concern. In recent years, evidence has been produced in this regard for European countries such as Sweden and Germany, as well as for the United States. In the case of Sweden, in

particular, an article published in the journal Demography in 2022 concludes that due to the socioeconomic gradient, the Swedish pension system is much less progressive than initially thought. For West Germany, registry data show – consistent with what we found for Italy – that the life expectancy gap between the richest 10% and the poorest 10% of the population increased from 4 years recorded in cohorts born in the 1920s to 7 years for cohorts born in the 1940s.

The regressive impact of the socioeconomic gradient on the pension system is an aspect that has only recently begun to be studied. Of course, the level of horizontal equity in a pension system is just one of many parameters that must be considered in the design and evaluation of a system. However, relatively simple corrective measures could be imagined. Ideally, the optimal approach, though technically complex to implement, would require a recalibration of pension calculations using a differentiated quantification of life expectancy by socioeconomic status. Other economic compensation mechanisms could also be imagined, defined by socioeconomic classes. More simply, in the Italian case, expanding the list of "strenuous jobs" could represent an approach that, while not consistent with the concept of the socioeconomic gradient, would still be more easily achievable.

Box: The paper

Lifespan Inequalities Among the Over 50 in Italy: Evidence from Administrative Data, by Simone Ghislandi and Benedetta Scotti.

Diversity and productivity

How much does team size matter? by Ezio Renda

According to a study by Alexia Delfino et al., integrating diverse skills into a group pays off more when the group is larger.

Text:

In recent years, the topic of diversity in teams has become central to corporate and academic discussions. Various research has shown how a mix of skills can lead to significant improvements in a group's overall performance. However, the question of how these diversity dynamics work in teams of different sizes is still debated. For example, integrating an expert in economics into a nursing team may lead to increased efficiency in resource management, but this may depend on the size of the team. This suggests that the added value of diversity might depend on the size of the team.

This is shown in the paper "Team size and diversity", based on research conducted by Alexia Delfino, assistant professor in Economics at Bocconi University, together with colleagues Brais Álvarez Pereira (Nova School of Business and Economics, Portugal) and Shan Aman-Rana (Virginia University). The study, published in the Journal of Economic Behavior and Organization, investigates the impact of diversity and team size on performance through a controlled experiment. The experiment shows that in two-member teams, the addition of a person with diverse skills leads to a 3.5 percent increase in individual performance. However, this increase rises to 6 percent when the team consists of four people. This suggests that the benefits of diversity are not linear, but grow as the size of the team increases.

"We found that the positive effect of having a team member with diverse skills increases with team size," says Alexia Delfino. "In larger teams, diverse skills not only improve productivity in specific areas, but also foster greater interaction and knowledge exchange among members."

The researchers conducted an experiment involving 248 business and nursing students, dividing them into teams of varying sizes and observing how the presence of different skills influenced the results. The students took tests of general and field-specific knowledge, first individually and then in groups. The results showed that teams with members of different skills performed better than homogeneous teams, with a significant increase in performance in the larger teams.

In particular, four-person teams with a mix of skills recorded a 6 percent improvement in correct responses compared to two-person teams. This result was particularly evident in the general knowledge questions, where the presence of an economist helped nurses respond better than when they worked only with other nurses.

"Our research suggests there are important aspects in the structure of organizations-such as team size-that should be taken into account more often to maximize the benefits of diversity," Delfino continues. "This may mean revisiting traditional organizational structures and experimenting with larger, more diverse teams."

In summary, the study by Delfino and colleagues highlights how team size plays a crucial role in determining the benefits of diversity. Organizations that wish to take full advantage of skill diversity should carefully consider the composition and size of their teams to promote a collaborative and productive work environment. This approach may require a cultural shift within organizations, fostering a mindset that is open to experimentation and flexibility in managing teams.

As Alexia Delfino points out, “Investing in diversity, but also in understanding the best way to integrate it into one’s organizational structure, can lead to significant competitive advantages, improving not only the performance but also the innovation capacity of organizations.” This message is especially relevant in an age when complex problems demand creative, multidisciplinary solutions.

Box: The paper

Team Size and Diversity, by Brais Álvarez Pereira, Shan Aman-Rana, Alexia Delfino.

Oil & gas industry

Pressuring extraction companies to be more transparent by Shirley Tang

In the fracking industry, public companies respond to public pressure in disclosing their environmental impact, but private companies are not as forthcoming on transparency. Stronger incentives or direct regulation is needed to push them to abandon harmful practices.

Text:

Public companies and private firms in the US oil and gas industry respond differently to public pressure and environmental regulations, particularly when it comes to disclosing the chemicals they use in hydraulic fracturing (fracking). And it is interesting to see how these companies are adjusting their behavior faced with increased transparency requirements regarding the use of potentially harmful chemicals.

To explore this, in a research study of mine I analyzed an extensive dataset about over five million chemical ingredients used in more than 170,000 wells across 20 states. One of the key things that emerged is that public companies - i.e. traded on stock exchanges - are far more likely to reduce their use of toxic chemicals and increase transparency in their operations in response to regulation. Why? Because they face pressure from investors, shareholders, and the general public. They need to keep up appearances and are more likely to align with growing expectations about Environmental, Social, and Governance (ESG). These companies respond to public scrutiny by disclosing more about what they're doing and cutting back on the use of trade secrets, which may be viewed as a way of concealing harmful activities.

Private firms, on the other hand, are a different story. Since they aren't under subject to the same level of scrutiny, they have more freedom to keep secrets - and often do so. As public pressure rises, these firms tend to use trade secrets to conceal the use of toxic chemicals, especially when the risk of regulatory consequences looms large. In other words, rather than being more transparent, private companies often double down on secrecy.

One of the most interesting part of this research was using the 2016 U.S. presidential election as an exogenous shock. The election of Donald Trump signaled a shift toward a more lenient regulatory framework as his administration rolled back over 100 environmental regulations. After the election, I found that private firms started reporting more on their use of toxic chemicals and sheltered less behind trade secrets. It seems that with the fear of stricter regulations easing, private firms felt more comfortable disclosing what they were doing. Public companies, however, continued their more transparent practices, staying on course with reduced toxic chemical use and fewer trade secret claims.

Another interesting finding was what I call the "spillover effect." Even in a less regulated environment, I found that private companies sometimes mimic the behavior of their public counterparts, especially when those public companies are performing well. For example, in areas where public firms with cleaner practices were operating highly productive wells, nearby private firms were more likely to adopt similar, greener methods.

The implications of these findings are crucial for policymakers. While public pressure can be a powerful tool in getting public companies to adopt more environmentally friendly practices, it's not enough in the case of private firms. Since private firms face less scrutiny, they need stronger incentives–or direct regulation–to move away from harmful practices. Otherwise, we end up with a system where public companies are doing the right thing because they have to, while private firms continue to operate under the radar.

This research highlights the importance of firm heterogeneity and is a reminder that one-size-fits-all policies don't always work. Public companies, driven by the pressures of shareholders and the publi, might adopt greener practices, but private companies need a stronger push. If they want real environmental progress, policymakers need to recognize these differences and craft policies that ensure that both public and private firms are held accountable. While transparency can drive public companies to reduce their ecological footprint, we can't expect the same results from private firms without additional regulatory measures.

So, what does this all mean? Essentially, while public pressure and information disclosure can encourage positive changes, they aren't enough on their own to drive widespread environmental improvement. For industries where private firms play a disproportionate role in determining the environmental footprint, we need policies that target them more directly–because when it comes to environmental responsibility, the principles of transparency and accountability should be requirements for all firms, not just the ones which have shareholders to answer to.

Cryptocurrencies

Simple negligence is not money laundering by Matthias Da Rold

The legislation designed to combat this financial crime also applies to digital currency intermediaries, who are required to register clients and report suspicious actions. But what if the intermediary is negligent? To indict them, intent would need to be proved.

Text:

For several years, financial institutions have been denouncing the danger posed by the use of cryptocurrencies for criminal purposes, such as the laundering of dirty money. Due to their intrinsic characteristics and their peer-to-peer functioning, cryptocurrencies are difficult to control for criminal law enforcement agencies. It is therefore incumbent upon those engaged in intermediary activities within this sector to collaborate with the state in order to facilitate the prosecution of criminal activities. These entities are primarily known as exchangers and wallet providers.

Since the 1990s, with the introduction of the first antimoney laundering regulations, the Italian legislator has sought the help of intermediaries to deal with the reintroduction of assets of illicit origin onto the market. Today, the legislative framework pertaining to anti-money laundering (AML) has been revised and now extends also to operators in the crypto industry: they must register their clients, retain pertinent documentation and report “suspicious transactions” to the authorities - namely the Bank of Italy -, i.e. all those operations that could be traced back to money laundering practices.

But what to do if the financial intermediary, i.e. a private individual, does not contribute to combating this phenomenon? From a political and criminal law point of view, there are two ways to solicit the active collaboration of intermediaries. The first is a relatively straightforward approach, whereby intermediaries are sanctioned every time they do not collaborate with the public authorities, regardless of the consequences of their behavior. The second approach, much less straightforward, involves prosecuting the very intermediaries for money laundering (which is punished very severely) along with the moneylaundering client.

On a technical legal level, this final solution employs a hermeneutic expedient: it is the interpreter who, by observing and qualifying the operator’s conduct in a certain way, discerns the intention to commit a crime, particularly an act of money laundering. This is a necessary step, as in the absence of intent the crime in question cannot be prosecuted (in the Italian legal system, money laundering cannot be committed solely through negligence, i.e. for not having been sufficiently diligent).

In this area of criminal law, as in others, there are instances where the law’s interpreter, confronted with conduct that differs from that specifically prescribed by the legislator, perceives it as indicative of bad faith on the part of the acting subject.With respect to the topic under discussion, then, such a reading leads to the conclusion that a failure to fulfil the various obligations can only denote the operator’s will to commit an act of money laundering.

Upon closer examination, however, such a reconstruction is in stark contrast not only with the prescriptions of law, but also with common sense. For instance, not having registered one’s clients and/or retained the relevant documentation, tells us nothing about the awareness (a logical prerequisite of active will) of exchangers and wallet providers regarding the “cleaning” assets of criminal origin. The mere violation of dutiful conduct, in fact, leaves the request for ascertainment of intent completely unanswered: it is one thing to behave in a manner that is different from the one required, but it is another to know that one’s behavior is a consequence of laundering conceived by others. Equally insufficient

is mere silence of the intermediary in the face of a suspicious transaction, since, as the Italian Court of Cassation has stated “suspecting” is not equivalent to “knowing”.However, it must be acknowledged that even for those who do identify a dissimulation scheme implemented by a client, the failure to report the transaction to the Bank of Italy could be explained differently (for example, such a failure to comply could depend on inadequate corporate governance). In short, it seems quite clear that ascertaining the violation of an AML obligation is not at all sufficient for the purposes of proving intent to commit money laundering: it is always necessary to seek additional external elements that can verify the breach in question.

In consideration of what has been said, therefore, it is legally preferable to focus on the intermediary’s lack of collaboration, in order to avoid forced legal interpretations – even at the cost of being unable to obtain the primarily political objective of enlisting exchangers and wallet providers in the fight against the distortions of the crypto world.

Box: the paper

Strategia antiriciclaggio e rischio penale per gli intermediari di criptomonete, by Matthias Da Rold

Markets

The platforms power by Andrea Costa

A new paper by Aldona Kapačinskaitė shows how specialized and generalist companies react differently when platform owners enter their markets. The case of Apple.

Text:

In a rapidly evolving digital world, understanding how firms navigate competition within platform ecosystems has become crucial. A recent study led by Aldona Kapacinskaite of Bocconi's Department ofManagement and Technology and Ahmadreza Mostajabi (London Business School) and published in the Strategic Management Journal sheds light on this dynamic by exploring how companies react when platform owners, like Apple, enter markets traditionally dominated by smaller, independent developers.

The study centers on Apple's 2017 launch of the Files app on itsApp Store, a move that sent ripples through the ecosystem of file management apps. Prior toApple's entry, the market was essentially divided among independent developers who had carved out niches onApp Store. However, Apple'smove into this space - using its control over the platform to promote its app - dramatically altered the competitive landscape.

The key finding from this research is that companies operating on these platforms do not respond uniformly to such incursions. The study reveals a significant difference between specialist firms, which focus exclusively on one platform, and generalist firms, which operate across multiple platforms.WhenApple introduced its Files app, specialist firms, which had invested heavily in their presence on theApp Store, doubled down on their efforts, enhancing their existing products in an attempt to hold onto their market share. In contrast, generalist firms, which had the flexibility to operate on other platforms likeGoogle Play, shifted their focus away fromApple's platform, reallocating their resources to other areas where competition was less intense.

This distinction between generalists and specialists is critical for understanding the broader implications of platform dominance. The researchers argue that platform owners likeApple possess an inherent advantage due to their control over the platform's infrastructure and their ability to leverage inside knowledge about the market. This control allows them to not only enter markets with a competitive edge but also to shape the competitive environment to their favor, often at the expense of smaller, independent developers.

"Our findings,"Kapacinskaite notes, "demonstrate that generalists, who face a relatively low cost to reposition to other platforms, are more likely to decrease their efforts on the original platform following a platform owner's entry." This strategic retreat allows these firms to avoid direct competition with the platform owner and instead capitalize on their presence in less contested spaces.

In contrast, the behavior of specialist firms is rooted in their deep investment in the platform. "For specialists, the cost of repositioning to another platform is high," Kapacinskaite continues. "Thus, they are more inclined to stay and fight, intensifying their efforts on the focal platform despite the increased competition. In the paper, we document rather sophisticated strategies of both fighting it out in the contested space while also reallocating some effort towards unaffected areas on the focal platform."

The study also highlights the unique challenges of competing directly with platform owners. Unlike typical markets, where incumbents might enjoy advantages like brand recognition and customer loyalty, platform owners can engineer the rules of the game. They can usually make their products appear on top of search results, access extensive

data about competitor apps, and charge fees that don't apply to themselves. This creates an uneven playing field, making it extraordinarily difficult for independent developers to compete. Some of these challenges have been targeted in the EU via theDigital MarketsAct but its effects are yet to play out.

Kapacinskaite and Mostajabi provide a nuanced view of how companies navigate competition within platform ecosystems. It underscores the importance of strategic positioning - whether as a generalist or specialist - in determining a company's response to competitive threats from platform owners.

Box: The paper

Competing with the Platform: Complementor Positioning and Cross-Platform Response to Entry, by Aldona Kapacinskaite, Ahmadreza Mostajabi.

Criminal law

Magnetic resonance imaging enters the courtroom by Simone Lonati

Neuroscience, including PET scans and fMRI, is now used in court to analyze the brains of criminal defendants or whether a witness is lying. This is a dangerous path to take, because the paramount protection of human dignity should prevent the transformation of anybody's psyche into a source of evidence, also because interpretation of results is not as etiologically sound as it may seem.

Text:

Neuroscience, i.e. the complex of sciences that studies the relationships between brain mechanisms and human behavior, plays a highly topical role at the intersection between science, courtroom and criminal law today. These are complex techniques, which carry a high degree of subjectivity both in implementation and interpretation of the results. They only have a statistical value as they are based on an empirical generalization inductively derived from common experience and detached from the concrete fact that needs to be proved. They are based on theories whose error rate is not always known and in relation to which it is often impossible to implement falsification tests.

These scientific methodologies, increasingly used in US courtrooms but not only, can be distinguished according to their usage. First of all, there are techniques (PET, fMRI) that can evaluate the mental state of the accused because they provide indications of their neurological conditions through the analysis of blood flows to a specific region of the brain. Then, there are lie-detection and memory-detection tools (Brain Finger Printing, the Implicit Association Test, in addition to the aforementioned fMRI) that can contribute to the reconstruction of the fact because they are capable of evaluating the witness's ability to remember. In short, the assumption underlying these studies of the cerebral cortex is that, compared to telling the truth, lying involves quantitatively and qualitatively different mental processes. When we lie, we must inhibit the truthful response and fabricate a false response that we must faithfully repeat every time we are asked the same question.

From a cognitive point of view, all this involves a greater "mental effort" that calls into play the mechanisms of attention and memory as well as those of planning, abstract thought and control. Net of the evident contribution that these techniques can make to ascertain the truth in a crime, the invitation is to navigate these issues with overzealous care. Neuroscientific methodologies, in fact, are able to condition the person's capacity for selfdetermination and their aptitude to correctly remember and critically evaluate the facts for fear that the possible outcomes of the exploration of the brain could be uncritically assumed as prejudicial, mortifying or stigmatizing elements. From this point of view, the tension is evident between the use of neuroscience and fundamental principles such as respect for moral freedom and the dignity of the human person. Moreover, the protection of human dignity, as derived from the normative paradigm constituted by constitutional and supranational provisions, prevents the transformation of the body and its psychic sphere into an immediate source of evidence that should, instead, emerge through oral debate and interrogation.

The value of the search for judicial truth, although it takes a central position in the constitutional and supranational legal system, cannot, therefore, be considered preeminent with respect to the value constituted by the dignity of the human person and the protection of their sphere of inviolability, with which the former must find a balance. Naturally this depends from the fact we all agree that inducing or forcing a suspect to admit what they would never have freely admitted without violating their psychic intimacy is detrimental to human dignity. And thus we should all agree that it is incompatible with

the respect for human dignity to reduce a person and their actions to a series of data to be read in the courtroom, after being automatically processed and coldly elaborated by an expert system, one which is only allegedly capable of explaining the defendant's behavior.

Box: The paper
Perizia psichiatrica, indagine psicologica e neuroscienze, by Simone Lonati.

Banks

Credit risk is always around the corner by Brunella Bruno

Following the actions of the ECB, the amount of Non-Performing Loans held by banks in the eurozone has fallen from an average of 6% in 2016 to less than 2% in 2023. However, credit risk management will remain a priority for supervisory purposes in the years to come, which is why a prudent approach and a functioning ecosystem are needed.

Text:

Ten years ago, in October 2014, the European Central Bank (ECB) became the single supervisor of all significant financial institutions in the eurozone. Since then, one of the ECB's main achievements has been dealing successfully with non-performing loans (NPLs) - i.e., past-due, unlikely-to-pay (UTP), or defaulted loans - that constituted a major threat to the health of European banks.

In the aftermath of the global financial and euro sovereign debt crises, European banks found themselves with an unprecedented amount of NPLs. By 2016, NPLs in the eurozone amounted to over €1 trillion, representing 6% of total loans in the region, with significant differences across banks and countries. One-third of European NPLs were held by Italian banks, where the average NPL ratio was 20%, compared to a 6%average in the eurozone. The scale of the problem required targeted action from the ECB, whose main concern was that an excess of NPLs could impair bank lending and reignite the so-called bank-sovereign risk "doom loop", where credit losses might lead to bank distress at the local level, threatening national government solvency. Spillover effects across regions were also possible, endangering the stability of the entire banking system.

Focusing on the potential effects of a high level of NPLs on the credit supply, impaired loans negatively affect bank profitability and capital. In turn, low profitability and low capitalization weaken the banks' ability to extend credit. It's not just a question of how much credit is provided, but also which borrowers receive the resources. Unprofitable and under capitalized banks face distorted incentives, often being tempted to lend more to weaker firms in an effort to delay their insolvency. Economists refer to these phenomena as "evergreen" and "zombie lending," where "weak" banks continue to finance unhealthy firms (zombie firms), artificially keeping them alive to avoid further negative repercussions on their profits and capital.

To prevent the accumulation of NPLs on the banks' balance sheets, the ECB introduced guidelines on how banks should classify, manage, and provision for NPLs. As a result of these and other measures, within a few years, the stock of impaired loans in the euro area halved, falling to less than 2% of total loans. For Italian banks, this meant NPLs for €56 billion, i.e. less than 2.5% of their total loan portfolio (PwC data as of December 2023).

Are NPLs no longer a priority? While the data are encouraging, a prudent approach remains necessary for several reasons. First and foremost, the credit risk once borne by the banking sector has not been eliminated but merely transferred to specialized investors. In Italy alone, non-banking institutions still hold around €250 billion in NPLs that need to be recovered or actively managed. Second, banks themselves may hold large amounts of loans in sub-performing status (the so-called Stage 2 of the impairment process), which, along with UTP exposures, require sophisticated management approaches that entail "back-tobonis" strategies as contract restructuring and the provision of new financing. Third, emerging risks - such as climate-related risks - reverberate on banks' balance sheets in the form of increased credit risk. As such, credit risk will continue to be a supervisory priority in the years to come.

To efficiently handle problem loans, a well functioning ecosystem is needed. This includes committed banks, non-banking financial institutions, supervisory authorities, and governments. In this regard, the quality of the institutional framework is a key factor affecting NPL management. Restructuring and insolvency regimes still vary across jurisdictions in Europe. Italy, for example, lags behind other EU countries, resulting not only in lengthy and costly recovery processes but also in more cumbersome corporate debt restructuring procedures. Advancement and greater harmonization in this area are much needed. Progress is especially desirable concerning UTP and Stage-2 loans to small and medium-sized enterprises, given the implications of risk management for small firms in the real economy, particularly in our country.

Innovation

Is marketing changing? Thanks to GenAI by Andrea Costa

The industry could benefit froman estimated 15 percent increase in productivity. However, as research points out, although an extraordinary resource, AI could reduce human creativity in the long run.

Text:

Generative artificial intelligence (GenAI) is radically changing marketing and innovation, with significant impact on both consumers and businesses. The study conducted by Paola Cillo (Bocconi Department of Management and Technology) and Gaia Rubera (Bocconi Department of Marketing), published in the Journal of the Academy of Marketing Science, starts with some predictions that GenAI could increase marketing productivity by up to 15 percent, an impressive figure that highlights the enormous influence of this technology on the industry. However, Cillo and Rubera warn that despite the hype, the long-term implications of using GenAI, for both companies and consumers, are still unclear and raise crucial questions.

GenAI differs from previous forms of AI in its ability to create new content, ranging from text to images to video. This has already found practical applications in numerous companies: Coca Cola has developed new beverages such as Coca-Cola Sugar Y3000, while Unilever and Nestlé use GenAI to create innovative advertising campaigns.

However, Cillo and Rubera warn that although GenAI is a tremendous resource for generating original and engaging content, in the long run it could lead to a reduction in human creative capabilities. Companies should therefore strive to balance the use of GenAI with the need to preserve the originality and uniqueness that come from humans. One of the most interesting points covered in the study concerns how GenAI might influence corporate innovation processes. Cillo and Rubera divide innovation into four main phases: development, testing, communication and consumer engagement. In each stage, GenAI can play a crucial role. In the development phase, for example, consumers can be involved in co-creation activities, taking advantage of crowdsourcing and open innovation platforms.

However, a risk related to “AI compliance” emerges: consumers may simply accept the solutions proposed by GenAI without making their own creative contributions. To mitigate this problem, the authors suggest designing platforms that encourage the diversification of ideas, reducing the AI-compliance effect.

Another aspect concerns the use of GenAI in the testing phase. Traditionally, companies have relied on market research conducted on samples of consumers to test the potential success of a product or advertising campaign. However, according to Cillo and Rubera, GenAI can make consumer involvement less necessary by generating results similar to surveys conducted on real people. In fact, recent studies show that GPT-4 and other AIs can fairly accurately replicate consumer preferences, representing a faster and cheaper alternative.

But not everything is plain sailing. The use of GenAI in the creation of new content is not entirely free from problems. The authors point out that this technology can sometimes generate “hallucinations”, that is, content that, while formally correct, turns out to be meaningless or factually wrong. A well-known example was the error of Bard, Google’s chatbot, which provided incorrect information during one of its demonstrations, resulting in a loss of billions of dollars in Google’s market value. Thus, it seems that GenAI currently works better in contexts where there are no right or wrong answers, such as artistic creation, than when creating scientific or informational content from scratch. The role of

GenAI in communication is another topic of great relevance. Cillo and Rubera note that GenAI can help companies create more persuasive marketing messages by adjusting the parameters of the model based on the preferences of the target audience. However, it should be explored how consumers perceive such AI-generated messages compared to those created by humans. Some studies suggest that messages created by GenAI are perceived as more authentic and conversational, but the impact of technical parameters such as the "temperature" of the algorithm on the persuasiveness of messages deserves further research.

Finally, the study raises crucial questions about the ethical implications and transparency of GenAI use. The growing use of this technology has led several governments and social platforms to mandate transparency in content creation. However, as experienced by Levi's, which has faced criticism for using GenAI in the creation of models targeting specific skin tones and body types, transparency may not be enough to avoid negative consumer reactions.

Box: The paper

Generative AI in Innovation and Marketing Processes: A Roadmap of Research Opportunities, by Paola Cillo and Gaia Rubera

The author

Humans lead the 'AI triad' by Diane Orze

Data, algorithms and computing power are the sparks of Artificial Intelligence, which, like fire, can be beneficial or malevolent, explains Andrew Imbrie, co-author of The New Fire. On what does the difference depend? On humans.

Text:

In a world increasingly driven by technology, artificial intelligence (AI) stands out as a transformative force, much like fire in ancient times. AI has the power to propel scientific breakthroughs, enhance our daily lives, and even revolutionize entire industries. However, it also carries risks, from deepening societal divisions to escalating geopolitical tensions. The metaphor of fire captures this duality perfectly, illustrating both the potential benefits and dangers inherent in this rapidly evolving technology.

Andrew Imbrie, Associate Professor of Practice at Georgetown University's School of Foreign Service, delves into these themes in his latest book, The New Fire, co-authored with Ben Buchanan (edited in Italian by Bocconi University Press, 2024, 368 pages, €28,50). Whether AI will become a tool of progress or a source of destruction will depend on how humanity chooses to use it. As Imbrie succinctly puts it, "The way we think and speak about AI matters. It shapes our judgments and conditions our sense of the possibilities."

The title of your book, The New Fire, evokes a powerful metaphor. Can you explain how AI represents a new kind of fire for humanity?
While metaphors are imperfect devices for grappling with a fast-changing technology, the book argues that fire is an apt guide for understanding the near- and medium-term future of AI. Just like fire, AI can warm our societies and fuel breakthrough advances in science and innovation. But, as with fire, AI can also be harnessed as a weapon of war or even blaze out of control if people do not use it responsibly. The range of potential outcomes is vast, and the benefits and risks are hard to disentangle, which is why strategic foresight, civic engagement and close partnerships between governments, industry and academic institutions are so important.

In the book, you talk about the three sparks of AI: data, algorithms and computing power. How do these three elements combine to fuel technological innovation?
Modern AI capabilities require data for training, algorithmic innovations to improve efficiency, and massive computing power to execute calculations. By some measures, these underlying components have been growing exponentially in recent years, but there are debates today about whether we are facing diminishing returns on the availability of high-quality data and computing power to train the largest models and, if so, what the drivers of change may be. These debates are a reminder of an important truth: underlying all three components of the so-called "AI triad" are the people who design, develop and deploy the technology. It is people who are making choices about the future course of this technology, and it is people – policymakers, legislators, executives, and citizens – who must confront and manage the risks so that we can ultimately benefit from its responsible use.

AI has the potential to transform democracy, but also to strengthen autocracy. What do you see as the main risks and opportunities in this dualism?
Whether AI can work for democracy is a proposition that citizens must prove together through concerted effort and wise policymaking. If managed poorly, AI could entrench divisions in our societies, fuel polarization, disrupt labor markets, and fan the flames of misinformation and disinformation, thereby undermining a vital element of the principle of

self-government: trust. If managed responsibly, AI could widen access to opportunity, drive innovations in science, reinvigorate our education systems, and enable more people to participate in the democratic process. It is no surprise that AI has become the fulcrum of geopolitical competition. Some worry that AI will prove to be an arrow in the authoritarian quiver by accelerating the centralization of control at home and providing new tools for authoritarian regimes to press their advantage abroad.

There is no question that democracies today are under stress. But we shouldn't underestimate the power of democracies to harness their dynamic innovation ecosystems, adapt to changes in technology, and shape the trajectory of AI in ways that uplift and empower people. One of the core strengths of democracies is that they are ultimately accountable to and govern in the interest of their citizens. That means that while democracies can and do make mistakes, they can self-correct and benefit from a diversity of voices and perspectives in the policymaking process.

They are stronger because of their commitments to human rights, transparency and broad public participation. And they can partner with other democracies in ways that are more enduring and less transactional than has often proven to be the case with more authoritarian forms of government. How democracies manage the risks and seize the opportunities of AI will come down to the choices we make and the willingness of citizens to stay engaged in the democratic process.

You mentioned how democracies might lag behind autocracies in adopting AI. What strategies can democracies adopt to avoid falling behind?

Already, democracies are taking action to shape the trajectory of AI in ways that are conducive to democratic values. They are investing in basic and applied research, supporting innovations in semiconductor manufacturing, forging creative partnerships around the world to shape norms and standards for responsible use, and widening access to shared data and computing resources. The risk of AI fueling misinformation and disinformation is already apparent, but governments, academic researchers and industry can work together to adopt content authenticity tools, invest in digital watermarking and deep fake detection, and promote the longer-term work of digital media literacy and civic renewal that will be at the heart of any effort to shore up the resilience of democratic societies. Democracies are also working together to invest in safety training, incident reporting, and test and evaluation methods so that AI can be developed responsibly and we can anticipate and mitigate the risks while also staying adaptable to changes in the field. There is no silver bullet, and ultimately, the solutions will need to be tailored to local realities and then shared with others so that we can learn from one another.

You talk about AI evangelists, warriors and Cassandras. Can you briefly describe these categories and explain how they intersect in the AI debate?

It is important to center the human dimension in debates around artificial intelligence: we are making choices every day that will shape the future course of this technology. Some of these choices reflect the view that AI will be, on balance, a net good for societies – that it will inspire innovations in science and help us advance medical diagnosis and drug discovery that will make our societies healthier and more productive. Others are quick to point out that technology cannot be separated from geopolitics and that innovations today will soon appear on the battlefield and could decide the wars of the future. Still others focus on the risks of AI – its propensity to fail and the mix of uncertainty and exuberance that may lead to dangerous outcomes.

The boundaries between these three perspectives overlap in practice: you can believe in the potential of AI to advance science and still see the risks, and you can focus on what AI will mean for national and international security and yet support investments in

testing, evaluations, and safety practices. What's important to recognize is that all three perspectives matter. All three viewpoints are legitimate and help to enrich the debate in our societies. How we strike the balance between them and manage the complex tradeoffs will define the landscape of risks and benefits that all of us must navigate in the years to come.

How has your academic and professional background influenced your views on AI and geopolitics?

I grew up the son of a diplomat, so I was always interested in the state of the world and how issues looked from the vantage point of different countries and cultures. AI is a general-purpose technology, which means that no one country can command all its benefits or shelter from the potential risks. Instead, we will need to invest in wise diplomacy so that even as nations compete over technologies like AI, they can also cooperate to promote stability, widen access to opportunity, and solve global problems, from climate change to food security to nonproliferation. That will require a complex geometry of diplomacy and development investments, and it will require countries to engage not just bilaterally and plurilaterally, but also in multilateral fora and with leaders in governments, industry and civil society. The stakes are high, and there is not a moment to waste for the next generation to make their voices heard in these debates.

Box: The book

Artificial Intelligence is revolutionizing the modern world. It is ubiquitous - in our homes and offices, in the present and most certainly in the future. Today, we encounter AI as our distant ancestors once encountered fire. If we manage AI well, it will become a force for good, lighting the way to many transformative inventions. If we deploy it thoughtlessly, it will advance beyond our control, as Ben Buchanan and Andrew Imbrie show in "Il nuovo fuoco" (Egea, 2024, 368 pages, €29.50).

Colophon

Issue 4, 2024

Publisher
Egea, Via Sarfatti, 25, Milano

Editor-in-Chief
Barbara Orlando, barbara.orlando@unibocconi.it

Editorial Office
Andrea Celauro, andrea.celauro@unibocconi.it

Weiwei Chen, weiwei.chen@unibocconi.it

Andrea Costa, andrea.costa@unibocconi.it

Susanna Della Vedova, susanna.dellavedova@unibocconi.it

Tomaso Eridani, tomaso.eridani@unibocconi.it

Davide Ripamonti, davide.ripamonti@unibocconi.it

Translation and revision
Alex Foti, alex.foti@unibocconi.it

Jenna Walker, jenna.walker@unibocconi.it

Rosa Palmieri, rosa.palmieri@unibocconi.it

Contributors
Paolo Tonato (photographer), Michele Chicco, Valentina Gatti, Pietro Masotti, Camillo Papini

Secretariat
Nicoletta Mastromauro, nicoletta.mastromauro@unibocconi.it, telefono 0258362328

Layout project
Luca Mafechi, mafechi@dgtprint.it

Production
Luca Mafechi

Registered at Court of Milan numero 844 del 31/10/05