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LAW AND ECONOMICS YEARLY REVIEW

ISSUES ON FINANCIAL MARKET REGULATION, BUSINESS DEVELOPMENT AND GOVERNMENT'S POLICIES ON GLOBALIZATION

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Mission

The "Law and Economics Yearly Review" is an academic journal to promote a legal and economic debate. It is published twice annually (Part I and Part II), by the Fondazione Gerardo Capriglione Onlus (an organization aimed to promote and develop the research activity on financial regulation) in association with Queen Mary University of London. The journal faces questions about development issues and other several matters related to the international context, originated by globalization. Delays in political actions, limits of certain Government's policies, business development constraints and the "sovereign debt crisis" are some aims of our studies. The global financial and economic crisis is analysed in its controversial perspectives; the same approach qualifies the research of possible remedies to override this period of progressive capitalism's turbulences and to promote a sustainable retrieval.

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FOCUS ON GLOBAL PERSPECTIVES

LAW AND ECONOMICS.
THE CHALLENGE OF ARTIFICIAL INTELLIGENCE

Francesco Capriglione *

The World became a machine
Remo Bodei, *Domination and submission.*
Slaves, animals, machines, Artificial Intelligence,
Bologna, 2019

ABSTRACT: *In the aftermath of the systemic turbulence caused by the pandemic crisis there is a need to rethink the ways on how law, economics and politics interact in view of the realization of changes of the current legal market order. In this context, the use of technology becomes an essential tool for economic recovery in a post-pandemic, while at the same time it highlights the problem to link the economic effects to ethics.*

The technological improvement has developed the so-called machine learning which aims to recognise the similarities through algorithms; these are considered the common instruments that resolve the day-to-day problems. However, the deployment of technology raises doubts about the internal procedures to produce outcomes.

Therefore, the mechanics of artificial intelligence (AI) does not go beyond neutral data processing that converges towards the objective of an adequate information disclosure; hence the impossibility for AI to activate the relationship between mind, as an organizational form of consciousness, and the brain as a physical structure, relation that characterize the human activity. Hence the consequence to exclude the possibility of thinking to a mechanistic procedure that executes a computer programme, although it would not be able to create the 'right software' to develop a 'mind'

* Editor in Chief

SUMMARY: 1. Foreword. - 2. Artificial intelligence: systematic framework… - 3. *Continued*: … and impact on economic processes. - 4. The orientation of the EU. - 5. The application of artificial intelligence in the financial field: benefits... - 6. *Continued*:.. and contraindications. - 7. Ethics and the development of AI.

1. The relationship between 'ethics, law and economics' identifies a central theme in the studies that aim to deepen the compatibility between *ethos* and social sciences that have as their object an *agere* that, starting from the trilogy "savings-investment-development", pursues growth objectives, characterised by its close connection to the binomial "finance-productivity".

For more than a century economic science has theorised the importance in *subiecta materia* of the notions of interest and profit, which, through various combinations with capital, organisation and labour, allow the affirmation of balanced processes that give content to *growth*[1]. The fundamental elements are thus identified, which in the constructions formulated by Keynes, initially, and by the US monetarist school, subsequently, have animated the scientific debate aimed at finding the most appropriate technical methods to ensure a constant and progressive development of civil society[2].

In this context, finance assumes a particular centrality, since it is entrusted with the possibility of guaranteeing a valid model of coexistence. The technicality that pervades its essence leads, however, to a perplexing assessment of whether it can actually be linked - at least in some operational hypotheses - to the values underlying respect for the person and, therefore, the protection of the rights of others. It seems, in fact, to be inspired by the canons of a logic which, being aimed

[1]See WALRAS, *Éléments d'économie politique pure*, Lausanne, 1900, in which the logical demonstration of the balance between supply and demand leads to the elimination of Smith's 'invisible hand'.

[2]Cf. KEYNES, *The General Theory of Employment*, *Interest and Money*, 1936, a fundamental work at the heart of macroeconomic studies. This theoretical orientation remained dominant for a long time until the flourishing of monetarism in the 1970s, led by Milton Friedman.

at pursuing individual interests, is, on a practical level, heedless of the solidarity profiles that characterise action oriented towards the indications of secular morality and, as far as believers are concerned, of the social doctrine of the Catholic Church[3].

This leads to the frequent questions posed in the literature on the possibility of configuring ethics in finance or an 'ethical finance', an issue to which I too have been devoting my attention for several decades in my investigations into the ordering criteria that regulate the many sectors of economic law[4]. The research - in highlighting a general need for lines of development marked by ethical principles - calls for a fair participation of all those involved in economic processes in the benefits brought by the latter[5].

It follows that there is now a need, following the systemic change brought about by the recent pandemic crisis, to revisit the ways in which law, economics and politics interact with each other in order to bring about changes to the current legal order of the market. In fact, there is a need to make room for innovative 'liberal democracy' schemes that give adequate recognition to the values of the individual, combating economic discrimination in line with a behavioural ethic that respects the individual (considering him part of a collective dimension) on the basis of his needs and not just his income capacity. The underlying intention is to acquire the awareness that only by avoiding economic marginalisation - *latu sensu* intended and, therefore, also including the prohibition of taking advantage of the weak conditions of others (often due to asymmetry of information) - will the law

[3]See above all the three encyclicals of Pope John Paul II *Laborem exercens* (1981) on human labour, *Sollicitudo rei socialis* (1987) on the development of peoples and, finally, *Centesimus annus* (1991), celebrating the hundredth anniversary of Leo XIII's encyclical *Rerum novarum*. For a commentary on these encyclicals see QUADRO CURZIO, *Riflessioni su principi di economia sociale di mercato*, in AA.VV., *L'economia al servizio dell'uomo*, Bologna, 1994, p. 35 ff; CAPPOTTI - MARIOTTI - PAUSANELLI, *Una sinossi documentale della dottrina sociale della Chiesa*, Foligno, 1991.

[4]Cf. *Etica della finanza e finanza etica*, Bari, 1997; *Etica della finanza mercato globalizzazione*, Bari, 2004.

[5]See the interesting works published in AA.VV., *John Paul II. Le vie della giustizia. Itinerari per il terzo millennio*, edited by Loiodice and Vari, Rome, 2003, a work offered as a tribute by Catholic jurists to His Holiness John Paul II on the occasion of the 25th year of his pontificate.

succeed in achieving the levels of freedom and equality indicated in our Constitution, which sees them as a necessary prerequisite of social utility, the cornerstone of civil coexistence[6].

It goes without saying that this scenario is completed by the effects of modern technology, the instrumentation of which, if on the one hand contributes significantly to the possibility of recovery from the post-pandemic crisis, on the other hand accentuates the problematic traceability of the economy within an ethical framework.

Technological development has made it possible to develop what is known as machine learning, which is capable of recognising similarities and is therefore the basis for the use of algorithms, which have entered our daily lives in the form of applications, programmes and expert software, helping us to solve problems that often make life difficult[7]. It follows that AI is the product of the ingenuity and work of human beings who have created these automated mechanisms which, like other inventions from the wheel to the printing press to the splitting of the atom, serve a beneficial function when used appropriately.

Hence the need for a responsible use of this particular technology, which makes use of an immense amount of information stored in order to give content to computer processing, notwithstanding the fact that it is capable of influencing production processes and relations between states (e.g. the recent episodes of hacking used either to alter the regular course of political elections in some countries or to block the structures of public bodies with a view to their subsequent submission to blackmail)[8].

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[6]See, among others, OPPO, *Commentary on Art. 41 of the Constitution*, in AA.VV., Commentary on the Bank Code, edited by Capriglione and Mezzacapo, Milan, 1990, volume I, p. 3 ff; NIRO, *Art. 41 of the Constitution, edited by Bifulco and others, Turin, 2006, p. 836*; LUCIANI, *Unità nazionale e struttura economica. La prospettiva della Costituzione repubblicana,* Report at the AIC Annual Conference, Turin, 2011.

[7]See DE MAURO, *Big data analytics: guida per iniziare a classificare e interpretare dati con il machine learning*, Milan, 2019.

[8]With regard to the recent violation of the information services of the Lazio Region, on which the Public Prosecutor's Office of Rome is investigating, see the editorial entitled *Attacco hacker Lazio, D'Amato: "E' partito dall'utenza di un dipendente in smart working",* available on *www.corriere*

Valid grounds for alarm are identified in the face of a tool which, in addition to the undoubted possibility of violating the privacy of us all, is capable of causing extremely dangerous disturbances.

2. The mechanistic dynamics that characterise the ways in which artificial intelligence is expressed pose, as mentioned above, a variety of problems, starting with the identification of their explanatory scope and, therefore, of the cases in which an activity attributable to the use of automated systems that make use of algorithms can be applied.

In this regard, it must be stated that robotics - however advanced the mathematical studies that support its development may be - has the undeniable limitation of an undoubted determinism in the options it is able to offer. In fact, by definition, it can only express evaluations that reflect the results of calculations made with reference to specific assumptions, which are identified in the programming of the machine that must provide the service[9].

It follows that the work of artificial intelligence - however much it is intermediated by man (who intervenes in the definition of the algorithmic procedures) - is identified in a product which, although it presents an objective character, does not go beyond a neutral elaboration of data which converge towards the objective of an adequate informative indication (sometimes taken as the basis of decisional choices)[10]; this, without prejudice to the fact that this process does not avail itself (nor can it) of the imprinting typically proper to human intelligence. In other words, AI lacks the possibility of activating the relationship between the mind, as the organisational form of consciousness, and

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comunicazioni.it/cyber-security/attacco-hacker-lazio-damato-e-partito-dallutenza-di-un-dipendente-in-smart-working.

[9]Cf. SARTORI, *La consulenza finanziaria automatizzata: problematiche e prospettive*, in *Riv. Trim. Dir. Econ*., 2018, I, p. 258 ff; MAUME, *Regulating Roboadvisory*, in *Texas Journal of International Law*, 2018; ROSSANO D., *Il Robo advice alla luce della normativa vigente*, in AA.VV., *Liber Amicorum Guido Alpa*, edited by Capriglione, Milano, 2019, p. 365 ff.

[10]See, in this regard, the results of the research of the *Osservatorio Artificial Intelligence* of the Politecnico di Milano, available at *https://www.osservatori.net/it/ricerche/osservatori-attivi/artificial-intelligence.*

the brain as a purely physical structure, a relationship which characterises the human personality; a conceptual hypothesis which is at the basis of George Berkeley's thesis, according to which the human mind is a pure manifestation of the soul[11].

In fact, the mechanistic apparatus through which the function of artificial intelligence is externalised does not allow for moments of self-reflection, that is, of openness of interpretation with regard to the reality under observation; as shown above, we are in the presence of a mere elaboration of data (provided primarily by experience) aimed at results that only bear abstract anticipations. We could say, like Fichte, that the link between 'factual reality and the act of the *pure Ego*', which cannot be objectivised[12], is not to be found in this elaboration. However, a systematic framework cannot disregard the capacity that it manifests to implement (in a unifying logic) the integration of different 'knowledge', reaching a global vision of 'knowledge' that responds to the constructive hypothesis of 'knowledge' formulated by Greek philosophy (Plato), which recognised its essence in the advantage that it is able to bring to men[13].

From this we can deduce the aptitude of artificial intelligence to discover the relationships between data pertaining to different realities, as well as to deduce from the concatenations between them the guiding criteria for the decisional options to be suggested to the users of its output. This is done without, in principle, being confronted with the indications of new forces that may call into question its essential characteristic of basing its reconstructive hypotheses on the deductive method and, therefore, of basing the arguments provided on a

[11]See *Opere filosofiche*, Milan, 2009, containing some significant works: *Saggio per una nuova teoria della visione*, *Trattato sui principi delta conoscenza umana*, *Tre dialoghi tra Hylas e Philonous*.

[12]Cf. FICHTE, *Il sistema di etica secondo i principi della dottrina della scienza*, edited by De Pascale, Roma-Bari 1994; *I fatti della coscienza 1810/11*, edited by d'Alfonso, Milan 2007. In these works Fitche opens up a new epistemological field, constructing an understanding of being in the form of an ontology of consciousness.

[13]This refers to the Platonic theory of knowledge, set out in the dialogue *La Repubblica* (Ital. ed., with an introduction by Vegetti, Bari, 2007), in which it is stated that only intelligible knowledge ensures true and universal knowledge; opinion, on the other hand, is led to confuse truth with its image.

rationality ascribable to the mathematisation of the processes it elaborates.

Hence an abstractness of judgement that - even if it succeeds in fulfilling the informative/knowledgeable function entrusted to the mechanistic instrumentation we are dealing with - shows an undoubted deficiency with regard to the definition of processes that require intuition or subjective impressions. This leads to the unequivocal differential profiles of the evaluations carried out in this way with respect to those that can avail themselves of the fullness of the elements of estimate found in human judgement. An initial configuration of the limits to be found in analyses carried out with recourse to mechanistic instruments is clear, which are marked - as has been pointed out in doctrine - by the linear structure of the "if-then binomial .... (for which) ... on the basis of certain premises, certain consequences inevitably arise"[14].

It is also necessary to answer some of the questions that arise in this area, from which useful indications can be drawn to identify the essence of AI. Can machines really think? Can they act in ways similar to those that drive human intelligence? Is mathematical deduction capable of replacing mental states?

A first response to these questions can be attempted by looking at the scientific results of 'biological naturalism', which analyses the 'mind-brain' relationship, overcoming the theses based on *materialism* and *dualism* of the previous interpretative versions of the same. The research carried out by J. R. Searle following this methodology offers a naturalistic solution that "treats mental phenomena as part of nature"[15], reaching the conclusion that the mind is also a biological phenomenon, often linked by causal relationships to the brain[16].

In this construction it is assumed that mental states are caused by

[14]See SEPE, *Prestazione frazionata, rapporti tra imprese e vigilanza nelle nuove filiere di valore dell'industria finanziaria*, in AA.VV. *Mercati regolati e nuove filiere di valore*, edited by R. Lener – G. Luchena e C. Robustella, Turin, 2020, pp. 244/245.
[15]See SEARLE, *Mente, cervello, intelligenza*, Milan 1984, p. 265.
[16]The criticism of both points to their limitations in their inability to reconcile 'physical brain and mind'. In particular, the error of materialism in reducing 'the existence of the mental' to the physicality of the organism is emphasised, while the shortcoming of dualism is seen in the ontological distinction between the mentioned entities, considering them irreconcilable.

processes in the brain based on a relational system that is also open to the outside world, hence the definition of the mind as «a sequence of thoughts, sensations and experiences, both conscious and unconscious, that form our mental life»[17]. This does not, however, allow for an identification between the former and the latter, since this can only be done by assuming that all reality is objective, whereas consciousness and subjectivity are fundamental aspects of the mind, something that cannot be overlooked in the investigation[18]. Once again, ancient philosophical thought is of help here, whose intuitions confirm the conviction expressed above. I refer, in particular, to the teaching of Leibniz, according to whom only if two individuals have exactly the same properties are identical (the so-called principle of indiscernibility of identities)[19]; a reality, the latter, certainly not found in the matter under examination since it is not objective in its entirety, as has just been pointed out.

At this point, it becomes possible to answer the question of whether a thinking machine can be constructed. According to biological naturism, a mechanistic instrument cannot be considered to have this faculty "simply because it runs a computer program"[20]; in other words, it must be excluded that it is sufficient to implement 'the right program' to build a "mind". Hence the inevitable negative answer to the question we had asked ourselves, on the basis of the consideration that a program is exclusively syntactic while the mind is semantic. This assumption is completed by the further clarification that the brain is certainly not assimilable to a piece of hardware as it has its own 'neurobiological structural specificity' which makes it impossible to compare it to a computer mechanism.

I would like to add here that the hypothesis of an incidence of quantum mechanics on neurochemical processes, which contribute to the functionality of the mind, presupposes that the human brain presents an operativity

[17]See SEARLE, op. cit., p. 4.
[18]Extensively on this point see DI PAOLO, *Il naturalismo biologico di J. R. Searle: il problema della costruzione degli atti mentali*, in *Dialegesthai*, 25 April 2007.
[19]See LEIBNIZ, *Opera Philosophica*, Pars prior, Berlin 1840, edited by Erdmann, p. 94
[20]Thus SEARLE, *La mente è un programma?*, in *www.neuroingegneria.com*

circumscribed within the limits of algorithmic processes (as such, formalizable and computable)[21]. This reduces thought to a mere manifestation (*rectius:* effect) of the functioning of neurons; thus, attributing to the machine the possibility of also making choices that imply ethical evaluations ascribable to "conscience". As is well known, the latter has to do with a sphere of judgement pervaded by morality, hence its identification in philosophical thought as the "intellectual soul", which allows us to express our interiority, which is often conditioned by emotional states [22]. In this regard, St Augustine's words are significant: «do not go out of yourself, go back into yourself: truth resides in the depths of man »[23]**.**

This leads to a conclusion that is also relevant from a prospective point of view, in order to identify future developments of machine learning. I refer to the application of innovative software which - by allowing artificial intelligence to achieve 'selflearning' capabilities - requires us to take into account a 'probabilistic' element in our investigation, perhaps able to 'create', on the basis of the experience gained by the machine, an innovative mental process. In particular, the presence of a technical development that improves the performance of the machine (by means of autonomous processing of the data inserted in the computer structure), induces us to re-propose the problem concerning the achievement - thanks to the referability to large quantities of data - of "a result similar to that which could be achieved by man"[24].

In fact, an artificial neural network is certainly capable of learning, but it must be borne in mind that the so-called deep learning - i.e. all the technical analyses that make use of such networks, as defined by the European Commission - is also capable of learning. Indeed, an artificial neural network is certainly

[21]For a more detailed discussion of quantum mechanics and a critique of the position of numerous cosmologists, see PENROSE, *La mente nuova dell'imperatore*, Milan, 1991, a work in which the English mathematician argues that true intelligence cannot be artificial.
[22]See BIUSO, *Mente temporale*, Rome, 2017, ch. I, where in the reference to Greek philosophy it is pointed out that the term psyche expresses a conceptual abstraction that includes different components (cognitive, intellectual, rational, but also irrational faculties).
[23]See CARAMAGNA, *Frasi, citazioni, aforismi e pensieri di Sant'Agostino,* available at *https:// aforisticamente.com/frasi-citazioni-aforismi-e-pensieri-di-sant-agostino.*
[24]See SEPE, op. cit., p. 245

capable of learning, but it must be borne in mind that deep learning - i.e. the complex of technical analyses that make use of such networks, according to the definition given by the *Artificial Intelligence Observatory* of the Milan Polytechnic[25] - has an unavoidable limit in the fact that the expansion of the cognitive process is not limited, as has been pointed out, to a mere technical context and, therefore, does not depend on the mere degree of equipment of a computer system.

It is true, as has been correctly observed, that automation must be distinguished according to whether it is based on deterministic or learning algorithms (hence the progressive increase in the autonomy of technological mechanisms). This introduces a probabilistic factor into the investigation, which - with reference to the uncertainties that are sometimes found in the results of human neural networks - could lead us, once again, to opt for an affirmative solution to the question at hand.

In my opinion, the similarity between the processes followed by the machine and those of the human mind does not allow us to assimilate the one to the other, which are differentiated by the different weight attributable to the 'variables' in question. There is no doubt, in fact, that the machine carries out its evaluations in objective terms, since computer networks are parameterised on criteria of technological autonomy, whereas the results of human *action* are affected by the action of 'moral control', which qualifies its essence, linking the decision-making activity to the dictates of conscience[26].

3. On the basis of the above, it is possible to identify the specificities that characterise interventions in the economy of artificial intelligence and, in particular, the extent of their impact on financial activity.

The advantages that the development of information technology brings in general are well known; it has become an irreplaceable tool to help man to face

[25]See conference presenting the results of the *Artificial Intelligence Observatory* research, Milan, February 2019.
[26]See GHETTI R., *Robo-advice: automazione e determinismo nei servizi di investimento ad alto valore aggiunto*, in *Banca e borsa*, 2020, I, p…

and solve the problems of everyday life. I refer in particular to the spread of voice recognition, automatic translation, autonomous vehicles, domestic robotics, remote medical diagnostics and, as far as the subject of this investigation is concerned, the promotion and development of economic processes. It is also well known that the instrumentation in question - due to the rigidity typical of mechanistic models – often ends up being exercised outside the ordinary systems of rules and, therefore, giving rise to an operation that is free from reference to the basic principles of ethics; this, with the obvious prospect of new types of risks for the companies that make use of it.

In this regard, it should be borne in mind that, starting from some studies of the beginning of the millennium whose contents seemed futuristic[27], the literature has analysed the theme of the incidence of the so-called cybernetic law on inter-subjective relations and, more generally, the relationship between the social sciences and information technology. As mentioned above, research, in progression with the times, has devoted more and more space to the examination of the relationship between the latter and ethics, in the awareness that the artificial intelligence of the future would have to deal with increasingly complex problems, hence the need to have/possibly make "choices" that involve the sphere of intellectual interiority, which coincides with morality[28].

In this context, safety in *agere* and, with it, the inescapable need to avoid errors in the pursuit of planned objectives has become a primary objective in the identification of methodologies targeted by robotics experts, philosophers and neuroscientists. Hence the prospect of going uphill! We are certainly still a long way from achieving definitive results as regards the specification of the above-mentioned relationships in terms that will make it possible to overcome atavistic resistance to accepting the training tools of the 'new'.

[27]See RIFKIN, *L'Era Dell'Accesso. La rivoluzione della new economy*, translated by Canton, Milan, 2001.

[28]The fear that machine error could subvert expectations of the benefits and advantages of AI is summed up in the well-known example in the literature of the self-driving car that has to choose between running over a schoolchild and crashing into a tree.

The ways of reconciling the techniques underlying the application of IT tools and the possibility of avoiding the shortcomings and inefficiencies that can sometimes be found in their use have not yet been sufficiently clarified. On the other hand, there is a strong need to activate forms of innovation in organisations, in management, production, distribution and supply processes, based on the dissemination of information and communication technologies. As has been correctly pointed out, "innovation must be far-reaching, pervasive and have a very ... wide-ranging and capillary impact, it must touch all the vital ganglia of the economy and society, in the public and private sectors, it must be a primary component of a modern country system"[29].

The meeting between different disciplines, which is achieved in this way, responds to the need to find adequate solutions to the problems of post-industrial systems, which are looking for operational formulas that allow to do business using services (*i.e.* simplification of processes through the automation of bureaucratic and administrative acts) that make possible a rapid dissemination of knowledge and information accompanied by the achievement of profitable objectives (*i.e.* increased profitability and savings).

It should be borne in mind that a recent survey on artificial intelligence highlighted the connective power of the network, to which the so-called information communication technology (ICT) can be traced, marking the expansive capacity of the tools available on the Internet, which give rise to "an unprecedented process of production, sharing and storage of information"[30]. As it is precisely underlined, the automated transmission of data establishes a dialogue between individuals and machines that enhances the massive collection of information, the circulation of which, besides raising privacy issues, jeopardises the protection of fundamental rights. The latter, in fact, end up being linked to the creation of computational models that, using the stored data, are able to issue

[29]Cf. MINISTER'S STUDY CENTRE FOR INNOVATION AND TECHNOLOGIES, Presentation of the *Report on innovation and digital technologies in Italy*, Rome, 2003, p. 3.
[30]See ABRIANI – SCHNEIDER, *Diritto delle imprese e intelligenza artificiale*, Bologna, 2021, p. 5.

interpretations and predictions that substantiate the transition to a 'decision-making technology'[31].

In fact, the current regulatory framework is often proving inadequate to cope with the impact of such innovative processes: the importance of the aforementioned ways of using data calls for a change in the existing structures that eventually characterises the socio-economic assets. The importance of the above-mentioned ways of using data requires a change in the existing structures that ends up characterising the socioeconomic framework. It is evident how the implementation and convergence of intelligent tools becomes the "motor(s) of a society that is structured - and self-defined - as a result of automated determinations"[32].

Access to networks is becoming fundamental for growth, influencing the way we do business: it ultimately affects the criteria governing competitiveness and opens up new operational opportunities. There is a progressive awareness that investment in artificial intelligence tools is destined to take on fundamental importance not only for the success of biotechnology, nanotechnology and the development of environmental technologies, but also for the design and growth of the various phases of economic processes that can make use of information technology. Consequently, a reality is emerging in which the core of the professional activity does not really change, but the technical modalities of the action put in place to achieve useful results change and improve.

A picture emerges in which the use of AI tools is aimed at resolving numerous issues, and so we are witnessing a growing expansion of their actual applications, as well as their inclusion in countless interventionist systems. It is understandable why, in the current social scenario, policy promotes increasing forms of IT integration, starting from the literacy of Public Administration personnel (and, therefore, from the diffusion of training moments dedicated to the classification and use of models and systems).

[31]See DAVOLA, *Algoritmi decisionali e trasparenza bancaria*, Milan, 2020, *passim*.
[32]See ABRIANI – SCHNEIDER, op. cit., p. 6.

Recently, the diffusion of digitalisation has been called upon to solve the modernisation of public and private organisations, placing itself at the centre of policy objectives related to the governance of the complexity that, at present, characterises the post-pandemic reality. It is no coincidence that in the well-known 'National Recovery and Resilience Plan', digital is included among the 'strategic axes' of the governance scheme in place at the Ministry of the Economy, which has been empowered to make the payment requests (to the EU Commission) envisaged by the Recovery Fund[33]. It is clear that the policy has deemed the transition from analogue to digital to be suitable for increasing production and consumption.

The birth of the 'single digital market', as it has been acutely observed, "synthesises this revolution"[34]. The need for renewal, diffused globally by the pandemic crisis, has given a significant propulsive input to the definition, within the EU, of precise ordering criteria in *subiecta materia*; a discipline that had already been launched with the first directive on electronic payments (dir. 2007/64/CE), implemented by Legislative Decree no. 11 of 27 January 2010. This was followed by the issuance of a wide-ranging set of rules aimed at «establishing a modern and coherent Community legal framework for payment services ..., which represents clear progress in terms of costs for consumers, as well as security and efficiency compared to the systems currently existing at national level»[35].

As already mentioned, we are in the presence of a legislative process that

[33]This refers to the agreement reached at the European Council of 23 April 2020 on the establishment of the so-called Recovery Fund. This refers to the agreement reached at the European Council of 23 April 2020 on the establishment of the so-called Recovery Fund, whose activity should be linked to the EU budget for the next seven years.
The Commission's proposal presented to the European Parliament at the end of May 2020 for the creation of an instrument called Next Generation EU was welcomed by many European countries with enthusiasm; the provision to set up a fund of 750 billion to be used for transfers and loans to Member States (500 and 250 billion respectively) was, in fact, considered suitable to «strengthen cooperation in the health field» as well as to give a common response to the crisis; cf. BANCA D'ITALIA, Relazione per l'anno 2019, Considerazioni finali, p. 17 of the press drafts, where, in relation to this fund, it is stressed that «this is an important opportunity to prepare a common response that, like monetary measures, is proportionate to the severity of the crisis».
[34]See ALPA, *Il mercato unico digitale*, in *Contratto e impresa Europa*, 2021, p…
[35]So says Recital 4 of Directive 2007/64/EC.

should anticipate the technological process or, at least, be arranged at the same time as it evolves; hence the difficulties that are likely to be encountered in application. Certainly, the automation of economic activities, according to a common belief, is considered instrumental to the streamlining of work[36]; it follows that the valorisation of AI tools is destined to accompany the realisation of growth projects which, in different locations, may be hypothesised in the future[37].

As regards the situation in Italy in particular, the Strategic Programme for Artificial Intelligence 2022-2024, approved by the government and published on 24 November 2021, is considered significant.[38] It aims to accelerate, over the next few years, innovation and the potential of AI in the economic and social fabric of the country, on the assumption that «the Italian ecosystem possesses great potential that is not yet fully exploited». In order to bring the latter into line with the European strategy, which foresees the realisation of appropriate research programmes, suitable sources of investment have been identified to support a similar development policy; this, proceeding with a comparative method and, therefore, after analysis of the use of artificial intelligence in Italy, from which an adequate comparison between the national reality and that of the principal countries of the planet[39].

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[36]See for all GUARASCIO - SACCHI, *Digitalizzazione, automazione e futuro del lavoro*, National Institute for Public Policy Analysis, 2017.

[37]See BASKERVILLE - CAPRIGLIONE - CASALINO, *Impacts, Challenges and trends of Digital Transformation in the Banking Sector*, on *Law and Economics Yearly Review*, 2020, p. 341 ff.

[38]The guiding principles of this programme, produced by the Ministry of Universities and Research, the Ministry of Economic Development and the Minister for Technological Innovation and Digital Transition, can be viewed on *www.Programma%20Strategico%20Intelligenza%20Artificiale%202022-2024%20pdf.*; for comment see BIANCHINI, *PMI: cos'è il Programma Strategico per l'Intelligenza Artificiale 2022-2024 e come le può cambiare*, available at *https://www.money.it/PMI-cos-e-il-Programma-Strategico-per-l-intelligenza-artificiale.*

In this regard, it is worth noting that, according to a study of the *European Commission E-government Benchmark* del 2020 (available at *www.E-government%20Benchmark%202020.en.pdf*) «Italy is characterised by an average level of digitalisation and there is still a gap between the supply of digital services and their actual use», so it is correctly predicted that «new artificial intelligence technologies will allow banks and insurance companies to improve their services».

[39]The data on the private market of artificial intelligence in Italy indicated in the Strategic Programme are significant, indicating that AI reached a value of 300 million euros last year, an increase of 15% compared to 2019, but equal to about 3% of the European market. These data are corroborated by the amount of investment made in research and development for the deepening of

4. The fundamental importance of artificial intelligence in the definition of socioeconomic development programmes has, for some years now, been understood by the Union, which has promoted numerous measures in this regard, in which specific ways of using AI in Europe have been indicated. These are summed up in an appropriate increase in investment, the need to strengthen excellence in artificial intelligence technologies and applications, so as to intensify collaboration between industry and academia in research and innovation in the sector in question.

In this regard, the conclusions on the 'Coordinated Plan for the Development and Use of Artificial Intelligence Made in Europe', adopted by the EU Council in February 2019, some significant measures of the European Commission (among which notes a 'White Paper on Artificial Intelligence', published in February 2020) and three legislative resolutions on AI formulated by the European Parliament on 'ethics, civil liability and intellectual property' are taken into consideration. This regulatory framework is completed by the recent «proposal for a regulation» of the European Parliament and of the Council that «establishes harmonised rules on artificial intelligence», aimed at making AI more efficient by «ensuring improved predictions, optimised operations and resource allocation, and personalised service delivery»[40].

The aim is to define a regulatory framework for reliable AI and thus to regulate robotics and related technologies in such a way as to prevent risks.

It is evident that the awareness that digital technology is at the heart of modern life has led to the need for Europe to establish criteria for its application in order to ensure confidence in its adoption. This has resulted, on the one hand, in linking its function to the values of the rule of law, and, on the other, in verify-

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the theme of Artificial Intelligence, hence the emergence of the gap between Germany (which in 2019 recorded an amount of such investment of 109,544 million euros) and our country (in which only 25,910 million euros were committed to *subiecta materia*).

[40]See COM (2021), 206 *final*. This proposal also responds to explicit requests from the European Parliament and the European Council, which have repeatedly called for legislative action to ensure the smooth functioning of the internal market for artificial intelligence systems.

ing the capacity of automated mechanisms to build reliable products and provide secure, albeit sophisticated, services. The underlying aim is to take full advantage of the operational innovations offered by artificial intelligence, from the aeronautical sector to the energy, automobile and medical equipment sectors. The increasing availability of computerprocessed data is also the basis for the conviction that the Union - by combining its industrial and technological strengths with a high-quality digital infrastructure – is capable of "becoming a world leader in innovation in the data economy and its applications"[41].

Ultimately, the European summits aim to ensure undoubted advantages for the citizens of the Member States, who will be able to benefit from better services (e.g. in health, transport, etc.), as well as for businesses, which will be able to move into new sectors of activity (e.g. green economy, cyber security, etc.). In particular, there seems to be an assumption that the costs of services will be reduced and products will be more sustainable, notwithstanding the need to respect fundamental rights such as freedom, human dignity and the protection of privacy.

In this context, it is worth mentioning, in particular, the measure with which the Presidency of the EU Council (Germany), in October 2020, formulated conclusions in which the impact exercised by artificial intelligence - and, therefore, by the digital change - on the 'Charter of Fundamental Rights' is evaluated; conclusions which were, then, assumed as the basis of the nominated proposal of Regulation on the AI (cd. *Regulation on a European approach for Artificial intelligence)* of 21 April 2021, published by the EU Commission. In particular, the Council referred to the recent pandemic crisis in order to underline that the latter has exacerbated the challenges posed to the Union by the need to protect the fundamental rights provided for by the provisions of the Treaties; hence the subsequent exaltation of the effects of informal technologies, on the assumption that these allow to support and promote common values when considering the development of strategic digital infrastructures as a factor of sustainable growth

[41]See EU COMMISSION, COM (2020) 65 *final*, *White Paper on Artificial Intelligence A European Approach to Excellence and Trust*, p. 2.

and, therefore, as an unavoidable prerequisite to ensure respect for human rights enshrined in the Charter.

It should be borne in mind, however, that the need to regulate the matter in question also appears to be dictated by the awareness that there is a possibility of improper dissemination of automated mechanisms, which entails risks for democracy and fundamental rights. Hence the close correlation between the commitment to build a model of excellence for the use of digital technology and the need to guarantee its compatibility with the correct use of AI[42].

The three legislative resolutions adopted by the European Parliament in October 2020 on ethics, civil liability and intellectual property seem to be directed towards the latter objective, followed by the request to the EU Commission to establish a comprehensive European legal framework based on ethical principles for the development, dissemination and use of AI, robotics, and related technologies.

In the wake of the previous European orientation, the Parliament attributes an essential role to AI in the digital transformation of society; it is ascribed particular importance in the relaunch of the post-Covid 19 economy, since it is able to create the ideal conditions for the growth of the productive system. These three resolutions provide the 'indicators' for effective regulation of artificial intelligence, which is correlated to standards that allow trust to be placed in it. Iban Garcia del Blanco, the Parliament's rapporteur, emphasised that "the citizen is at the heart of the proposal", referring to the objective of transparency and accountability of operators, which the content of the proposals in question is intended to achieve[43]. Hence the need to prevent prejudice and discrimination from

[42]In this respect, it should be noted that the proposal for a regulation on AI represents a set of specific provisions for risk-based artificial intelligence systems. In particular, four risk levels are identified: *Unacceptable risk AI*, *High-risk AI*, *Limited risk AI and Minimal risk AI*. This proposal is currently being discussed by the colegislators (European Parliament and EU Council). In Parliament, the dossier has been provisionally assigned to the 'Internal Market and Consumer Protection Committee' (IMCO). It could later also be assigned to the 'Special Committee on Artificial Intelligence' established in June 2020 (*Committee on Artificial Intelligence in a Digital Age*) (AIDA).

[43]Significant in this respect is the Parliament's political agreement with EU governments on financial transparency rules. A country-by-country public reporting (pCBCR) has been agreed,

hindering the development of artificial intelligence, given the legal certainty that its use will derive from appropriate regulation to bring it within the law.

It is in this context that the analyses underlying the proposal submitted this year by the European institution for the creation of a uniform regulation governing the matter in question converge in highlighting the need for human 'control' over AI, which is considered indispensable in order to avoid forms of programming with discriminatory effects, or that artificial intelligence could turn into a lethal weapon to the detriment of business and free political determination.

Finally, in a forecasting logic of the possible future developments of the AI, it must be remembered that the EU Commission has presented a programme of interventions in which, in a prospective key, the ambits of the digital transformation of Europe by 2030 are outlined. This programme is developed around four cardinal points, aimed at further expanding the present boundaries of the subject matter of artificial intelligence. These include the development of specialist skills, the increased introduction of technological mechanisms in companies, the complete digitisation of public services and the provision of secure and sustainable digital infrastructures. In this way, the sectors in which the Union intends to carry out its innovative action in view of the attainment of objectives have been thoroughly identified, which – besides giving it a solid structure of governance (founded on a system of monitoring) to identify 'successes and gaps' of the AI - should facilitate the realization of 'multinational projects which combine investments of the EU, of the Member States and of the private sector'[44].

The Commission's launch in May 2021 of a public consultation on the "formulation of a set of digital principles" completes the framework of activities put in

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which will oblige large multinationals to publicly disclose where they make their profits and pay their taxes. This political agreement also includes an obligation for companies to publish how many full-time employees they have, their turnover and taxes paid, as well as all the profits and losses they have in each country in which they operate, within the European Union and in tax havens.

[44]See the European Commission document entitled *Digital Decade for Europe: Digital Goals for 2030*, available at *https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_it.*

place to properly identify the guidelines that Europe intends to follow in the development of digital rules and regulations that will allow, in the next decade, to extend its benefits to all citizens.

5. A particularly ample and delicate sector of intervention of the above mentioned operative techniques is the financial one, given the incidence that it presents on the dimension of the market, indissolubly tied to the possibilities of development that the AI is able to determine. Specifically, artificial intelligence confers on the latter an organisational capacity which, on the one hand, eliminates the need for 'physical space' and replaces it with virtual space (i.e. the platforms instrumental to the exchange function), and on the other, forms the basis of the realisation of projects (often multinational) which, in a prospective key, identify the transformations necessary to implement lines of development which could not otherwise be hypothesised. This has the obvious consequence of changing the reality of the market and the legal order that regulates it.

The result is an undoubted increase in the number of operations carried out, which obviously meets multiple requirements: from the need to achieve high margins of security in accessing IT systems, to the implementation of adequate levels of digital skills, to the reliability of the online environment. This is without prejudice to the need to comply with the principles of sustainability that are currently at the heart of economic, financial and social activities. It goes without saying that reference is made here to the notion of "sustainable finance" in the indications of the EU Commission, according to which this is to be understood as the link between the investment decisionmaking process and "environmental and social factors"[45]; hence the obvious contribution made by AI to the development of civil society, since it is instrumental to the objective of avoiding subjecting finance to limits, burdens and constraints.

[45]See COM (2018) 97 *final*, *Communication from the Commission to the European Parliament*, *the European Council*, *the European Central Bank*, *the European Economic and Social Committee and the Committee of the Regions. Action Plan to finance sustainable growth.*

Hence the necessary reference to certain principles - applicable in the use of automated mechanisms - to which the correct exercise of digital technology must be informed. These are principles that, if we consider them carefully, are ethical in nature, since they are designed to protect the individual, preventing him from being the victim of possible abuses connected to the misuse of algorithms. I refer, in particular, to the guarantees that must be given to all citizens so that they can benefit, on an equal footing, from the tools of artificial intelligence, which - thanks to the objective nature of its results - in the financial sphere should, first and foremost, ensure that the information asymmetries of the market are overcome.

This requirement is correlated to the fact that, even today, most of the activity carried out in the financial sector is carried out in an automated form, in accordance with rules imposed in algorithmic programs[46]. These programmes are entrusted with the computerisation of the system, aimed at achieving a unitary area, of a neutral character, in which one witnesses the "transformation of all phenomena into a numerical calculation"[47]. We are in the presence of a 'technological paradigm shift' insofar as the instruments of artificial intelligence operate the passage from a cognitive system to a decisional system characterised by the fact that the "capacity to act has decided to cause an event for which it is legally - and before that morally - responsible"[48]. Hence the configurability of a cause/event relationship that poses problems of imputability that can also be assessed from an ethical point of view: the traditional legal concepts of freedom and autonomy are called into question and seem to be replaced by a determinism that is unconvincing in terms of conceptual logic.

As has been pointed out in the literature, the adoption of computer schemes, based on deep learning logics, has allowed a processing of big data – sometimes collected independently - which allows (through the comparison and

[46]See for all BERRUTTI – ROSS – WEINBERG, *The trasformative power of automation in banking*, 2017, available at *www.mckinsey.com*.
[47]See ALPA, *Il mercato unico digitale*, cit., p. 2.
[48]See ABRIANI – SCHNEIDER, op. cit., p. 26.

integration of information) to "incrementally develop evaluative heuristics" [49]. Hence a peculiar flexibility in the interpretation of data that involves new types of risk, in particular those of overfitting[50], with the obvious consequence of arriving at an abandonment of the paradigms of responsibility that must characterise financial *agere*.

This is a scenario in which the use of mechanical tools and automated procedures facilitates the typical activities of banks, insurance companies and other parties authorised to carry out intermediary activities in the financial sector. Innovative ways of organising companies and simplifying the bureaucratic processes of the P.A are opened up; it becomes possible to hypothesise the realisation of business models (taking into account personal factors) inferable from the profiling of risks, to which automated systems can have easy access.

The prospective evolution of the digital market also interacts on the regulation of contracts, which is increasingly oriented towards systems of protection different from those used in the past: the need to have flexible forms of intervention leads, in fact, to a progressive abandonment of the regulatory rigidity that has long governed exchange relations, often draining their development. Modern forms of online contracting, favouring distance selling (and, in particular, those that take place globally), hint at a future in which the methods of negotiation that, in times prior to the emergence of digital technology, dominated the market can be overturned[51].

This explains why, at present, the affirmation of digital technology, while leaving the essence of finance unchanged (oriented towards the growth of the production system), interacts with its connotation, giving it an entanglement that allows it to be recognised as having a closer link with society, with obvious repercussions on the role it plays.

Once again, the measures adopted by the EU to tackle the pandemic crisis

[49]See DAVOLA, *Algoritmi decisionali e trasparenza bancaria*, cit., p. 42.
[50]I refer to the ability to detect false irregularities, see JAMES – WITTEN – HASTIE – TIBSHIRANI, *An introduction to statistical learning with application in*, Springer, 2014, p. 22.
[51]See the articles published in the book *E-Commerce*, Milan, 2001, edited by Antonucci.

(and, in particular, the aforementioned 750 billion euro Recovery Fund for transfers and loans to the Member States) are relevant in this regard. In fact, they give content to an interventionist context that, in the opinion of many, shows a spirit of cohesion and solidarity of the Union[52]; the latter innovates the ways in which finance is exercised, which is assigned the specific task of carrying out a balanced distribution of funds intended to support countries in crisis. As I have argued elsewhere, this affects the very qualification of the activity in question, which takes on distinctive features that we could define as ethical in nature[53].

In this context, the contribution of AI is significant, as it enables careful management of flows and, therefore, the achievement of goals that go well beyond the mere intermediary function that traditionally characterises financial operations. Digitisation in the *subiecta materia* makes it easier to overcome the difficulties faced by some EU countries, opening up the prospect of reducing inequalities and the new pandemic-induced poverty.

It goes without saying that an optimisation of the results deriving from the use of automated AI mechanisms would seem to be achievable with the establishment of a "common benchmark", at European level, for the identification of the rights and fundamental values of those who benefit from digitalisation. This includes the recognition of freedom of access to information of various kinds, which translates into the ability to carry out an online activity, based on transparency and on EU indications to Member States for the elaboration and application of coordinated policies.

6. Reference has been made several times in the preceding pages to the new risks to which financial activity is exposed, as well as to the regulatory interventions of the Union to protect its operational security from the pitfalls of the digitalization process. In this regard, I have referred to the intensive work done by

[52]See CAPRIGLIONE, *Covid 19. Incertezze domestiche e speranze europee*, in *Riv. trim. dir. econ.*, 2020, p. 651 ff.
[53]See CAPRIGLIONE, *Il sistema finanziario verso una transizione sostenibile*, in *Riv. Trim. Dir. Econ.*, 2021, I, p. 241 ff.

the EU to improve crossborder relations and to safely develop artificial intelligence mechanisms, not only by increasing specialised regulation, but also by allocating structural funds to expand the use of digital in the post-pandemic recovery.

We should now dwell on those aspects of AI which give rise to perplexity regarding hypothetical techniques of use which could lead to application inconsistencies of various kinds and, therefore, transform the possible benefits, mentioned above, into a lost opportunity for an innovative and sustainable future. The exponential growth of digital technology suggests that a critical mass will be reached in the next few years, which could cause difficulties in the management of information, with obvious negative implications for the sustainability of automated mechanisms.

In this regard, questions concerning possible breaches of privacy come into consideration first. This is a particularly important aspect of the investigation, since it involves the difficult reconciliation between transparency of the *agere* and the obligation of confidentiality. It follows that the automated management of data collected through the networks must be carried out in compliance with the General Data Protection Regulation (GDPR) not only to avoid incurring penalties, but also to strengthen users' trust in intermediaries[54]. In this regard, the indications of the European Parliament on the digital shift are relevant, in which the need to take into account confidentiality in the use of data is emphasised; hence the frequent reminders of the importance of complying with EU legislation on the subject, which is considered a prerequisite for a correct transition to artificial intelligence tools.

In this context, it is worth pointing out that data collection should be limited to the information needed to carry out the operations requested by customers (and, of course, anything else related to the performance of the contractual activity); it being, understood that, otherwise, the consent of the data controllers

[54]See Regulation (EU) No. 2016/679 of the European Parliament and of the Council on the protection and regulation of the processing of data relating to persons in the EU by persons, companies or organisations, as well as Legislative Decree No. of 1962003 (as amended by Legislative Decree No. of 1012018) in which special rules are provided for data controllers.

to the use of their data is required.

From another point of view, the complex structure of the automated mechanisms, although facilitating the meeting between supply and demand, does not allow to reach a unitary configuration of the new operational techniques, determining different ways of access to the digital market[55]. This translates into an intrinsic difficulty in the identification of the applicable discipline, with obvious implications in terms of competition; indeed, in the face of possible exclusions from negotiations of some users (even if deserving), the presence of multiple and varied ordering criteria is identified, which certainly does not facilitate the formation of a favourable humus for interaction between different categories of operators. The definition of platforms given by the OECD as "a digital service that facilitates interactions between two or more distinct but interdependent sets of users who interact through the service via the internet"[56] is rendered meaningless.

This complexity also interacts negatively at system level: the inequalities between intermediaries in the sector are accentuated as the average size of the sector increases, which is particularly important in the digital challenge.

In this logic, the supervisory authorities tend to encourage the overcoming of subjective banking fragmentation with aggregations intended to increase the "weight" (also international) of the banks, which would lead to a strengthening of the sector in question [57]. Hence, with regard to Italy, the interventions of the ECB's top management and of Governor Visco aimed at achieving 'large size' in the credit sector, which I have discussed on another occasion[58]. In view of this objective, it is assumed that large banks are more efficient and resilient than medium-small ones, thus going against the indications of the 1936 banking law, which considered

[55]See AMMANNATI, *Regolare o non regolare, ovvero l'economia digitale tra 'Scilla e Cariddi*, in AA.VV., *I servizi pubblici. Vecchi problemi e nuove regole*, Turin, 2018, p. 101 ss; CANEPA, *I mercanti dell'era digitale. Un contributo allo studio delle piattaforme*, Turin, 2020, p. 27 ff.
[56]See OECD, *An introduction to online platforms and their role in the digital trasformation*, May 2019, viewable at *www.oecd.org*.
[57]See CASELLI's editorial entitled *Banche. Maxi, slim o tech? È tempo di scegliere la taglia*, published in *L'economia* on 23 August 2021.
[58]See CAPRIGLIONE - SEPE, *La spinta della Banca Centrale Europea per la grande dimensione*, in *IlSole24Ore* on 7 April 2021.

pluralism in banking as one of the cornerstones of the Italian financial system[59].

It is true that large banks are able to make more significant investments in IT than small ones: in fact, they have greater strength in attracting specialised human capital and have more substantial financial resources, which makes them particularly central to the conversion to digital. However, it is also true that such a situation excludes banks that do not meet these requirements from drawing up growth programmes that enable them to compete with other players in the financial-tech market, by innovating their services and expanding their offerings. Hence a critical prospect of a balanced growth of all the intermediaries of the banking system in which digitalisation will be fundamental to "decree success in domestic and European challenges"[60].

A further aspect concerning the potential risk of the process of transition to the use of automated mechanisms is identified in the modalities with which the techniques of the AI interact on the evaluations which characterize the financial action. Significant, in this regard, is the consideration of the doctrine in which it is pointed out that the digital, in the face of the increase of production, «accentuates the difficulty of individuating regulatory techniques suitable to support the computer expansion», for which it is not exempt from hypothesizable imbalances caused by the intensification of the technological applications[61].

Having said this, it appears undeniable that the application of the sophisticated operative models in which the AI is comprised, if, on the one hand, it is able to generate profiled databases which are of help in the verification of the credit worthiness[62], on the other hand, it ends up depriving savers/users of the personal-

[59]See MASERA, *Community banks e banche del territorio: si può colmare lo iato sui due lati dell'Atlantico?*, Rome, 2019, with a foreword by Ignazio Visco, a work in which it is argued that banking biodiversity represents the organisational model best suited to the size of industrial enterprises, which in Italy are predominantly SMEs.
[60]Thus CASELLI, *Banche. Maxi, slim o tech? E' tempo di scegliere la taglia*, cit.
[61]In this sense, see PELLEGRINI, *Il diritto cybernetico nei riflessi sulla materia bancaria e finanziaria*, in AA.VV. *Liber amicorum Guido Alpa*, edited by Capriglione, Milan, 2019, p. 354.
[62]See MATTASOGLIO, *La valutazione del merito creditizio e l'innovazione tecnologica,* in AA.VV., *Fintech. Introduzione ai profili giuridici di un mercato unico tecnologico*, Turin, 2019, vol. II, p. 197 ff.

ized evaluation attributable to human intelligence, which is substituted by the elaboration carried out by the artificial one. In particular, the interpretation of the relationships on which the new technologies interact is usually oriented (*rectius*: correlated) to the mere ascertainment of the "costs" of the same; therefore, the analysis does not give rise to a verification of the validity of the investment choices, the positive feedback of which requires that these last are parameterized on the need to remove the new criticalities identified in the protection of the interests of savers, now delegated to the use of automated instruments.

I refer, in particular, to the possibility of programming artificial intelligence in a way that circumvents situations of risk and possible insolvency of the company issuing financial instruments, or of conflict of interest, all hypotheses in which we are far from achieving full protection of transparency which - as has been stressed by an authoritative scholar - is the guardian of the freedom to act, not subject to limits, charges, conditions and prohibitions[63]. A similar consideration should be made with regard to the application of software from which conduct is permitted that is reprehensible and generates negative externalities (e.g. the sacrifice of common goods). Such cases are undoubtedly outside the "correct relationship between the financial economy and the real economy", which, according to the doctrine, must characterise the virtuous spiral underlying the ethical dimension of finance[64]. It is very true that there exists a close connection between explainability of the artificial intelligence and transparency - deducible, among other things, from certain precise indications of the EU Commission[65] - it is not possible, however, to reduce "the regulations on transparency to an instrument of trigger of the competitive mechanisms of the market", as has been pointed out[66].

[63]See ALPA, *La trasparenza dei contratti bancari*, Bari, 2003
[64]See SEPE, *Impresa e finanza tra etica e diritto*, in AA.VV., *Finanza impresa e nuovo umanesimo*, edited by Capriglione, Bari, 2007, p. 49.
[65]See *Technical Report by the European Commission Joint Research Centre (JRC*), *Robustness and Explainability of Artificial Intelligence*, available at *https://publications.jrc.ec.europa.eu/ repository /handle /JRC119336.*
[66]See DAVOLA, op. cit., p. 198.

7. Numerous references have been made in the preceding pages to the interaction between ethics and AI applications in the subject under consideration. In fact, the investigation has shown how the latter are correlated to criteria of rigid reference to the categories of economic science and technology (such as interest, profit, efficiency, etc.), hence the hypothetical sacrifice (due to this systemic system) of human rights.

In fact, in the situation outlined above, the guiding principles for the creation of an economy inspired by respect for the dignity of those who intend to use automated mechanisms to invest their savings, operating in a context characterised by the fairness of the negotiating counterparties, may often not be observed. It can be deduced from this that the activity carried out with regard to the canons of artificial intelligence is often deficient in terms of ethicality; this is because the function of guaranteeing an operativeness characterised by the provision of informed consent, necessary to create a breeding ground to prevent 'abuse of power' by intermediaries and, therefore, to achieve adequate levels of protection of savers/investors[67], is of little importance.

A first conclusion can be drawn from the above. The objective nature of the transparency achievable with the application of the AI affects the information and, therefore, the contractual activity through which the digital is expressed. Indeed, the, neutrality of the judgments formulated through algorithmic processing prevents the investment proposals of intermediaries from allowing investors to acquire a full awareness of the various profiles of the relationship they are about to sign; the latter are not provided with the guarantees deriving from the presence of 'human advice', which is underpinned by the assumption of a series of obligations aimed at preventing erroneous expressions of will.

In other words, the limits of a mechanistic construction, free from forms of personalisation of relations, emerge; hence a lack of attention to verifying the conformity of the financial products offered to the specific needs of investors. It is,

[67]See IANNARELLI, *Il contraente risparmiatore*, in AA.VV., *I contratti dei risparmiatori*, edited by Capriglione, Milan, 2013, p. 57.

therefore, in line with a liberalist logic that proposes the maximisation of profit and does not overcome discrimination; it attenuates the equal position between members of the social community and does not promote solidarity towards those who remain distant from the production processes. It is no coincidence that, in assessing these implications of automated processes, the need to mitigate the rigidities in question has been acutely recalled, making room for the emergence of 'individual judgement' where its radical replacement by algorithmic[68] systems is imposed on the market.

In this context, it is possible to answer the question I posed in my introduction concerning the ethical status of the results of modern technology. In this regard, it must be stated that an intensive use of IT requires codification, so as to offer a conceptual paradigm useful for an unequivocal interpretation of the phenomenon in question; this will make it possible to verify whether the area of progressive influence of ethics in the economy can find new life through the application of artificial intelligence mechanisms, or whether, because of the latter, a fracture is created in the process mentioned above.

The integration of markets and the global dimension they have taken on have found in technological innovation the appropriate instrument for programming a development that - as has been stated in this paper - can bring benefits to those who make use of it. A complex path can be identified in which the dialogue between economics and ethics can continue in a positive manner if it does not try to escape the law of morality, if it does not lose its driving force due to the prevalence of logic inspired by a conceptual positivism [69]. It is based on a methodological approach that bases the cognitive process solely on the data that the machine has or is able to acquire.

It is evident that the results of AI, where they are limited to the transmis-

[68]See DAVOLA, op. cit., p. 93.
[69]For an analysis of the various aspects of positivism, see BOBBIO, *Giusnaturalismo e positivismo giuridico*, Milan, 1984, where it is stressed that this cultural current paid little attention to law, even from a sociological
point of view.

sion of information resulting from algorithmic processing, express a tendency to exclude ethics from the relative assessment activity, or to assign it a completely marginal role. This translates into a 'formalistic' version of knowledge, far removed from the cultural tradition of our country, which finds expression, among other things, in the methodology of law and interpretation [70].

Hypothesising the abandonment in market practice of theprevalence of technical elaboration over the free determination of operational choices is the path to follow in view of a positive encounter (rectius: an effective collaboration) between ethics and economics. In this way, it becomes possible to recover a conceptual framework in which one identifies a just concern for the ethical implications of a 'financial action' aimed at human growth, in the conviction that the welfare of the community is closely linked to the satisfaction of the interests of individuals.

In this scenario, respect for the human person, to be pursued even in the presence of modern informal technologies, requires "a profound rethinking of the liberal order", since "the grammar of human rights" is constantly being strained "by the globalization of markets" [71].

IA places new types of constraints that affect the freedom of the financial company and, at the same time, the behaviour of those who have economic relations with it. The new forms of risk measurement disregard the adoption of criteria to ensure the protection of savers/investors, which is delegated to a neutral formalism that, as previously pointed out, can often lead to incorrect management of client interests, eroding the latter's confidence in the market. Reversing this direction of travel, orienting the products of artificial intelligence in the direction of a greater attention to the respect of the rights of others, does not mean renouncing technological innovation, but rather giving an ethical sense to the change.

[70]See BOBBIO, op. cit., p. 108.
[71]See CORTELLESSA, *Diritti umani nell'era della globalizzazione,* available at *www.diritto.it/ diritti-umani-nellera-della-globalizzazione.*

There is no doubt that the mechanisms of the digital world must be counted among the “new indicators” of progress and growth prospects in the post-modern Era. In order for this function to be exercised correctly, it is necessary for their activation to be detached from formalistic schemes that disregard the criterion of orienting the products of cultural evolution and scientific research towards respect for man.

This is a daring and complex plan, but it is certainly feasible if it is based on an essence of values that combines the objective of sustainability of financial action with that of liberation from abuses, as well as the implementation of projects that find their raison d’être in a pluralistic vision of well-being, in which abuses are eliminated in view of a healthy and balanced process of economic development.

THE CHALLENGES FOR THE POST-PANDEMIC CHINESE ECONOMY

Marcello Minenna *

ABSTRACT: *After decades of an impressive economic boom, China has to deal with the imbalances and contradictions that made this mighty expansion possible. Since the global financial crisis, foreign trade – the main growth engine – has experienced a structural downsizing of its relevance for the Chinese economy in a climate of growing distrust from the rest of the world towards the Asian giant. At the same time, domestic demand shows signs of weakening, signaling the difficulties encountered by the authorities in pursuing an effective upgrading of spending and investment needs and capacities to the typical levels of a middle-income economy. The non-financial sector is burdened by heavy overleveraging and the recent initiatives undertaken by policymakers to curb speculation in the real estate sector and limit the indebtedness of local governments have not produced the desired results. The government had to back down and promise new stimuli to the economy. Meanwhile, the challenge of «common prosperity» remains open.*

1. In the year of the 20th National Congress of the Chinese Communist

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Party, China is fully committed in promoting a stable and healthy economic environment. The anniversary is of great significance and, for the occasion, Xi Jinping will have to prove that he has what it takes to obtain his third term as President of the People's Republic.

The last two years have been closed with great success. In 2020 – a year of recession for almost all countries worldwide – China grew by an enviable 2.3% and in 2021 its GDP increased by 8.1%, well above the pre-pandemic average.

The seeds of the Chinese unprecedented economic boom during the 21st century had appeared during the last decades of the previous century marked by an epochal season of reforms unleashed by Deng Xiaoping. The annual GDP – which has never experienced a negative rate of change since 1977 onwards – has gone from $ 191 billion in 1980 to $ 360 billion in 1990, and reached $ 1211 billion in 2000.

This extraordinary economic performance continued into the 2000s, with an average annual growth of 10.35% over the period 2000-2009, which allowed China to capture an increasingly large chunk (currently about 18%) of global GDP at the expense of powers such as the United States and Japan (see Figure 1). The decade 2010-2019 saw a progressive slowdown in the growth rate of Chinese GDP (on average + 7.67% per year), which must however be contextualized in light of the negative consequences of the global financial crisis not only for the Chinese economy but for the entire world economy.

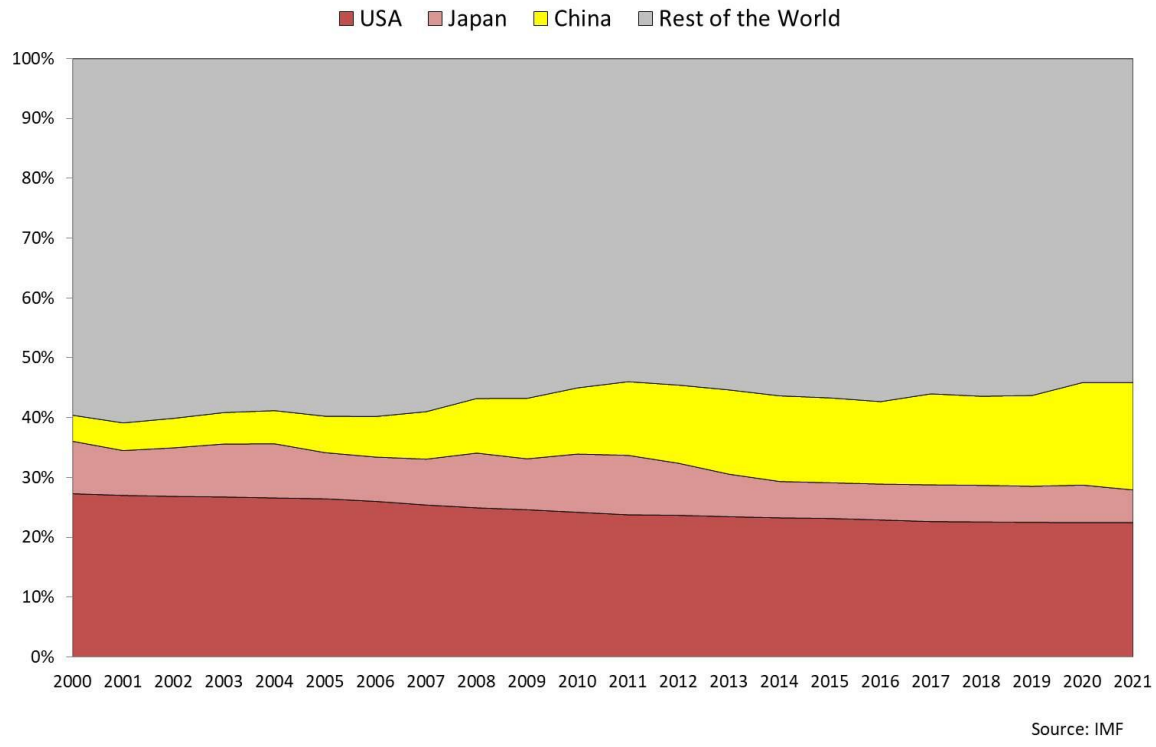
The main driver of Chinese growth has undoubtedly been the strong expansion of foreign trade, which has been blessed by the country's accession to the World Trade Organization in 2001 [Yu and Hamid, 2008]. Within a few years (2004-2008), China's trade surplus has skyrocketed from $ 32.8 billion to $ 297 billion, posting an increase of over 800%.

Foreign trade has confirmed itself as the main engine of Chinese economic growth also in the period 2020-2021. In particular, the over 8% output growth posted in 2021 is largely the result of a rebound in global economic activity – especially on the demand side – that China has been able to skilfully ride with its

trade expansion strategy, as evidenced by the record trade surplus of $ 676.4 billion.

However, a slowdown is expected for 2022. The signs can be seen in the downward trend of last year's quarterly growth data: + 18.3% per annum in the first quarter, + 7.9% in the second, + 4.9% in the third and + 4% in the fourth. For 2022, the consensus of analysts stands at around 5%, with the International Monetary Fund which in January revised its estimates downwards, bringing them to + 4.8% against the + 5.6% expected in October 2021.

Figure 1 – Percentage contribution to World GDP



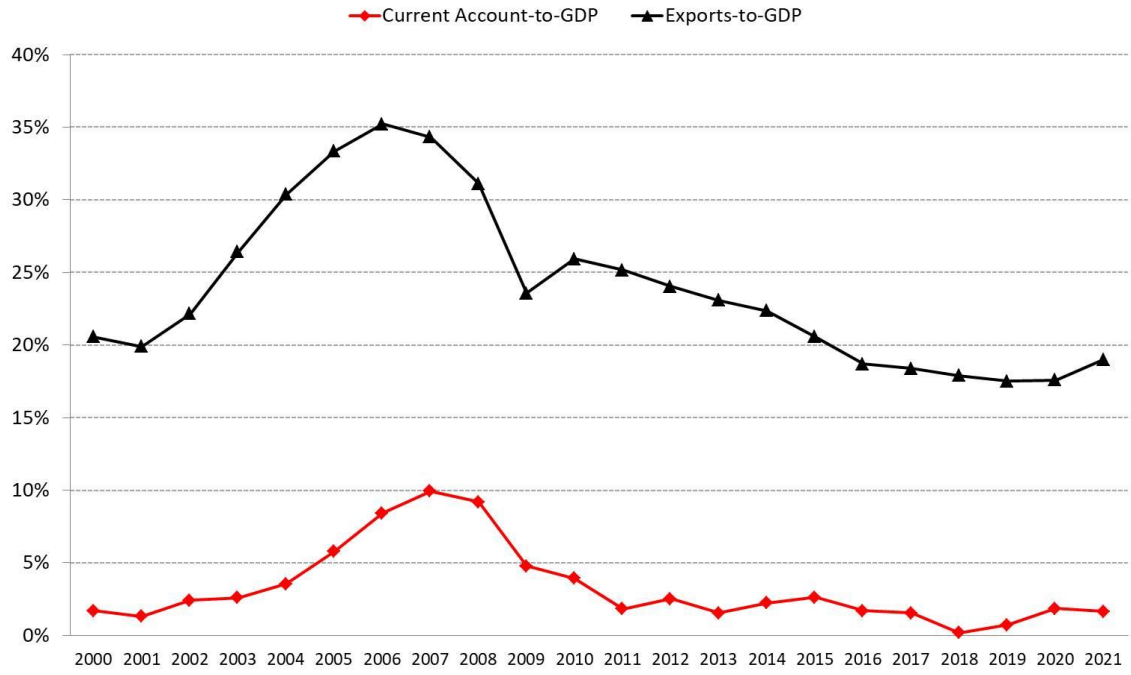
Source: IMF

Among the causes of the expected economic slowdown there is an almost inevitable deceleration in trade. As early as December 2021, top representatives of the Chinese Ministry of Commerce began to declare they expected a decline in exports for 2022 due to the contraction in foreign demand, problems in supply chains, persistent uncertainties about the evolution of the pandemic and geo-political tensions.

However, deeper dynamics are also at work, which raise uncertainties about the Asian giant's performance [Dollar, 2022]. Among them, two deserve particular attention: the structural reduction in the relevance of trade for the Chinese economy after the global financial crisis and the enormous leverage of the non-financial sector.

2. After the global financial crisis, the weight of trade in the Chinese economy has been structurally downsized. The phenomenon is evident by examining the trend of the current account balance and exports as a percentage of GDP since the beginning of the century (see Figure 2). The current account balance, which in 2007 had reached 10% of GDP, underwent a major decline in 2008-2009; since then it has fluctuated below 5% following an essentially downward path, with the exception of the rebound that occurred in the last two years due to the extraordinary conditions created by the pandemic.

Figure 2 – Chinese current account surplus and exports in GDP terms



Source: IMF and Bloomberg

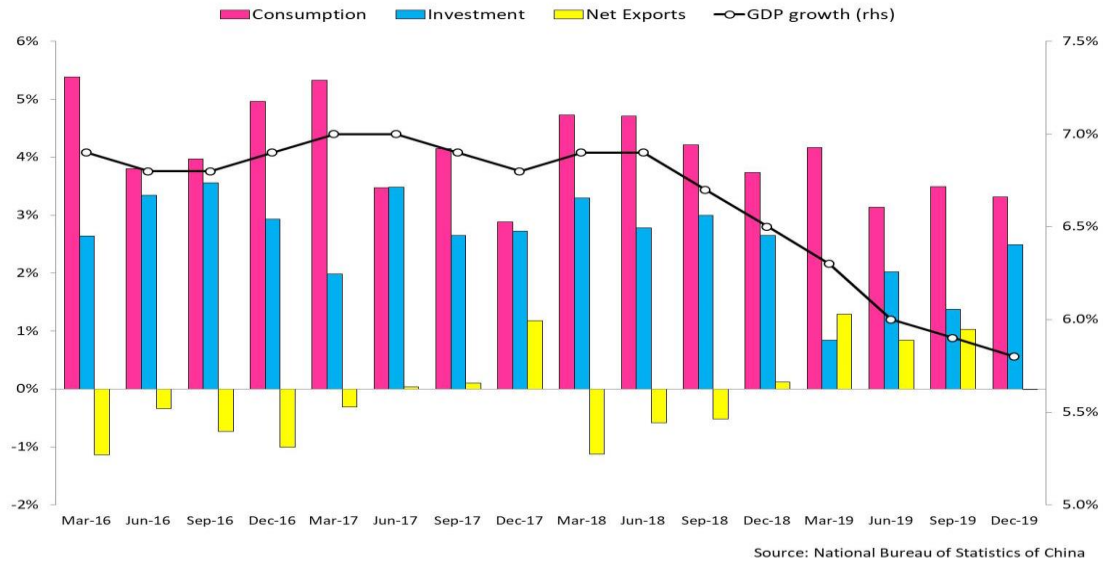
The same goes for exports: in the period 2000-2008, Chinese exports were on average equal to 28% of GDP, with peaks of 35% in the years immediately

before the international financial crisis. After the sharp slowdown in 2009 and the (physiological) rebound the following year, the exports-to- GDP ratio has embarked on a path of decrease that has brought it steadily below 20%. Even in 2021 – despite a 1.6% recovery compared to the first year of the pandemic – it remained below this value.

These dynamics come from a mixture of factors, among which: a narrowing in Chinese competitiveness as global exporter related to rising labour costs (especially in labour-intensive production processes, [Nicita and Razo, 2021]), and increased importance of domestic demand as driver of growth (even if not able to fully compensate for the decline in the component represented by foreign trade).

To assess this latter point, it is useful to take a look at the contribution of the three main demand-side items to China's GDP growth in the run-up of the pandemic (see Figure 3). In the four-year period 2016-2019 internal demand has been pivotal to Chinese growth. Consumption, in particular, had a strong role, experiencing an average growth above 4%, albeit in what looks like a downward trend. Even more amazing is the poor performance of net exports, whose contribution to the economic growth averaged close to zero during the period at stake.

Figure 3 – Contribution of the three main demand components to China's GDP growth: 2016-2019
(YoY growth rate)

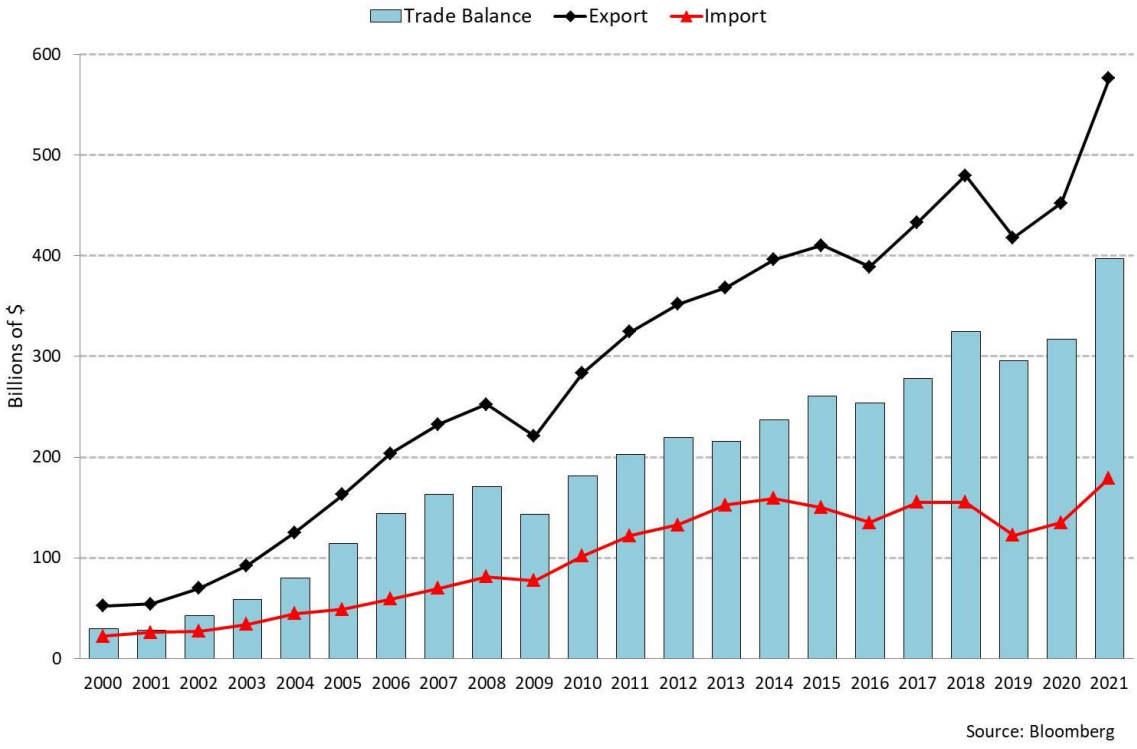


Source: National Bureau of Statistics of China

3. A third element that has weighted considerably on the downsizing of trade within the Chinese economy is the changed attitude of the United States and other countries towards the Chinese production and commercial machinery after 2010.

The US – as well known – is the leading market for Chinese exports, with a trade deficit towards the Asian giant of almost $ 400 billion in 2021 (see Figure 4). Washington recently announced that the Beijing government has not respected the purchase commitments made under Phase 1 of the Sino-US trade agreement signed in early 2020, when Trump decided to shelve the tariff war.

Figure 4 – China's trade with the US



Source: Bloomberg

Those commitments envisaged that in the two-year period 2020-2021, Chinese imports of certain US products and services (including agricultural goods, manufactured goods and energy products) should have exceeded the base levels reported in 2017 by at least $ 200 billion, for a total of $ 502.4 billion. Instead, actual Chinese imports of the goods and services identified by the agreement

would have been equal to 57% of what was promised, with peaks of 80% for agricultural goods.

A resumption of the tariff war appears unlikely. Some sectors of the American economy have strongly benefited from the increase in Chinese demand and Trump's tariffs have hit American consumers and investors much more than Chinese exporters [Amiti *et al*., 2020; Fajgelbaum *et al.*, 2020]. Yet, there is a mounting economic and political pressure on the White House to pretend from China new purchase commitments of US goods and services for the coming years.

Apart from its bilateral trade relations with Beijing, Washington is also actively engaged in curbing the expansion of Chinese power in the international arena, not only from an economic and financial point of view, but also from a political, military and ideological one. In February 2022, the Biden Administration published its *Indo-Pacific Strategy* [US White House, 2022], which reveals an unequivocal shift of the US attention towards a region that is considered *vital* to its security and prosperity. Since inception the document makes it clear the US position with a sharply defined statement: «*The United States is an Indo-Pacific Power*» and explains that the intensified American focus on the region is partly due to the mounting challenges faced by the Indo-Pacific, particularly from the People's Republic of China.

The US is also a frequent presence in the long list on initiatives taken over the last years to contain the enlargement of the Chinese sphere of influence. Underlying these initiatives [Beckley, 2022] is a sentiment of distrust towards China shared by an increasing numbers of countries. According to a survey carried out in 2020 by the Centre for Strategic and International Studies, about 75% of foreign policy elites in Asia, the US and Europe consider China as a national security problem and believe that the best way to address it is to form coalitions of like-minded countries.

There is not only a growing annoyance with China's mighty economic expansion, but there are also concerns over security and defence issues and a growing embarrassment of many countries in willingly accepting the official

position and the concrete decisions of the Beijing government on respecting and safeguarding human rights[1].

International cooperation against the perceived Chinese threat already includes several partnerships and agreements. In 2021 the United States, the United Kingdom and Australia have signed a security pact (*AUKUS*), by which the US and the UK commit to help Australia in the acquisition of nuclear-powered submarines. Last year the US have also entered into a partnership with Japan for competitiveness and resilience that fosters innovation in digital technologies, research and investment in biotechnology, the identification of reliable suppliers and collaboration on sensitive supply chains, such as that of semiconductors. Meanwhile, Japan has signed an agreement on supply chains with Australia and India that offers incentives to companies that move their activities outside of China [Beckley, 2022].

To these measures on a voluntary basis add others that are somehow "stimulated" by the US. This is the case of the restrictions placed by numerous countries against Huawei, the Chinese 5G telecommunications giant, but also of the moves aimed at slowing China's progress in the production of cutting-edge chips by inhibiting its access to the equipment of the United States and their allies. For example, in 2020 the United States *de facto* forced the Dutch ASML, the only company in the world to produce the components necessary for the manufacture of the most advanced chips, to block the sale of a machine to the Chinese SMIC.

4. For its part, China keeps striving to consolidate its power through strategic agreements and ambitious outward investment projects. Over the last years it has exploited its huge economic and trade leverage to sign important partnerships with historical US allies. In 2022 it has entered into force the *Regional*

[1] In May 2021 the European Union froze the ratification of the Comprehensive Agreement on Investment (CAI) with China in response to the sanctions adopted by the latter against the EU institutions and deputies who had condemned violations of human rights by part of the Beijing government. Later on (September 2021) the European Parliament approved a Report on a new EU-China strategy which affirms the strategic importance of EU-China relations but clarifies that until China removes the aforementioned sanctions, the CAI approval process will not will be resumed.

Comprehensive Economic Partnership (RCEP), a free trade agreement among 15 Asia-Pacific countries – including China, Japan, South Korea, Indonesia, Australia and New Zealand – which account for almost one third of global population and GDP.

Meanwhile, the *Belt and Road Initiative* (BRI) and the growing stakes cultivated in Africa aim to ensure a reliable network of commercial partners (possibly geographically close or in any case easily reachable using infrastructures financed by Chinese capital) towards which to direct Chinese exports and from which to procure the resources and goods needed to the functioning of the Chinese locomotive.

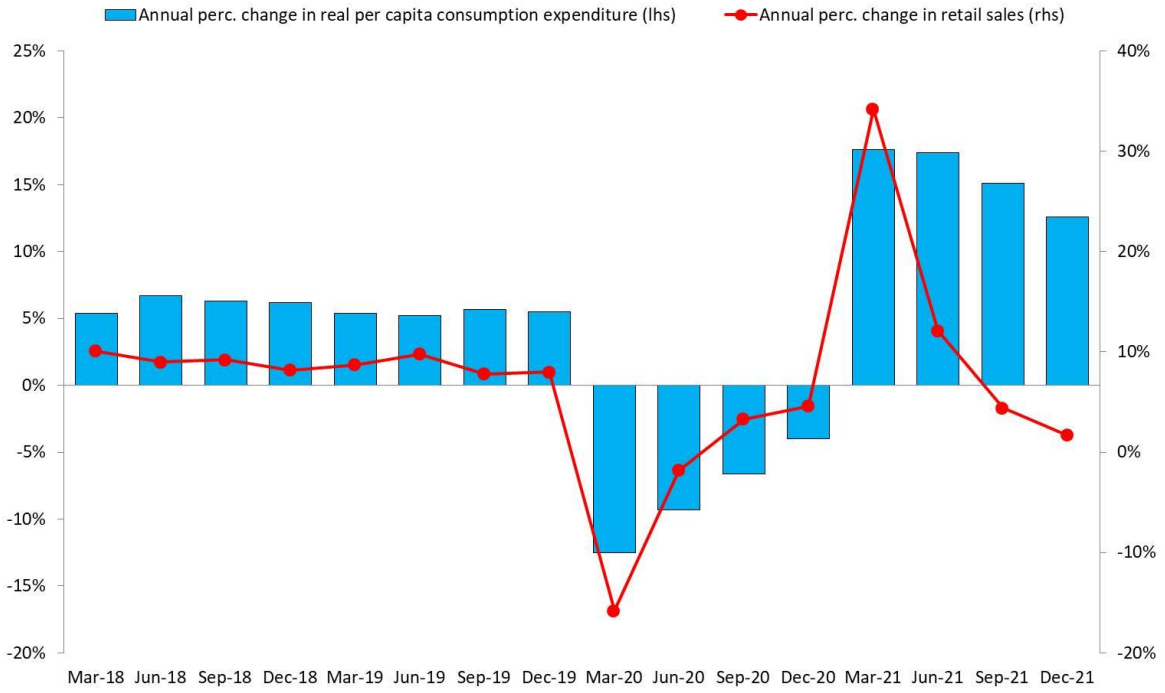
Other initiatives are instead aimed at strengthening the internal market, as in the case of the mega-project of the *Great Bay Area* which intends to connect Hong Kong, Macao and the Guangdong province (the most profitable in mainland China) with a 36 km bridge to create a single market that is at the forefront of innovation and development on a global scale [Mauldin, 2018].

These projects are part of the broader *dual circulation strategy* with which China – taken note of an increasingly less favourable external climate – intends to reorient its economy inwards (*internal circulation*) without however renouncing investments and international trade (*external circulation*) [Lin and Wang, 2021]. Formalized by the Politburo of the Communist Party in April 2020, after the Covid experience had forced China to turn its gaze to the domestic market, the *dual circulation strategy* should prioritize domestic consumption as a growth driver with the dual purpose of increasing the self-reliance of the country and achieving the «*common prosperity*» of its people.

However, almost two years after the announcement of the new strategy, there has been little concrete progress towards *internal circulation*. After the blaze recorded in the first part of 2021, the recovery in private consumption has lost its tone as indicated by the slowdown in the growth of real per capita expenditure in the last quarters of 2021 (see Figure 5). The retail sales figure is also disappointing, which last December had increased by just 1.7% compared to the same period in

2020.

Figure 5 – Evolution of Chinese private consumption from 2018 to 2021



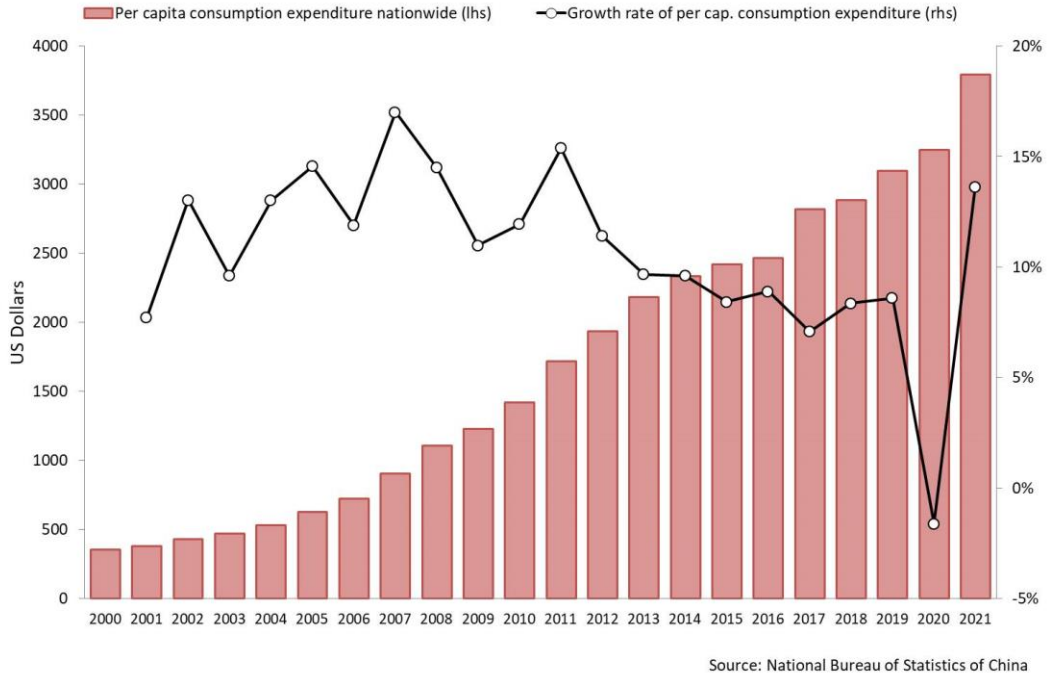
Source: National Bureau of Statistics of China

The slowdown in private consumptions was influenced by the problems on the global supply side (for example in the automotive sector) that emerged during 2021 as well as by the reduction of the credit stimulus by the Chinese monetary authorities. But it is also symptomatic of the difficulty of achieving – at least in a short time – a stable boost in consumption by a population that continues to receive relatively low wages and is still far from having the typical spending needs of a mature economy. In 2020, Prime Minister Li Keqiang said the annual disposable income per capita is $ 4,200 and that 600 million people live on a monthly income of just $ 140.

An analysis over a longer time horizon reveals that, since the global financial crisis, both consumption and wages have experienced a slowdown in growth rates. The phenomenon is particularly evident when observing the trend in per capita consumption expenditure (see Figure 6): in the period 2000-2011 it posted an average annual growth rate of 12.7%, while in the period 2012-2021 the

average annual growth rate fell to 8.4%.

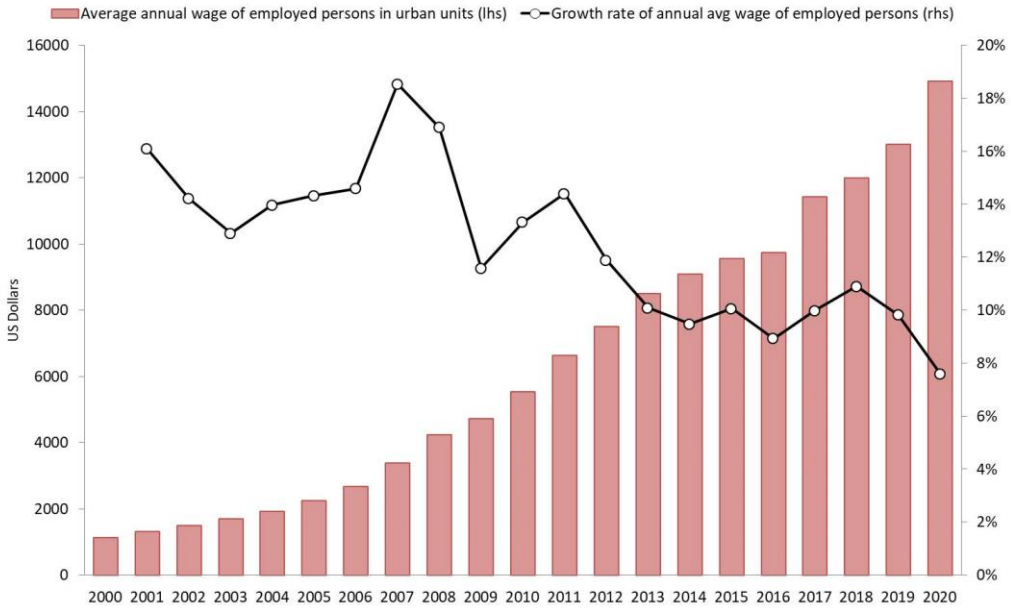
Figure 6 – Chinese per capital consumption expenditure: 2000-2021



Source: National Bureau of Statistics of China

Average wages share a similar pattern (see Figure 7). Today, the average annual remuneration of urban workers has increased by more than 1200% compared to the beginning of the century, but in the decade 2011-2020 its average annual growth rate has dropped by more than 4 percentage points (from 14.6% to 10.3%) compared to the previous decade.

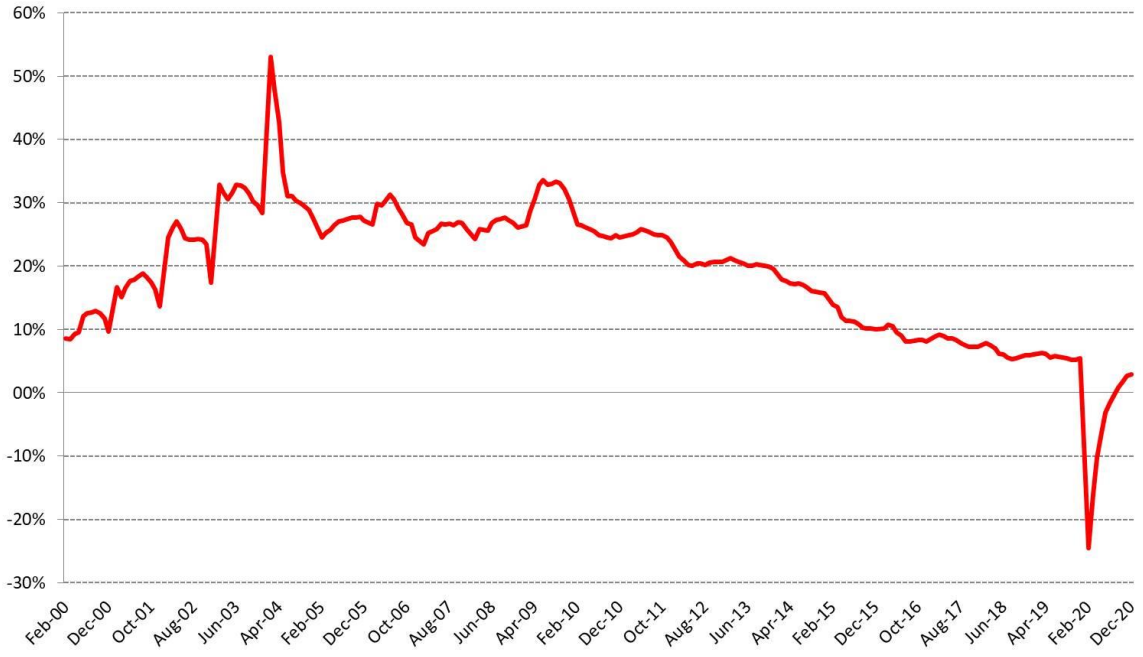
Figure 7 – Chinese average annual wages: 2000-2020



Source: National Bureau of Statistics of China

The weakness of consumption is accompanied by a (only partially physiological) decline in growth rate of investments. Indeed, provided that in absolute terms investment spending remains high in both the public and private sectors, a look at the long-term trend reveals a descending pattern. Infrastructure investments fell from 12 to 6 per cent of GDP between 2007 and 2020 and over the same period their annual growth rate fell from 13.6 to 5.8 per cent. More generally, starting from the global financial crisis, the growth rate of expenditure on fixed-asset investment – on average equal to 25% in the period 2000-2007 – began to decline (see Figure 8) and ended 2019 just above 5%. A further slowdown occurred in 2020, which clearly suffered from the pandemic shock. However, even for 2021 the data show an at least controversial picture.

Figure 8 – China fixed-asset investment YoY: 2000-2020
(excl. rural households)



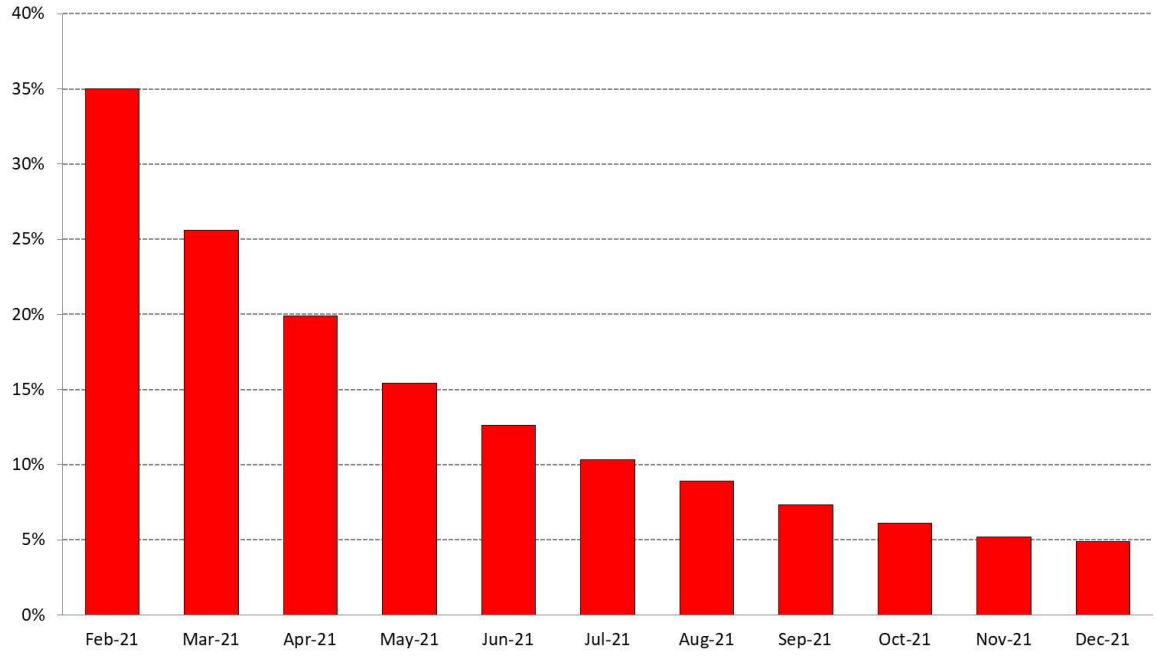
Source: National Bureau of Statistics of China

Last year investments in fixed assets grew by 4.9% (by 7% those of the private sector), but the focus on monthly data (see Figure 9) reveals a clear downward trend that from 35% at the beginning of the year continuously drops,

falling below 5%.

In fact, in the first half of 2021 there was a rebound effect from the pandemic shock which in the second half was followed by a gradual slowdown linked to the reduction of the credit stimulus and the outbreak of the real estate crisis triggered by Beijing's attempt to stop speculation in a sector that represents 29% of GDP.

Figure 9 – China: fixed-asset investment YoY in 2021
(excl. rural households)



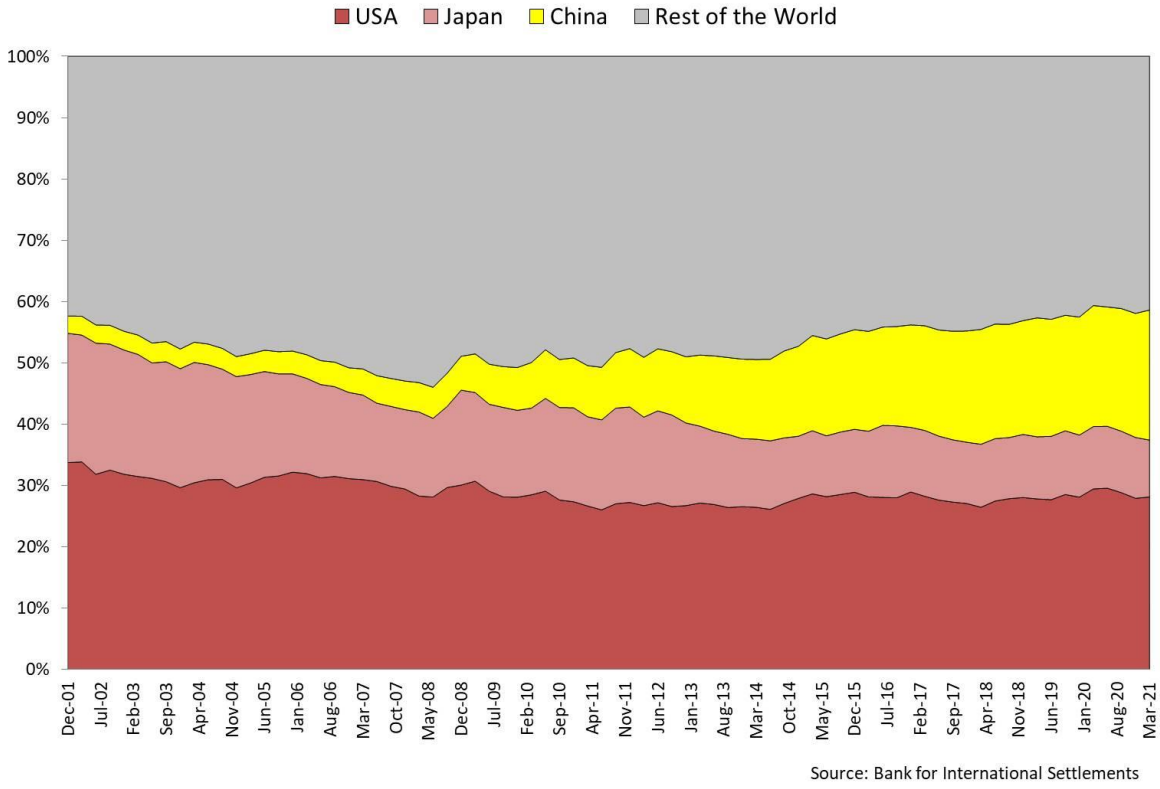
Source: National Bureau of Statistics of China

5. Huge leverage is the other big weak link in the Chinese economy, recently brought to the fore by the real estate giant Evergrande crisis.

The data of the Bank for International Settlements on credit to the non-financial sector allow to immediately frame the exceptional dimensions of the phenomenon. In March 2021, the aggregate debt of households, businesses and the public sector exceeded $ 46 trillion, equal to 287% of China's GDP. Growth rates are impressive, with an average annual increase of 18% over the last two decades.

As a consequence, if at the beginning of the century China represented a fairly small share (less than 3%) of the global non-financial sector debt (public and private), currently its weight is 21%, second only to that of the United States (28%, see Figure 10).

Figure 10 – World non-financial sector debt (public and private) in GDP terms: main contributors by reference economic area



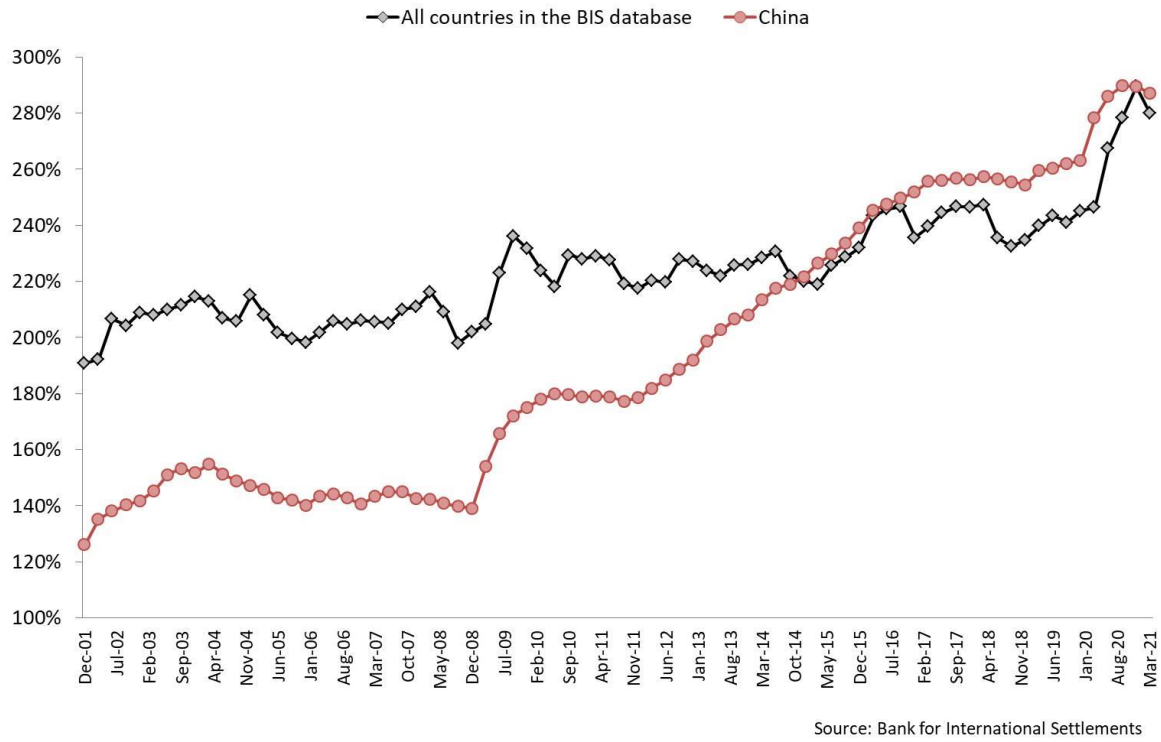
Source: Bank for International Settlements

Note the similarity between the dynamic of Figure 10 and that of Figure 1 of Section 1: the comparison between the two Figures makes it immediately clear how the resort to indebtedness was fundamental to stoke China's economic growth over the past two decades.

Once again, however, the global financial crisis marks a watershed between two distinct phases. Until 2008, debt growth went substantially in step with that of the economy, so the leverage of non-financial operators represented a fairly stable percentage of GDP. The picture changed radically since 2009: that year the leverage of the non-financial sector posted a big leap upwards increasing by about $ 2,400 billion (that is over 36 percentage points of GDP) driven by an

extraordinary credit stimulus. Under pressure from the authorities concerned to react adequately to the global financial crisis, the banking system more than doubled new loans to the economy compared to the previous year (from 4178 to 9622 billion Yuan). Since then, China's debt/GDP ratio has continued to grow at a rapid pace until 2015, surpassing the global one by the end of 2014 (see Figure 11).

Figure 11 – Non-financial debt in GDP terms



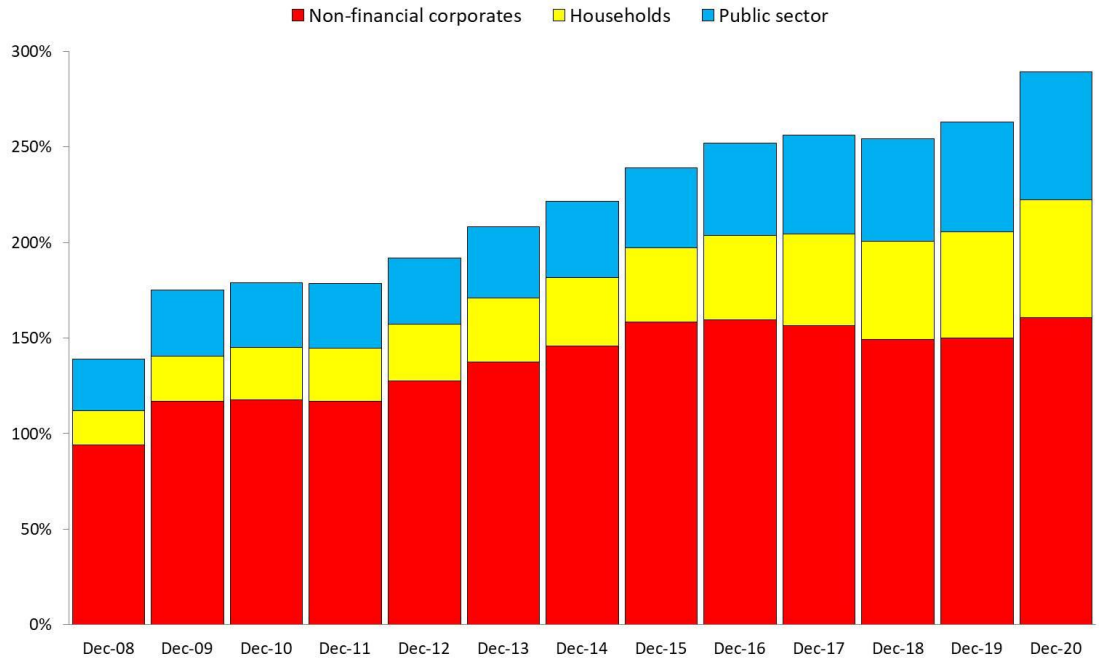
Source: Bank for International Settlements

The undisputed protagonists of this expansion were non-financial companies, whose total debt at the end of 2015 was equal to 1.6 times the entire gross domestic product of China (see Figure 12). In the case of state-owned companies, this exploit was mainly favoured by public banks' lending, while for private ones, resources also came in abundance from unregulated credit channels, the famous shadow banking.

The uncontrolled growth of shadow banking (+ 660% between December 2008 and December 2015) and the significant credit exposure achieved by state

banks prompted the Beijing government to start a policy of deleveraging the economy between the end of 2014 and 2015. The effect of this policy was to halt the advance of corporate debt which remained at around 150% of GDP in subsequent years. The following years (up to the end of 2019) were characterized by a significant increase in household debt, which went from 48% to 55.5% of GDP, with a significant incidence of real estate loans. Finally, in 2020, a new expansion of credit to the economy to quickly emerge from the pandemic emergency led to another considerable increase in leverage in all three sub-sectors that are part of the non-financial economy.

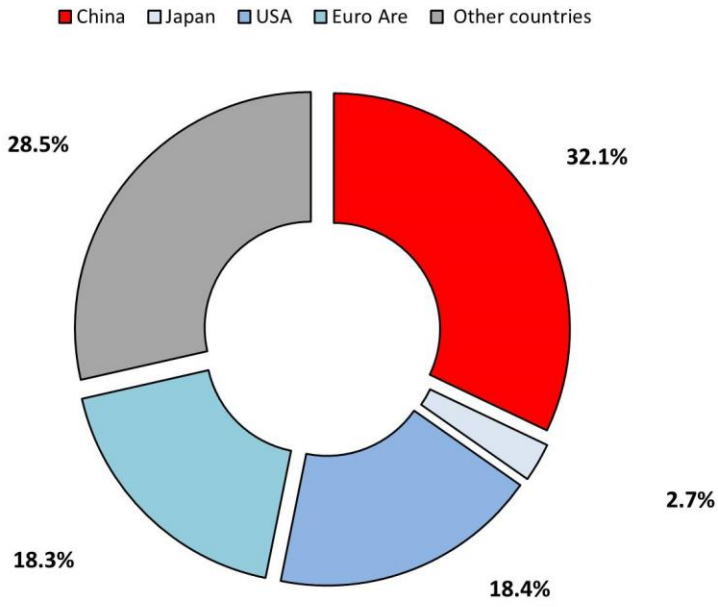
Figura 12 – China: non-financial debt in GDP terms - breakdown by sub-sectors



Source: Bank for International Settlements

Between March 2020 and March 2021, the overall leverage of the non-financial sector increased by 22% compared to + 8.5% in the United States and + 14% in the euro area. In terms of contribution to the increase in global non-financial debt in the time interval considered (over $ 26 trillion), China outperformed the other economic macro-areas, with a weight equal to almost 1/3 of the total (see Figure 13).

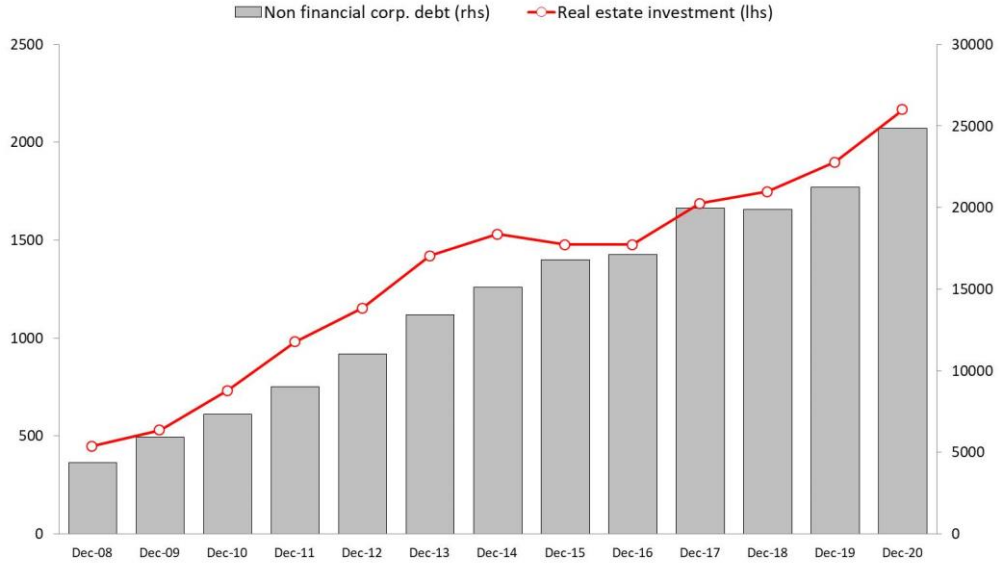
Figure 13 – Increase in global non-financial debt global from March 2020: contribution of the main economic macro-areas



Elaborations on Bank for International Settlements' data

6. The real estate sector is among those that have benefited most from the rapid accumulation of debt in the Chinese economy. The connection between real estate boom and corporate credit expansion is evident by comparing the latter with data from the National Bureau of Statistics of China on real estate investments in the country (see Figure 14). The dynamics of the two quantities are largely superimposable.

Figure 14 – Real estate boom and corporate debt in China (data in billions of $)



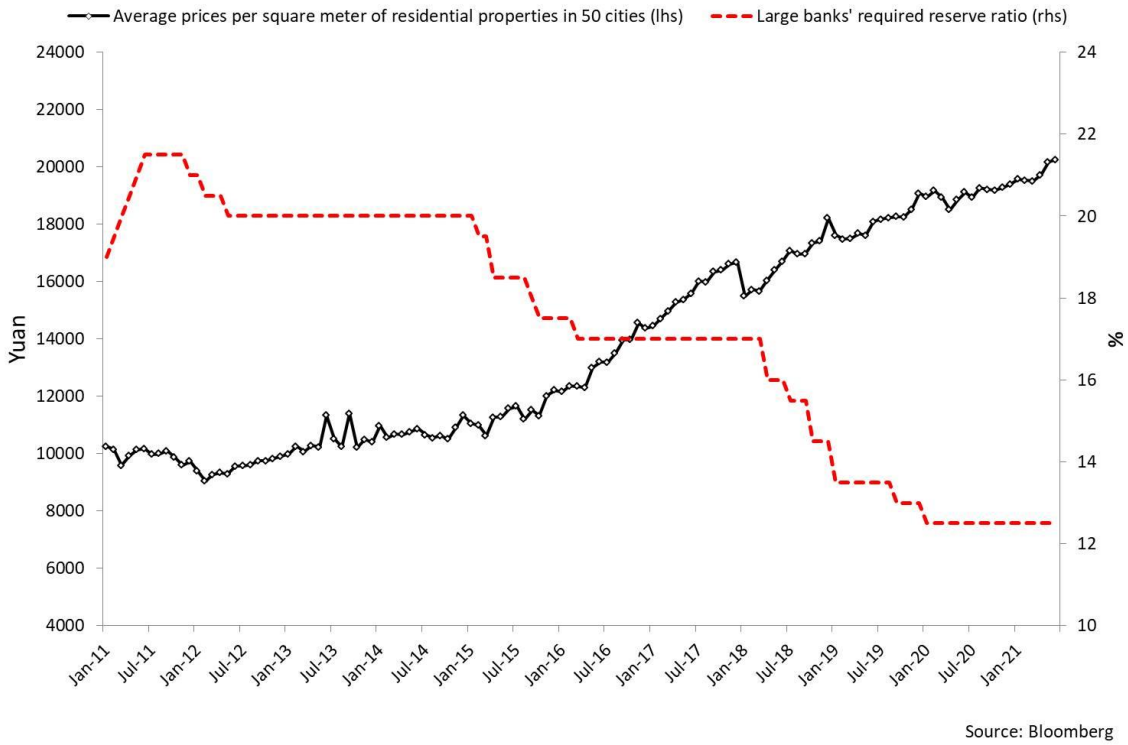
Source: Bank for International Settlements and National Bureau of Statistics of China

Real estate investments, which amounted to $ 471 billion at the end of 2008, in 2014 had exceeded $ 1500 billion; after a modest slowdown in the two-year period 2015-2016, they resumed growth as early as 2017 and reached $ 2166 billion in December 2020.

At the base of these astronomical figures there are several factors, starting from the strong demand for housing, especially in cities. The urbanization process has resulted in an exceptional flow of individuals from rural to metropolitan areas. In 2000, 64% of the Chinese population lived in rural areas; in 2015 this percentage had dropped to around 50% and today it is around 38%. This phenomenon intersected with another peculiar feature of the Chinese reality: the high rate of home ownership. Among the large economies, China is in fact the one with the highest percentage of owner-occupied dwellings (about 90%) and over 20% of households own more than one house, a figure higher than the one of many developed countries. These habits of life and investment have consolidated over time and reflect the preference of the Chinese for investments perceived as not risky (the safety of the "brick") compared to those considered more risky, such as in the stock market.

These socio-cultural dynamics have been favoured by the large inflows of liquidity from abroad in return for China's commercial success in the international arena. But the abundance of credit to the economy by the domestic financial system also played a decisive role, favoured by years of support by the monetary authorities. When the real estate sector, which is extremely important to economic growth, showed signs of slowing, the People's Bank of China intervened by cutting banks' required reserve ratios to guarantee a copious credit supply both to companies in the sector and to households, with the effect of supporting house prices (see Figure 15).

Figure 15 – China: real estate prices *versus* required bank reserve ratios



Source: Bloomberg

In the long run, these artificial support mechanisms have fuelled a de-anchoring of property prices from household income, witnessed by abnormal values in the house price-to-income ratio. In Hong Kong the ratio is 45, in Beijing it is close to 50, meaning that the price of a house in the capital is about 50 times the annual income. Such high figures have not even been seen in Japan during the bubble of the early 90s. Not to mention that these are average values on all homes, but home prices are significantly higher in the most renowned cities (*tier 1*). For example, in June 2021 the average price per square meter of residential properties was $ 3,240 calculated on a sample of 50 cities of various levels, while that of housing in *tier 1* cities was $ 8,140.

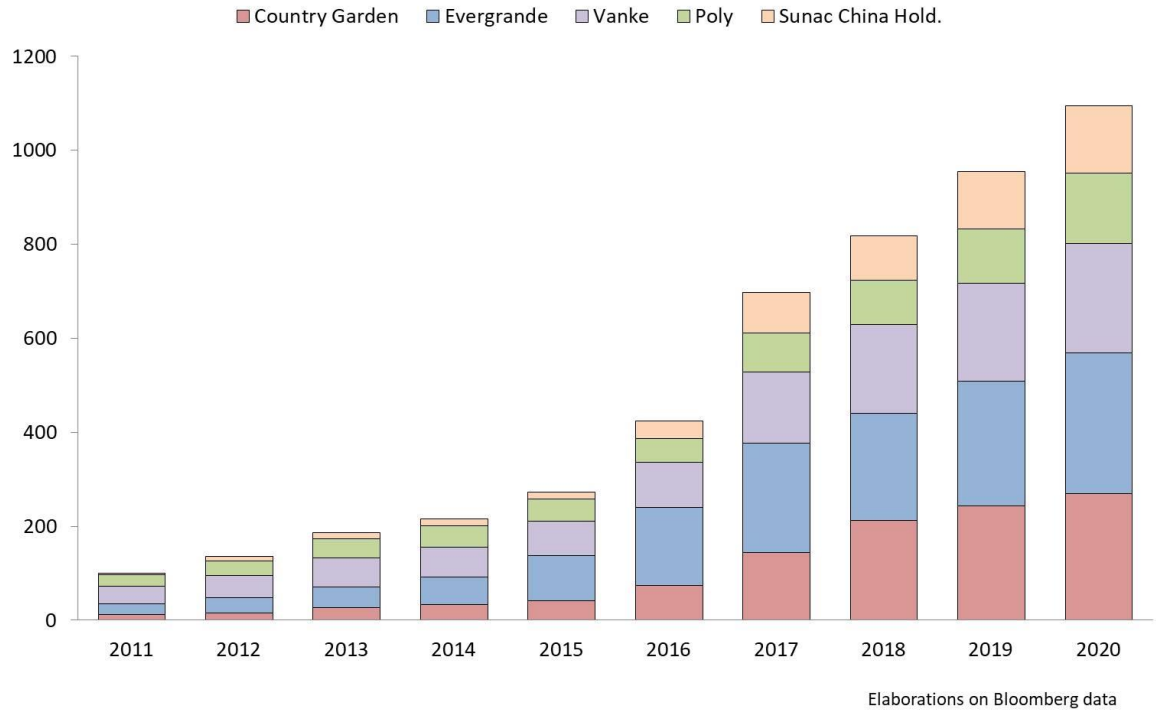
The overheating of the sector has unleashed speculation and moral hazard on the part of developers, favouring an excessive building proliferation, certified by the high share of empty homes. According to a nationwide survey, nearly 22% of China's urban housing stock was unoccupied in 2017, which equated to more than 50 million empty homes.

To fund their projects, developers have accumulated a monstrous debt not

only towards banks and other intermediaries but also towards non-financial counterparties. Very often builders collect large advances or security deposits from customers on properties that have not yet been completed or even started. The payment of suppliers through commercial papers (i.e. short-term credit notes) is also widespread, so much so that in July 2021 the Chinese regulators began asking developers to include information on the issuance of these forms of debt in their periodical reports.

To get an idea of the enormous leverage of the sector, it is enough to consider that at the end of 2020 the top 5 real estate companies (Country Garden, Poly, Evergrande, Vanke and Sunac) had total liabilities of over $ 1,000 billion, about 10 times more than levels of 2011 (see Figure 16). And this figure does not include off balance sheet liabilities.

Figure 16 – Total liabilities of the top 5 Chinese real estate developers
(data in billions of $)



Elaborations on Bloomberg data

7. Since August 2020, the Beijing government has announced its intention to limit the debt of developers with the aim of halting the growth in property

prices, diverting credit to other strategic sectors (such as technology) and curbing the speculation. The squeeze came in 2021 with the «*three red lines*» policy, which introduces thresholds for three financial ratios of some large real estate companies: liabilities on total assets, net debt on equity and cash on short term debt. According to what was established by the central bank together with the Ministry of Housing, the first two ratios must be below 70% and 100% respectively, while the third must be above 100%. If a company does not comply with any of the three thresholds, the following year it will not be able to increase its debt by more than 15%. As a comparison, it is worth noting that some large companies such as Country Garden and Evergrande have reached peaks of increases in total liabilities of 95% and 75%, respectively, in the last decade.

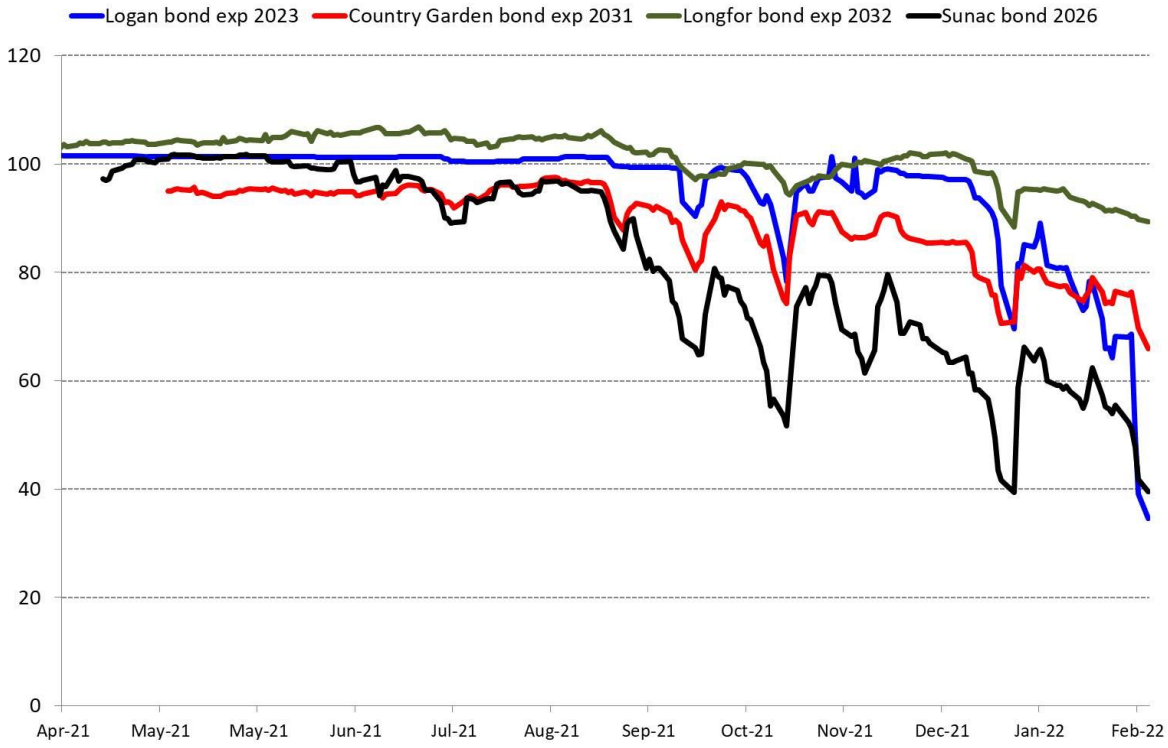
The new rules have made the financial climate more hostile for real estate companies, not only because of the limits on leverage but also because – together with the first defaults of small public companies – they have contributed to questioning the implicit guarantee of the state on the corporate debt.

In February 2021, the China Fortune Land Development company did not honour some payments and in the meantime other developers have also started to have liquidity problems. In the case of Evergrande (which, needless to say, did not respect any of the three red lines) this scenario aggravated a situation that had deteriorated since the third quarter of 2020. The first rumours that if strategic investors had asked for their money back, Evergrande would have had a liquidity crisis date back to that period. Since then things have plummeted. Banks have begun to reduce their exposure, regulators have put the company under pressure and the management has begun to sell company branches to raise cash and pay off debts. In a short time, the downgrades from the main rating agencies arrived and the prices of the bonds issued by Evergrande collapsed. Lack of cash and the impossibility of funding did the rest [Minenna, 2021].

The contagion to the entire real estate sector and to other strategic areas of the Chinese economy revealed how unrealistic Beijing's intentions were [Pettis, 2021]. Within a few months, financial markets repriced the credit risk of the

property sector: many of the biggest names in Chinese real estate (such as Country Garden, Sunac or Logan, see Figure 17) have burned billions of dollars in market capitalization and the value of their bonds has plummeted, in some cases reaching default prices.

Figure 17 – Market value of a sample of bonds issued by top Chinese developers: Apr. 2021-Feb. 2022



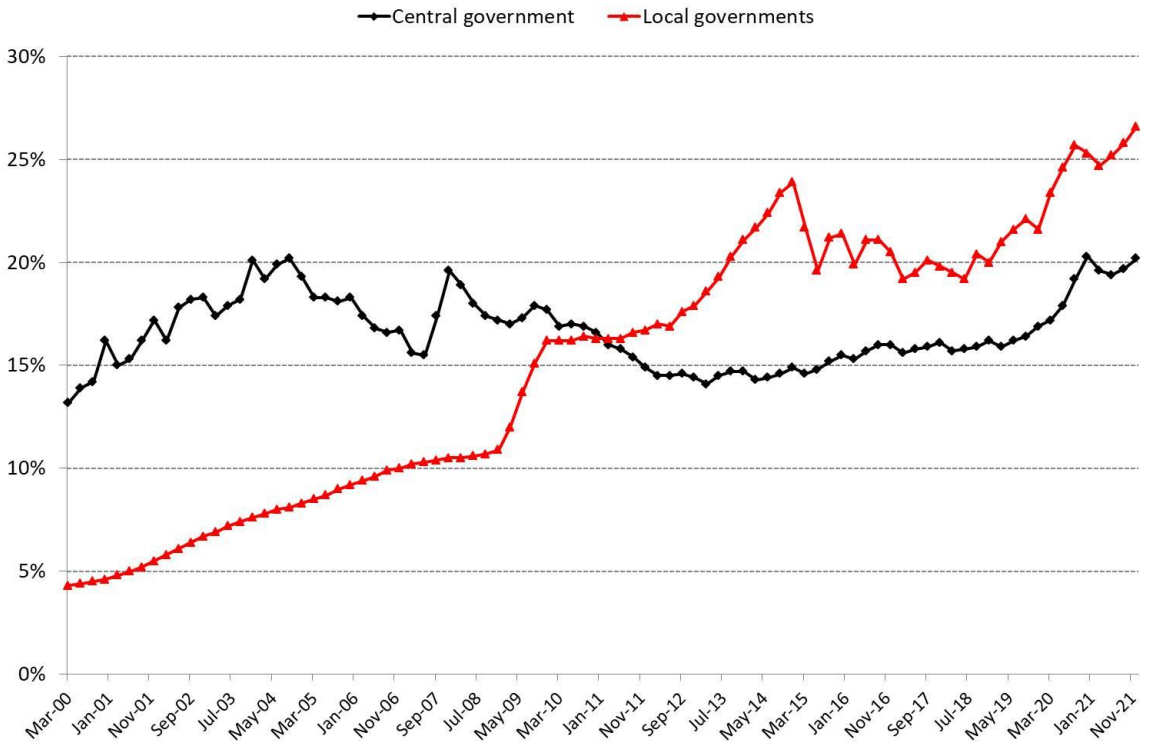
Source: Bloomberg

8. Problems quickly spread from real estate to the finances of local governments who rely heavily on proceeds from land auctions to replenish their coffers. In China, the land belongs to the people (that is, it is public) and the auctions concern the temporary allocation of land for relatively long periods. Between June and September 2021, the percentage of unsold lots in local government auctions almost tripled (from 10 to 27 percent) and the situation did not improve in the following months. A research on a sample of 300 cities revealed that in 2021 the land revenues of local governments fell by 7%, the lowest value since 2014, creating budget problems for local governments, which

are the main source of financing of public spending[2] and which are also burdened with a mountain of debt.

From 2010 onwards, local public debt has systematically overtaken that of the central government (see Figure 18) and has now exceeded 25% of GDP, with a value of nearly $ 5 trillion.

Figure 18 – China: central government and local governments debt in GDP terms



Source: Center for National Balance Sheets

Moreover, this is only the explicit debt of local governments, to which must be added the more abundant implicit (or hidden) debt, which was mainly ignited by financial vehicles (so-called Local Government Financing Vehicles or LGFVs) created specifically to circumvent the restrictions on local government loans and proliferated after the global financial crisis. Nomura's estimates for 2020 indicate that the total implicit debt of China's local governments would be $ 7 trillion. This means that the total liabilities of local governments (implicit + explicit) are around $ 12 trillion; adding up the additional $ 3.6 trillion in central government debt, it

[2] In 2018 the IMF observed: «*China is the most decentralized country in the world in terms of expenditures shares, with subnational governments responsible for 85 percent of government spending*» [Wingender, 2018].

comes to $ 15.6 trillion in total public debt, roughly equal to 87% of GDP [Minenna, 2022].

The government has repeatedly tried (unsuccessfully) to rein in local government debt. In the summer of 2014, it passed a package of fiscal reforms which should have improved the discipline and transparency of public finances and tightened budgetary constraints for local governments to push them to a more careful selection of investments to be financed. The "braking" effect of these reforms did not last long: already in 2018 the ratio between local government debt and GDP was back on a growing path and with the further surge in 2020 it exceeded for the first time the 25% threshold.

A new attempt took place in July 2021, when the China Banking and Insurance Regulatory Commission and the Ministry of Finance issued a document titled «*Guiding Opinions for Banking and Insurance Institutions to Further Do a Good Job in Preventing and Resolving Hidden Debt Risks of Local Governments*» [Hsu, 2021].

The document (also known as *Circular No. 15*) urged banks and insurance companies not to increase the hidden debt of local governments and to carefully assess their financial conditions and spending commitments before disbursing new funds. However, it seems that, within a few weeks, *Circular No. 15* disappeared, along with most of the references to it in the state media [The Economist, 2021].

Perhaps it was a preliminary version, destined for further filing, or perhaps Chinese authorities have decided not to give too much prominence to the news. A plausible alternative is also that the crisis that was already brewing in the real estate sector has required an afterthought. Indeed, as property auction revenues declined, local governments faced increasing difficulties in placing their bonds on the market due to the gradual deterioration of domestic investor confidence and the reduction of monetary stimulus from the central bank.

9. Faced with the real risk of a chasm in local government budgets and

persistent problems in the real estate sector, the Chinese government has had to reverse the credit tightening. Since autumn 2021, money supply has resumed growing at a faster pace and, with it, the credit impulse to the economy (see Figure 19).

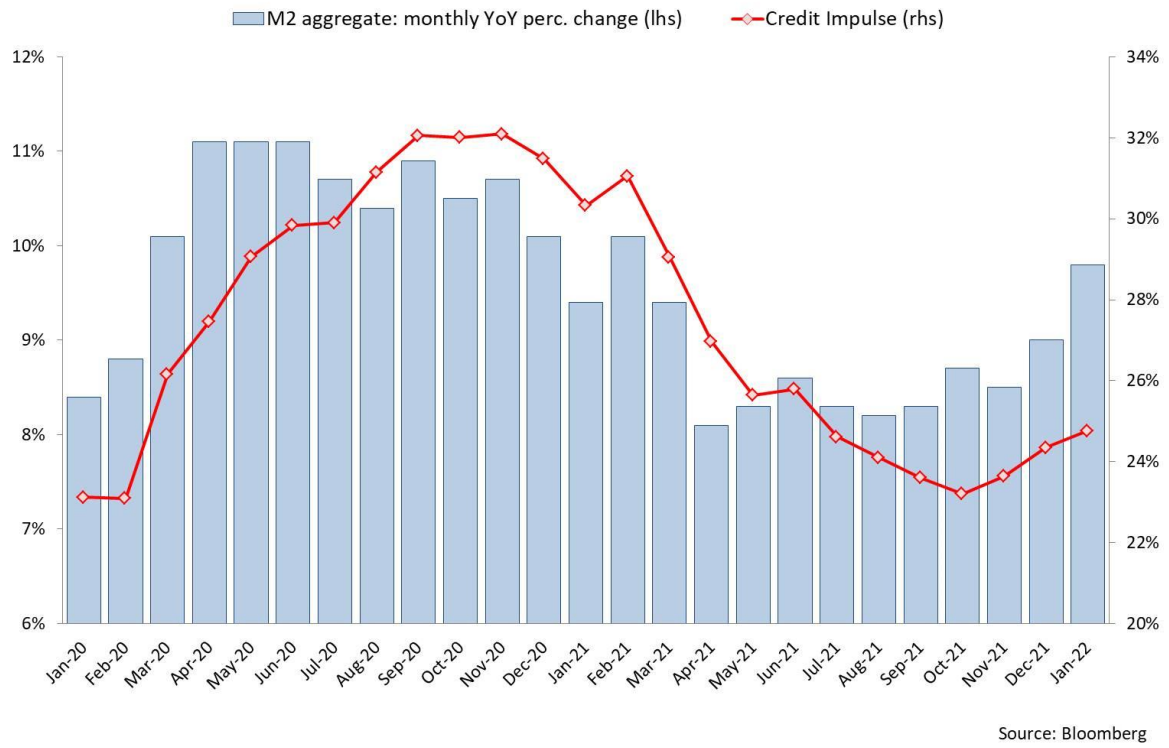
In the meantime, new measures to support domestic demand have been announced both through a relaxation of regulatory constraints on debt and in the form of a reduction in the tax levy on companies, especially small and medium enterprises.

In March 2022, strong reassurances also came from the government about its commitment to support the financial markets and the interests of private investors. In the two-year period 2020-2021, Beijing embarked on an important regulatory and sanctioning campaign to stem the monopolistic and anti-competitive conduct of tech companies such as Alibaba and Tencent[3]. The squeeze on internet giants – such as the one on the property sector – was part of President Xi Jinping's broader plan to turn China towards a «*genuine growth*». To this aim, it was essential to disconnect the country's economic development from the credit stimulus and to pursue «*common prosperity*». However, the deterioration in investors' confidence prompted by the Russian-Ukrainian conflict and the resumption of Covid-19 infections in China[4] and Hong Kong triggered a sell-off in the Chinese stock market in early March 2022, which hit especially the tech sector. Faced with the choice of continuing with the reforms or supporting the economy in a hard moment, the government opted for the second alternative and decided to put the reforms on hold to focus on its growth objectives.

[3] The crackdown on technological companies also included actions to counter the listing of large Chinese companies in the US market.

[4] Since the beginning of the pandemic, China has adopted a zero-Covid policy which has led the government to order tight lockdowns even on large and densely populated areas as soon as the risk of new outbreaks became apparent. This policy penalized the country's economic and commercial activity, and only in March 2022 the policymakers declared the intention to adopt a more flexible attitude in the action to counter the pandemic. However, in the same month, the authorities ordered the lockdown of the Shenzhen technology hub and, subsequently, of the city of Shanghai (the latter organized in two subsequent stages to dampen the impact on population and economy).

Figure 19 – China: money supply and credit to the economy



Source: Bloomberg

10. After decades of impressive expansion, Chinese economy is facing multiple challenges associated with the difficult transition to a middle-income economy. Since the global financial crisis domestic demand has weakened, with consumption and wages experiencing a clear slowdown in their growth rates. Investment in fixed assets also exhibits a descending pattern in the long-term. A reversal occurred in early 2021 but proved to be temporary as it manifestly cooled down in the second part of the year. On the other hand, foreign trade – which has been the main growth engine since over two decades – has undertaken a structural decline in its relevance for the Chinese economy. China's formidable trade performance – initially welcomed by neighbouring countries and the West – from 2010 onwards has been perceived with growing concern by the rest of the world, favouring the proliferation of anti-Chinese agreements and partnerships.

A further criticality arises from the enormous leverage of the Chinese economy. Non-financial sector debt is worth about 280% of GDP and was accumulated with the help of strong credit stimuli launched in response to the international financial crisis. Addiction to over-leveraging is particularly evident in

the real estate sector and in the public sector, and explains the crackdown that the government has tried to give on both sectors through regulatory and credit tightening in 2021.

The crisis of the real estate giant Evergrande and its rapid spread to the entire property sector and to the finances of local governments, however, made it necessary to take a sharp retrofit to protect China's ambitious growth objectives in an international environment threatened by the economic consequences of the war in Ukraine and persistent problems in global supply chains. The credit impulse to the economy has been resumed, another round of regulatory and fiscal easing has also been announced together with the promise of market-friendly policies to support the domestic stock market.

Once again, Beijing was forced to backtrack on reforms. As observed by Daniel H. Rosen [Rosen, 2021], China's economic and monetary policy over the past decade has been characterized by numerous attempts to bring financial speculation and over-indebtedness under control, especially by subnational governments and state enterprises. In 2013, the People's Bank of China cut banks' access to short-term funding: the manoeuvre sent short-term debt rates skyrocketing, causing a crisis in the interbank market that forced the central bank to quickly revoke its decision. The same fate has struck the attempt – undertaken between 2013 and 2014 – to deleverage the public sector through the involvement of private investors on the equity markets. The relaxation of listing rules and the related boom in IPOs triggered the euphoria on the stock markets which soon turned into the bubble that burst in middle 2015.

In March 2022, the government has renewed its commitment to deliver economic growth, maintain a stable macroeconomic performance, pursue high-quality and innovation-driven development, and achieve supply-side structural reforms [Li Keqiang, 2022]. Yet, such ambitious goals will have to confront with difficulties and obstacles both inside and outside the country.

Internally, the decision to go ahead with measures to support the economy is tantamount to postponing again the solution of the problem represented by the

huge debt of the non-financial sector. Thus, at least in the short term, China will not come out of what increasingly looks like a debt trap. The government's wager, in the year of the 20th anniversary of the National Congress of the Communist Party, is that the response of domestic consumption and investment to the new wave of stimuli will be such as to ensure the economic performance will catch up and possibly outperform, in the end, the growth of debt. But slowing factors productivity, shrinking population and low Covid tolerance will hardly allow for such an outcome.

On the external front, the climate of distrust on the part of the United States and many other key trading partners, the withdrawal of monetary accommodation in many advanced economies, the surge in the prices of energy, agricultural and food commodities and the numerous unknowns related to the Russian-Ukrainian conflict pose a heavy burden on the fate of China's foreign trade.

According to some observers [Pozsar 2022; Munchau 2022; Escobar 2022], the Russian-Ukrainian conflict, however, could also represent a huge opportunity for China in the medium to long term. Indeed, the conflict could accelerate the establishment of a multi-polar order in which China appears destined to play a leading role in the opposing bloc to the Western one. A first step in this direction could be the consolidation of the Yuan among the main currencies at the international level, with a simultaneous downsizing of the dollar's importance. Yet, for such a scenario to really materialize, it would be necessary for the Beijing government to permanently put aside capital controls, which it never really seemed willing to do.

In any case it is clear that the economic relevance, innovation capacity and determination of its people will continue to guarantee China a central role in the global economic and financial landscape. But it will be also very interesting to understand how the Asian giant will face the internal and external challenges that separate it from the full transition to an advanced economy and with fewer imbalances.

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SOCIAL MEDIA IN EMERGENCY SITUATIONS: THE CASE OF COVID-19 IN WUHAN

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ABSTRACT: In the so-called Industry 4.0. Era, understanding the impact of social media (SM) in both developed and underdeveloped economies has become increasingly crucial, especially during emergencies. This paper aims at shedding light on SM usage by applying the stakeholder theory lens in a unique emergency due to the wide spread of COVID-19.

Design/methodology/approach: Through a study based on a case approach, this paper presents a new way of studying SM and investigating the local Chinese aspects considering the Wuhan experience, which represents the outbreak of this pandemic. Moreover, it contributes knowledge by analysing the benefits and drawbacks of SM usage.

Findings: SM appeared as an emerging technology for different stakeholders during the entire COVID-19 pandemic period with benefits and drawbacks. SM aligns the actions of different entities (citizens, companies/businesses, and the government) in a new communication ecosystem creating a strategic anti-infodemia shield.

Originality: The analysis presents a broad level of activity. In addition, the paper focuses on Chinese scientific literature and different types of data (i.e. institutional documents, professional reports, websites, speeches in Chinese), as well as interviews. The research used a multifaceted approach including the authors' tacit knowledge about the context under investigation.

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SUMMARY: 1. Introduction. – 2. Literature review. – 3. Research methodology. – 3.1. The context and data collection. – 4. Emerging results. – 5. Theoretical and managerial implications. – 6. Discussion and conclusion.

1. Emergencies and disasters are events with high levels of uncertainty and risk under pressure in terms of time, urgency, and resources (Blum *et al.,* 2013; Chen *et al.,* 2008). Managing knowledge in these turbulent and fast-changing environments is crucial for various stakeholders that must create a common and changing foundation given by the emergency's development (Benali and Ghomari, 2016). Therefore, to respond to emergencies, several stakeholders (i.e., organizations, governments, and citizens) must operate in such environments, which often present a completely unique situation that traditional knowledge management systems do not support.

Compared with task changes in ordinary situations, in emergencies, resources are often constrained, and both additional responsibilities and new coordination mechanisms appear. Moreover, the knowledge availability is modified with information asymmetries that require better processing capabilities to limit conflicts and avoid *infodemia* (Manfredi, 2011). Hence, individuals are exposed to large quantities of information without being aware of its validity, creating extra issues in an already difficult situation (Day *et al*., 2009; McKenzie *et al.,* 2011; Xie *et al.,* 2011).

Furthermore, in emergencies, the decision-making should be faster than in regular circumstances to prevent other pitfalls and to generate more stable conditions. Timeliness of response and action is critical in emergencies (Janssen *et al*., 2010).

In other words, various stakeholders bring their own structures and background, and without appropriate communication technologies, the timely knowledge exchange between them is dramatically hindered (Heard *et al.,* 2014). In particular, the general public often takes an active role in these critical events, and their involvement is becoming visible with the usage of information and

communication technologies (ICTs) (Palen and Liu, 2007).

During emergencies, knowledge management systems require higher flexibility and reliability because the communication and knowledge-sharing support is crucial to improve cooperation in all steps of the crisis, often characterized by multiple crisis events that arise over time (Hiltz *et al.,* 2010). Therefore, the political and business areas, as well as everyone, face new and unique challenges in terms of knowledge management to respond to an emergency case, as in the recent COVID-19 pandemic.

As such, different stakeholders are increasingly relying on information technology such as social media (SM) to access knowledge. Although many SM platforms were originally designed for individuals to connect with friends, classmates, and relatives, recently, SM has moved beyond personal communication, emerging as technology tools with other goals and purposes.

In daily routine, SM platforms are useful to connect millions of users worldwide and to provide rapid communications, leading to a paradigm shift in the way humans interact; at the same time, in emergencies, SM has the potential to allow for better flexibility due to users' changing needs (at both the individual and organizational levels) arising from the situation itself, as well as to coordinate the wide spread of the information flow. SM facilitates a higher virtual exchange of information through conversation, interaction, and exchange of user-generated content (Huang *et al.*, 2010; Abbasi *et al*., 2010; Kavanaugh *et al*., 2011).

Unlike other technologies, SM stands out as a useful technology because it helps to manage knowledge in clusters (i.e., posts, videos, images), which renders it a crucial option during disruptive and chaotic situations. The latter is an important feature of SM as a technology that supports all stakeholders during a specific emergency to align knowledge gathering and widespread sharing, also offering a sense of reassurance and assistance in such peculiar crisis events (Taylor *et al*., 2012).

In addition, SM changed the traditional model of the information flow characterized by the dissemination from organizations to the public (Low *et al.*,

2010); thus, SM presents a new pathway with more information providers and a higher involvement of citizens and single users (Zook *et al.*, 2010).

In line with the above, this kind of media emerges as an innovative technology in emergency events for different stakeholders who are not all daily users, revolutionizing the collection, dissemination, and flow of the information to respond to emergencies in real time.

The present paper makes three contributions to the existing literature. First, despite purposeful usage of SM during emergencies having received extensive attention in both academia and practice, this research area under the lens of the stakeholder's perspective remains largely underdeveloped. Thus, this study sought to shed a light on understanding the usage of SM by several stakeholders as a knowledge management platform and supporting tool that brings together different expertise and roles in providing a common ground to respond quickly to an emergency. Second, this study presents a critical analysis highlighting the positive and negative features of the use of SM as an emergent technology during a unique crisis: the COVID-19 pandemic. Third, the present work is based on SM platforms that are rarely examined in the literature, which refers mostly to Western tools (i.e. Facebook and Twitter) and, therefore, to Western cultures and countries.

Consequently, the research questions are the following: *How have governments, citizens, and companies used SM during the COVID-19 emergency? What are the benefits and drawbacks of SM usage during the COVID-19 emergency?*

To answer these questions, we conducted a qualitative study to identify the main aspects of SM usage during the COVID-19 pandemic in Wuhan.

The rest of the paper is structured as follows. Section 2 presents the literature review. Section 3 describes the research methodology and data collection. Section 4 defines the results. Section 5 is dedicated to the theoretical and managerial implications. Finally, Section 6 concludes, analysing the limits of the paper and suggesting further work.

2. As defined by Kaplan and Haenlein (2010), SM "concerns a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0 and that enable the creation and exchange of user-generated content". In the current Era, SM platforms are part of daily life and have an important impact on aspects such as communication, information asymmetries and the overall culture and society (Alexander, 2005). Hence, with the wide spread of the Internet, users are more active in searching for updates and information on events (Palen and Liu, 2007; Lu and Yang, 2010). Consequently, SM has become an important tool to gather and share information (Hughes *et al.,* 2008; Bird *et al.,* 2012; Huang *et al.*, 2010; Ahmed *et al.*, 2019). In other words, SM has changed the way people create, communicate, and collaborate (Aral *et al.*, 2013).

Recently, practitioners and scholars in the operations and supply chain management field have been focusing their attention on SM. For instance, SM can enhance companies' knowledge management with the collection and sharing of knowledge (Grant, 2016; Billington and Davidson, 2013); SM can offer insights to address decision-making (Tseng, 2017; Tseng *et al*., 2019a), or it can support the implementation of sustainability initiatives (Williams *et al*., 2014). Moreover, other scientific contributions suggest that SM enables communication among employees to promote speed, visibility, and traceability in the context of reference (Leonardi *et al*., 2013) or with the general public (Gu and Ye, 2014). SM transform the way employees connect, communicate, and exchange information and knowledge among departments and locations, with an impact on operations and innovation management (Lam *et al*., 2016; Leonardi, 2014; Neeley and Leonardi, 2018).

Therefore, SM presents different functions in businesses' information flows in terms of operations and supply chain management between companies and the public, within companies, and across companies (Lam, Yeung, and Cheng, 2016; Irani *et al.,* 2017).

SM represents a useful technology during disasters in addition to routine situations (Cohen, 2013; Sarcevic *et al*., 2012; Leidner *et al*., 2009; Simon *et al*., 2015;

Yates and Paquette, 2011).

Scholars in the emergency field suggest that SM in particular is effective for organizational knowledge sharing during emergencies (Grabowski and Roberts, 2011; Graham *et al*., 2015; Rathi *et al*., 2014). For example, organizations can capture information from SM to make decisions during emergency operations (Huang and Xiao, 2015; Swaminathan, 2018) or can disseminate information to the public and decrease the adverse effects of the critical situation (Hadi and Fleshler, 2016). At an individual level, citizens' heavy reliance on SM creates an SM dependency phenomenon (Wang *et al*., 2015). People's participation in the case of crisis situations supports the idea that individuals take actions – in an organized or disorganized manner – to respond to an event (Drabek and McEntire, 2002). For instance, the first posts on two terrorist attacks – the Boston Marathon bombing in the USA and the Westgate mall terror attack in Nairobi (Kenya) – were published initially via an SM tool: Twitter (Cassa *et al.,* 2013; Simon *et al*., 2014). At the same time, SM also supports the government to achieve more interactive and participatory communication with the community (Latonero and Shklovski, 2011; Palen and Liu, 2007; Luna and Pennock, 2018) or as an anti-corruption tool (Bertot *et al.,* 2010).

In other words, numerous contributions dealing with disaster management highlight the importance of SM to coordinate parties involved in an event (Yates and Paquette, 2011); others have focused on situational awareness (Vieweg *et al.*, 2010) or on rumours (Oh *et al.*, 2013), and others on communication systems, showing in some cases that the other technologies used were inadequate to support the flow of information during a disaster (i.e. Reddy *et al.,* 2009).

Human beings are information seekers, relying primarily on their own social networks (Palen and Liu, 2007), especially in an emergency situation, when they want to learn about the event to reduce uncertainty and anxiety (Boyle *et al*., 2004; Stiegler *et al*., 2011; Hughes *et al.*, 2008). In this research field, scientific contributions have mainly focused on data from popular Western SM platforms such as Twitter (i.e. Martínez-Rojas *et al.,* 2018; Landwehr *et al*., 2016), evidencing a gap

in studying other tools used in other countries.

In emergency situations, SM, unlike other tools, presents an online environment that reduces uncertainty because each individual can create content and have direct conversations with others (Huang *et al*., 2010; Abbasi *et al.*, 2010; Kavanaugh *et al*., 2011; Yates and Paquette, 2011). Thus, each SM platform is an alternative channel with a significant impact on mobilizing people (Lerman and Ghosh, 2010); at the same time, SM provides access to relevant and timely information from both official and unofficial sources, which offers a feeling of being connected (Taylor *et al*., 2012).

In the case of a disaster, SM improves the chances to share, coordinate, and spread information regarding the specific event on a real-time basis (Gupta *et al*., 2013; Blum *et al*., 2013). In fact, people hit by an emergency use SM to respond to their needs for both seeking information on the situation and providing help to the community (Taylor *et al*., 2012). In addition, some scholars have said that, especially during the peak of an emergency, SM works as a *self-regulating* instrument because people tend to correct inaccurate information or rumours (i.e. Bird *et al*., 2012; Simon *et al*., 2015).

Because each emergency situation is unique and presents a new and fast-changing environment with peculiar geographical, political, economic, and sociological concerns, new knowledge structures emerge. In this context, users at the individual and organizational level are able – using SM compared with other ICTs – to create content and knowledge via the system, enabling knowledge sharing and managing knowledge in clusters.

Therefore, SM gives users the ability to respond quickly to changes to information and the environment arising from the emergency; furthermore, it offers higher flexibility, adaptability, usability, and customizability required to support people to fight against the event. In line with this, SM "supports the creation of informal users' networks facilitating the flow of ideas and knowledge by allowing the efficient generation, dissemination, sharing and editing/refining of informational

content" (Constantinides, 2008). SM provides shortcuts for information flows by more directly connecting different actors, giving them access to each other's knowledge stores, which appear crucial during disasters. Meanwhile, the use of SM can rearrange the roles of stakeholders in emergencies (Sutton *et al*., 2008).

By understanding how different stakeholders have used SM during the COVID-19 pandemic, this paper can provide insights into how to effectively use SM in emergencies to better facilitate disaster and knowledge management.

3. The research followed a qualitative interpretive case-study approach because of its exploratory nature, which is appropriate for studying a phenomenon that is evolving and changing (Gephart, 2004). This method provides an in-depth qualitative analysis of the issues under examination. Indeed, different trends in research topics and philosophical perspectives have prompted a more extensive variety in research designs and methods, particularly the rise of qualitative designs in information systems research (Trauth, 2001). There is a developing convention to utilize qualitative research approaches to study information technology phenomena (e.g. Trauth and Jessup, 2000), and case-study research figures among those qualitative methods that have been perceived as having gained acknowledgment over the previous decade in this field (Klein and Myers, 1999).

Qualitative research designs include the utilization of qualitative data – such as documents, interviews, and participant observation data – to comprehend and clarify social phenomena. They were created in the social sciences to empower researchers to study social and cultural phenomena as they incorporate participant perception, meetings, documents and texts, and the researcher's impressions and responses (Myers, 2009).

Qualitative research was deemed suitable for this research because the purpose of this study was to explore the views of different stakeholders. The descriptive nature of qualitative research enables readers to understand the meaning attached to the experience, the distinct nature of the problem, and the impact of the

problem (Meyer, 2001). The present contribution therefore used a qualitative approach for different reasons: First, the case study design (Yin, 1994; Campbell, 1975) is extremely focused and very specified. Thanks to this methodology, a deep comprehension of the phenomenon is possible. Moreover, the contextual conditions are extremely relevant for this case study. Building on the literature considered in the previous section, this article considers SM in emergency situations. In fact, this study sought to intensely examine the data within a specific context, as Yin (1984) suggested that the case-study research method is "an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between the phenomenon and context are not clearly evident; and in which multiple sources of evidence are used."

Second, the exploratory nature of qualitative research helps the researcher to provide a description of the participants' experiences, which will either sustain or confront the theoretical assumptions on which the work is based (Meyer, 2001), allowing for the exploration and understanding of a complex issue. Thus, the research question is broad and flexible, and the expected outcomes are not identified previously but emerge as further insights are obtained through data collection and analysis (Hammersley, 1997).

Third, qualitative research typically combines several qualitative data accumulation techniques, such as interviews, documentation, and so on. In line with this, for the present paper, various types of qualitative data were collected, specifically structured texts (i.e. scientific papers, books, and reports) and unstructured texts (i.e. SM messages and information, transcription of speeches, news, reports). In addition, we conducted cross-sectional semi-structured research with a snapshot time horizon.

Finally, inside and out case investigations open up a pathway to new thoughts and new lines of critical thinking and pinpoint the opportunities, difficulties, and challenges of the topic under examination with scientific and practical implications.

According to all of the previous information, the case study was the most

appropriate method to obtain answers to our research questions and to participate in the improvement of the knowledge in this research field.

3.1. This paper presents a broad level of activity to better understand SM in Wuhan's emergency due to COVID-19. The choice of studying Wuhan was driven by three main reasons. First, China experienced another important epidemic event in 2003 with the wide spread of SARS; however, the COVID-19 case better illustrates the first public crisis in this country since the emergence of SM. During SARS, there was no real mobile SM platform in China. For example, the popular SM platform Sina Weibo appeared six years after SARS and marked the beginning of the Era of mobile SM in the country. Second, the city of Wuhan represents the outbreak of this pandemic. The third reason is the deep knowledge of the authors of the local context, which aids in translation and access to original data and information in Chinese. In addition, we can share our personal experiences about this pandemic situation as direct users of Chinese SM. This is a critical element, especially to study SM during the pandemic in China as direct users and citizens. Therefore, because SM platforms have an important impact on people' lives, tacit knowledge of a given country's specificities is fundamental to understand local implications.

Today, there are several SM tools (i.e. Facebook, Instagram, Twitter, WeChat) that are used around the world, with some differences in terms of popularity and spread depending on the country of reference. For instance, most Western countries prefer Facebook or Twitter, whereas China considers other SM platforms. In China, the most used is WeChat.

The present analysis has a multifaceted side because it includes structured and unstructured texts dealing with SM from the beginning of COVID-19 to its widespread in Wuhan (January–April 2020). Therefore, data were collected from different data sources, such as scientific papers, reports, websites, speeches, and news, as well as information directly from SM. The data source details are summarized in Table 1.

Table 1. Data sources

Knowledge source	Materials
Scientific papers	The authors collected papers about SM and COVID-19 written by Chinese authors in the January–April 2020 period.
Websites, reports	The authors collected information about SM and COVID-19 from different reports and websites, especially in Chinese, in the January–April 2020 period, such as information from the Hubei Health Commission, the National Health Commission. In addition, international websites such as that of the Centers for Disease Control and Prevention (CDC) (https://www.cdc.gov/) were monitored.
SM	The authors used the following platforms to obtain information from the beginning to the wide spread of COVID-19 (January–April 2020): • WeChat • Sina Weibo • DXY.CN(丁香园) • Live video platforms: douyin.com, kuaishou.com • Alipay • CCTV

Moreover, to have access to real-life SM experiences during the COVID-19

case in Wuhan, interviews were used to collect the research data and to develop trust and enable an exploration of deeper themes. This facilitated the exploration of the complex context linking different stakeholders to the usage of SM during this unique emergency event.

As Kvale (1996) argues, interviews are valuable tools for collecting data in qualitative research and help the researcher interact with the participants. Thus, the interviews allowed us to gain clarity and a deeper understanding of the research field.

The interviews were structured to analyse and differentiate each phase of the pandemic – specifically at the beginning, during the peak, and at the end – to better comprehend the phenomenon under investigation in its stages. As a result, the reporting and analysis of data reflect the views of the various participants, also considering the positive and negative features of SM use during COVID-19 in Wuhan.

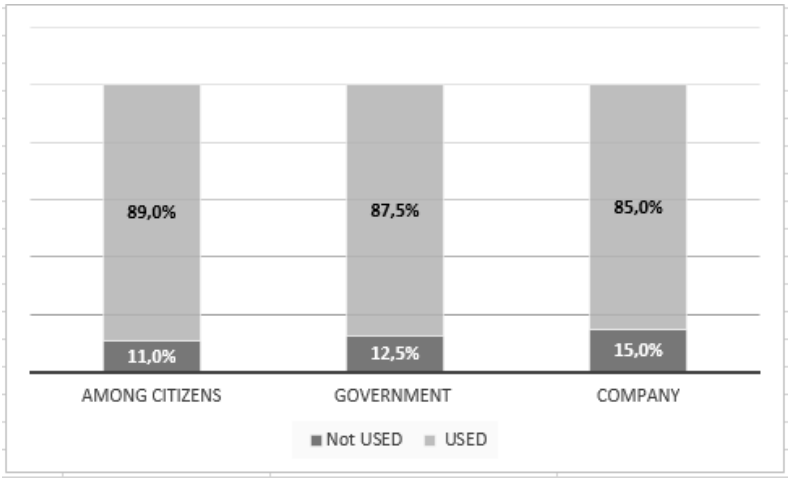
This method was chosen to design an examination of the data conducted within the context of its use, that is, within the situation in which the activity takes place (Yin, 1984).

4. In daily life, most Chinese citizens use SM via their mobile phone to be connected always and everywhere. From our analysis, it emerged that different stakeholders used SM in the emergency context investigated to be part of the information flow and to report about the pandemic. Therefore, not only Chinese citizens but also other players in the Wuhan pandemic case considered SM a strategic tool. In other words, SM was used to provide information from actors at the institutional and organizational levels. Thus, SM is present in daily routine, and, during this peculiar and dangerous emergency, it emerged as a predominant or auxiliary technology depending on the stakeholders.

Regarding the citizen side, our results suggest that the majority (89%) used SM throughout the whole COVID-19 pandemic period. In addition, we found that the government mostly used SM (87.5%) to communicate and coordinate actions and

plans to better manage the crisis event. Furthermore, within organizations, SM was mainly used (85%) to inform and communicate with employees throughout the pandemic period (Fig. 1).

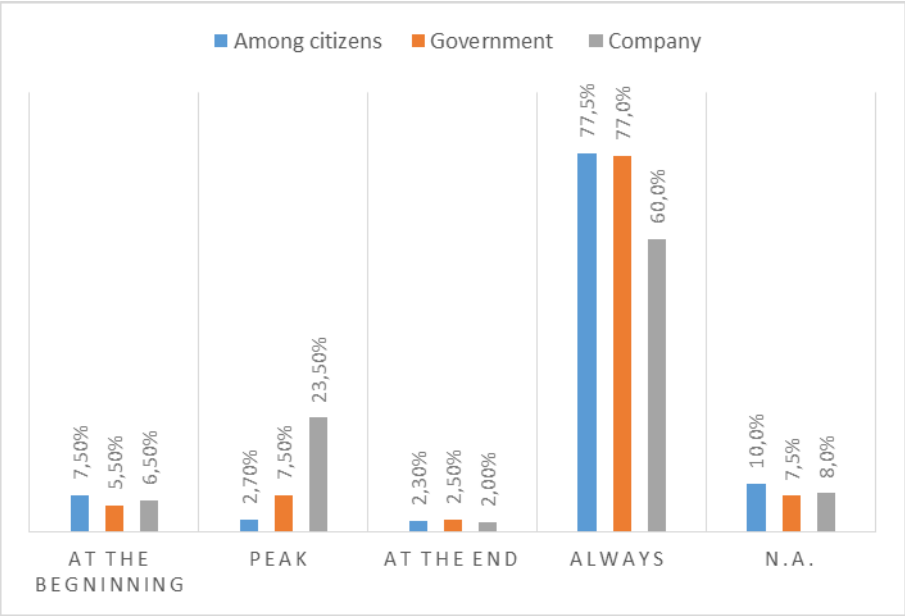
Fig. 1: Usage of SM at the citizen, government, and company levels



Our findings show that most of the citizens, the government, and the company entities used SM during the whole pandemic period – from the beginning to the end of the outbreak – in Wuhan. For instance, after the epidemic occurred, General Secretary Xi Jinping delivered important speeches and instructions many times. Various reporting formats provided timely and accurate interpretations of the decisions and deployments of the central government and provided follow-up and guidance for the prevention and control of the epidemic in the country. In this scenario, the National Health Commission connected experts and front reporters to interpret and report on the spot to improve people's awareness and ability to fight the COVID-19.

Moreover, an interesting outcome is that within organizations, SM platforms were always preferred during the pandemic to inform and communicate with employees as well as the general audience; however, 23% used SM especially during the peak of the COVID-19 spread (Fig. 2).

Fig. 2: Usage of SM at the citizen, government, and company levels during the different pandemic stages



Compared with traditional media, in the COVID-19 case, SM leads to the active participation of users, a stronger information exchange, a higher speed of diffusion, and more clustered knowledge, creating a new information channel. In addition, SM can be used to widely spread fake news. Our analysis found that SM use presents both positive and negative aspects, summarized in Table 2.

Table. 2: Benefits and drawbacks of SM usage

Benefits	**Drawbacks**
- Rapid information transmission - Learning real-time information - Having a general understanding of the spread of the pandemic - Helping to prevent and control the pandemic situation (i.e. propaganda about wearing masks) - Relieving anxiety	- Easy to cause the spread of fake information - Health problems due to the continued usage of mobile devices - Easy to enlarge some social problems - Unwilling to communicate face to face

- Providing preventive measures - Guiding public opinion - Spreading positive news - Not spreading rumours - Information dissemination among colleagues and within the company	- Privacy issues - Alienation between friends/relatives and colleagues - Reading a lot of news and information

As Zhang (2020) also suggested, many platforms were set up to refute rumours during the pandemic. For instance, the *Xinhua News Agency*[1] launched a platform to refute rumours with the following service functions: "question-and-answer", "verification", and "collection", among which "verification" focuses on determining news authenticity. In this context, users can select the type of verification on the verification platform, such as protection knowledge, true or false rumours, the latest epidemic situation, or others, and they can input relevant verification information. Another example is the rumour-refuting platform set up by *Doctor Ding Xiang,*[2] which ranked the rumours related to COVID-19 to facilitate public understanding. At the same time, *Sina Weibo* launched the "fight against pneumonia" special area with many functions, such as an epidemic map, Wuhan diary, aid donation, help, and free medical treatment. Baidu launched an official account for refuting rumours and realized sharing and interaction with mainstream media such as China Media Group, *Xinhua News Agency,* and People's Daily, providing users with timely and authoritative information that allows users to search and verify contents related to rumours by keywords.

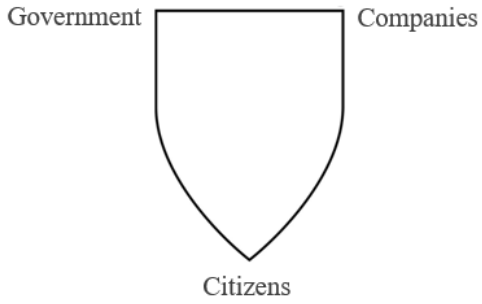
Therefore, in China in general and in particular in the Wuhan experience, SM

[1]Xinhua News Agency: The Xinhua News Agency is the official press agency of the People's Republic of China and the biggest center for collecting information and press conferences in China. It is the largest news agency in China, ahead of the China News Service. Xinhua is subordinate to the State Council and reports to the Communist Party of China's Propaganda and Public Information Departments.

[2]Doctor Dingxiang, developed by the team of Dingxiang Yuan, a medical website, is a drug information inquiry and daily safe medication assistant tool for public users.

appeared as an emerging technology for different stakeholders to share contents about COVID-19 throughout the pandemic period with benefits and drawbacks. According to our analysis, during this pandemic situation, SM aligned the actions of different entities (citizens, companies/businesses, and the government) in a new communication ecosystem, “dancing together” to create a *strategic anti-infodemia shield*.

Figure 3: The anti-infodemia strategic shield



In this scenario, our findings suggest that the impact of visual media has increased due to the outbreak of COVID-19 and has an important role in disaster reporting. This is because vision is the basis of the human symbolic system. The main reasons we identified for the increased usage of videos during COVID-19 are as follows:

- intuitive presentation
- rapid response
- instant interaction
- true information
- public opinion guidance

In the COVID-19 context, people are seeking true and real information; thus, videos, instead of texts, help to achieve this goal. A video can improve communication participation and consensus, as well as the communication effect.

Live videos from Wuhan and from all over the country have continuously poured into social platforms such as Weibo, WeChat, Douyin, and Kuaishou, so that the Chinese population as well as the outside world can intuitively understand the epidemic situation. For instance, the epidemic diaries and other self-media products have been flooding various communication platforms.

For example, the live broadcast program “People’s War Epidemic” (formerly known as “Wuhan Time”) launched by People’s Video was simultaneously broadcast on hundreds of platforms, attracting tens of millions of people every time.

The power of SM in general, and of videos specifically, is also more suitable for national and international dissemination. For instance, the videos of the medical staff of Wuhan Fangcang Hospital dancing with patients are widely disseminated on foreign social platforms (Cui, 2020).

In other words, during COVID-19, live videos spread quickly in Wuhan, especially playing the role of audience interactions and supporting citizens much more than in a non-disaster situation. In addition, in the case under investigation, critical information from press conferences was put on SM platforms such as WeChat, as well as on Douyin and Kuaishou, in the form of short videos to ensure re-dissemination.

5. This research makes several theoretical contributions. First, we explore the role of SM through the stakeholder theory lens. This paper provides evidence that SM appeared as an emerging technology during the pandemic for different stakeholders who are not all routine users, revolutionizing the collection, dissemination, and flow of information to respond to emergencies in real time. SM removes many information asymmetries, achieving a high level of openness and participation of different stakeholders to avoid infodemia. Interestingly, SM in general, and specifically the use of live videos, has had several effects during the COVID-19 disaster. Second, the structure of the data collection process helps to gain a deeper understanding of SM usages not only in terms of different stakeholders’

perspectives but also concerning the stages of the pandemic – from the beginning to the peak and the end of the COVID-19 spread.

Furthermore, this study presents a critical analysis to identify the positive and negative aspects of SM usage during emergencies. SM improves transmission efficiency, which concerns not only information related to a single SM user but also the wide spread of recommendations from companies, business entities, and authoritative experts and of required and relevant government measures. In addition, SM usage must deal with fake news, privacy issues, and excessive time spent on these tools.

In other words, SM pushes the decentralized organization's ability, creating more connections that have a significant social influence due to the many-to-many communication. However, the case of COVID-19 in Wuhan required real-time feedback and a new supervision ability to avoid the drawbacks of SM usage driven also by the uniqueness of the event.

This research also presents some managerial implications. Practitioners should innovate new professional services based on SM to facilitate the overall processes within an organization in the case of an emergency. Moreover, the government and the public world, as well as practitioners and individuals in other managerial roles, should pay attention to the significant influence of SM in managing a disaster event. Considering the diffusion of SM among different stakeholders, governments and companies must provide emergency management services more efficiently. On one side, decision makers should create policies and guidelines to channel SM information and interact with citizens to reduce the spread of false news. On the other side, managers and entrepreneurial entities must develop SM technological features and functionalities that provide customized solutions for managerial purposes, the company supply chain organization, and the overall performance goal. Finally, it is also important that citizen- generated content regarding the disaster event be monitored in real time to reward useful information and avoid reporting unreliable news.

6. With the advent of Industry 4.0, there is an opportunity to investigate technological applications to improve emergency management. As SM captures more and more people across the world, a deeper understanding of SM usage during emergencies is required.

In the whole process from the development of the COVID-19 event in Wuhan to during the crisis and lockdown, SM emerged to play a crucial role in the Chinese community. SM emerges as an enabling platform that makes knowledge sharing easier than in past emergencies for different stakeholders.

The flow of information using SM impacted a huge percentage of the population very quickly, giving real-time information on the progress of the pandemic. Thus, SM enables the audience to have full expression and a considerable impact on the public opinion, which has encouraged Chinese companies and the government to meet new standards and make improvements in this field.

SM in the case of COVID-19 formed a huge scale of participation of people at different levels (i.e. institutional, business, and individual) throughout the whole process, having a real-time influence. Therefore, from Wuhan's experience, it emerged that SM brings an overall improvement concerning response speed, efficiency of problem discovery, degree of connection, and transparency of audience information. In addition, in a pandemic and unique crisis such as COVID-19, direct, clear, rapid, and continuous communication among different stakeholders is the basic principle of SM communication and an important element for public opinion. Hence, during emergencies, private and public organizations should respond quickly and communicate effectively to reduce the anxiety and pressure of the population using SM tools. The latter means that it is important to have the proper infrastructure to speed up the flow of information and, at the same time, the ability to communicate directly through SM.

This study presents several limitations that could open doors for future studies. The findings referred to the Wuhan case and could be broadened to other

COVID-19 cases in other countries to investigate specific SM platforms from different local point of views. Further analyses could present a multi-case approach to compare different cultural contexts to conduct a deeper critical analysis of the pros and cons of SM usage. In addition, new scientific contributions could involve quantitative research or a mix between qualitative and quantitative methods. Finally, a debate could be aimed at shedding light on the potential role of SM as a humanitarian supply chain technology during emergencies.

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FINANCIAL INVESTMENTS AND AI: CROSS-BORDER CROWDFUNDING *

Jacopo Paoloni ** - Madjid Tavana***

ABSTRACT: *The digitization of production processes and services tout court has given national legislators the difficult task of adapting sector regulations to the rapid evolution of the business segments. Regarding to financial investments, and specifically to crowdfunding, the European regulator has intended, by means of Regulation 2020/1503, a uniform investment and credit capital raising model for all member states, thus offering the possibility to operators, investors and businesses to enjoy common rules.*

1. Technological development brought us to the current "phase" of the digital revolution. In the context of financial services and operations, this has opened the way to a new field of study, defined by the term *Fintech*, in which converge[1] the set of new *business* models, applications, processes, or products belonging to the financial sector, that are an immediate and direct consequence of technological innovation.

For what concerns specifically the banking and financial sector, technological

*The entire work has been thought and discussed by both authors; however, paragraph 1 is attributable to Madjid Tavana, while paragraphs 2,3 and 4 are attributable to Jacopo Paoloni.

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[1]The definition of the phenomenon was effectively expressed by the Financial Stability Board, and it is an official Board's *key word*. See: https://www.fsb.org/work-of-the-fsb/financial-innovation-and-structural-change/fintech/.

innovation has allowed the development of high-impact techniques – both from an economic and a social point of view – in several business segments among which it is certainly possible to include: funds supply through *crowdfunding*[2][3]; payment services; virtual currencies (also known as *Bitcoin*) advisory services (robo-advisors)[4]; data circulation and analysis (*blockchain* or *distributed ledger technology*)[5].

If on one hand technology has determined a steady and quick change in the aforementioned business segments, on the other hand, the law has not always managed to "keep up" with evolution, and therefore to provide a prompt and adequate regulation of these new phenomena – able not only to allow greater protection of users and operators but also to act as a real "lunch pad" for further development of the matter.

For these reasons, on March 8th 2018, the European Commission drafted and published a regulatory intervention plan, aimed at coordinating the effects of innova-

[2] For a general overview on the phenomenon, refer to J. PAOLONI, *Il processo di disintermediazione finanziaria: modelli collaborativi nel settore del credito (peer to peer lending e crowdfunding)* and La rivoluzione digitale nei servizi finanziari tra innovazione, diritti e concorrenza, directed by V. FALCE and G. FINOCCHIARIO, Zanichelli, 2019.

[3] It is known that the first regulation of the phenomenon in the European framework was represented by the Payment Services Directive (EU Directive 2007/64), which provided a first legal framework for a phenomenon which, shortly thereafter, would have actually grown exponentially. Then, the Payment Services Directive 2 (EU Directive 2015/2366) entered into force in the European Union on January 13th 2016 and then into national law with the Legislative Decree no. 218 of December 15th 2017, which entered into force on January 13th 2018. Refer to F. CASCINELLI and V. PISTONI, The Directive (EU) 2015/2366 on payment services in the internal market, in Rivista Diritto Bancario, July 2016, available in Italian at: www.dirittobancario.it. S, E. ZEPPIERI, L'implementazione in Italia della nuova direttiva sui servizi di pagamento, in Rivista Diritto Bancario, February 2018, available at: www.dirittobancario.it.

[4] For an overview of the phenomenon in the Italian legal system, see G. MARINO, *Robo advisor e consulenza finanziaria*, in La rivoluzione digitale nei servizi finanziari tra innovazione, diritti e concorrenza, directed by V. FALCE e G. FINOCCHIARIO, Zanichelli, 2019. For a European and extra-European overview, cf. BAKER - DELLAERT, *Regulating Robo Advice Across the Financial Service Industry*, in Iowa Law Review, 2018, 713-750, RINGE - ROUF, *A Regulatory Sandbox for Robo Advice*, EBI Working paper no. 26/2018, May 2nd 2018, at www.ebi-europa.eu, FISCH – TURNER, Robo Advisers v. Human: Which Make the Better Financial Adviser? at https://housefinance.dauphine.fr.

[5] There are several papers on the subject. Recent ones are LENER, *Il paradigma dei settori regolati e la democrazia dell'algoritmo. Note introduttive*, in Riv. dir. banc., 2020, 193 ff.; MIGLIONICO, *Innovazione tecnologica e digitalizzazione dei rapporti finanziari*, in Contr. e impr., 2019, 1376 ff.; ANNUNZIATA, *La disciplina delle trading venues nell'era delle rivoluzioni tecnologiche: dalle criptovalute alla distributed ledger technology* in ODC, 2018, 3, 1 ff. CIAN - SANDEI (edited by), Diritto del Fintech, Milan, 2020, passim, as well as FINOCCHIARO - FALCE (edited by), *La rivoluzione digitale nei servizi finanziari tra innovazione, diritti e concorrenza*, Zanichelli, 2019.

tion in the financial sector[6]. This plan represented and still represents a part of the ambitious big project of European unification of national capital markets and financial services in general, from the point of view of creating regulations as well as establishing a unified digital market.

Despite the significant efforts made by the European and national legislator[7], the regulation of technological phenomena of the banking and financial sector is in a real "race against time". This is due to the fact that innovation brings about quick changes in operational processes that make "custom-made" regulations obsolete. This phenomenon forces the legislator - national and European - to intervene again in order to adapt those regulations to the evolution of the subject matter[8].

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[6] With the public announcement of March 8th 2018, the European Commission explains the strategies and initiatives that Europe intends to adopt, stating that *"The financial sector is the largest user of digital technologies and represents a major driver in the digital transformation of the economy and society." The action plan presented today includes 23 initiatives to enable innovative business models to expand, promote the diffusion of new technologies and strengthen the cybersecurity and integrity of the financial system. Some of these initiatives are listed below.*
"The Commission will host an EU FinTech Lab where European and national authorities will be invited to engage with technology solution providers in a neutral, non-commercial space." The Commission has already created an EU Blockchain Observatory and Forum, which will report on the challenges and opportunities of cryptocurrencies throughout 2018 and is working on a comprehensive strategy on distributed ledger technology and blockchain for all sectors of the world. 'economy. A distributed ledger is a database shared across a network. The best-known type of distributed ledger is the blockchain.
The Commission will launch consultations on how best to promote the digitization of information published by listed companies in Europe, including through the use of innovative technologies to achieve the interconnection of national databases. This will allow investors to more easily access essential information to make informed decisions about their investments.
The Commission intends to organize seminars to improve the exchange of information on cybersecurity.
The Commission will present a best practice program on regulatory experimentation spaces, based on guidance provided by the European Supervisory Authorities. A regulatory experimentation space is a framework developed by regulators that allows startups in the financial technology sector and other innovators to conduct live experimentation in a controlled environment, under the supervision of a regulatory authority. Spaces for regulatory experimentation are gaining popularity, especially in the more developed financial markets.
[7] It is certainly worth mentioning the remarkable initiative developed by the MEF to implement the European Commission's Fintech action plan at a national level. This initiative led to the creation of a Fintech Coordination Committee, set up as a result of a nonbinding agreement between the Ministry of Economy and Finance, the Bank of Italy, CONSOB, IVASS, AGCM, the Data Protection Authority, the Agency for Digital Italy and the Italian Tax Authority, in order to *"create an overview of the sector to boost its growth and guarantee adequate levels of consumer protection, stability, and competition without changing the administrative and legal duties of the individual administrations adhering to the protocol"*.
[8] See WORLD ECONOMIC FORUM, *The Future of Financial Services: how disruptive innovations*

Among the underlying risks of trying to adequately regulate these developmental procedures, there is certainly that of not allowing certain new operators to do business in competition with the "old" agents of the reference market, thus damaging the interest of the end-user, who might not be able to benefit from a particular service at the best price, or even to benefit from it at all.

So, taking into consideration the *crowdfunding* and *peer to peer* credit supplies sector, it has already been highlighted how current Italian regulations - particularly referring to the resolution of the Bank of Italy no. 584/2016 – seem to be very unsuitable for guaranteeing the development of the phenomenon and for allowing new operators to be a valid alternative to the banking system.

It is for this reason that the new EU Regulation 2020/1503 of the European Parliament and of the Council related to European *Crowdfunding* Service Providers for Businesses – which entered into force on November 10th 2020 and whose main purpose is to cross the complicated and sometimes obsolete sector regulations of the Member States - can certainly be considered a significant disciplinary turning point.

2. The "European Banking System" perfectly meets the main goal of the European Banking Union of conforming the credit markets based on the individual realities of the Member States, throughout unique regulatory systems and a generally centralized sector supervision system[9].

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are reshaping the way financial services are structured, provisioned and consumed. An Industry Project of the Financial Services Community. Prepared in collaboration with Deloitte. Final Report, June 2015.

[9] From a genetic point of view, the bases for the establishment of a unified European market for banks (or *Banking Union*) were laid by the European Union through the adoption, on October 15th, 2013, of the European Council Regulation no. 1024/2013 – with which the European Central Bank was invested with specific and fundamental powers of prudential supervision usually belonging to national financial institutions – as well as Regulation no. 806/2014, with which the European legislator established new rules and procedures for the resolution of the financial institutions and financial companies crisis. Although several authors believe that the process of centralization of supervisory powers on the continent's banking system received a significant "push" after the financial crisis of 2008, it's important to remind that the project for the establishment of a *Single European Regulatory Authority* actually has its roots in the very concept of "European Union". For a more in-depth analysis on the subject see PUGLIESE, *L'unione bancaria europea tra esigenze di coerenza interna e risposte*

Technological innovation has not just allowed the development of new operating techniques in the financial sector. In fact, it is necessary to highlight how AI (...) has also strongly affected the banking world from the point of view of supervision - that is the supervisory activity carried out by the competent authorities - as well as the *compliance* procedures and *reporting* of banking institutions with respect to the precepts of the aforementioned authorities. This form of union between AI and the banking system is commonly known as *RegTech*[10].

The implementation of technological progress in the prudential supervision field, and the fact that supervised entities must comply with supervisory rules, can be considered an immediate and direct consequence of technological innovation. In fact, the appearance of new processes in the financial context and therefore of new and greater risks for both operators (banks, financial intermediaries) and users (savers, professional, and *retail* investors), have determined, on one hand, the need for the supervisors to make supervision quicker and more direct and, on the other hand, the need for the supervised entities to speed up *reporting* and adjustment to the regulations issued by the supervisors.

The creation of a single credit market by putting banks and more capitalized national banks under the control of the ECB has certainly highlighted the effectiveness of the new technological tools[11]. In particular, *cloud computing* and *distributed*

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alle sfide globali, in Diritto dell'Unione Europea (Il), fasc. 4, 2014, pag. 831, and also CIRAOLO, *Il Regolamento UE n. 1024/2013 sul meccanismo unico di vigilanza e l'unione bancaria europea. Prime riflessioni*. in Amministrazione in Cammino, directed by DI GASPARE, available in Italian at https://www.amministrazioneincammino.luiss.it/2014/05/05/il-regolamento-ue-n-10242013-sul-meccanismo-unico-di-vigilanza-e-lunione-bancaria-europea-prime-riflessioni/

[10] More specifically, the use of technology in banking supervision represents a branch of *RegTech*, known as *SupTech*. With regard to the phenomena just mentioned, see PACKIN, *RegTech, Compliance and Technology Judgment Rule*, 93 Chi.- Kent L. Rev. (2018), 194; ARNER - BARBERIS - BUCKLEY, *FinTech, RegTech, and the Reconceptualization of Financial Regulation*, 37 Nw. J. Int'l L. & Bus. (2017), 373; WEBER, *RegTech as A New Legal Challenge*, 46 J. Fin. Transformation (2017), 10; COLAERT, *RegTech as a response to regulatory expansion in the financial sector*, (March 2017), in www.ssrn.com, 6; YANG - TSANG, *RegTech and the New Era of Financial Regulators: Envisaging More Public-Private-Partnership Models of Financial Regulators*, 21 U. Pa. J. Bus. L. 354 (2018), 363 ff.

11 Cf. PERRONE, *La nuova vigilanza, RegTech e capitale umano*, in *Banca Borsa Titoli di Credito*, 4, OCTOBER 27th 2020, p. 516, which emphasizes the use made by companies of technological

ledger systems technology have been proven to be extremely effective methods to carry out broad and efficient monitoring.

These technological tools are indeed very useful to European and national supervisors - SupTech – and they have also allowed banking and financial enterprises to create remarkable economies of scale with regard to assessment and risk *rating* in active transactions with its customers.

Nevertheless, as it has already been said, one of the greatest benefits that the companies created thanks to technological finance have, is the absence of fixed instrumental costs related to the retrieval and storage of information about the creditworthiness of users. The direct consequence is that they are allowed to provide the same services as traditional businesses but at considerably lower costs.

Even in the context of *compliance* with the so-called capital *ratios* [12] - which are the prudential supervisory requirements imposed at an ultra-national level, regarding the degree of capitalization of enterprises that carry out banking and financial activities - the data storage in the *cloud* and the use of artificial intelligence algorithms, aimed at the collection and classification of accounting data, allow supervised enterprises - and therefore large ones - to easily and promptly exploit large numbers of data.

3. So, technology has allowed the creation of new *business models* for companies that make use of artificial intelligence and are therefore able to generate significant economies of scale by eliminating a series of startup costs - by downsizing, for

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innovation for supervisory and *compliance* purposes. It should be noted that it dates back to the last years of the last century and it particularly characterized big financial institutions which, following the Basel II Accord, benefited from risk assessment and elimination of anomalies while negotiating financial instruments, by using innovative automated systems for this purpose.

[12] International capital requirements which were gathered in the so-called "Single Rulebook of the banking union" introduced by the Basel III Accord. Particularly, referring to the EU Regulation No. 575/2013 of the European Parliament and of the Council of June 26th 2013, relating to prudential requirements for credit institutions and investment companies and amending Regulation (EU) no. 648/2012, as well as Directive 2013/36/EU of the European Parliament and of the Council of June 26th 2013, on accessing the business by credit institutions and on the prudential supervision of credit institutions and investment companies, amending Directive 2002/87/EC, repelling Directives 2006/48/EC and 2006/49/EC.

example, the labor in the production process. Moreover, we need to take into account that technology has also contributed to the development of many other older companies, which are becoming more and more aware of the inevitability of scientific progress.[13] On a purely competitive level, the introduction of production and selling strategies based on digital systems by many companies, both in the startup and mature phase, has allowed companies that offer financial services (and other

[13] It is worth mentioning the invaluable statistical contribution provided by the PWC "Big Four", which publishes an annual analysis/overview on entrepreneurial Fintech investment, which is extremely useful to understand the extent of the phenomenon, for what concerns both start-up projects and the resources exploited by large or medium-large companies, whose business models are already established on technological channels' research and development.
Based on the 2020 report, only for what concerns Italy – a country which, over the last four years, has particularly struggled to keep up with technological progress – there are currently 364 companies operating in the Fintech sector, which are also a product of this sector. Of these, 278 operate in the whole financial sector (Payments, Capital Market & Trading, Wealth & Asset Management), and 86 are TechFin companies - that is companies already operating in the artificial intelligence sector, that have expanded their range of activities to support services for technological finance that are *outsourced* to them by the main *players*. In addition to a growth in operators (plus 49 new Fintech companies compared to 2019), also business segments are increasing. In fact, there are new sectors such as the Asset Based Lending for Real Estate, cryptocurrencies investments, and non-performing and impaired loans (NPL). Moreover, overall revenues have grown compared to 2019 - plus 40% with 373 million euros - as well as the expected *scaleup* of companies with turnover equal to or greater than one million euros, which rise from 28 to 37. The only "concerning" data is the substantial decrease in investments in technology by companies already present on the market, which decreased by about 40 million. The COVID - 19 pandemic contributed significantly to such decrease, since it has determined a considerable drop in 2020 revenues for many entrepreneurs.
According to the analysis carried out by PWC, the current operating segments of Fintech companies in Italy are: "• *Payments, which are the star of Italian FinTech in terms of revenues, number of companies, and growth. Margins are still an issue.*
• Money Management is one of the smallest segments but everything (growth in revenues, investments, profitability) indicates an extremely positive growth (multi-bank aggregators, Personal and Enterprise Financial Management, Online Invoicing).
• Wealth & Asset Management, in which overall revenues are penalized by the fact that larger entities have their registered office abroad, is a rapidly evolving sector (for example Real Estate Equity Crowdfunding is a new segment that already includes 7 companies) and is attracting many new players.
• Lending is a key segment in terms of revenues and number of companies: risk rating areas and Circuits are growing and the Real Estate segment is new. SMEs are the main target. Profitability, despite the inherent risks, is positive. Investments are still low.
• The Capital Market & Trading is growing significantly and also showing good profitability, despite very low investments. It's worth mentioning some new business segments, including Trading and Investments in cryptocurrencies and specialized Trading for NPLs.
•InsurTech is the newest sector (over 70% of companies were born after 2015) but, for what concerns revenues, it has already become the third sector of Italian FinTech. Growth is strong, but investments are insufficient.
• Crowdfunding has 34 companies distributed in the two main segments, Donation and Reward.
• *RegTech (18 companies) is significantly developing in the international scenario, and in Italy tends to specialize in solutions for SMEs such as tax assistants and documentation management.* "

types of companies) to consistently increase their revenues[14]. It is clear that introducing digital technologies requires considerable short-term costs for these companies, whereas it allows them to significantly reduce other fixed costs in the long run, making their business particularly competitive with regard to the final price on the retail market.

Particularly for what concerns the companies operating in the credit supplies sector (capital market), it can be said that Equity Crowdfunding – a form of raising capital in exchange for shares – is replacing, at a European and national level, the role of “ordinary" banking institutions, taking care of those who are considered to be "non-bankable" by the system[15].

In relation to the phenomenon of the so-called *Equity Crowdfunding* - raising

[14] According to a study carried out at the end of 2020 by Workday, Inc. (NASDAQ: WDAY) (leader in enterprise cloud applications for finance and human resources) regarding business strategies of top management of financial companies, the goal is to increase the investments in the digitization of services, forecasting a substantial increase in profits, generated not only by the reduction of costs but also by improved organizational capabilities in the provision of services. In particular, it emerges that “*Digital revenues dominate (and are accelerating). More than one-third of firms now expect that 75% or more of their revenue will come from digital within three years—more than three times as many firms as 2019 Changing tools is easier than changing minds and habits. While more than half of organizations (56%) said their technology is compatible with digital transformation goals, just 16% said the same about their company’s culture. Organizations that put additional emphasis on helping employees adopt and adapt to new technologies are likely to achieve higher digital return on investment (ROI).”*
Agility is extended to investments in technology. Now, over three quarters (77%) of companies say that their company is ready to react in the event of an unsuccessful investment in new technology (technology that is not being implemented or used successfully), compared to 70% in 2019. Continuous planning emerges as a new best practice. Almost half (43%) of the interviewees embraced continuous planning before the pandemic, indicating three factors of success: access to data, implementation of intelligent technologies, and agility.

[15] For what concerns our country, the report for 2020 published by the Entrepreneurship & Finance Observatory of the Politecnico di Milano shows particularly interesting data.
To sum up, it is possible to state that Mamacrowd platform is a leader in the capital raising sector (34 million euros confirmed as of June 30th, of which 12 million were collected during last year alone). The pandemic we are facing has not resulted in any decreases. In fact, it has benefited users since, with the "Relaunch Decree" of May 19th, approved in the Chamber of Deputies on July 9th 2020, those who invest in start-ups and innovative SMEs can now deduct 50% of their individual income tax return (previously 30%). Regarding the equity sector (equity loans), growth is significant with an increase of 56%.
As of June 30th 2020, 595 campaigns have been carried out in Italy (193 during last year alone compared to 170 during the previous year), on 42 authorized platforms with 11,376 investors, with a total collection of 158.9 million euros. Average investments made by natural persons have increased from €3,222 to €5,624 and those made by legal entities have increased from €20,000 to € 46,890.
The new real estate crowdfunding industry was also very successful, with 154 financed projects and a total investment of 19.5 million euros.

capital that remunerates the investment through shares - it should be noted that Italy is currently a leader from a regulatory point of view.

In fact, the national legislator had already created the first regulatory framework in 2012 with the Growth Decree 2.0 (Decreto Crescita 2.0 or Decreto Crescita Bis)[16]. With the subsequent 2017 Budget Law, the regulation was extended to any company, as long as it was established as a joint-stock company, aimed at raising capital through *crowdfunding* platforms. This was then further extended to any joint-stock company with the Legislative Decree no. 50 of April 24th 2017, which was implemented with the Consob Regulation on the raising of risk capital through *online* portals (introduced with Resolution no. 18592 of June 26th 2013, and then amended with the Consob Resolution no. 19520 of February 24th 2016 and the following Consob Resolution no. 20204 of November 29th 2017).

On the other hand, the framework of reference related to the phenomenon of the *peer to peer lending* - loans operated on *social lending* platforms for both companies and consumers - still seems to be inadequate for the structural development of the phenomenon as a real alternative to the banking system. This is also due to the legal reserve about the activity of collecting savings, made by the primary legislator to the banking institutions.

4. The Regulation (EU) 2020/1503 marks a big step in the development of one of the most significant products of technological finance: *crowdfunding*. The primary objective of this regulation is to overcome the undeniable "gap" in the development of this type of regulations among the Member States. For this reason, the regulatory framework was standardized and unified, and access to capitals throughout these digital platforms is now easier and more homogeneous and, last but not least, platforms were also allowed to operate throughout the entire European territory (based

[16] At first, raising financial capital throughout IT platforms was only allowed to the so-called innovative start-ups, namely operating in the field of technological innovation. With the subsequent Legislative Decree no. 179 of October 18th 2012, access to equity crowdfunding was also granted to innovative SMEs and to UCIs and joint-stock companies that mainly invest in the field of technological innovation.

on a single framework of reference that facilitates a safe and cautious business competition). Moreover, this regulation represents a significant step towards the disciplinary establishment of the single capital market (*Capital Markets Union*)[17].

The Regulation (EU) 2020/1503 has changed the previous legislation on *crowdfunding* – in particular the Regulation (EU) 2017/1129 and the Directive (EU) 2019/1937. Its introduction was accompanied by the issuing of the Directive (EU) 2020/1504 of the European Parliament and of the Council, with which art. 2 of the MiFID II Directive (2014/65/EU), called "Exemptions", was modified to extend the scope of application of the exemption rule also to digital platforms that provide instrumental services for *crowdfunding* operations.

This exemption represents an extremely relevant innovation, since it reduces the set of duties that constitutes the safeguards for achieving the best interest of the investor, typical of the MiFID Directive. This allows to avoid the overlapping of rules of conduct, and therefore it unburdens the national crowdfunding operators, that were previously obliged to comply with both the aforementioned directive and the specific rules of conduct of the national regulations on the matter.

It should be noted, however, that the rules of conduct contained in the new directive are similar to the rules that, within the MiFID Directive, are dedicated to protecting the interests of investors. This shows that on a supranational level, there is a tendency to assimilate crowdfunding service providers to financial intermediaries or, with regard to the services provided by both, to assume that the subjects that make use of them, have the same need of protection.

[17] In the opening statement no. 6 of Regulation 2020/1503, it is stated that "*The differences between the existing national rules are such that they obstruct the cross-border provision of crowdfunding services and thus have a direct effect on the functioning of the internal market in such services. In particular, the fact that the legal framework is fragmented along national borders creates substantial legal costs for retail investors who often face difficulties in determining the rules applicable to cross-border crowdfunding services. Therefore, such investors are often discouraged from investing cross-border using crowdfunding platforms. For the same reasons, crowdfunding service providers operating such platforms are discouraged from offering their services in the Member States other than the one in which they are established. As a result, crowdfunding services have remained hitherto largely national, to the detriment of a Union-wide crowdfunding market, thus depriving businesses of access to crowdfunding services, especially in cases where those businesses operate in smaller national markets.*"

Judging by the introduction of the Regulation 2020/1503 and Directive 2020/1504, it is very clear the willingness of the European legislator to confirm the importance of *crowdfunding*, as an alternative channel for finding risk and credit capital, especially for what concerns start-ups, micro-enterprises, and SMEs in general[18].

To proceed towards a regulatory unification of the phenomenon, the legislator specifies that, in accordance with the amount of shares established by most of the Member States for the banking system, the digital *crowdfunding* platforms must not collect funds from savers, except when they have a specific authorization issued in accordance with article 8 of Directive 2013/36/EU of the European Parliament and of the Council. On the other hand, it is specified that they "*merely facilitate the conclusion by investors and project owner of loan agreements without the crowdfunding service provider at any moment acting as a creditor of the project owner. The facilitation of granting of loans which falls within the scope of this Regulation is to be distinguished from the activity of a credit institution, which grants credits for its own account and takes deposits or other repayable funds from the public."* Thus, clearly distinguishing a *Fintech social lending* platform from any credit institution.

However, the regulation does not attribute to digital platforms the role of mere intermediaries in raising capital. It actually recognizes them a bigger role by au-

[18] In fact, in Directive 2020/1504 it is stated that *"Crowdfunding is a financial technology solution that provides small and medium-sized enterprises (SMEs) and, in particular, start-ups and scale-ups, with alternative access to finance to promote innovative entrepreneurship in the Union, thereby strengthening the Capital Markets Union. That in turn contributes to a more diversified financial system that is less dependent on bank finance, therefore limiting systemic and concentration risks. Other benefits of promoting innovative entrepreneurship through crowdfunding are the unlocking of frozen capital for investment in new and innovative projects, the acceleration of efficient allocation of resources, and diversification of assets*." Therefore, the Regulation establishes that "*Crowdfunding is increasingly an established form of alternative finance for start-ups and small and medium-sized enterprises (SMEs), typically relying on small investments*.", and also that "*Crowdfunding can contribute to providing access to finance for SMEs and completing the Capital Markets Union. Lack of access to finance for SMEs constitutes a problem even in those Member States where access to bank finance has remained stable throughout the financial crisis. Crowdfunding has emerged and become an established practice of funding business activities of natural and legal persons. Such funding takes place through online platforms; the business activities are typically funded by a large number of people or organizations; and the businesses, including business start-ups, raise relatively small amounts of money* (...) *In addition to providing an alternative source of financing, including venture capital, crowdfunding can offer other benefits to businesses. It can validate a business idea, give entrepreneurs access to a large number of people providing insights and information, and be a marketing tool*."

thorizing further activities as collateral services, such as consulting services aimed at assessing the risks of an investment, safekeeping of the financial instruments offered on the platform, and provision of payment services related to real crowdfunding. The intermediary, however, can implement these services only if authorized as a payment service provider in accordance with Directive 2015/2366/EU.

Nevertheless, this is in contrast with the Consob provisions at a national level that, with a specific regulation dedicated to the "*collection of capital via online portals*", adopted with Resolution no. 18592 of June 26th 2013 and updated with Resolution 21259 of February 6th 2020, defines the platforms in question as having the exclusive purpose of facilitating the raising of capital by open-end companies.

Furthermore, this Regulation, which will have to be implemented in the Member States from November 10th 2021, has established the application area of the regulations contained therein, concerning the maximum threshold that can be financed through intermediary digital platforms between supply and demand – both with regard to projects for raising credit capital and projects involving the public offering of one's own equity capital. The threshold has been set at 5,000,000.00 euros[19].

Article 2 of the new regulation on European *crowdfunding* does not define the phenomenon itself; it defines the services provided by the digital platforms to which the regulation is applicable. It establishes that crowdfunding means "*the matching of business funding interests of investors and project owners through the use of a crowdfunding platform and which consists of any of the following activities: (i) the facilitation of granting of loans; (ii) the placing without a firm commitment basis, as referred to in point (7) of Section A of Annex I to Directive 2014/65/EU, of transferable securities and admitted instruments for crowdfunding purposes issued by project owners or a special purpose vehicle, and the reception and transmission of client or-*

[19] This amount has not been randomly set. In fact, the European legislator acknowledges a normative figure common to many Member States, given that 5 million euros represent the threshold above which, in many States of the Union, a security provider is obliged to publish prospectuses to protect potential investors. In accordance with Art. 1 of the Regulation, *crowdfunding* offers exceeding the 5 million euros' threshold, calculated over 12 months, are therefore excluded as well as *crowdfunding* services or related services that are provided to project owners who are consumers, as defined by Article 3 (a) of Directive 2008/48/EC.

ders, as referred to in point (1) of that Section, in relation to those transferable securities and admitted instruments for crowdfunding purposes; (…)".

It is very clear the intention of protecting the investors[20], throughout the imposition of a series of significant obligations that the platforms providing *crowdfunding* services have to respect and with the establishment of important prudential requirements[21].

First of all, Article 4 states that *crowdfunding* service providers must act in an honest, fair, and professional way, and in their customers' best interest. To that end, they cannot pay or accept payments (in cash nor with other payment methods) for guiding investors towards a particular *crowdfunding* offer on their own platform or on a third-party platform.[22]

When a potential investor comes into contact with a platform, the latter does a customer profiling that takes into account known parameters and information contained in the *cloud* (*big data*), as well as additional information directly requested to the customer. All of this is used to guide the investor towards the most suitable transactions for the elaborated risk profile. In this regard, it should be noted that in accordance with Art. 4, paragraph 4, the platform must always refer to the latest profile when it comes to choosing the investments to propose to the customer, for what concerns both individual transactions and centralized management of portfolio investment.

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[20] The Regulation offers a very broad definition of investor: on one hand, an investor is defined as *"any natural or legal person who, through a crowdfunding platform, grants loans or acquires transferable securities or admitted instruments for crowdfunding purposes"*; however, a distinction is then made between sophisticated investor, that is *"any natural or legal person who is a professional client by virtue of point (1), (2), (3) or (4) of Section I of Annex II to Directive 2014/65/EU or any natural or legal person who has the approval of the crowdfunding service provider to be treated as a sophisticated investor in accordance with the criteria and the procedure laid down in Annex II to this Regulation"* and non-sophisticated investor.

[21] According to Art. 11, each *crowdfunding* service provider shall, at all times, have in place prudential safeguards equal to an amount of at least the higher sum between € 25.000 and one quarter of the fixed overheads of the preceding year, reviewed annually, which are to include the cost of servicing loans for three months where the *crowdfunding* service provider also facilitates the granting of loans. These sums may consist of own funds, an insurance policy or a combination of both.

22 It is very clear that the prohibition in question is fundamental to guarantee complete freedom and autonomy of investors, as well as correct information on the investments that best comply with their risk profiles.

Aiming at guaranteeing absolute transparency, integrity, and security of the service provider, the Regulation defines some high caliber operational requirements for the members of the management bodies of the intermediary platform; in particular, in Art. 4, paragraph 1, it is stated that *"The management body of a crowdfunding service provider shall establish, and oversee the implementation of, adequate policies and procedures to ensure effective and prudent management, including the segregation of duties, business continuity and the prevention of conflicts of interest[23], in a manner that promotes the integrity of the market and the interests of its clients*."

In this context, the management body has to put in place an adequate background check of the owners of investment projects, at least verifying that: a) the project owner has no criminal records in respect of infringements of national rules in the fields of commercial law, insolvency law, financial services law, anti-money laundering law, fraud law or professional liability obligations; b) the project owner is not located in a jurisdiction considered to be non-cooperative by Union policies or in a third country considered to be a high-risk country in accordance with Article 9, paragraph 2 of Directive (EU) 2015/849. Therefore, this means that, in order to operate as a *crowdfunding* service provider, any legal person, in addition to having to be established in the territory of the Union, is required to obtain a specific authorization by the competent authority in the Member State in which it is established, as stated in Article 12.

Regarding supervision, the subjects authorized in accordance with Art. 12 are monitored by the competent national authority as well as by ESMA[24] (European Se-

[23]Article 8 of the Regulation is about prevention from conflicts of interest; to sum up the safeguards provided by the law, it is possible to state that *crowdfunding* service providers are prevented from participating in any *crowdfunding* offer on their platforms. Moreover, it is specifically forbidden for main shareholders, managers, and employees of a platform, as well as any natural or legal person linked to them by control, to act as project owners in relation to the *crowdfunding* services offered on the platform itself.

[24]ESMA is an independent EU authority established in 2011 with the institutional aim of protecting investors, promoting European financial stability and market transparency. ESMA is made up of the national authorities responsible for supervising the securities markets, as well as representatives of the European Banking Authority (EBA), the European Insurance and Occupational Pensions Authority (EIOPA), the European Systemic Risk Board (ESRB), the European Commission (EC), and Iceland, Liechtenstein, and Norway.

curities and Markets Authority). In accordance with Art. 16, the competent authorities of the Member States annually provide information about financial projects concerning the provision of *crowdfunding* services – needed for the development of implementing technical standards to be submitted to the European Commission for approval.

ESMA also established a register of all *crowdfunding* service providers, in accordance with Art. 14.

One of the greatest innovations brought by the Regulation, which represents a significant achievement for service provider platforms, is undoubtedly the possibility for each provider to offer their services also outside the territory within which it has obtained the authorization. In accordance with Art. 18, every *crowdfunding* service provider which plans to provide services in a Member State other than the Member State where it obtained the authorization, is required to provide a set of information to the competent authority, that was designated as a single point of contact by the Member State in which the authorization was granted (*former* Art. 29, paragraph 2):

1. a list of the Member States in which the crowdfunding service provider intends to provide crowdfunding services;
2. the identity of the natural or legal persons responsible for the provision of crowdfunding services in those Member States;
3. the starting date of the provision of the crowdfunding services by the crowdfunding service provider;
4. a list of any other activities provided by the crowdfunding service provider not covered by this Regulation.

The platform may start operating in Member States other than its own upon receiving the aforementioned information.

STRIKING A BALANCE BETWEEN PROFIT, PEOPLE WELFARE, AND ECOSYSTEM HEALTH IN THE TRANSITION TOWARDS A SUSTAINABLE FINANCIAL SYSTEM

Mirella Pellegrini [*] – Antonio Davola [**] – Nunzio Casalino [***] – Peter Bednar [****]

ABSTRACT: *As the attainment of sustainability goals arises as a pivotal – and desirable – format in the development of financial markets the role of the State in favouring this process becomes multifaceted and complex to decipher. In order to promote a favourable environment for sustainable investments, public powers are required to act as policymakers (by establishing a clear regulatory framework), active players (e.g., by issuing sustainable debt) and supervisors (monitoring the respect of CSR rules by companies) at the same time; this, also considering that the introduction of sustainability-related policies is susceptible to greatly vary in its approach and meanings. Corporate welfare projects and improving also the organisational culture could improve the managerial decisions and allow workers to be involved in this needed revolution. People management strategies are also becoming fundamental to allow a sustainable organisation of working environments and adequately valorising workers. A similar discussion has been identified in relation to the need for greater transparency in business operations and practices. All these aspects call for a major coordination effort, both at EU and at Member States level to reach an alignment of*

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public and private interests in sustainability while, at the same time, preserving the proper functioning and traditional role of financial markets. Consequently, the document explores the different strategies that could be implemented to – directly or indirectly – reconcile private actors' traditional profit-seeking orientation with the promotion of wider interest related to global wellbeing.

1. In the aftermath of the 2007 financial crisis – and considering its impact of market's foundational structures – it has been widely acknowledged that the development of financial markets is a major determinant for the functioning of advanced economic environments, also in consideration of the pivotal role played by technological developments in a profoundly globalized world.[1]

Financialization – that is, the growing influence of financial markets, of their institutions and operators, on social structures – of markets is a structural element characterizing the shift from industrial to financial capitalism in the contemporary society;[2] consequently all those phenomena, that are related to the failure of financial markets, are nowadays potentially able to exercise an influence that goes beyond their traditional scope.

In such a framework, the goals related to financial stability (*in primis* al long as EU Member States are concerned) are increasingly connected to the development of

[1] A. GENNARO, *Unione Europea e capitalismo "responsabile": spunti di riflessione*, in Riflessioni sul futuro dell'Europa, edited by A. Gennaro and R. Masera, Canterano, Roma, 2020, 31.
[2] T. LAGOARDE-SEGOT, *Financialization: towards a new research agenda*, in *International Review of Financial Analysis*, 2016.

social phenomena: on the one hand, financial stability has an indirect impact on the Real Economy; on the other hand, individuals and social groups are influenced by it in seeking welfare.[3]

With regards to the first aspect, the creation of an institutional and regulatory framework, that can promote the stability and the transparency of economic and financial relations is regarded as an essential basis for the efficient allocation of economic resources, as well as for the creation and redistribution of income:[4] stability and transparency operate as conditioning factors for economic agents' decision-making and have a direct impact on their risk perception. As such, they have an impact on the collection of savings, on the allocation of economic resources amongst public and private operators, and on credits' cost and supply, therefore interacting with the traditional modes of operativity of banking institutions.[5]

On the basis of these considerations, it could already be inferred those financial markets are essential in order to pursue – besides their traditional allocative function – social-distributive goals, and this aspect is particularly relevant in the definition of the relevant regulatory framework and in operating choices related to the financial markets' institutional design.

Yet, this new characterization of the role of financial markets is further supported by inspecting the modes of interface between markets and essential features of contemporary society, namely sustainability and digitalization.[6]

If, on the one hand, the essential goals pursued by companies – and, therefore, the determinant for the allocation of economic resources – can still be found in the creation of economic value, it is nowadays acknowledged that any entrepreneurial process shall take into account concomitant (not conflicting)

[3] See P. DE GRAUWE, *Economics of the Monetary Union*, OUP, 1996, 241.
[4] J. GREENWOOD, and J. BOYAN, *Financial Development, Growth, and the Distribution of Income*, in *Journal of Political Economy* 98, no. 5, 1990, 1076–1107.
[5] BANK OF ITALY, *Financial Stability Report*, 1, 2021, https://www.bancaditalia.it/pubblicazioni/rapporto-stabilita/2021-1/en_FSR_1-2021.pdf?language_id=1, *passim.*
[6] EUROPEAN COMMISSION, *Shaping the digital transformation in Europe. Working paper: Economic potential*, Feb. 2020.

principles such as providing an equitable compensation to workers, respecting social and ethical values, and protecting the surrounding environment. The financial market, therefore, is essential to shape the strategies pursued by financial intermediaries and investors' behaviours and to promote rational and sustainable investments.[7]

The European Union is, unsurprisingly, a player of pivotal importance in promoting these goals, being in direct charge of creating an institutional and regulatory framework to adjuvate the shift of the European financial markets towards forms of sustainable capitalism.

Truth to be told, the potential of the financial markets in promoting social development has been part of the scholarly debate for a long time: yet, the pandemic that affected the world in the past two years renewed the need for a structural rethinking of the relationships between ethics, law and economics, also considering the effect of these kind of events of marginalized populations.[8] Already in previous decades, Western countries underlined that the preservation of natural resources and biodiversity was meant to become a social priority in the wake of globalization; in some Member States, this effort has also determined the modification of the Constitutional Charters.[9]

While analysing this issue in its entirety goes out of the scope of the present work, it is work observing that focusing on the relationship between the current functioning of financial markets and social welfare unveils an intrinsic contradiction of contemporary economies: in recent years – and mostly due to the influence of the first wave of EU law and market globalization – entrepreneurship has gained a primary role within society, and emerged as a sort of "quasi-fundamental" right

[7] G20 GREEN FINANCE STUDY GROUP, *G20 Green Finance Synthesis Report*, 2016.
[8] S. LATOUCHE, *La planète des naufragés: Essai sur l'après-développement*, La Découverte, 2017 (1st ed. 1996).
[9] E.g., the recent modification to Artt. 9 and 41 of the Italian Constitution (8 Feb 2022) encompassed the interest of future generations within the general goal of the protection of environment, biodiversity, animals, and ecosystem.

against conflicting (or, at least, countervailing) values.[10] Previously existing boundaries to private economic initiative have been gradually eroded in view of economic development; this process has been promoted as functional to the establishment and strengthening of the European Single Market, which is oftentimes imprinted with utilitarian interpretations that have actually little (or even no) concern for social benefit.[11]

Alongside the affirmation of the Single Market, arose the awareness regarding the existence of globally widespread frailties existing at economic, social, and environmental level: the development of the market economy has been related to the incremental divide between social groups and to the over-consumption of natural resources, therefore calling for an "ethical rebirth".[12]

The debate over the role and relevance of creating a sustainable financial markets, therefore, lies at the crossroad of all these elements: on the one hand, profit-seeking logics still constitute (and shall continue to do so) the main determinant of any economic activity; on the other hand, economic welfare cannot be fully attained without considering social inclusion, as well as the need that long-term development is intrinsically tied to reaching an equilibrium within the ecosystem. In embracing this perspective, the protection of those rights, that are symptomatic of the egoistic goal of individuals,[13] must be conjugated with the protection of the common interest, including in this concept also the need to protect diversity and future generations.

2. Nowadays, the influence of EU institutions on financial markets does not focus exclusively on its stability and efficiency anymore; in parallel with these goals,

[10] G. MONTEDORO, *Postfazione*, in AA.VV., *Finanza, impresa e nuovo umanesimo*, a cura di Capriglione, Cacucci, Bari, 2007.
[11] F. CAPRIGLIONE, *Etica della finanza mercato globalizzazione*, Cacucci, Bari, 2004.
[12] M. PELLEGRINI, *"Impresa e finanza" alla luce della dottrina sociale della Chiesa*, in *Finanza, impresa e nuovo umanesimo*, cit.
[13] S. RODOTÀ, *Il terribile diritto. Studi sulla proprietà privata e i beni comuni*, Il Mulino, Bologna, 2013.

the promotion of financial markets' sustainability has gained a major relevance, which is meant to further grow in the forthcoming years.[14]

Starting from the first definition of the notion of sustainability in the 1987 *Brundtland Report,*[15] the goal of promoting sustainable markets represented a common trait in the debates animating the European Union in the first decade of the new millennium.[16] Still, it is only after the 2015 Paris Agreement on climate change that the role of financial markets in promoting sustainable development has been expressly recognized: since that date, a multiplicity of initiatives pertaining to sustainable finance arose:[17] accordingly, the enthusiasm towards the relevance of financial markets as a means to promote sustainable goals led to the need to redefine the pertinent regulatory framework, through the recent approval of the Taxonomy Regulation (TR) and the Sustainable Financial Disclosure Regulation (SFDR).[18]

Consistently with the considerations that inspired the European *Green Deal,*[19] the most recent interventions undertaken by EU institutions are characterized, on the one hand, by their emphasis on intergenerational sustainability and its impact on productive processes; on the other hand, major attention is devoted to all those duties that are based on social solidarity and on the protection of EU citizens' socio-economic rights. This last aspect, in particular, marks a significant change of perspective from the traditional marginalization characterizing the economic-neoliberal approach of the origins.

It is, indeed, undeniable – as we already forementioned – that the events

[14] C. PEREZ, *Capitalism, Technology, and a Green Global Golden Age: The Role of History in Helping to Shape the Future*, in *Rethinking Capitalism: Economics and Policy for Sustainable and Inclusive Growth*, edited by M. Jacobs and M. Mazzuccato, Wiley, 2016.
[15] ONU, *Report of the World Commission on Environment and Development: Our Common Future*, 1987.
[16] COMMUNICATION FROM THE COMMISSION, *A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development*, 15 May 2001.
[17] See *inter alia* the Communication from the Commission to the European Parliament, the European Council, the Council, the European Central Bank, the European Economic and Social Committee and the Committee of the Regions *Action Plan: Financing Sustainable Growth.*
[18] Reg. (EU) 2020/852 and Reg. (EU) 2019/2088 respectively.
[19] COM/2019/640 final.

related to the economic crisis first, and to the pandemic outburst then, exacerbated the need for a radical change of perspective on the social function of financial markets. In recent years, together with enduring these new challenges, populations worldwide had to cope with the disruptive effects of climate change and the crescent disaggregation of social groups: these phenomena, in their conjunction, highlighted how the promotion of traditionally intended entrepreneurship could not be prioritized against the general welfare anymore.

In addition, EU institutions acknowledged the hardship (and even the impossibility) to pursue sustainability goals without an aware and prominent involvement of the private sectors; this, of course, further stressed the central role of the financial system to promote sustainable development.[20]

Sustainability goals have been identified as structural characteristics of modern entrepreneurship, together with the need to reorganize consumption and production processes in order to include natural and social capital within the enterprise's structure of costs, next to the financial capital. These steps are seen as essential to establish a financial system (and indirectly, a market) that can self-sustain and perpetuate itself in the medium and long run:[21] accordingly, the realization of the capital markets shall operate as a tool to promote this change, by stimulating investments in accordance with sustainability goals.

For this process to be accomplished, and in order for the financial system to successfully re-orientate markets towards sustainable development two operative strategies are traditionally identified: a) the *direct contribution* to social and environmental welfare by channelling investments towards projects that are able to create long-term (and not only economic) value; b) the *indirect contribution* by means of the incorporation of *Environmental, Social,* and *Governance* (*ESG*) factors within the dynamics of financial markets.

[20] F. PANETTA, *Finanza sostenibile: trasformare la finanza per finanziare la trasformazione*, 25 Jan. 2021, www.ecb.europa.eu.
[21] D. SCHOENMAKER, W. SCHRAMADE, *Principles of Sustainable Finance*, Oxford University Press, 2019

With regards to this second aspect, the initiatives related to *sustainable corporate governance* are particularly prominent; as far as the first strand of development is considered, a twofold strategy can be envisaged: the promotion of *Socially Responsible Investments* (*SRI*) can be achieved, on the one hand, by promoting investments in sustainable debt (e.g. green bonds, social bonds, or sustainable loans); on the other hand, sustainable goals are attainable by favouring stakeholders' investments in *ESG* attentive enterprises - e.g. through Social Entrepreneurship Funds[22].

3. As far as the relationship between sustainable finance and corporate governance, it is worth observing that encompassing social factors within the traditional modes of activities of a company is able to modify its business organization and management, therefore promoting the adoption of new operative schemes.

First and foremost, considering the social implications of a company's activity implies moving away from strategies based on the maximization of shareholders value in favour of models that take into account – oftentimes as their primary goal – the common interest of all the stakeholders affected by the activity of the company, including the surrounding environment.[23] This step is, indeed, to prioritize high-level social impact investments based on a sound systemic analysis in the regulatory agendas of EU Member States.

In order to promote the growth of sustainable inclusive companies, managers are required to consider those needs and interests, of those people that are (oftentimes indirectly) affected by the company's choices even without qualifying as stakeholders; these groups are highly heterogeneous and include, e.g. company's employees and their families, the customers, suppliers, communities, governments,

[22] Regulation (EU) No 346/2013.
[23] *Inter alios* L. LOCCI, *Brevi riflessioni in materia di fattori ESG e informativa non finanziaria nella crisi da Covid–19*, in *RTDE*, 1/2020, 124.

and even trade associations that relate to the company.[24] A wider consideration of these interests is, indeed, deemed pivotal in order to ensure that the development of an entrepreneurial process does not contribute to systemic crises.

The consideration of stakeholders' perspectives for the development of business strategies is not, though, limited to purely "internal" considerations occurring within the company and its management: Corporate Social Responsibility is emerging as a fundamental driver for investments as well, and its integration within the corporate governance and its decisional process has become an element, that investors carefully consider when deciding about how to allocate their resources.[25]

Even if, in recent years, major worldwide companies invested significant resources in introducing new management assets and organizational measures to promote sustainability goals within corporate decision-making, it must also be observed that this process must be conducted alongside a concomitant sensibilization of shareholders' expectations, as they are still mostly concerned with short-term return considerations. Consequently, sustainability-attentive boards of directors must strike a delicate balance between the different parties' interests by, on the one hand, altering management policies in favour of general welfare (e.g., with regards to the organization of dividends and their related rights) and, on the other hand, avoiding that these abrupt changes destabilize the company's activity.

The difficulties that this process creates are well highlighted by recent regulatory interventions occurred at EU level: the s.c. *Non-Financial Reporting*

[24] This is consistent with the notion of Corporate Social Responsibility (CSR), which is defined as "a self-regulating business model that helps a company be socially accountable to itself, its stakeholders, and the public. By practising corporate social responsibility, also called corporate citizenship, companies can be conscious of the kind of impact they are having on all aspects of society, including economic, social, and environmental." See *inter alia* L. MOIR, *What Do We Mean By Corporate Social Responsibility?*, in *Corporate Governance*, 1,2, 2001, 16-22.

[25] See A. MIGLIETTA, *ESG, CSR, Shareholder value: non è il momento per un reset del capitalismo*, in *Corporate Governance and Research & Development Studies*, 2/2021, 65. In its research, the Author tries to conjugate shareholder and stakeholder theory by demonstrating that investors' preferences are often aligned with the shareholders' ones, as long as a companies' business plan is apt to pursue business optimization, rather than profit maximization.

Directive[26] prescribes (Art. 1) that public interest entities shall include in their management reports "a non-financial statement containing information to the extent necessary for an understanding of the undertaking's development, performance, position and impact of its activity, relating to, as a minimum, environmental, social and employee matters, respect for human rights, anti-corruption and bribery matters, including: (a) a brief description of the undertaking's business model; (b) a description of the policies pursued by the undertaking in relation to those matters, including due diligence processes implemented; (c) the outcome of those policies; (d) the principal risks related to those matters linked to the undertaker's operations including, where relevant and proportionate, its business relationships, products or services which are likely to cause adverse impacts in those areas, and how the undertaking manages those risks; (e) non-financial key performance indicators relevant to the particular business. Also, the *Shareholder Rights Directive II*[27] requires (Art. 9b) that when directors' remuneration is split out by component and includes a variable remuneration, an explanation regarding how the total remuneration contributes to the long-term performance of the company, and information on how the corporate social responsibility criteria were applied must be provided. Lastly, the recently approved proposal for a Directive on corporate sustainability due diligence empowers directors to set up and oversee the implementation of due diligence for the assessment of the sustainability level of the company and to integrate it into the corporate strategy.[28]

These recent developments show policymakers' and institutional investors' major concern about regulating CSR and incorporating ESG factors within entrepreneurial strategies. At the same time, companies have been receptive to

[26] Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups.
[27] Directive (EU) 2017/828 of the European Parliament and of the Council of 17 May 2017 amending Directive 2007/36/EC as regards the encouragement of long-term shareholder engagement.
[28] See Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Corporate Sustainability Due Diligence and amending Directive (EU) 2019/1937, Brussels, 23.2.2022 COM(2022) 71 final.

these instances by implementing CSR and ESG compliant strategies based on the idea that, ultimately, "doing good is good for business".

These are, though, only preliminary steps in order to develop an integrated framework for the achievement of sustainability goals: in order to further advance this process, in fact, the regulatory environment must also empower stakeholders and shareholders to clearly identify if and how managers are actually pursuing sustainability goals, reducing the margins of discretion characterizing the business judgment rule in an uncertain regulatory environment, in which different and heterogeneous interests can be qualified as dominant on a casuistic basis.[29]

In addition, and consistently with the considerations animating the *Sustainable Corporate Governance Consultation*[30] debate, the everlasting primacy of remuneration schemes based on the shareholders' value and the reduced enforcement by companies of the duties deriving from CSR (subject to a highly restrictive interpretation) might jeopardize this evolutionary process. Consequently, further development of the regulations on the subject is advisable. More in general, and with reference to this aspect, the need for a regulatory framework characterized by a significant downsizing of the "theory of efficient markets" – in which the prices of financial instruments always fully reflect the information available – should be taken into consideration, accordingly with positions that banking law scholars have been defending in recent years.[31]

In order to design a model that responds to the need for finding the right financial price also in consideration of non-financial values, various factors (which are not connected to the mere economic performance of the short and medium term only) are structurally required to interact, and a consideration of their entirety is

[29] C. ANGELICI, *Diligentia quam in suis e business judgement rule*, in *Riv. dir. comm.*, I, 2006, 675; A. SACCO GINEVRI, *Crediti deteriorati e* business judgement rule, in *RTDE*, suppl. 2/2019, 161.
[30]https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12548-Sustainable-corporate-governance_it.
[31] F. CAPRIGLIONE, *Il dopo CoViD-19: esigenza di uno sviluppo sostenibile*, in *NGCC*, suppl. 5/2020, 26.

essential impossible in order to reach a proper risk assessment.[32]

This consideration clarifies the reason why the overall composition of the portfolio – and not only its quantitative content – matters in the general definition of the investment strategy; hence, the conviction that it is preferable to promote investment that focus, besides their economic fundamentals, also on the promotion of other non-financial factors.[33]

4. In recent years, there has been a lot of talk about organisational well-being and corporate welfare[34], often in connection with the (real or supposed) sustainability strategy pursued by corporate management. With most medium-sized and large organisations committing to reduce their net emissions by 2050[35], the obligation to be environmentally sustainable is stronger than ever and companies are finding it difficult to find their way. However, investing in green technology is not only good for the environment. Green practices and solutions have been shown to improve employee productivity, corporate reputation and increase staff retention.

Internally, an organisation can adopt Corporate Social Responsibility policies oriented towards managing the effects on the environment and natural resources, with reference to the natural resources directly used in the production of goods or the provision of services, in order to reduce its environmental impact[36]. This is done

[32] CUSSEDDU, *La nuova finanza: la transizione verso la sostenibilità*, 21 Feb. 2020.
[33] M. MAUGERI, *Informazione non finanziaria e interesse sociale*, in *Riv. Soc.*, 2019, 1017 ss.
[34] N. CASALINO, *Piccole e Medie Imprese e Risorse Umane nell'Era della Globalizzazione*, Collana di Studi di Tecnica Aziendale, n.90, Wolters Kluwer, Cedam, 2012.
[35] See what the European Council endorsed in December 2019 the objective of making the *EU climate-neutral by 2050*, in line with the Paris Agreement. The EU submitted its long-term strategy to the United Nations Framework Convention on Climate Change (UNFCCC) in March 2020. See also the document *Going climate-neutral by 2050 - A strategic long-term vision for a prosperous, modern, competitive and climate-neutral EU economy*. In November 2018, the European Commission presented a long-term strategic vision to reduce greenhouse gas (GHG) emissions, showing how Europe can lead the way to climate neutrality – an economy with net-zero GHG emissions. The strategy explores how this can be achieved by looking at all the key economic sectors, including energy, transport, industry, and agriculture. A portfolio of options was explored to underline that it is possible to move to net-zero GHG emissions by 2050, based on existing – though in some cases emerging – technological solutions, empowering citizens and aligning action in key areas such as industrial policy, finance, or research, while ensuring social fairness for a just transition.
[36] M. CAROLI, *Economia e Gestione Sostenibile delle Imprese*, 1/Ed, Mc Graw Hill, 2021.

by reducing the consumption of resources, pollutant emissions and waste, paying attention to the impact of products throughout their life cycle, adopting environmental management systems and audits that can be certified by accredited bodies and improving environmental performance throughout the production chain.

Looking outside the company boundaries[37], the organisation can act in the field of Corporate Social Responsibility by intervening in situations involving environmental issues that have much wider repercussions, assuming socially responsible behaviour not only at a domestic level but also on an interregional or international scale. This can be done by encouraging an improvement in environmental performance throughout the production chain, by complying with environmental legislation related to company management and products, and by investing in economic environments other than one's own.

The economic shock of the last two years has led to an increased emphasis on local communities. Organisations are recognising the importance and values of digitalization[38], local markets and supply chains[39], not only as a means of trying to reduce carbon emissions and supply chain costs, but more importantly to tap into local talent and solutions. As a result, companies are engaging in activities that will also benefit their human resources. This could include supporting services aimed at the organisational well-being of their employees, but also local charities, sponsoring community events or sports teams, organising workshops or specific educational programmes.

All this brings us to the need to consolidate the new work organisation, characterised also by more flexible working hours and spaces, more collaboration and sharing of objectives, relationships based on trust and empowerment of people,

[37] D. ROGERS, *The network is your customer: 5 strategies do thrive in a digital age*, Yale University Press, UK, 2011.
[38] R. BASKERVILLE, F. CAPRIGLIONE, N. CASALINO, *Impacts, challenges, and trends of digital transformation in the banking sector*, in *Law and Economics Yearly Review Journal - LEYR*, Queen Mary University, London, UK, vol. 9, part 2, pp. 341-362, 2020.
[39] M.P.M. DUEÑAS, L. AIELLO, R. CABRITA, M. GATTI, *Corporate Social Responsibility for Valorization of Cultural Organizations*, IGI-Global, 2018.

rather than on control.

Similarly, the corporate welfare projects that work are those in which management acts as an intellectual sponsor and in which workers actively and constantly participate. They are those that identify strategic levers for action in several areas (better organisation of working time, corporate culture, personal and workplace services, working environment, etc.) and that are adequately communicated and valorised.

Finally, a similar discussion can be made in relation to the need for greater transparency in business operations and practices. In this respect, in response to the increasing availability of data and consumer and shareholder demands for information that once remained private, buyers and organisational experts want organisations to be transparent about their internal operations, especially their environmental, social and governance disclosures[40]. For example, companies that have invested their time and therefore committed to achieving gender balance goals are expected to demonstrate what they are really doing towards that goal by showing reports with relevant indicators and detailed company's statistics.

Much of the stress in the workplace stems from a lack of harmony between employees' needs, demands and those of their environment. With so many people feeling that their work and personal lives are becoming increasingly complex and pose a threat to work-life balance, employees are more likely to be loyal to an organisation that helps them contribute to the work and personal issues they care about. That's why, in addition to providing appropriate working conditions, transparency[41], diversity, equity and inclusion policies, mental health support, and better addressing complex workplace issues, internal CSR activity should also extend to creating opportunities for meaningful engagement that align with employees' social concerns. This not only creates a motivated and open work culture, but also

[40] F. CAPRIGLIONE, N. CASALINO, *Improving Corporate Governance and Managerial Skills in Banking Organizations*, in *International Journal of Advanced Corporate Learning* (iJAC), Austria, vol. 7, issue 4, pp. 17-27, 2014.
[41] M. CAROLI, *La politica anticorruzione nei Gruppi internazionali*, Luiss University Press, 2019.

much less stressful, which bodes well for employee retention.

5. Human resources are the name given to all the people who bring value to an organisation and who, on a day-to-day basis, build the foundations or reinforce a significant source of competitive advantage. This asset allows organisations to grasp the convergence between *Corporate Social Responsibility* and *Employer Branding*.

In general, the main objective of Employer Branding strategies is to build a distinctive, positive corporate image, capable of attracting good resources and contributing to the professional growth of those already employed. This is a fundamental asset for organisations which, in the context of a constantly evolving labour market, are increasingly oriented towards social, environmental, and economic sustainability.

Human resources are the first actors on which social responsibility actions should focus precisely because they are the subjects towards whom the organisation has a direct responsibility arising from a relationship of trust and a common purpose that binds them[42]. Companies, which today are effectively oriented towards sustainability, are looking for professional figures with high skills and strong specialisation able to identify ethical and sustainable production processes, attract new customers and investors, and exponentially increase the performance of their business processes[43].

Among the most sought-after roles for these positions are those linked to the corporate areas of supply chain management, human resources and diversity management, research and development, analysis of "green" strategies, resources and energy supply management, organisational planning and process design, finance

[42] V. WEERAKKODY, M. JANSSEN, Y.K. DWIVEDI, *Transformational change and business process reengineering (BPR), Lessons from the British and Dutch public sectors* in Government Information Quarterly, 28(3), pp. 320-328, 2011.

[43] N. CASALINO, M. DE MARCO, C. ROSSIGNOLI, *Extensiveness of Manufacturing and Organizational Processes: an Empirical Study on Workers Employed in the European SMEs*, in *Smart Digital Futures 2015*, Neves-Silva R., Tsihrintzis G.A., Uskov V. (Eds.), Smart Education and E-Learning 2015, Uskov V., Howlett R.J. and Jain L.C. (Eds.), IOS Press, KES Smart Innovation Systems and Technologies series (TBC), Springer, 2015.

and risk management, marketing, environmental management, all roles naturally declined according to the dimension of sustainability.

A category of stakeholders considered by many scholars, researchers, and entrepreneurs to be the most important and influential is therefore that of human resources, considering that every organisation cannot refrain from considering the problem of the impact of its activities on the environment nor ignore the social function it is called upon to perform in the communities in which it operates[44].

For example, by encouraging innovation[45] and creativity, recognising the merits of its employees, ensuring that the workplace gives them a sense of security. Furthermore, that pay is fair and adequate, that they are also allowed to properly fulfil their family responsibilities, that there is a real opportunity to make suggestions and present constructive criticism, as well as the fact that equal work, development, and career opportunities are always guaranteed for those with the required skills and that superiors are responsible for the choices they make, are competent and that their actions are just and ethically correct.

Common objectives that can only be pursued through cooperation between individuals, or rather between people who make up the organisation itself. There are two fundamental concepts in this vision: people and cooperation. Individuals in a company do their work daily, but it is when they become people, interfacing and relating to each other, that they achieve something that goes beyond their individuality, an added value that only exists in the relationship, as Simon said, with others.

All this can be achieved by activating a process to improve the quality of work and the working environment, implementing a healthy corporate culture, increasing the degree of satisfaction of the internal customer (the employee) and the commitment that will consequently stimulate the interest of the labour market. It is

[44] L. GIUSTINIANO, A. PRENCIPE, *La digital transformation di una multi-utility. Tecnologia e persone, fattori chiave dell'esperienza ACEA*, Harvard Business Review Italia, 2017.
[45] T. BURNS, G.M. STALKER, *The management of Innovation*, Oxford University Press, 1996.

fundamental to remember that people are basically a company's primary asset. However, there is also a need for legislation that is even more focused on creating and fostering working conditions that allow, in a time of persistent economic crisis such as the current one[46], to value, incentivise, reward, and equip workers with the tools to improve and enhance their performance[47].

The acknowledgment of the primary role of human resources as stakeholders involved in the development of sustainable organizations, is also at the basis of a renovated understanding of sustainability within the organizational environment as well. In such a sense, it is worth observing that, even within the new models of sustainable corporate governance, different goals and different notions of sustainability can be identified, which overall contribute to the general idea of organizational sustainability.

6. Desired Organizational Learning (DOL) is often intentionally pursued as part of a sociotechnical agenda and explicit aim for organizational excellence in financial organizations. Organizational Learning and change always happen, but not all organizational learning is desirable, and some can even be described as organizational stupidification[48] or nonsense-making[49] as if not addressed it can result in practices which sabotage desirable outcomes and any effort to change business practices for the better, towards organizational excellence.

Recently the awareness that there needs to be a significant investment and governmental support for the development of systemic organizational sustainability,

[46] M. PELLEGRINI, V. USKOV, N. CASALINO, *Reimagining and re-designing the post-Covid-19 higher education organizations to address new challenges and responses for safe and effective teaching activities*, in Law and Economics Yearly Review Journal - LEYR, Queen Mary University, London, UK, vol. 9, part 1, pp. 219-248, 2020.

[47] P. BOCCARDELLI, C. ACCIARINI, E. PERUFFO, *Dinamismo ambientale, esperienza digitale del board e cambiamento strategico delle imprese. L'integrazione tra Dynamic Managerial Capabilities e Resource Dependence Theory*, in Corporate Governance and Research & Development Studies-Open Access, 2021.

[48] M. ALVESSON, A. SPICER, *The Stupidity Paradox: The Power and Pitfalls of Functional Stupidity at Work*. Profile Books, 2016.

[49] M. ALVESSON, A. JANSSON, *Organizational Dischronization: On Meaning and Meaninglessness, Sensemaking and Nonsensemaking*, in *Journal of Management Studies*, 2021.

and that this by necessity requires attention to Human Sustainability as well as Environmental Sustainability has become more and more pronounced. Many have realized that the ambition of Industry 4.0 is not enough and could not address the real complexity of the challenges faced by contemporary society.[50] It is not satisfactory to prioritise efficiency, local effectivity, and societal sub optimization when it sabotages overall effectivity and global wellbeing.

The main purpose with promoting sustainable organizational excellence is about supporting a long-term competitive advantage in an increasingly complex and changing socio-technical environment.[51] Desired and successful outcomes are all based on how the organizational work systems are being supported/improved not only for the now and here, but especially for the future of work. The background is rather simple. Employees are expected to be able to solve complex problems which are intrinsically not predictable. Basically, if problems are predictable and not complex then the work could be automated, and no employees would be needed. If however managers need and want their employees to go out of their way to try to solve complex problems these employees must be willing to volunteer to do so. Also, employees must be allowed to solve complex problems in their work environment on the basis of their own professional competences. Which means they must also be supported in their problem-solving efforts as part of the development of Smart Working Practices.[52] Not micro-managed.

A sociotechnical system approach and perspective refers to the interrelatedness of social and technical aspects of an organized human activity, whether or not formalized. Any long-term competitive advantage is intrinsically dependent on Human Sustainability, in the context of a Human Activity System. If people are to volunteer to go out of their way in their efforts to explore and solve

[50] EUROPEAN COMMISSION. *Industry 5.0: Towards a sustainable, human-centric and resilient European industry*, in https://op.europa.eu/en/publication-detail/-/publication/468a892a-5097-11eb-b59f-01aa75ed71a1/language-en, 2021.
[51] P. BEDNAR, *Socio-Technical Toolbox*. 5th ed. Craneswater Press, 2022.
[52] P.M. BEDNAR, C. WELCH, *Socio-Technical Perspectives on Smart Working: Creating Meaningful and Sustainable Systems*, in *Information Systems Frontiers*, 2020, 22, 281–298.

problems and to pursue work excellence in collaboration with each other; they also need to be able to maintain their health, enjoy their work and get satisfaction from their efforts.

The real-world organizational problem space is complex, ambiguous, and changing. Organizational achievement is a consequence of individual professionals' work activity as part of a work system. Each professional is interacting with technology and collaborating with other professionals. Organizational sustainability consists of many complementary areas of concern, none of which can be successfully addressed in isolation from any of the others.[53] People do not just need to be able to do their job as professionals, they also need to be allowed to use their competence and knowledge of context to be able to do "their best jobs". Or to aim for professional excellence. This means professionals to be allowed (and supported) to make professional decisions. It means that professionals need to be trusted and they need to be able to trust their employer. Which requires special care and attention to the human sustainability aspect of the organized activity.

In such sense, different meanings of sustainability within the organizational system can be envisaged, by distinguishing inter alia:

a) *Environmental Sustainability:* This is about how work practices in a Human Activity System are related and influence natural resources. Today we often talk about "green work". How are existing work practices green? For the professional employee it is about how green work is actually promoted and prioritised as part of everyday work activities? How could these activities become greener in the future?;

b) *Economic / Financial Sustainability:* This is about how work practices in a Human Activity System are able to continue in the future because they are competitive enough in context. How is the employee involved in decision making related to costs of resources required to do their jobs?;

c) *Social Sustainability:* This is about how work practices in a Human Activity

[53] *Ibidem.*

System are experienced as fair and responsibilities are distributed in a socially and culturally just fashion. How is the employee involved in decision making or support of others, and themselves? How could collaboration between and help for different stakeholders (inside and outside the organization) be supported better in the future?

d) *Technical Sustainability:* This is about how work practices in a Human Activity System are related to and influence use of technological resources. How is the employee involved in the design, decision making process and choice of the appropriate technology, including design of use of technology, in their job as a priority? How could this be done better in the future?

e) *Cybersecurity Sustainability:* This is about how work practices are naturally involved in IS Security activities (including information and knowledge management), or not, as part of their everyday work routines. How is the employee involved in the decision making in the development of security practices? How has the employee influenced IS Security as a professional?

Contemporary society is experiencing a lot of turmoil and upheaval on multiple fronts, pandemic, economic, energy and political crisis. It is perhaps not surprising that concerns have resulted in raised expectations that governing bodies do more and prioritize the required transformation both in public as well as private organizations. The demands on proactive change continue to be growing.[54] It is relatively easy to change models of organizational processes, easy to change models of workflows, and easy to have ambitious policies documented. But it is not easy to change real world behaviour, for that we need to promote human sustainability. And put our money where our mouth is.

The difficulty in encompassing these different "souls" of organization sustainability is also one of the reasons why a significant amount of attention has been devoted to the capacity of the State to promote Socially Responsible

[54] EUROPEAN COMMISSION *Industry 5.0, a transformative vision for Europe: Governing systemic transformations towards a sustainable industry*, 2022, in https://op.europa.eu/en/ publication-detail/-/publication/38a2fa08-728e-11ec-9136-01aa75ed71a1/language-en/format-PDF/source-search

Investments, which represents an approach that is significantly closer to the traditional parameters and modes of public interventions.

7. As it has been pointed out, one strategy to promote the affirmation of sustainability themes within the financial market entails the incorporation of ESG attentive practices in corporate governance, it is clear that a significant portion of this process must necessarily pass through the allocation of market capital as well: this can be achieved, in particular, through the integration of ESG factors in the creation, research, and analysis of financial products, as well as more generally in the composition of investment portfolios, ultimately favouring the development of Socially Responsible Investment in an integrated model which allows to carry out, in addition to the assessment of economic underpinnings, also the analysis of other non-financial factors which can be generally be traced back to negative externalities.

Such processes are being met with great interest by institutional and retail investors: investors are exhibiting increasing awareness for environmental and social concerns related to sustainable development; subsequently, they often pursue products that align with their values. This phenomenon is symptomatic of a broader trend taking place in consumption phenomena, as consumers declare to be willing to change their shopping habits to reduce environmental impact, and support the use of clean energy resources, indirectly fostering the adoption of green technology and sustainable products and processes in the market.[55] Notably, consumers' concern is not limited to the environmental impact arising from uncontrolled industrial development and mass consumption, but rather embraces a wide set of social goals: promotion of gender equality, reduction of wealth disparity, contrast to extreme poverty and systemic unemployment in developing countries currently all represent major declared drivers for consumption.[56]

[55] IBM, *Meet the 2020 consumers driving change. Why brands must deliver on omnipresence, agility, and sustainability* 2020, https://www.ibm.com/downloads/cas/EXK4XKX8.
[56] *Healty & Sustainable Living. A global consumer insight project*, in *Globescan* 2020.

Even if the reasons behind investors and shareholders' interest for Corporate Social Responsibility are disputed,[57] in response to this trend, financial market actors are increasingly marketing financial products and services that directly or indirectly support sustainability-related projects, promoting these products as green and sustainable.

The opportunity therefore arises, to take advantage of the current favourable conjunction by stimulating investment activity towards sustainable debt instruments or in the shares of companies that promote sustainable goals. In both cases, this can be achieved alternatively by promoting investments in those bonds, the proceeds of which are specifically earmarked for sustainable projects, or in products which are linked to sustainable activities although not having their direct implementation as the main goal (s.c. sustainability-linked products).

Besides constituting sources for direct investment in sustainable activities, green or social financial products are, in fact, likely to operate indirectly as well, through the inclusion of instances that are collaterally linked to environmental and social sustainability within traditional investments: the conjunct use of these two tools allows, on the one hand, to reduce the externalities associated with the environmental and social impact of traditional investments – while providing companies enough margins of appreciation to gradually accomplish their transition processes - and, on the other hand, to preserve (and, where possible, raise) investors' perception regarding the risks that are related to the sustainable impact of traditional investments.[58]

With reference to the first hypothesis – that is, the promotion of investment in directly or indirectly sustainable products - public entities can play a leading role in two ways: firstly, they can be directly involved in the issue of green or social

[57] A. PACCES, *Sustainable Corporate Governance: the Role of the Law*, in D. Busch, G. Ferrarini, S. Grünewald (eds.), *Sustainable Finance in Europe. Corporate Governance, Financial Stability and Financial Markets*, Palgrave Macmillan, Londra, 2021.

[58] G20 GREEN FINANCE STUDY GROUP, *G20 Green Finance Synthesis Report*, 2016, https://unepinquiry.org/wp-content/uploads/2016/09/Synthesis_Report_Full_EN.pdf.

securities, whose emission is strictly connected to initiatives that have a positive impact in terms of ESG performance (this happened, e.g. in February 2021, with the Italian government issuing the first block of green *BTP*s)[59]. In this way, sovereign sustainable bonds can operate alongside those already issued by supranational entities, financial corporations, and banks. As an alternative, the public operator can indirectly promote investments in sustainable financial products through the creation of a regulatory framework that clearly identifies the minimum standards to qualify a given bond as green or social. Currently, no global standard exists, to certify a bond as being univocally "green" or "sustainable", and the industry mostly refers guidelines developed by non-regulatory entities such as the International Capital Market Association (ICMA); this is, though, not advisable, as it is generally up to the legislator to encourage the identification of unambiguous indexes for sustainable products, that can promote investors' confidence and at the same time provide effective parameters for public supervision.

The need to lay down a clear-cut regulatory framework regarding this issue is, indeed, already well-known to EU institutions and to national legislators: with reference to the latter, for example, alongside the aforementioned issuance of green BTPs, the Italian government established a plurality of issuance and traceability parameters; in addition, an Interministerial Committee was empowered to identify and supervise eligible investments. As regards initiatives at EU level, the identification of unambiguous classification indices is the core *rationale* behind the drafting of the Taxonomy Regulation and its Technical Screening Criteria.[60]

As for the second potential strategy (i.e. the promotion of investments in the shareholding of ESG attentive companies), the recent experience of the European Social Entrepreneurship Funds (EuSEF) is of particular note: according to Regulation (EU) 2013/245, these funds are required to allocate a significant proportion of the total amount of their capital contributions and uncalled subscribed capital in assets

[59] http://www.dt.mef.gov.it/it/debito_pubblico/titoli_di_stato/quali_sono_titoli/btp_green/.
[60]https://ec.europa.eu/info/files/200309-sustainable-finance-teg-final-report-taxonomy-annexes_en.

qualifying as eligible investments under the Regulation; more generally, EuSEF shall conduct their business activity in a way that furthers the positive social impact of the portfolio undertakings in which they invest, the best interests of the social entrepreneurship funds they manage, ultimately promoting market integrity as a whole.[61]

As the framework outlined so far unveils, the developments that have taken place over the last decade in the relationship between the financial system and sustainability have changed and at the same time reaffirmed the role of the public authority in the pursuit of sustainability-related objectives. For a long time, policies on socio-environmental preservation have been considered to be the exclusive prerogative of the State (or, in the EU, of the Union): this view was supported by the idea that the socio-environmental aspects of business development should have been included among the negative externalities, to which businesses must pay attention in terms of cost only; consequently, consideration of these aspects was minimized both in the definition of entrepreneurial projects and (considering, for example, the dynamics connected to access to credit) in the worthiness assessment for the purposes of granting loans.

In contrast to this traditional view, however, recent times are witnessing a reversal of such trend, and an increased favour for the (direct or indirect) externalization of sustainability policies by the actors of the financial system.

This *revirement* can be, indeed justified both on the basis of considerations that are common to the general debate on sustainable finance (reduction of the environmental and social impact of the investment and reallocation of economic resources towards virtuous investments) and also in the light of the desire to encourage greater involvement of businesses and an overall functionalization of the financial system as a whole towards sustainability goals, in order to compensate for the difficulties encountered by public bodies in promoting sustainable consumption.

[61] Artt. 3 and 7 Reg. (EU) 2013/245.

Lastly, a major involvement of the private sector in the pursuit of sustainability-related policies would also raise investors' awareness of environmental and social risk in a broad sense, through their direct involvement and building on the current interest towards these issues, that can be generally observed within contemporary consumer markets.

In light of these aspects, public entities are required to play a twofold role in the approach to sustainability issues, operating both as directly involved actors and regulators levelling the playing field for private parties to operate.

8. The great attention paid to the functionalization of financial markets to the promotion of sustainability-related issues is undoubtedly a welcome development. At the same time, it should also be noted that focusing economic interests in this area is likely to create new risks for the market functioning, and therefore calling for action by public actors not only as legislators and market agents but also as a monitor for the correct implementation of financial practices related to sustainability.

In particular, in recent years market operators have undertaken a series of promotional initiatives which – with the alleged aim of strengthening the perceived sustainability of their activities – might end up favouring a distorted or manipulative use of sustainability claims: this trend, identified with the term "greenwashing"[62], has emerged as a fundamental issue in contemporary financial markets.

In the lack of a common definition and with little or no-normative clarification by policy makers, financial service providers developed their definition for "green" and "sustainable" products in isolation: therefore, they vary in scope, level of detail, transparency, and other dimensions.[63]

It is no surprise that, since investors have little guidance in selecting investments that have an actual potential to provide environmental benefits, the

[62] T. WAHIDA SHAHAN, *Green Washing: An Alarming Issue*, in *ASA University Review* 7, 1, 2014, 81-88.
[63] EUROPEAN COMMISSION, *Defining "green" in the context of green finance. Final report*, 2017, https://ec.europa.eu.

breadth of definitions hampers the selection of assets for green products, reduces transparency for investors and ultimately fosters greenwashing, also considering that financial products are usually qualified as credence goods.[64]

As soon as financial companies started modernizing their products making them eco- and social friendly, the integration of sustainability risks and factors in the investment protection regime to avoid greenwashing emerged as a primary goal of the European strategy within the Financing Sustainable Growth Action Plan:[65] as part of their duty to act in the best interest of clients, financial markets participants – and, in particular, advisors – must inform investors on the sustainable characteristics of the promoted investments, in order to reduce the principal-agent informational asymmetry lying at the core of greenwashing phenomena.[66]

This is mainly because promoting investment in greenwashed financial products by unaware investors is likely to cause sector-specific externalities that are worthy of primary consideration: financial greenwashing misallocates capital, therefore indirectly hindering the transformative process towards sustainable markets; in addition, it increases investors' confusion about CSR and has a negative effect on investment propensity[67]. Lastly, in the long run financial greenwashing is likely to affect investors' attitude and increase their scepticism over environmental commitments.[68]

In order to hold up to the promise that sustainable finance subtends to foster responsible development, a significant effort was made in recent years by European

[64] A. DAVOLA, *Algoritmi decisionali e trasparenza bancaria*, Utet, Milano, 2020, 214; ID., *Bias cognitivi e contrattazione standardizzata.*

[65] Communication from the Commission to the European Parliament, the European Council, the Council, the
European Central Bank, the European Economic and Social Committee and the Committee of the Regions action plan: Financing Sustainable Growth, Com/2018/097.

[66] M. SIRI, S. ZHU, *Will the EU Commission Successfully Integrate Sustainability Risks and Factors in the Investor Protection Regime? A Research Agenda*, in *Sustainability*, 11, 2019, 6292.

[67] P. SEELE, L. GATTI, *Greenwashing revisited: in search of a typology of an accusation-based definition incorporating legitimacy strategies*, in *Business strategy and the Environment*, 26(2), 2017 239-252.

[68] Y. CHEN, C. CHANG, *Greenwash and green trust: The mediation effects of green consumer confusion and green perceived risk*, in *Journal of Business Ethics*, 114, 2003 489-500.

institutions to introduce sustainability-related rules on investments. In particular, the abovementioned SFDR and TR are supposed to shape a uniform system for qualifying, indexing, and reporting sustainable investments, reducing information asymmetry between end-investors and financial market participants, ultimately favouring aware investments considering sustainability risks and adverse impacts.[69]

The SFDR operates by introducing both disclosure rules and fiduciary duties, and its goal is to facilitate comparison amongst sustainable (and non-sustainable) financial products, level the playing field for such products and for distribution channel, and to promote transparency with regards to the consideration of sustainability factors in the communication between professionals and investors. To do so, the SFDR establishes under which conditions financial products can be qualified as "sustainable investments" and then, if a product fits the definition the Regulation fleshes out specific disclosure obligations that must be provided to investors regarding its sustainability characteristics, impact, and risks.[70]

On the other hand, the Taxonomy Regulation aims at establishing a harmonized classification system for sustainable activities at European level[71] and, in order to do so, it identifies six environmental objectives;[72] accordingly, the Regulation qualifies a product as environmentally sustainable if it makes a significant contribution to (at least) one of them while not significantly harming the others.[73]

While it is certainly appropriate for the EU institutions to take legislative action in this regard, it should be pointed out that the introduction of a regulatory framework (even a well-structured one) is unlikely to be sufficient to avert the risks associated with greenwashing in the absence of a system able to couple it with

[69] SFDR Recital 9 and 10.
[70] See Art. 2(22) and Art. 2(24) SFDR.
[71] For an overview of the TR see D. BUSCH, G. FERRARINI, A. VAN DEN HURK, The European Commission's Sustainable Finance Action Plan and Other International Initiatives in *EUSFiL Research Working Paper Series* 3 8, 2020.
[72] Art. 9.
[73] Artt. 11, 12, 13, 14.

effective supervision:[74] the integration and monitoring of ESG factors in the processes of prudential supervision has therefore been identified as a priority in the process of transition of the financial system, placing sustainability at the heart of the control activities of Member States' and European Supervisory Authorities.[75]

This is, indeed, consistent with the idea that preventing greenwashing activities – and, more generally, combating disinformation in the financial markets - constitutes a traditional task of supervision, as the latter is aimed at preserving confidence in the financial system, protecting investors, and preserving markets' stability, smooth operation, and competitiveness.

It should be noted, though, that these goals can be achieved only in part through the definition of an ad hoc regulatory framework: public players (and, in this case, the Supervisory Authorities in particular are, in fact, equally in charge of preserving the safety and soundness of the financial system by ensuring compliance with positive law. At the same time, in conducting supervision, they must be flexible enough to allow for the proper "maintenance" of the Regulations – as they are still in development – and, at the same time, to engage in a fruitful dialogue with the players in the financial sector. This interaction must be aimed not only at ensuring compliance to the rules, but also at promoting competitiveness in the market for (effectively) sustainable products, by encouraging their dissemination and placement towards investors.

9. The overview conducted shows that the transition of the financial system (and, consequently, of the market) towards sustainable dynamics raises - alongside the ones pertaining to the identification of the most effective strategies and the definition of the relative regulatory framework - several open questions regarding the role to be attributed to the public actor within this process.

[74] See *Discussion Paper on management and supervision of ESG risks for credit institutions and investment firms* (EBA/DP/2020/03).
[75] See *Consob*, *UE, primi passi di vigilanza Esg*, 2020 https://www.eticanews.it/esma-una-strategia-esg/.

In the past thirty years, the affirmation of the essential function of Corporate Social Responsibility businesses as well as – more recently – the discovery of Corporate Social Performance as an integrated parameter for evaluating business results, have been gradually challenging the traditional role of the State as the subject in charge of controlling and minimizing externalities; as a result of this process, the role reserved for the public authorities has changed, and they now operate in financial markets not only as regulators but also as facilitators and as players directly involved in the sustainable transition. This process goes beyond the transition from the entrepreneurial to the regulatory state that characterized the market economy of European countries in the '90s;[76] rather, it marks an increased awareness of the opportunities arising from a synergic approach between the private and public sector.

The latter is, currently, in charge of designing an industrial ecosystem that is favourable to 'virtuous' entrepreneurship, while at the same time being directly involved in activities that contribute to the achievement of goals related to social and environmental sustainability; as for the role of private parties, companies are required to gradually convert their operating models, combining the needs of profitability and stability with those related to sustainability. Moreover, the direct involvement of public actors as providers of sustainable products and services seems to be functional to an indirect regulation (as in the case of green BTPs), setting operational standards which can serve as guidelines for private sector companies.

The State plays, therefore, a dual role - regulator and key player - which becomes indeed threefold considering how the transition of financial markets towards the provision of sustainable services and products requires - in the uncertainty of a still in-development regulatory framework[77] - the assumption by the supervisory authorities of a delicate balancing role; this in order to ensure legal

[76] See M. PELLEGRINI, A. SACCO GINEVRI, *Il ruolo dello Stato nei settori strategici dell'economia*, in *Corso di diritto pubblico dell'economia*, edited by M. Pellegrini, Cedam, Padova, 2016, 462.

[77] E.g., the TR will operate from 2022 - with some aspects delayed to 2024 - onwards.

certainty, providing unambiguous guidance to operators in the sector.

Seeking for a balance between these different roles of the State and its structures – considering also that these issues are often intertwined with the allocation of competences at Member States' and EU level - is certainly a complex issue, which will require a considerable coordination effort in terms of interdependence and convergence between the ESAs and national financial markets and banking authorities. Nevertheless, this path seems to be the only one to promote the exchange and dissemination of sound practices on sustainability. This coordination process – that has been already anticipated by ESMA during the announcement of the creation of the *Sustainability Coordination Network*[78] – is indeed necessary to stimulate the transition towards a financial system capable of reconciling economic development with environmental, ethical, and social values.

[78]https://www.esma.europa.eu/press-news/esma-news/esma-prioritises-fight-against-greenwashing-in-its-new-sustainable-finance.

ARTIFICIAL INTELLIGENCE AND CORPORATE GOVERNANCE

Andrea Sacco Ginevri [*] - Lorenzo Locci [**] - Argha Kumar Jena [***]

ABSTRACT: *The digitization of corporate processes is increasingly accelerating starting from the Covid-19 emergency legislation, which fostered the use of telematic tools in the corporate organization, with positive effects on the efficient management of costs, times and results. Also, the impact of AI on corporate governance is not limited to virtual interactions but may help all areas of activity of the corporation such as the control over business processes, as well as, potentially, the performance of administrative functions of organizational and, in perspective, managerial nature. However, we argue that the individual must still be at the center of the digital transformation and not vice versa. This seems consistent with the objective of developing a policy framework to ensure trust in AI systems pursued by the European Union's policy makers.*

1. There is no doubt that the digitalization of corporate processes has been accelerated by the emergency legislation aimed at countering the effects of Covid-19. The traditional rights of minority shareholders, including the right to attend the

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Although this paper is the result of a joint reflection, paragraphs 1, 2, 3 and 5 can be primarily attributed to Andrea Sacco Ginevri, while the remaining paragraph 4 is primarily attributable jointly to Lorenzo Locci and Argha Kumar Jena.

annual shareholders' meetings, have been compressed during the pandemic – in the name of health and protection of personal safety – in favor of forms of attendance to corporate events based on remote and virtual modalities, implying distance interactions and electronic voting[1].

More in general, the business organization has become increasingly digital and governed by new technologies, thus raising also questions of a systematic nature. However, even before the spread of the pandemic there was a feeling that corporations were about to face an evolution towards an inevitable digitalization of processes, including a progressive introduction of artificial intelligence in corporate dynamics, whose impact on corporate governance is potentially not limited to the use of virtual interactions. Indeed, artificial intelligence may be of fundamental help both in the activities of financial reporting[2] and in the control of business processes[3], as well as in the performance of functions having an organizational administrative and, prospectively, managerial content.

This is because artificial intelligence can contribute with adaptable intensity to the functioning of the managing body, it being able to characterize itself, alternatively, as *assisted AI* (to provide support on specific tasks), or *augmented AI* (to support and strengthen the decision making processes, with the possibility to develop into *amplified AI*, where human and machine co-decide) or, in perspective, even *autonomous AI* (where the human being is entirely replaced, including the extreme case of the *autopoietic AI*, which implies the self-directed development of

[1]On this topic see, *inter alia*, A. BUSANI, *Assemblee e Cda in audio-video conferenza durante e dopo COVID-19*, in *Società*, 4, 2020, 393 et seq.; F. MAGLIULO, *Quel che resterà del verbale assembleare dopo il Covid-19*, in *Notariato*, 2020, 249-257; P. MORARA, *Svolgimento delle assemblee cooperative e distanziamento sociale, con specifico riferimento al rappresentante designato*, in *Società*, 2020, 544-552; M. IRRERA, *Le assemblee (e gli altri organi collegiali) delle società ai tempi del Coronavirus*, in *Il diritto dell'emergenza: profili societari, concorsuali, bancari e contrattuali*, edited by M. Irrera, in *Quaderni di RES*, 2020, 66-81; L. LOCCI, *Assemblee societarie "a porte chiuse": quali indicazioni per il futuro?*, in *La Nuova Giurisprudenza Civile Commentata*, supplement no. 5/2020, 78 et seq.

[2]See M.L. MONTAGNANI – M.L. PASSADOR, *Il consiglio di amministrazione nell'era dell'intelligenza artificiale: tra corporate reporting, composizione e responsabilità*, in *Rivista delle società*, 2021, 1, 121-151.

[3]See M. HILB, *Toward artificial governance? The role of artificial intelligence in shaping the future of corporate governance*, in *Journal of Management and Governance*, 2020, 851 et seq.

the artificial intelligence system itself).

Consistently, neologisms such as "*robo-board*", "*corp-tech*", "*self-driving corporations*" have appeared in the international vocabulary as an index of an imminent dehumanization of corporations[4].

In light of the above, administrative bodies of large companies are setting up special internal committees responsible for implementing and monitoring the correct use of IT and digital solutions, with the task to identify and verify which data were used by the algorithm, how it works and its reliability parameters[5]. Moreover, it is undeniable that in the financial field the digital transformation is already affecting services and processes, by enhancing the use of information systems for the automatic analysis of collected data[6]. All of this while being aware that "*the machine makes its evaluations in objective terms (...) while the results of human actions are affected by moral control*"[7].

The distinction at hand must be kept in mind for the purposes of the adoption of adequate organizational structures, which, nowadays, must provide for an

[4]See, among others, N. ABRIANI, *La corporate governance nell'era dell'algoritmo. Prolegomeni a uno studio sull'impatto dell'intelligenza artificiale sulla corporate governance*, in *Il Nuovo Diritto delle Società*, 2020, 3, 261-285; N. ABRIANI, G. SCHNEIDER, *Il diritto societario incontra il diritto dell'informazione. IT, Corporate governance e Corporate Social Responsibility*, in *Rivista delle Società*, 2020, 1326 -1397; L. ENRIQUES – D.A. ZETSCHE, *Corporate Technologies and the Tech Nirvana Fallacy*, in *Hastings Law Journal*, 2020, 72, 55 et seq.; V.J. ARMOUR – H. EIDENMÜLLER, *Self-Driving Corporations?*, in *Harvard Business. Law Review*, 2020, 3-38, 87 et seq.; L. ENRIQUES, *Responsabilità degli amministratori e ruolo degli algoritmi: brevi annotazioni sul senno di poi 4.0*, in *Intelligenza Artificiale-Il diritto, i diritti, l'etica*, edited by A. Ruffolo, Milan 2020, 295-300; G.D. MOSCO, *Roboboard. L'intelligenza artificiale nei consigli di amministrazione*, in *Analisi Giuridica dell'Economia*, 2019, 1, 247-260; G. SCARCHILLO, *Corporate Governance e Intelligenza Artificiale*, in *Nuova Giurisprudenza Civile e Commerciale*, 2019, 4, 881-892; F.M. SBARBARO, *Algoritmi, intelligenza artificiale e personalità giuridica: prime note sul recente dibattito in tema di autonomous entity*, in *Il Nuovo Diritto delle Società*, 2020, 7, 885-904; P. TULLIO, *Diritto societario degli algoritmi. E se i robot diventassero imprenditori commerciali?*, *Analisi Giuridica dell'Economia*, 2019, 1, 225-246; P. MOSLEIN, *Robots in the Boardroom: Artificial Intelligence and Corporate Law*, in *Research Handbook on the Law of Artificial Intelligence*, edited by W.Barfield and U. Pagallo, Northampton 2018, 649 et seq.

[5]See. M. MONTAGNANI, *Intelligenza artificiale e governance della "nuova" grande impresa azionaria: potenzialità e questioni endoconsiliari*, in *Rivista delle società*, 2020, 1003-1026

[6]See M. PELLEGRINI, *L'intelligenza artificiale nell'organizzazione bancaria: quali sfide per il regolatore?*, in *Rivista Trimestrale di Diritto dell'Economia*, 2021, 3, 422 et seq.

[7]See F. CAPRIGLIONE, *Diritto ed Economia. La sfida dell'Intelligenza Artificiale*, in *Rivista Trimestrale di Diritto dell'Economia*, 2021, suppl. no. 3, 14 et seq.

appropriate recourse to artificial intelligence as an instrument to support the administrative body, the lack of which – where useful in abstract – must be precisely motivated as well.

This is even more true for large or supervised firms, which, due to the potentially systemic impact of their possible crisis, must, more than others, take care of the implementation of an organizational structure that is effective in preventing shocks and resilient in managing stress situations[8].

These features are consistent with the construction of internal governance architectures based, *inter alia*, on tools of assisted AI as well as on forms – even if still potential – of augmented AI.

In order for the corporation's organizational structure to be deemed as effectively adequate – and, therefore, suitable to protect both the executive administrative body (as regards the activity of care of the structure) and the collegial body (as regards the activity of assessment of the structure) from potential liabilities – it is necessary to carefully weight the support of artificial intelligence in the business management. For these purposes, it is certainly useful to get a sufficient number of directors with the necessary experience and knowledge in the technological field. In such circumstances, the qualitative and quantitative composition of the management body can be deemed to be optimal, and consequently adequate organizational structures can be implemented using artificial intelligence too[9].

As a result, corporate compliance – made up of audits, information flows, factual analyses and interactions – will be increasingly efficient, fast and cheap, while allocating to apical functions the task, and related liability, of knowing how to plan and monitor, among other things, the role played by IT support in corporate

[8] On this topic See F. CAPRIGLIONE – A. SACCO GINEVRI, *Metamorfosi della governance bancaria*, Turin, 2019, 297 et seq.; M. PELLEGRINI, *Il diritto cybernetico nei riflessi sulla materia bancaria e finanziaria*, in VV.AA., *Liber amicorum Guido Alpa*, edited by F. Capriglione, Padua, 2019, 351 et seq.

[9] See F. CAPRIGLIONE – A. SACCO GINEVRI, *Metamorfosi della governance bancaria*, mentioned, 297 et seq.

governance processes.

2. Artificial intelligence, in addition to fluidizing the gears of the organizational structure, can effectively corroborate the management activity of the enterprise, by contributing to the adoption of fully informed and bias-free determinations.

The complexity of an interaction between man and machine in such an environment lies in the fact that the management activity increasingly involves a delicate balance between different values.

Nor can it be considered easy to program artificial intelligence with a precise scale of priorities that can guide it in the selection of the objectives pursued, since corporate interest, as is known, represents a concept in continuous evolution and of difficult interpretation[10]. In this regard, reference shall be made to the many initiatives undertaken both at a political (e.g., the 2019 Business Roundtable) and regulatory level (e.g., the second EU directive on shareholders' rights) which pave the way to a swift of the traditional paradigm of the shareholders' primacy towards a new paradigm where the management is required to increasingly take into account the interest of all the stakeholders involved (including employees, communities, the environment, etc.) in running the company [11].

If it is true, therefore, that the use of augmented AI, or even amplified AI, aims at achieving a significant reduction of the risk of conflicts of interest in taking business decisions, it is equally true that an excessive reduction of human managerial discretion would lead to the sacrifice of the *individual*'s own sensitivity in the valorization of elements that are difficult to weight in *objective* terms. Hence the

[10]See U. TOMBARI, *Corporate Purpose e diritto societario: "dalla supremazia degli interessi dei soci" alla libertà di scelta dello "scopo sociale"?*, in *Riv. soc.*, 2021, 1, 1 et seq.; M. VENTORUZZO, *Brief Remarks on "Prosperity" by Colin Mayer and the Often Misunderstood Notion of Corporate Purpose*, in *Riv. soc.*, 2020, 1, 43 et seq.

[11]See on this topic, *inter alia*, M. STELLA RICHTER JR., *Long-terminism*, in *Riv. soc.*, 2021, 1, 16-52; P. MARCHETTI, *Dalla Business Roundtable ai lavori della British Academy*, in *Riv. soc.*, 2019, 5/6, 1303-1306; M. MAUGERI, *"Pluralismo" e "monismo" nello scopo della s.p.a. (glosse a margine del dialogo a più voci sullo statement della Business Roundtable)*, in *Rivista ODC*, 2019, 3, 637-645; L. LOCCI, *Brevi riflessioni in materia di fattori ESG e informativa non finanziaria nella crisi da Covid–19*, in *Rivista Trimestrale di Diritto dell'Economia*, 2020, suppl. no. 1, 124 et seq.

difficulty of entrusting an algorithm with the full and autonomous management of a company, unless the activities involved are so unsophisticated that they can be performed on "autopilot".

In this perspective, the role of the director changes in the renewed technological context that surrounds us, since it must be characterized by the ability to use, and simultaneously monitor, the technical tools available, constantly verifying their efficiency, reliability and suitability to cope with different prospective situations.

In other words, nowadays it would be irresponsible to drive a (corporate) vehicle that is outdated in terms of its basic technology, since driving it would be dangerous (for oneself and for others) in an evolved ecosystem. However, it would be equally unacceptable to entirely grant an artificial intelligence with the task to drive a futuristic (corporate) vehicle if the adoption of crucial decisions concerning the survival (of oneself and of others) is left to the aseptic evaluation of the algorithm.

The above considerations are even more valid in the financial sector, where a plurality of interests and heterogeneous values of difficult balancing intersect with each other[12], and whose adequate weighting cannot disregard, to date, the *human* evaluation of (the priority of) the objectives pursued.

The proposal for a European Regulation on Artificial Intelligence of April 21, 2021 also confirms the importance of these principles, where it provides that high-risk AI systems must be designed and developed, including with appropriate human-machine interface tools, in such a way that they can be effectively supervised by individuals during the period in which the system is in use. This is because, as specified therein, human surveillance is intended to prevent or minimize risks to

[12]F. CAPRIGLIONE – R. MASERA, *Bank Corporate Governance: a New Paradigm*, *in Law and Economics Yearly Review*, 2016, 2, 201 et seq.; A. SACCO GINEVRI, *Il conflitto di interessi nella gestione delle banche*, Bari, 2016, 48 et seq.

health, safety or fundamental rights[13].

In conclusion, it seems that the digitalization of the organizational processes of the legal person shall be adequately balanced by a progressive rediscovery of a more human dimension of corporate interest. This last component, further strengthened by the pandemic – which has shown the ability and the will of the biggest economic operators to serve the community through business initiatives aimed at counter the effects of the health emergency – preludes to new scenarios in which corporations, while leaving the responsibility for corporate compliance processes to the "machines", will be called upon, with greater vigor than in the past, to direct their management choices towards a sort of new humanism of values.

3. A recent study by Ernst&Young[14], addressed to the European Commission, has analyzed the effects on corporate governance deriving from the use of artificial intelligence, starting (1) from a recognition of the tools currently in use, and then (2) verifying the possible existence of regulatory gaps on this matter, and finally (3) evaluating the opportunity to issue regulatory prescriptions in this area.

As regards the first aspect, the study shows how, nowadays, artificial intelligence is little used in Europe in corporate governance. Only 13% of the companies surveyed already use AI in this area, while 26% plan to use such tools in the future. The reasons for this skepticism towards artificial intelligence are mainly due to the lack of a sufficient level of technological know-how for its adequate understanding and application, as well as the perception of its negligible added value compared to the related investments that, instead, appear to be significant.

With reference to the second aspect, it emerges – in Europe, United States, UK, China and Singapore – the lack of regulatory barriers and specific disciplines

[13]M. SEPE, *Innovazione tecnologica, algoritmi e intelligenza artificiale nella prestazione dei servizi finanziari*, in *Rivista Trimestrale di Diritto dell'Economia*, 2021, supplement no. 3, 186 et seq; D. ROSSANO, *L'Intelligenza Artificiale: ruolo e responsbilità dell'uomo nei processi applicativi (alcune recenti proposte normative)*, *ibid*, 212 et seq.

[14]E&Y, *Study on the relevance and impact of artificial intelligence for company law and corporate governance*, 2021, consultabile in *www.europa.eu.*

concerning the use of AI in corporate governance. At the same time, however, there is also a lack of regulatory incentives to use such devices. In the same legal systems, AI is considered admissible as a support tool for the administrative body (but not as a complete replacement of the same), without prejudice to the personal responsibility of humans for the organization and management of the company.

While the Ernst & Young study does not recognize a need to close the regulatory gaps in the short term, it foresees the possibility that directors may face liability claims arising from the inappropriate use, or unjustified non-use, of AI in corporate governance matters, and may need to consider co-opting board members with appropriate digital expertise.

Finally, with reference to the third strand examined, the study at hand concludes by recommending a European intervention aimed at promoting a responsible use of AI in corporate governance, in line with the Ethics Guidelines for Trustworthy AI prepared by the High-level Expert Group on Artificial Intelligence[15].

The above was recently confirmed by the European declaration on digital rights and principles of January 26, 2022, particularly in the part dedicated to sustainability in which the European Commission notes that digital products and services must be structured and used "*in a way that minimized their negative environmental and social impact*", and therefore in compliance with the general principle that "*People are at the center of the digital transformation in the European Union*"[16].

4. More in general, the goal of "*developing a policy framework to ensure trust in AI systems*" is one of the key objectives pursued by the European Union in order to achieve the opportunities offered by AI technologies in all sectors of activity.

This emerges from several initiatives undertaken at European Union level with

[15]See European Commission, Directorate-General for Communications Networks, Content and Technology, Ethics guidelines for trustworthy AI, Publications Office, 2019, https://data.europa.eu/doi/10.2759/177365.
[16]Available at *https://data.consilium.europa.eu/doc/document/ST-5783-2022-INIT/it/pdf.*

reference to the use and implications of AI, including the European strategy on AI launched in April 2018 and aimed at making the EU a world-class hub for AI, while ensuring that AI is human-centric and trustworthy [17]. Subsequently, in December 2018 the first coordinated plan on AI was published, consisting in a joint commitment between Member States to foster the development and use of AI in Europe and to coordinate European and national efforts on AI [18]. Later, in April 2019, the High-Level Expert Group on Artificial Intelligence (HLEG) developed the abovementioned Guidelines for Trustworthy AI and, in July 2020, an Assessment List for Trustworthy AI (ALTAI). Reference shall be made also to the EU Commission's White Paper on AI published in February 2020, which proposed a number of measures and policy options (including the amendment of the existing legal framework) in order to promote the uptake of AI and address the risks associated with certain uses of this new technology [19].

Moreover, strengthening Europe's AI capabilities is also a key element of the wider strategy defined in the 2030 Digital Compass published in March 2021 [20].

The described path – and the need to take into account the constant evolution of the technological, economic and policy context on AI – led to the issuance, in April 2021, of a revised Coordinated Plan on AI, that was published together with the abovementioned proposal for a regulatory framework on AI [21].

In particular, the revised Coordinated Plan on AI identifies four key sets of suggestions on how the EU Commission, together with the Members States and private actors, can achieve the opportunities offered by AI technologies (including investing in data spaces and computing resources, fund AI testing and experimentation facilities, etc.). Among such initiatives, particular attention shall be paid to that of developing a policy framework to ensure trust in AI system, which

[17]See communication COM(2018) 237 final.
[18]See communication COM(2018) 795 final.
[19]See communication COM(2020) 65 final.
[20]See communication COM(2021) 118 final.
[21]See communication COM(2021) 205 final.

focuses on three interrelated issues: issues of safety and fundamental rights, issues of liability of AI and revision of the existing sectoral safety legislation when necessary.

Monitoring the evolution of such initiatives seems crucial also under a corporate perspective, considering the take-up of AI in corporate governance.

5. As demonstrated in the context of the pandemic crisis, artificial intelligence could fluidize the organizational and managerial processes of companies that had survived the coronavirus, contributing to their evolution in view of an increased standardization and structural resilience to be implemented together with an enhancement of human sensitivity in the planning of corporate strategy.

The man-machine relationship remains at the heart of the issue under analysis. The personification of the productive organism constitutes a *fictio* with effects on the juridical level; but the enterprise, even the most technologically advanced one, remains a complex affair, both in its internal dynamics (its functioning), and in its external relations (the market), and, finally, in the selection of the objectives to pursue.

In this context, artificial intelligence is the tool, not the solution. And being a tool, it must be known how to build it, program it, use it, monitor it, review it, update it and, if necessary, replace it with more advanced tools.

In other words, the use of artificial intelligence in business organization and management cannot operate as an instrument to exclude liability of the human management, which instead will remain fully entitled to management prerogatives and related fiduciary duties. The selection of the modality of use, or lack of use, of artificial intelligence is therefore included in the areas in which the business judgment rule operates, and at the same time the apical functions granted to the administrative body cannot be emptied in favor of external decisional centers.

Nor, finally, can we argue in favor of a full managerial autonomy of the algorithm by leveraging on the paradigm of self-driving subsidiaries, since in this organizational model we would probably assist to a *de facto* administration by the

individuals on top of the corporate group instead of a proper direction and coordination activity, which, in any case, would require a minimum degree of autonomy in the managing bodies of the subsidiaries [22].

In a nutshell, as the European institutions have pointed out several times, it is the individual who is at the center of digital transformation and not vice versa, and this is also true when identifying the role assigned to artificial intelligence in corporate governance.

[22]See A. SACCO GINEVRI, *La nuova regolazione del gruppo bancario*, Turin, 2017, p. 37 et seq.