

NEW BOUNDARIES OF THE PRECAUTIONARY PRINCIPLE FOR A NEW NORMALITY¹

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⁴ The authors shared (co-authorship), with equal responsibility, the work research, analysis methodology, conceptual approach, text processing, through a continuous fruitful comparison, in such a way as to have allowed a full adherence of both to the theses presented and to the conclusions to the which have been received (equal first-authorships). Therefore it is possible to apply consider the criterion of full counting. However, if necessary, the drafting of the individual parts shall be attributed to A.M. COLARUSSO for Paragraphs 1, 3, 5, 6 and to S. TERRACCIANO for Paragraphs 1.1, 2, 4, 6.

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1. INTRODUCTION

In the current framework of the risk society, scientific uncertainty and relentless technological progress force the public decision-maker to rapidly address the challenges of the contemporary world, arising from natural, biological, human, technological risks, in order to ensure a high level of protection of fundamental individual and collective interests.

The need to guarantee and encourage technological progress, scientific discovery and the freedom of private economic initiative lies within a perimeter whose limit is drawn by the threshold of acceptable risk for possible damage to the environment or health. When science is unable to prove the probability of occurrence and the severity of an adverse event to protected interests or its evolution and harmful effects, the precautionary principle compels public authorities to adopt a decision with a structured approach to the analysis of risk.

In other terms, the recourse to the precautionary principle presupposes that potentially dangerous effects deriving from a phenomenon, product or process have been

barely identified and that scientific evaluation does not allow the risk to be determined with sufficient certainty⁵.

The application of the precautionary principle attributes a more interventionist role to the State, that becomes the guarantor of the integrity of the environment and human/animal/plant health, with the result that public policies are oriented to urgently implement these objectives. In this sense, alongside the traditional functions of protection of public order and security, the State also protects the community from technological risks through choices guided by the precautionary principle.

Furthermore, the acquired awareness towards the protection of the environment and human health – in addition to the mentioned expansion of state functions – seems also to have an impact over relations between state powers: even if the setting of the thresholds of protection constitutes a prerogative of the legislator (based on a political choice), the sphere of competences of the legislator and the public administration often overlap, since the prescriptions are formulated with the use of indeterminate legal concept in order to ensure the flexibility of the regulation and the adaptation to technological progress.

Indeed, it is often the public administration that, in application of indeterminate legal concept, specifies the scope of the rule which governs administrative discretion and is required to carry out a risk assessment that justifies the adoption of a precautionary measure which limits private economic initiative or the attribution of ampliative measures in favor of private citizens.

In this scenario, public administrations adopt decisions in a context of scientific uncertainty and, consequently, the risk assessment phase appears to be the core of the

⁵ European Commission, Communication on the precautionary principle, Brussels, COM(2000) 1 final, February 2000.

administrative proceeding in which the administration is compelled to evaluate all the possible variable and (economic, social, ethic) aspects of the concrete situation.

1.1 Aim and scope of the paper

The paper aims to argue that, in order to guarantee high levels of protection for fundamental interests (such as health, environment, protection of the food supply chain) through the respect of the precautionary principle, artificial intelligence may be an effective and sustainable tool to manage and contrast the increasing unknown risks of the new normality.

In fact, in cases of administrative measures based on the precautionary principle, it seems possible to encounter an increasing occurrence of factual variables that decision-makers shall manage.

Moving from the development of the precautionary principle as a general principle of the administrative action and through the analysis of the development of the use of artificial intelligence in public administrations, the analysis will focus on the possible interrelation between precaution and artificial intelligence.

This is for the purpose of evaluating if AI systems may be a useful tool to select and classify facts which appear to be significant in order to provide empirical concreteness to an imprecise administrative rule and, consequently, to increase knowledge management and reduce scientific uncertainty.

It seems, however, appropriate to clarify, also to limit the scope of the present investigation, that the relations between the precautionary principle and artificial intelligence are potentially analyzable – at least – in two respects: we find that it is possible to envisage a *summa divisio* between «*the risk of AI*» and «*the risk through AI*».

On one side, the *risk of* development of AI refers to the potential effects of the application of the precautionary principle in establishing a regulatory framework of the pervasive use of the AI systems⁶.

In this respect, it has been outlined by the doctrine that «if policymakers want their nations to achieve the full benefits of AI, they should base their actions on the innovation principle to foster it rather than use the precautionary principle to limit, delay and constrain progress»⁷.

However, it should be noted that some of the most relevant normative act concerning the use of AI systems make express reference to the precautionary principle as a principle to be followed while conducting research activities or other activities related to the development and implementation of AI systems.

⁶ See P. ZUDDAS, *Pregiudizi digitali e principio di precauzione*, in *Consulta online*, II, 2020, 416, who considers different declinations of the precautionary principle and expresses that «Venendo allora al ruolo che possono svolgere i due principi nella gestione dei rischi di discriminazione legati all’impiego di sistemi di intelligenza artificiale, può osservarsi che il principio di prevenzione può trovare applicazione sia nella fase di elaborazione dell’algoritmo – che va impostato in modo tale da impedire la produzione di effetti discriminatori diretti e indiretti –, sia nella fase di selezione dei dati da immettere nel sistema informatico – che va operata anche attraverso adeguati interventi di “depurazione” dalle informazioni sulle quali potrebbero fondarsi trattamenti discriminatori. Il principio di precauzione trova invece una sede ideale di applicazione nell’imposizione di limiti all’evoluzione autonoma (e, per certi versi, incontrollata) dei sistemi di *machine learning*. Il processo di selezione dei caratteri e degli elementi rilevanti per la decisione, infatti, può essere in parte indirizzato in sede di programmazione, ma il percorso che conduce ad individuare correlazioni significative all’interno dei dati, specialmente in presenza di un data set aperto, sfugge al pieno controllo dei programmatori: è questa peraltro la fase della decisione algoritmica nella quale risulta più elevato il rischio di *bias*, legato alla possibilità che il sistema generi nuove classi di individui discriminati in base a caratteri ricorrenti individuati autonomamente dal sistema informatico».

⁷ D. CASTRO, M. MCLAUGHLIN, *Ten Ways the Precautionary Principle Undermined Progress in Artificial Intelligence*, in *Information Technology & Innovation Foundation*, February 2019.

Indeed, the European Parliament resolution on Civil Law Robotics of 2017⁸ specifies that «Robotics research activities should be conducted in accordance with the precautionary principle, anticipating potential safety impacts of outcomes and taking due precautions, proportional to the level of protection, while encouraging progress for the benefit of society and the environment»; the European Parliament resolution on a comprehensive European industrial policy on artificial intelligence and robotics of 2018⁹, referring to the technological path towards AI and robotics, outlines that «while encouraging progress for the benefit of society and the environment, AI research and other related activities should be conducted in accordance with the precautionary principle and fundamental rights; stresses that everyone involved in the development, implementation, dissemination and use of AI should consider and respect human dignity and the self-determination and wellbeing – both physical and psychological – of the individual and society at large, anticipate potential safety impacts and take due precautions proportionate to the level of protection, including the prompt disclosure of factors that might endanger the public or the environment».

Even if there are abstract and general references to precaution as a principle to be considered by the public authorities while developing automated systems and their regulatory

⁸ European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)), where the Commission and MS are invited «to carefully monitor and guarantee a smoother transition for these technologies from research to commercialisation and use on the market after appropriate safety evaluations in compliance with the precautionary principle» (par. 7) and that «Emphasises that testing robots in real-life scenarios is essential for the identification and assessment of the risks they might entail, as well as of their technological development beyond a pure experimental laboratory phase; underlines, in this regard, that testing of robots in real-life scenarios, in particular in cities and on roads, raises a large number of issues, including barriers that slow down the development of those testing phases and requires an effective strategy and monitoring mechanism; calls on the Commission to draw up uniform criteria across all Member States which individual Member States should use in order to identify areas where experiments with robots are permitted, in compliance with the precautionary principle» (par. 23).

⁹ European Parliament resolution of 12 February 2019 on a comprehensive European industrial policy on artificial intelligence and robotics (2018/2088(INI)).

framework, the concrete application of the said principle in automated systems does not seem to be deepened in these documents¹⁰.

In fact, the supranational and national regulatory framework more often refers to a risk-based approach¹¹, that postulates a degree of knowledge of the risk which appears akin to the one required in the application of the prevention principle.

In this sense, the Proposal for a Regulation of the European Parliament and of the European Council introducing harmonised rules on artificial intelligence (Artificial Intelligence Act) of April 21st 2021¹², pursues a risk-based approach, classifying the AI

¹⁰ See, P. ZUDDAS, *Pregiudizi digitali e principio di precauzione*, cit., 410 et seq., who underlines the absence of an explicit reference to the precautionary principle in the following documents: the Ethics guidelines for trustworthy AI of the High level expert group of AI set up by European Commission on April 8, 2019; the White paper on Artificial Intelligence – A European approach to excellence and trust of February 19, 2020; White paper on Artificial intelligence at the service of the citizens drafted by group of expert set up by AgID in March 2018; Italian National Strategy of Artificial Intelligence drafted by Ministry of economic development of 2019; Strategic Program on artificial intelligence 2022-2024 jointly development by the Ministry of education, university and research, Ministry of economic development, and the Minister of technological innovation and digital transition.

¹¹ See the contribution of R. BUDISH, *AI's Risky Business: Embracing Ambiguity in Managing the Risks of AI*, in *Journal of Business & Technology Law*, 2021, 16, 259-298, where the Author distinguish between a quantitative and a qualitative approaches to the AI Governance and emphasizes that «A review of 35 of the most significant sets of AI principles shows around a third of them urge the adoption of “risk management” approaches for AI governance, but what “risk management” means in practice is largely undefined and poorly understood» and argues that «the emerging field of AI governance should embrace a more responsive, inclusive, and qualitative approach that is better tailored to the inherent and inescapable uncertainties and dynamism of AI technology and its societal impact».

¹² See the EU Commission, Proposal for a Regulation on a European approach for Artificial Intelligence, 2021/0106, available at the following link: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0206>.

system as high-risky¹³ and non-high-risky¹⁴. Indeed, the proposal «puts in place a proportionate regulatory system centred on a well-defined risk-based regulatory approach that does not create unnecessary restrictions to trade, whereby legal intervention is tailored to those concrete situations where there is a justified cause for concern or where such concern can reasonably be anticipated in the near future. At the same time, the legal framework includes flexible mechanisms that enable it to be dynamically adapted as the technology evolves and new concerning situations emerge. The proposal sets harmonised rules for the development, placement on the market and use of AI systems in the Union following a proportionate risk-based approach»¹⁵.

On another side, the *risk through* AI systems regards the possible application of the automated systems within the action of public administrations as a procedural and organizational module, verifiable, constantly controllable and correctable by the human being, which may be useful to manage and counter scientific uncertainty that the public decision maker faces.

With the mentioned premises, the paper focuses mainly on the *risk through* AI, deepening some interconnection between the precautionary principle and the use of AI in the fact-finding phase of administrative proceedings characterized by scientific uncertainty.

¹³ See Title III of the EU Commission, Proposal for a Regulation on a European approach for Artificial Intelligence, 2021/0106.

¹⁴ See Title IV of the EU Commission, Proposal for a Regulation on a European approach for Artificial Intelligence, 2021/0106.

¹⁵ EU Commission, Proposal for a Regulation on a European approach for Artificial Intelligence, 2021/0106, Explanatory Memorandum.

2. SCIENTIFIC UNCERTAINTY AND RISK ASSESSMENT IN THE LIGHT OF THE PRECAUTIONARY PRINCIPLE

As outlined by the European Commission at the beginning of the millennium in its Communication on the precautionary principle, decision-makers are constantly faced with the dilemma of balancing the freedoms and rights of individuals, industry and organisations with the need to reduce the risk of adverse effects to the environment, human, animal or plant health¹⁶.

Sometimes, the balancing dilemma occurs at a time in which science is not (yet) able to (fully, consistently, deeply, specifically, univocally) evaluate the risks of potentially dangerous effects deriving from a phenomenon, a product or a process.

The scientific uncertainty about the existence and the probability of occurrence of an adverse event and the need of protection of some individual and collective fundamental interests represent the context of natural emergence of the precautionary principle¹⁷.

¹⁶ EU Commission, Communication on the precautionary principle, cit., 2.

¹⁷ The legal doctrine over the precautionary principle is very broad. Among others, for Italian legal doctrine, see D. AMIRANTE, *Diritto ambientale italiano e comparato*, Naples, 2003, 38 et seq.; A. GRAGNANI, *Il principio di precauzione come modello di tutela dell'ambiente, dell'uomo, delle generazioni future*, in *Rivista di diritto civile*, 2003, 9 et seq.; T. MAROCCO, *Il principio di precauzione e la sua applicazione in Italia e in altri Stati membri della Comunità Europea*, in *Riv. it. dir. pubbl. comunitario*, 2003, 5, 1234-1245; G. MANFREDI, *Note sull'attuazione del principio di precauzione in diritto pubblico*, in *Dir. pubbl.*, 2004, 1075 et seq.; U. IZZO, *La precauzione nella responsabilità civile*, Padova, 2004, 28 et seq.; COMITATO NAZIONALE DI BIOETICA, *Il principio di precauzione: profili bioetici, filosofici, giuridici*, in *www.governo.it*, 2004, passim; F. DE LEONARDIS, *Il principio di precauzione nell'amministrazione del rischio*, Milan, 2005; F. TRIMARCHI, *Principio di precauzione e "qualità" dell'azione amministrativa*, in *Riv. it. dir. pubbl. comunitario*, 2005, 6, 1674-1707; P. DELL'ANNO, *Il ruolo dei principi nel diritto ambientale europeo: norme d'azione o di relazione?*, in D. AMIRANTE (e.b.), *La forza normativa dei principi. Il contributo del diritto ambientale alla teoria generale*, Padova, 2006, 143 et seq.; F. GIAMPIETRO, *La responsabilità per danno all'ambiente: l'attuazione della direttiva 2004/35/CE*, Milano, 2006, 556; C.M. DONÀ DALLE ROSE, *Riflessioni intorno all'evoluzione del concetto di principio di precauzione*, in G. ALPA, G. CAPILLI

Thus, the principle is invoked to justify public decisions which restrict or prevent the exercise of rights and freedoms (such as, the freedom of economic initiative) in order to protect other fundamental interests (such as environment, health, public safety) in the event of an uncertain risk of harm of those fundamental interests¹⁸.

(e.b.), *Lezioni di diritto privato europeo*, Padova, 2007, 217 et seq.; M. ANTONIOLI, *Precauzionalità, gestione del rischio e azioni amministrativa*, in *Riv. it. dir. pubbl. com.*, 2007, 51 et seq.; A. ZEI, *Principio di precauzione*, in *Dig. disc. pubbl.*, Agg. 2008, III, 670, 673 et seq.; M. MARCHESE, *Il principio di precauzione tra luci ed ombre*, in www.comparazionediritto.it, 2010; I.M. Marino, *Aspetti propedeutici del principio giuridico di precauzione*, in *Studi in onore di Alberto Romano*, Naples, 2011, vol. III, 2177 et seq.; L. MORMILE, *Il principio di precauzione fra gestione del rischio e tutela degli interessi privati*, in *Rivista di Diritto dell'Economia, dei Trasporti e dell'Ambiente*, 2012, 10, 247 et seq.; O. PORCHIA, *Le politiche dell'Unione Europea in materia ambientale*, in V. FERRARA, C.E. GALLO (e.b.), *Le politiche ambientali, lo sviluppo sostenibile e il danno*, in R. FERRARA, M.A. SANDULLI (e.b.), *Trattato di diritto dell'ambiente*, vol. I, Milan, 2014, 166 et seq.; S. LANDINI, *Principio di precauzione, responsabilità civile e danni da eventi catastrofici*, in *Contratto e Impresa/Europa*, 2014, 1, 14 et seq.; M. ALLENA, *Il principio di precauzione: tutela anticipata v. legalità-prevedibilità dell'azione amministrativa*, in *Il diritto dell'economia*, vol. 29, n. 90 (2 2016), 411-446; F. FOLLIERI, *Decisioni precauzionali e stato di diritto. La prospettiva della sicurezza alimentare (I parte)*, in *Riv. it. dir. pubbl. comunitario*, 2016, 6, 1496-1530; F. FOLLIERI, *Decisioni precauzionali e stato di diritto. La prospettiva della sicurezza alimentare (II parte)*, in *Riv. it. dir. pubbl. comunitario*, 2017, 1, 61-106; N. OLIVETTI RASON, *Il principio di precauzione tra sicurezza e libertà*, in *Liber amicorum per Vittorio Domenichelli*, Bari, 2018, 341 et seq.; F. DE LEONARDIS, *Tra precauzione, prevenzione e programmazione*, in L. GIANI, M. D'ORSOGNA, A. POLICE (e.b.), *Dal diritto dell'emergenza al diritto del rischio*, Naples, 2018, 49-73; P. GARGIULO, *Brevi riflessioni sulla natura giuridica e sul contenuto dei principi di precauzione e di prevenzione nel diritto internazionale*, in L. GIANI, M. D'ORSOGNA, A. POLICE (e.b.), *Dal diritto dell'emergenza al diritto del rischio*, cit., 31-49; S. TERRACCIANO, *Principio di precauzione: grado di rischio e discrezionalità amministrativa*, in L. DANIELE, A. BURATTI (e.b.), *Principi generali del diritto, diritti fondamentali e tutela giurisdizionale: nuove questioni*, Università degli Studi di Roma "Tor Vergata" – *Collana delle pubblicazioni del dipartimento di giurisprudenza – Quaderni del Dottorato di Ricerca in Diritto Pubblico*, Milan, 2019, 67-84; S. COGNETTI, *Precauzione nell'applicazione del principio di precauzione*, in *Scritti in memoria di Giuseppe Abbamonte*, Naples, 2019, I, 387 et seq.; E. FREDIANI, *Amministrazione precauzionale e diritto alla «scienza incerta» in tempo di pandemia*, in *Dir. Amm.*, 2021, 1, 137-160.

¹⁸ See A. ZEI, *Principio di precauzione*, cit., 4; L. HARTZELL-NICHOLS, *From 'the' precautionary principle to precautionary principles*, in *Ethics, Policy & Environment*, 2013, 16, 3, 308-320.

Indeed, as pointed out by the European Commission, the application of the precautionary principle is part of the risk management when scientific uncertainty precludes a full assessment of the risk and when decision-makers consider that the chosen level of protection (which is a political responsibility) may be in jeopardy¹⁹.

Although it is difficult to find a univocal definition of the precautionary principle²⁰, it is possible to argue that its theoretical *substratum* may be found in those philosophical and sociological studies that have revised the assumption of the certainty of science and scientific knowledge, suggesting rather that the science is fallible, uncertain, falsifiable, and likely to be contradicted by empirical experience²¹ and that, consequently, science and technique may not always be able to assess in advance and manage potential risks of damage of a process, a product or a phenomenon.

The uncertainty of science is embedded in the complexity of the contemporary reality and in the social need for security of the so called risk society²², influencing the decision methods of the institutional actors.

¹⁹ See EU Commission, Communication on the precautionary principle, cit., par. 5.

²⁰ See A. ZEL, *Principio di precauzione*, cit., 6; J. SCOTT, E. VOS, *The juridification of uncertainty: observations on the ambivalence of the precautionary principle within the EU and the WTO*, in C. JOERGES, R. DEHOUSSE (e.b.), *Good Governance in Europe's Integrated Market*, Oxford University Press, 2000, 253, where the A. observe that «few legal concepts have achieved the notoriety of the precautionary principle. Praised by some, disparaged by others, the principle is deeply ambivalent and apparently infinitely malleable».

²¹ K. POPPER, *The Logic of Scientific Discovery*, London, New York, 1959, 18, according to the philosopher of science «I shall not require of a scientific system that it shall be capable of being singled out, once and for all, in a positive sense; but I shall require that its logical form shall be such that it can be singled out, by means of empirical tests, in a negative sense: it must be possible for an empirical scientific system to be refuted by experience».

²² See U. BECK, *Risikogesellschaft. Auf dem Wegin eine andere Moderne*, Suhtkamp Verlag AG, Frankfurt, 1986; N. LUHMANN, *Soziologie des Risikos*, Walter de Gruyter Eds., Berlin, 1991; E. CARRÀ, «Rischio»: *analisi di un concetto sociologico*, in *Studi di sociologia*, 1992, 30, 1, 47-59; A. BARONE, *Il diritto del rischio*, Milan, 2006; D.

It has been pointed out that the idea of precaution, not as a generic prudential approach, but as a general and legally structured method of evaluating the inherent risks of human actions, stems from the insecurity of contemporary society in the face of the increasingly extensive horizons that the dizzying pace of the development of new technologies and their diffusion in the social context pose both to institutional actors and to public opinion and individual consciousness²³.

In this context, scientific uncertainty becomes a constant to be considered as a central element in decision-making processes²⁴ and the threshold of the level of protection that must be guaranteed by the law shifts progressively ahead, until it becomes protection against uncertain harmful events²⁵.

STEEL, *Philosophy and the precautionary principle. Science, evidence and environmental policy*, Cambridge, 2015;
A. BARONE, *The "risk society": a new concept for the principle of legal certainty?*, in L. GIANI, M. D'ORSOGNA,
A. POLICE (e.b.), *Dal diritto dell'emergenza al diritto del rischio*, cit., 73-86.

²³ D. AMIRANTE, *Diritto ambientale italiano e comparato*, cit., 39.

²⁴ D. AMIRANTE, *Diritto ambientale italiano e comparato*, cit., 47, where the Author exposes that the *pre-conditions* of the precautionary principle find their culminant moment in a paradox. Indeed, the Author observes that the greatest paradox is that the great risks (such as technological ones) arise in a period in which (starting, at least, from the second half of the last century) society expresses an increasingly strong need for security, linked to the cultural and methodological approach of the exact sciences as a solution to all the problems of humanity. The neo-positivism prevailing until a few years ago is in fact based on an idea of total control by science on human life and social organization. The paradigm of total control has traditionally referred to security as a value that the system had to be able to guarantee always and in any case. Now, the current risks, both global and widespread, have caused a real short-circuit of the system and we find ourselves in the paradox of living in a society based on the idea of total control, but which is absolutely unable to guarantee security. And it is from this contrast that the precautionary principle originates. A principle, therefore, of a social nature intended not so much to slow down progress and technology, but to identify tools for action and management of the risks produced by a technology that can no longer control itself.

²⁵ In this terms F. FOLLIERI, *Decisioni precauzionali e stato di diritto. La prospettiva della sicurezza alimentare (I parte)*, cit., 1507. The Author also believes that increasing certainties with respect to more concrete dangers means

From an historical perspective, the precautionary principle finds its roots in the German legal order with the adoption of the Federal Emission Control Act of 1974 (*Bundesimmissionschutzgesetz*) in response to the public concern determined by the ecological disaster of the acid rains in the *Schwarzwald*²⁶: it was established that emissions had to be reduced to the minimum technically possible, *even without proof of their harmfulness*, based on the presumption that the reduction of atmospheric emissions is a positive factor for human health and for the planet.

More specifically, the correlation between the notions of precaution and risk has been elaborated starting (and distinguishing) from the concept of hazard (*Gehfar*) applied by German scholars in the field of police law to justify the limitation of individual rights by the exercise of public powers in order to protect public order and safety²⁷.

that we shift our attention to less concrete dangers, because they are the only ones against which we feel “uncovered”. The cause of this unprecedented concern with the uncertain, according to the Author, is not only the progression of knowledge and its provisional character, but also the security achieved with regard to the (relatively) certain.

²⁶ The *Bundesimmissionschutzgesetz* established the principle that emissions must be reduced to the minimum technically possible, irrespective of proof of their harmfulness. This is the regulatory translation of a political choice based on the presumption that the reduction of atmospheric emissions is a positive factor for human health and for the planet. Thus, the authorization to open a plant is subject to the reduction, to the minimum allowed by technology, of the emissions produced regardless of the proof of their harmfulness. See, P. SAVONA, *Dal pericolo al rischio: l'anticipazione dell'intervento pubblico*, in *Dir. amm.*, 2010, 375; L. MORMILE, *Il principio di precauzione fra gestione del rischio e tutela degli interessi privati*, cit., 249.

²⁷ See, P. SAVONA, *Dal pericolo al rischio: l'anticipazione dell'intervento pubblico*, cit., 372 et seq., also for references of the German doctrine, which recalls the “*Kreuzberg Urteil*”, a famous case decided in 1882 by the “*Preussische Oberverwaltungsgericht*” (Prussian Administrative tribunal), considered to be the first application of the principle of “*Gefahrenabwehr*” (the principle of defence from hazard). In that case, which is an expression of the conception of the State as “*Nachtwacherstaat*” (so called “night guardian state”), it was established that the exercise of public powers restricting individual rights is subject to the rule of law and the law gives the administration the power to intervene in the private sphere only when it is essential for the protection of public order and security. The Author specifies that the decision is one of the first recognition of the rule of law and, in the meantime, it

Indeed, the *Gehfar* is generally considered to be a situation in which, if no action is taken to change the course of events, it can be expected with sufficient probability, on the basis of a prognostic judgement, that damage to protected interests will occur²⁸.

The hazard is evaluated on the basis of the past experiences, of the scientific knowledge and of the technique. From the assessment of these elements, the existence, the degree of probability and the seriousness of the harmful effects may be foreseen with a rather reliable degree of accuracy and, thus, a preventive intervention of public authorities for the protection of the selected interests is required.

From the notion of hazard thus understood, i.e. as a relatively imminent damage that will occur with sufficient probability according to experience or technical scientific knowledge²⁹, German legal scholars elaborated the different notion of *Vorsorge*, namely the anticipated cure in situations where it is not yet possible to speak about an hazard (*noch nicht Gehfar*) due to the scientific uncertainties about the existence of a damage, the probability of occurrence of an harmful event and the causal link between an event and an harmful effect.

Thus, the concept of risk (*Risiko*) is invoked when there is a lack of knowledge about the link between a given event/product/process and the potential harmful effects on the protected interests.

highlights one of the limitation of the lawmakers' power to interfere in the individual sphere: the limit of the defence from hazards (spec. 373).

²⁸ P. SAVONA, *Dal pericolo al rischio: l'anticipazione dell'intervento pubblico*, cit., 374.

²⁹ Definition given by F. FOLLIERI, *Decisioni precauzionali e stato di diritto. La prospettiva della sicurezza alimentare (I parte)*, cit., 1507.

Despite scientific uncertainty, the high level of protection recognized to some interests, such as environment and human health, compels public authorities to evaluate precautionary measures *even without proof of the harmfulness* of an event.

Furthermore, some scholars, after distinguishing risk (*Risiko*) from hazard (*Gehfar*) in the sense specified above, clarify that the uncertainty associated with the concept of risk may refer to situations where it is not possible to assess the probability of occurrence of the feared event (*uncertainty in the broad sense*) or the possible developments of events and their effects (*uncertainty in the narrow sense*)³⁰.

Following the German recognition of the precautionary principle in the legislations concerning nuclear energies and atmospheric emissions, the principle was affirmed during

³⁰ E. SCHMIDT – ASSMAN, *Das allgemeine Verwaltungsrecht als Ordnungsidee*, 2. Auflage, Springer Berlin Heidelberg, 2004, 161.

the 1980's in international³¹ and european union law with the main objective of ensuring high levels of protection in the environmental field³².

It is commonly recognized that the 15th Principle of the Rio Declaration on Environment and Development of 1992 is the most solemn proclamation of the principle, where it is recalled as follows: «In order to protect the environment, the precautionary

³¹ The first reference of the precautionary principles in international law may be found in the World Charter for Nature, adopted in 1982 by the General Assembly of the United Nations, where it is specified that «activities which might have an impact on nature shall be controlled, and the best available technologies that minimize significant risks to nature or other adverse effects shall be used; in particular: a) Activities which are likely to cause irreversible damage to nature shall be avoided; b) Activities which are likely to pose a significant risk to nature shall be preceded by an exhaustive examination; their proponents shall demonstrate that expected benefits outweigh potential damage to nature, and where potential adverse effects are not fully understood, the activities should not proceed» (par. 11). Moreover, the principle was expressed in the Final Ministerial Declarations of the Protection of the North Sea, in the International Conferences on the Protection of North Sea held in Bremen (1984), London (1987), The Hague (1991) and Esbjerg (1995). It was also stated in the Bergen Report of 1990 “Action for a common future”, adopted by the Economic Commission for Europe on the Bergen Conference, 8-16 May 1990, where it was agreed «to base national and international policies on the precautionary principle in order to anticipate, prevent and attack the causes of environmental degradation (...) in order to achieve sustainable development, policies must be based on the precautionary principle. Environmental measures must anticipate, prevent and attack the causes of environmental degradation. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation». Subsequently, the precautionary principle was invoked in other international documents, such as the UN Convention on Biological Diversity of 1992; UN Framework Convention on Climate Change of 1992.

³² For references of the precautionary principle in international law: J. CAMERON, J. ABOUCHAR, *The precautionary principle: A Fundamental Principle of Law and Policy for the Protection of the Global Environment*, in *Boston College International and Comparative Law Review*, 1994, 6 et seq.; O. MCLNTYRE, T. MOSEDALE, *The Precautionary Principle as a Norm of Customary International Law*, in *Journal of Environmental Law*, 1997, 221 et seq.; A. TROUWOBORST, *Evolution and Status of Precautionary Principle*, in *American Journal of International Law*, 2002, 1016 et seq.; F. BASSAN, *Gli obblighi di precauzione nel diritto internazionale*, Rome, 2004; L. MARINI, *Il principio di precauzione nel diritto internazionale e comunitario*, Padova, 2004; P. GARGIULO, *Brevi riflessioni sulla natura giuridica e sul contenuto dei principi di precauzione e di prevenzione nel diritto internazionale*, cit., 31 et seq.

principle shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation»³³.

As for EU law³⁴, since the 1980's, the precautionary principle was included in art. 130R(2) TEC, then in the Maastricht Treaty (Art. 174 TEC, now art. 191 TFEU) and it was invoked by the rulings of the European Court of Justice as a «fundamental principle of environmental law»³⁵.

Indeed, art. 191, par. 2, TFEU states that «Union policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Union. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay»³⁶.

Despite the principle is recalled in the Treaty only with reference to the environmental policy, it is not in dispute that it has a wider scope, as already acknowledged by the European Commission in the aforementioned Communication, in which it was clearly

³³ Rio Declaration on Environment and Development of 1992, Principle 15, available in https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.15.1_26_Vol.I_Declaration.pdf.

³⁴ See M. RENNA, *Ambiente e territorio nell'ordinamento europeo*, in *Riv. it. dir. pubbl. com.*, 2009, 649 et seq.; R. FERRARA, *I principi comunitari della tutela ambientale*, in *Dir. amm.*, 2005, 509 et seq.; A. DOYLE, *Precaution and prevention: giving effect to Art. 130r without direct effect*, in *European environmental law review*, 1999, 44 ss.; E. FISCHER, *Precaution, Precaution Everywhere: Developing a Common Understanding of the Precautionary Principle in the European Community*, in *Maastricht Journal of European and Comparative Law*, 2002, 7 et seq.

³⁵ European Court of Justice, *Commission v. France*, C-121/07 – rul. 9 December 2008, 2008, I-09159.

³⁶ The principle is also invoked in art. 11 TFEU.

stated that «The precautionary principle is not defined in the Treaty, which prescribes it only once – to protect the environment. But, in practice, its scope is much wider, and specifically where preliminary objective scientific evaluation, indicates that there are reasonable grounds for concern that the potentially dangerous effects on the environment, human, animal or plant health, may be inconsistent with the high level of protection chosen for the Community».

Through the rulings of the European Union Courts³⁷, the principle acquired the status of a «general principle of Community law requiring the authorities in question, in the particular context of the exercise of the powers conferred on them by the relevant rules, to take appropriate measures to prevent specific potential risks to public health, safety and the environment, by giving precedence to the requirements related to the protection of those interests over economic interests»³⁸ and, nowadays, the precautionary principle is mentioned

³⁷ European Court of first instance, *Artogodan and Others v. Commission*, rul. September 26th November 2002, paragraphs 182 to 184; see also to that effect Tribunal of the European Union, sec. III, *Pfizer Animal Health v Council*, rul. September 11th 2002, T-13/99, paragraphs 114 and 115; European Court of first instance, *Alpharma Inc. v. Council*, rul. September 11th 2002, T-70/99, par. 135 and 136.

³⁸ European Court of first instance, *Solvay Pharmaceutical v. Council* – rul. 21 October 2003, 121.

also in fields such as finance³⁹, immigration⁴⁰, terrorism⁴¹ and, for the purpose of the present paper, also in the field of artificial intelligence⁴².

Furthermore, it has been pointed out that *precaution* may be understood as a criteria of conduct or of decision in which three dimensions reciprocally interact: the *axiological dimension* requires that precaution refers to a value that needs to be protected, whether individual (human life or health) or super-individual (environment, public safety and order, health, culture); the *subjective dimension* identifies the action or decision to which the precaution should refer (the decision of private individuals, of the legislator or of public administration); the *objective dimension* refers to the possibility that the law restricts the application of the precaution in a specific field (health, environment, food safety, consumer protection)⁴³.

³⁹ H. CHENET, J.R. COLLINS, F. VAN LERVEN, *Finance, climate-change and radical uncertainty: Towards a precautionary approach to financial policy*, in *Ecological Economics* 183 (2021) 106957, par. 3, where the Authors argue that «a precautionary approach to financial policy and regulation (henceforth precautionary financial policy (PFP)) helps to meet the challenge of radical uncertainty associated with the specificity of climate-related financial risks (CRFR). The PFP framework is inspired by two regulatory traditions — the precautionary principle and macroprudential policy — but is not intended to be rigid applications of either of these ideas». See also, R. PEREZ, *L'azione finanziaria europea al tempo della crisi*, in *Riv. it. Dir. pubbl. comp.*, 2011, 1043-1055, who refers to the concept of *financial precautionary principle*.

⁴⁰ A. CANEPA, *Regolazione del rischio e immigrazione. Il ruolo dell'informazione nella gestione delle emergenze*, in www.amministrazioneincammino.luiss.it.

⁴¹ M. SIMONCINI, *La regolazione del rischio e il sistema degli standard. Elementi per una teoria dell'azione amministrativa attraverso i casi del terrorismo e dell'ambiente*, Naples, 2010.

⁴² See par. 1 of the present paper where we refer to «the risk of AI».

⁴³ The elaboration of precaution and its three dimensions is attributed to F. FOLLIERI, *Decisioni precauzionali e stato di diritto. La prospettiva della sicurezza alimentare (II parte)*, cit., 1516-1521. According to the Author, the law attributes *precautionary powers* (and burdens of precautions in the exercise of other powers) in relation to the values

According to this elaboration, by way of example, art. 191 TFEU compels the use of precautionary approach to the European legislator (subjective dimension) for the protection of human health and environment, in the light of sustainable development (axiological dimension) within environmental policy of the EU (objective dimension)⁴⁴.

The aforementioned elaboration expresses the full complexity and the multi-dimensionality of *precaution* and the different perspectives from which the principle can be investigated.

Thus, it is also useful to limit the scope of this paper to the analysis of the precaution as a principle of the administrative action, which is, in its *subjective dimension*, addressed to the Italian public administration through the reference in art. 1 of the Italian Administrative Procedure Act, enacted with the law 7th August 1990, no. 241⁴⁵.

Indeed, the recalled disposition clarifies that administrative action is governed by the principles of EU law, which certainly include the precautionary principle.

Moreover, the principle is mentioned in sectorial legislation, such as art. 3-*ter*⁴⁶ and art. 301 of the Italian environmental code⁴⁷, which prescribes that, in the event of a potential hazard to environment and human health, a high level of protection should be ensured and

for which those who act must be cautious and (eventually) in the sectors in which the law prescribes that decisions must be cautious.

⁴⁴ In this terms, to F. FOLLIERI, *Decisioni precauzionali e stato di diritto. La prospettiva della sicurezza alimentare (II parte)*, cit., 1522.

⁴⁵ Law August 7th 1990, no. 241 as modified by law February 11th 2005, no. 15.

⁴⁶ See art. 3-*ter* of the Leg. Decree April 3rd, 2006, n. 152 introduced by Leg. Decree January 16th 2008, no. 4.

⁴⁷ See art. 301 of the Leg. Decree April 3rd, 2006, no. 152.

that the application of the principle should in any case refer to a risk assessed after a preliminary objective scientific evaluation.⁴⁸

Should the principle be applied, the Authority has the power to adopt *preventive measures*⁴⁹ at any time, in accordance to art. 304 of the environmental code⁵⁰, that are: a)

⁴⁸ For a critique approach to this legislation, see the analysis of M. ALLENA, *Il principio di precauzione: tutela anticipata v. legalità-prevedibilità dell'azione amministrativa*, cit., spec. par. 4.

⁴⁹ *Ibidem*, 429, which refers to a *problematic assimilation between the concepts of precaution and prevention*.

⁵⁰ Art. 304 of the Leg. Decree no. 152/2006 prescribes that (our translation): «1. When environmental damage has not yet occurred, but there is an imminent threat of its occurrence, the involved operator shall, within twenty-four hours and at his own expenses, take the necessary preventive and safety measures.

2. The operator must precede the actions referred to in paragraph 1 with an appropriate communication to the municipality, province, region, or autonomous province in whose territory the damaging event is expected to occur, as well as to the Prefect of the province, who in the following twenty-four hours shall inform the Minister of the Environment and the Protection of Land and Sea. This communication must deal with all relevant aspects of the situation, and in particular the generalities of the operator, the characteristics of the site concerned, the environmental matrices presumably involved, and a description of the interventions to be carried out. The notice, as soon as it is received by the municipality, immediately enables the operator to carry out the interventions referred to in paragraph 1. If the operator fails to carry out the interventions referred to in paragraph 1 and the communication referred to in this paragraph, the controlling authority or, in any case, the Ministry of Environment and Protection of Land and Sea shall impose an administrative penalty of not less than one thousand euros nor more than three thousand euros for each day of delay.

3. The Minister of Environment and Protection of Land and Sea, at any time, has the power to:

(a) request the operator to provide information on any imminent threat of environmental damage or suspected cases of such imminent threat;

(b) order the operator to take the specific preventive measures deemed necessary, specifying the methods to be followed;

(c) take the necessary preventive measures himself.

4. If the operator fails to comply with the obligations stipulated in Paragraph 1 or Paragraph 3(b), or if the operator cannot be identified, or if the operator is not required to bear the costs in accordance with Part Six of this Decree, the Minister of the Environment and Land and Sea Protection shall be entitled to adopt the necessary measures for the prevention of the damage by itself, approving the note of expenses, with a right of recourse exercisable against

proportionate to the level of protection to be achieved; b) non-discriminatory in their application and consistent with similar measures already adopted; c) based on an examination of the potential benefits and burdens; d) amendable in the light of new scientific data.

Thus, in Italian legal order, both in sectorial legislation and as a general principle of administrative action, the need to ensure very high thresholds of protection of certain values or interests allows the anticipated adoption of measures even when scientific uncertainty exists.

However, the legal qualification of precaution still remains debated, since precaution is not always considered as a principle but only a *general and broad guideline criterion*⁵¹, sometimes it is not considered as an autonomous principle but as a *hendiadys with the principle of prevention*⁵² or an *expression of other principles* such as proportionality and reasonableness or sustainable development⁵³.

Although the connections between the precautionary and the preventive principle cannot be denied and since it is not possible here to offer a comprehensive response to the debate, it seems preferable to confer an autonomous qualification to the precautionary

the person who caused or contributed to causing the expenses, if he is identified within the period of five years after the payment is made».

⁵¹ See, T.A.R. Parma, sez. I, February 10, 2015, no. 41, in *Foro Amm. (II)*, 2015, 2, 589. See also, W. GIULIETTI, *I principi di prevenzione e precauzione nella materia ambientale*, in L. GIANI, M. D'ORSOGNA, A. POLICE (e.b.), *Dal diritto dell'emergenza al diritto del rischio*, cit., 241, where the Author defines the principle as a «guiding criterion».

⁵² R. FERRARA, *Precauzione e prevenzione nella pianificazione del territorio: la "precauzione inutile"?*, in *Riv. giur. ed.*, 2012, 76, according to which prevention characterizes the protection policy while precaution is only an operating modality of prevention.

⁵³ See A. ZEI, *Principio di precauzione*, cit., 21, for references and debate.

principle and to embrace a conceptual differentiation with the principle of prevention⁵⁴, even though, as it will be explored below, the use of AI for the assessment of the risk within the administrative proceedings may determine a shifting of precaution into prevention⁵⁵.

Both principles address an anticipation of the threshold of protection of certain interests but the former anticipates the assessment and the response in the context of scientific uncertainty about the probability of occurrence of a harmful event or of its possible developments and effects.

The precautionary principle, as a principle of administrative action, finds its expression in the context of administrative procedure. Given that the precautionary decision, in the absence of specific evidence and on the basis of circumstantial evidence, is capable of limiting certain constitutionally guaranteed rights in the face of balancing against other primary interests, the fact-finding stage in the context of the investigation activity represents a crucial moment.

From a general perspective of the Italian legal system, the investigation phase of the administrative proceeding has the purpose of ascertaining the facts and acquiring the relevant interests for the final determination. Indeed, art. 6, par. 1, let. *a*) and *b*), of the recalled law no. 241/90 disposes that the responsible for the proceeding assesses, for the purpose of investigation, the conditions of admissibility, the requirements of legitimacy and the prerequisites that are relevant for the adoption of the final act and that ascertains the facts *ex officio*, ordering the performance of the necessary acts for this purpose, and takes all measures for the proper and prompt conduct of the investigation.

⁵⁴ For this position see F. DE LEONARDIS, *Tra precauzione, prevenzione e programmazione*, in L. GIANI, M. D'ORSOGNA, A. POLICE (e.b.), *Dal diritto dell'emergenza al diritto del rischio*, cit., 53.

⁵⁵ See § 4.

In particular, the responsible of the proceeding may request the issuance of declarations and the correction of erroneous or incomplete statements or applications, and may carry out technical investigations and inspections and order documentary exhibits.

The investigative phase of the administrative proceeding is governed by the inquisitorial principle and its performance must respect the principles of efficiency and economy, refraining from the aggravation of the proceeding beyond what is necessary.

In the context of scientific uncertainty, the performance of the inquiry stage in administrative proceeding seems more aggravated and complex for at least two reasons: the difficulty in ascertaining and selecting complete, comprehensive and reliable facts and data; and the difficulty in following a single path of evaluation due to the lack of knowledge of cause-and-effect relationships.

Some legal scholars find that the application of the precautionary principle should imply special procedural burdens, requiring the creation of deliberative arenas and contractual dynamics including all the interests at stake, where the available data could be compared and evaluated also with a prognostic view over the consequences of a specific choice⁵⁶.

Thus, scientific uncertainty makes the fact-finding activity more complex and the precautionary principle, as a principle of administrative activity, influences the course of the proceeding in concrete terms, requiring additional investigative effort.

In that respect, the recalled Communication of the European Commission, even if not prescriptive and designed to be flexible, can be considered as a cornerstone for the development of the principle, since it has detected a precautionary method, progressively

⁵⁶ A. ZEI, *Principio di precauzione*, cit., 25-26; V. COMPORI, *Contenuto e limiti del governo amministrativo dell'inquinamento elettromagnetico alla luce del principio di precauzione*, in *Riv. Giur. Amb.*, 2005, 219.

clarified by the European Court's rulings⁵⁷, thus influencing the debates that led to the introduction of the principle in the legislations of EU Member States.⁵⁸

Indeed, the Communication structures the principle through a triphasic analysis of the risk, which comprises the elements of: risk assessment, risk management and risk communication.

Scientific uncertainty is managed through a proceduralization of the administrative action. Specifically, the phase of the risk assessment consists of a collection, selection and qualification of facts aimed at reducing the informational *vulnus*, the lack of accuracy and of exhaustiveness of available scientific information.

⁵⁷ See, K. GARNETT, D.J. PARSONS, *Multi-Case Review of the Application of the Precautionary Principle in European Union Law and Case Law*, in *Risk Analysis*, 37(3), 2017, 502-514, in which the Authors, after analyzing the application of the principle in different fields, found that «The different standards of proof for invoking the precautionary principle, established in EU directives and regulations, suggest that grounds for invoking the precautionary principle may be dependent on what is at stake. Extension of the application of the precautionary principle from prevention of environmental damage to protection of human health and consumer safety has changed the nature of the hazards considered and the types of evidence available. The cases reviewed revealed a trend toward requiring less evidence of harm where there was a severe threat to human health. Some member states appeared to accept a lower standard of proof than the ECJ would accept. In cases where possible consequences of an activity were sufficiently severe (human mortality in *United Kingdom v. Commission*), it was entirely feasible that the standard of proof would be lowered from an “absence of full scientific certainty” to “reasonable grounds for concern” and that precautionary measures would include preventive action».

See also, S. DE VIDO, *Science, precautionary principle and the law in two recent judgements of the Court of Justice of the European Union on glyphosate and hunting management*, in *DPCE online*, 2020/2, 1319-1343, where the Author proposes an analysis of the principle through the lens of reasonableness to reduce the role of courts as scientific experts and avoid the risk that the courts become decision makers.

⁵⁸ A. ZEI, *Principio di precauzione*, cit., 8. G. MANFREDI, *Note sull'attuazione del principio di precauzione in diritto pubblico*, cit., 1081, who considers the principle as a great example of legal models circulation.

Indeed, the Communication identifies four components of the phase of the risk assessment:⁵⁹

- 1) *Hazard identification*, which refers to the identification of the biological, chemical or physical agents that may have adverse effects; the identification of the hazard may also be revealed through the analysis of the effects over the environment or the population, so that the adverse effect becomes a hint for the potential hazard;
- 2) *Hazard characterization*, consists of determining, in quantitative and/or qualitative terms, the nature and severity of the adverse effects associated with the causal agents or activity. It is at this stage that a relationship between the amount of the hazardous substance and the effect has to be established. However, the relationship is sometimes difficult or impossible to prove, for instance because the causal link has not been established beyond doubt;
- 3) *Appraisal of exposure* consists of quantitatively or qualitatively evaluating the probability of exposure to the agent under study. Apart from information on the agents themselves (source, distribution, concentrations, characteristics, etc.), there is a need for data on the probability of contamination or exposure of the population or environment to the hazard;
- 4) *Risk characterization* corresponds to the qualitative and/or quantitative estimation, taking account of inherent uncertainties, of the probability, of the frequency and severity of the known or potential adverse environmental or health effects liable to occur. It is established on the basis of the three preceding and closely depends on the uncertainties, variations, working hypotheses and conjectures made at each stage of the process. When the available data are

⁵⁹ European Commission, *Communication on the precautionary principle*, cit., Annex III.

inadequate or non-conclusive, a prudent and cautious approach to environmental protection, health or safety could be to opt for the worst-case hypothesis. When such hypotheses are accumulated, this will lead to an exaggeration of the real risk but gives a certain assurance that it will not be underestimated.

In other terms, as anticipated, the assessment of the risk constitutes the technical-scientific inquiry in light of the precautionary principle and it is crucial as it establishes the factual premises of the precautionary decision⁶⁰.

The circumstance that the risk characterization depends on uncertainties, variations, working hypotheses and conjecture reflects the peculiarities of the investigation phase of the proceedings informed by the precautionary principle: the *ex officio assessment of facts* recalled in art. 6 of the law no. 241/90 is not limited to the assessment of past and present facts in a descriptive way, but it is instead extended to a prognostic assessment of uncertain or partial data through working hypothesis.

The uncertainty about the absence or the partiality of scientific knowledge or the controversy about existing data triggers the risk assessment activity and requires to choose between different and disputable thesis or methods.

As a consequence, it seems possible to affirm that the fact-finding phase also includes evaluative moments and, thus, the risk assessment already expresses an evaluation about, for example, which set of data have to be taken into account, which is the *best*

⁶⁰ In this sense, F. FOLLIERI, *Decisioni precauzionali e stato di diritto. La prospettiva della sicurezza alimentare (II parte)*, cit., 65, who specifies that the assessment phase consist in the framing of the problem under a scientific prospective.

available technology in a specific historical moment, which is the majoritarian scientific thesis, which number of technical advices should be requested⁶¹.

Furthermore, the investigatory activity related to the precautionary proceeding is peculiar since it may not be considered as a delimited and defined phase but, instead, it should be considered as an ongoing process which is based above the premise that the predictive/prognostic evaluation is only temporary and may change, evolving, and potentially reduce the scientific uncertainty.

In this sense, the investigation activity and the subsequent monitoring activity are strictly interrelated and essential in order to guarantee the legitimacy and the reasonableness of a determined act/measure/decision adopted as a result of the application of the precautionary principle. In fact, a regular monitoring of the adopted precautionary measure allows the administration to re-evaluate a concrete situation in the light of new scientific information, promoting the research for a more objective assessment of the risk.

The respect of a procedural legality is able to recover the substantial legality of decisions taken within scientific uncertainty: indeed, while interpreting the concept of «objective scientific evaluation» as grounding the choice based on probable risk, some legal scholars refer to a “decatalogue” of the precaution which compels the administration to: 1) start from the available technical-scientific data; 2) use the most recent scientific results and review the results often; 3) rely on technically competent bodies of proven excellence; 4) rely on independent technical bodies; 5) evaluate a reasonable number of technical-scientific opinions; 6) disregard the majority principle in the decisions of the technical body; 7) place the burden of proof of the risk on the administration; 8) carry out a cost-benefit analysis; 9)

⁶¹ A. ZEI, *Principio di precauzione*, 23.

adopt a proportionate measure; 10) express in depth the process followed and the assessments carried out in the reasoning of the decision⁶².

Ultimately, it seems possible to affirm that the precautionary principle, as a general principle of administrative action, enhances the necessity of a proceduralization of the scientific uncertainty, through a risk based approach⁶³, and, at the same time, strengthens the procedural guarantees, since public administration are asked to perform a detailed and prognostic evaluation of the risk of harmful effects, to involve all the interests at stake and to justify the action through an analytic motivation of the final decision.

3. THE ALGORITHMIC ADMINISTRATIVE PROCEEDING: RISK PERSPECTIVES FOR A LEGAL AND PROCEDURAL FRAMEWORK

The Italian experience of the Information and Communication Technologies (hereinafter also ‘ICTs’) has become deeply experimented even in the field of administrative organization and activity⁶⁴.

⁶² F. DE LEONARDIS, *Tra precauzione, prevenzione e programmazione*, in L. GIANI, M. D’ORSOGNA, A. POLICE (e.b.), *Dal diritto dell’emergenza al diritto del rischio*, cit., 67-68, where the A. refers to the *decalogue* as a test to which all the risk assessments should be subjected.

⁶³ According to F. FOLLIERI, *Decisioni precauzionali e stato di diritto. La prospettiva della sicurezza alimentare (II parte)*, cit. 66, the distinction in four steps of the risk assessment is an investigation method of future events translated into legal rules for the conduct of the investigation phase.

⁶⁴ According to the «*White Book on Artificial Intelligence to the service of citizens*» (2018), drafted by the task force promoted by AGID (Italian Agency for digitalization), Italy ranks 5th in the world for the production of mostly-cited scholar papers on machine learning after the United States, China, India, and Great Britain. The «*National Strategy for Digital Competences*» of July 21st, 2020, adopted by Decree of the Ministry for technological innovation and digitalization, states that the majority of public administrations has not yet proceeded to the appointment of the Responsible for the transition to the digital, as mandated by art. 17 CAD and that, many of the professionals

As a preliminary remark, it should be pointed out that the ICTs needs to be properly distinguished from the artificial intelligence systems (hereinafter also ‘AI’), by which legal categories and institutes are interpreted and applied through automated systems.

Since the 1970’s, the administrative act in electronic form has been investigated by the doctrine, receiving a first legislative recognition with the Legislative Decree no. 39/1993 and with the subsequent introduction of art. 3-*bis* of Law no. 241/1990 (by Law no. 15/2005), which requested to design the administrative proceeding in an electronic form and to manage the relationship between public and private parties using the ICTs.

Furthermore, through article 41 of the Italian Code of digital administration (Legislative Decree no. 82/2005), it was established an effective obligation to pursue automated administrative proceedings⁶⁵.

The more recent Law August 7th 2015, no. 124, art. 1, par. 1, letter b), which refers to the Italian Charter of digital administration, prescribes to redefine and simplify administrative procedures, in relation to the need of certainty and transparency towards citizens and businesses, through a discipline based on their digitalization and the full implementation of the «digital first» principle, as well as the organization and procedures within each administration.

appointed for this role do not possess adequate technological competences concerning legal and managerial IT mandated by the norm.

⁶⁵ See R. CAVALLO PERIN, D.-U. GALETTA (e.b.), *Il diritto dell’amministrazione pubblica digitale*, Turin, 2020; E. CARLONI, *I principi della legalità algoritmica. Le decisioni automatizzate di fronte al giudice amministrativo*, in *Dir. Amm.*, 2020, 2, 271 et seq.; D.-U. GALETTA, *Algoritmi, procedimento amministrativo e garanzie: brevi riflessioni, anche alla luce degli ultimi arresti giurisprudenziali in materia*, in *Riv. it. dir. pubbl. com.*, 2020, 3, 501 et seq.; D.-U. GALETTA; J.G. CORVALÀN, *Intelligenza Artificiale per una Pubblica Amministrazione 4.0? Potenzialità, rischi e sfide della rivoluzione tecnologica in atto*, in *Federalismi*, 2019, 3.

This in accordance with art. 41 of the Charter of Fundamental Rights of the European Union, stating the right to good administration⁶⁶, which may decisively be implemented by the automated procedures, and also in accordance with the EU Reg. 2016/679 (GDPR), which contains a first legal framework of the public decision through algorithms (for the purpose of guaranteeing full transparency; non exclusivity and an anthropocentric approach; non-discrimination of the input data).

The Law Decrees no. 76/2020, converted by Law no. 120/2020 (also known as «*Decreto Semplificazioni*») and no. 77/2021, converted by Law no. 108/2021 (also known as «*Decreto Semplificazioni bis*») determined a substantial acceleration of public digitization, amending the mentioned art. 3-*bis* of the Law no. 241/1990, in order to ease and catalyze the digital relationships between citizens and public administration, reducing the need for physical access to public offices, also in the light of contrasting the *digital divide*.

In December 2021, the Agency for digital Italy (AGID) drafted the new Three-year Plan for IT in the Public Administration 2021-2023, defining the digitalization as *an essential tool to promote the digital transformation of the country and, in particular, of the Italian Public Administration*.

For this purpose, the digital transformation of the public administration has become also an essential task between the six missions of the National Recovery and Resilience Plan

⁶⁶ See, D.-U. GALETTA, *Il diritto ad una buona amministrazione nei procedimenti amministrativi oggi (anche alla luce delle discussioni sull'ambito di applicazione dell'art. 41 della Carta dei diritti UE)*, in *Riv. it. dir. pubbl. com.*, 2019, 2, 165 et seq.; A. ZITO, *Il «diritto ad una buona amministrazione» nelle Carte dei diritti fondamentali dell'Unione europea e nell'ordinamento interno*, in *Riv. it. dir. pubbl. com.*, 2002, 427 et seq.; F. TRIMARCHI BANFI, *Il diritto ad una buona amministrazione*, in M.P. CHITI, G. GRECO (e.b.), *Trattato di diritto amministrativo europeo*, Milan, 2007.

(NRRP), within the Mission 1 of the Plan, which is intended to rethink policies and common actions related to «Digitization, innovation, competitiveness, culture and tourism»⁶⁷.

At a supranational level, the EU has always used soft-law regulation tools for the promotion of a sustainable development of AI⁶⁸, until the adoption, in 2021, of the aforementioned Proposal for a Regulation on a European approach to Artificial Intelligence, based on the proceduralization of a risk-management approach to AI systems, defined as systems that are «developed with one or more of the techniques and approaches listed in Annex I and can, for a given set of human-defined objectives, generate outputs such as content, predictions, recommendations, or decisions influencing environments they interact with»⁶⁹.

⁶⁷ See the National Strategic Programme on Artificial Intelligence 2022 – 2024.

⁶⁸ See, in particular, the White Paper on Artificial Intelligence, prepared by a task force of 30 experts on A.I, published by AgID on March 21, 2018 (available at <https://ia.italia.it/assets/librobianco.pdf>); the Report published in 2007 by the Australian Ombudsman titled «Administrative Review Council, Automated Assistance in Administrative Decision Making: Report to the Attorney-General, based on a survey conducted in 2004 (Report No. 46-04) by the Administrative Review Council, providing guidance on best practices in automated decision making»; the report «AI in the UK: ready, willing and able?», published on April 16th, 2018 by the Committee on Artificial Intelligence of the House of Lords; the report of the Norwegian Data Protection Authority of January 2018, titled «Artificial Intelligence and Privacy»; the briefing report on European strategies for artificial intelligence prepared by the European Affairs Committee of the French Senate on January 31st, 2019; the Communication - COM(2018) of April 25th 2018 sent by the EU Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Artificial Intelligence for Europe; the report titled «Artificial Intelligence and Data Protection: challenges and possible remedies», published on November 25th, 2019 by the Council of Europe.

⁶⁹ See the EU Commission, Proposal for a Regulation on a European approach for Artificial Intelligence, 2021/0106, available at the following link: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0206>.

In the described context, ICTs and their evolution influence many aspects of human life, requiring an increasing demand of values and an urgent need to provide an ethical regulatory framework⁷⁰.

In order to analyse the multiple shapes of the incidence of data-sciences on the exercise of the public (bonded and/or discretionary) power - that represents a crucial matter, given the strong contrast between the potential simplicity of use of the automated system and the unintelligibility of the rules of operation - it has to be preliminarily assessed the difference between:

- *administrative digitalization*, related to a mere organizational tool by which drafting, storing and communicating administrative measures in a digital guise (act in electronic form);

- *traditional or simple algorithms*, that are characterized by a deterministic approach, linked to a cause-effect relation between the *input data* selected by humans and the electronically processed *output* decision;

- *AI with a predictive function* (to be further sub-divided in machine-learning or deep machine learning), by which the machine does not merely apply pre-established rules (*input*) to concrete situations, but continuously re-elaborates the data initially entered with a chain of progressive inferences which tends to exclude human control (such as the ANN-Artificial Neural Networks, that imitates human neural connection through a series of algorithms);

⁷⁰ M.C. CAVALLARO, G. SMORTO, *Decisione pubblica e responsabilità dell'amministrazione nella società dell'algoritmo*, in *Federalismi*, 2019, 16, 18 et seq.; see also G. TERRACCIANO, *I.I.A. (intelligenza artificiale amministrativa) e sindacato giurisdizionale*, in *Amministrativ@mente*, 2022, 2, 37-46.

- *servicing or non-servicing algorithms*, which rely, respectively, on the acquisition of a mere ancillary role in the pre-decisional phase or of an effective replacing function of the human decision;

- *supervised algorithms*, that use a pre-labeled and pre-processed set of *input* data and elaborate responses to the data, building a knowable model to generate reasonable predictions (the *output*) for the subsequent input. A *supervised learning* algorithm analyzes the training data and the consequent results, producing an inferential function, which can be used for mapping new *input*;

- *unsupervised algorithms*, in which the system autonomously elaborates inferential connections through un-tagged *input* data, also indicating new data-relations, which the public power may use in order to consider and deepen new evidentiary perspectives that the human mind cannot detect.

On the basis of the provided taxonomy, it should be particularly remarked the distinction between algorithmic administrative action through pure programmed automation, in which the product of the machine anticipates the human will, responding to massive predetermined, logical and conditioned instructions (*weak AI*), and algorithmic sequences which do not operate only at the deductive level, but, instead, operate at a predictive, emulating the human intellectual faculties (*strong AI*)⁷¹.

The mentioned two different forms of AI involve two possible issues:

⁷¹ N. PAOLANTONIO, *Il potere discrezionale della pubblica amministrazione. Sconcerto e stilemi. (Sul controllo giudiziario delle "decisioni algoritmiche"*, in *Dir. Amm.*, 2021, 4, 813 et seq.; M. CORRADINO, *Intelligenza artificiale e pubblica amministrazione: sfide concrete e prospettive future*, in www.giustizia-amministrativa.it, September 10th, 2021.

- on one hand, an approach based exclusively on deductive analysis referred to a large amounts of *data*, would not be able to guarantee a certain decision-making output regarding the discretionary power;

- on the other hand, the so called strong predictive AI manifests an unavoidable degree of unpredictability (the so-called «*black box effect*»⁷²) arising from the weight, not always controllable, assigned by the machine to the new *input*, based on the inferences originating from previous experience.

Furthermore, whenever the automated systems concern administrative power, it becomes even more relevant to know if and how the general principles and the rules of the administrative proceeding (Law no. 241/1990), which safeguards constitutionally protected values, can still be respected⁷³.

Thus, it should be assessed whether the use of AI systems is possible only during the evidentiary-investigation phase or if it might also affect the determination of the content of discretionary measures and the legal position of third parties involved.

In fact, it should be determined if all the phases of the automated administrative proceeding could fully and properly be covered by the regulation already in force (i.e.,

⁷² See N. MUCIACCIA, *Algoritmi e procedimento decisionale: alcuni recenti arresti della giustizia amministrativa*, cit., 350, also for other references; S. WACHTER, B. MITTELSTADT, C. RUSSEL, *Counterfactual Explanations Without Opening the Black Box: Automated Decisions and the GDPR*, in *31 Harvard J. L. & Tech*, 2018, 841; W. SAMEK, T. WIEGAND, K.R. MÜLLER, *Explainable Artificial Intelligence: Understanding, Visualizing and Interpreting Deep Learning Models*, in *ITU Journal: ICT Discoveries*, 2017; L. FLORIDI, C. RUDIN, J. WARD (e.b.), *Black Box Artificial Intelligence and the Rule of Law*, in *Law and Contemporary problems*, 2021, 84, 3.

⁷³ P.S. MAGLIONE, *La pubblica amministrazione al “varco” dell’Industria 4.0: decisioni automatizzate e garanzie procedurali in una prospettiva human oriented*, in *Amministrazione in cammino*, May 26th, 2020; R. CAVALLO PERIN, I. ALBERTI, *Atti amministrativi e procedimenti digitali*, in R. CAVALLO PERIN, D.-U. GALETTA (e.b.), *Il diritto dell’amministrazione pubblica digitale*, cit., 120 et seq.

communication of the starting of the procedure; participation of the third parties and effectiveness of the function of the responsible of the proceeding; transparency and access to administrative documents; preliminary investigation phase; motivation of administrative measures).

This question is even more relevant in the exercise of administrative discretionary power, because it recalls a strong circularity between the interpretation of indeterminate rules and principles and the selection and ascertainment of relevant facts for the purpose of the subsumption under the applicable regulation.

On the contrary, fewer problems can be encountered in the case of bonded/constrained power, which is strictly based on the sillogistic inference mechanism *if-then*⁷⁴.

The elaboration of a proper notion of AI applied to the exercise of administrative power may be useful to analyze and better understand the decision-making processes carried out through automated systems, in the course of the entire administrative proceeding.

It appears desirable to depart from the idea of a mere documentary digitalization – which involves the use of technology only to collect, organize, and communicate data – and to pursue a model of meta-documentary automation, in order to achieve a fully automated reproduction of the logical processes of the human decision-making process⁷⁵.

⁷⁴ See also A. VALSECCHI, *Algoritmo, discrezionalità amministrativa e discrezionalità del giudice (Nota a Cons. Stato, sez. VI, sent. del 4 febbraio 2020, n. 881)*, in *iusinittinere*, September 14th, 2020.

⁷⁵D.-U. GALETTA, *Digitalizzazione e diritto ad una buona amministrazione (il procedimento amministrativo, fra diritto UE e tecnologie ICT)*, in R. CAVALLO PERIN, D.-U. GALETTA (e.b.), *Il diritto dell'amministrazione pubblica digitale*, cit., 85-113.

By identifying the legal basis and the systematic compatibility of the automated decisions, AI may become a phenomenon which is different from digitalization as a merely organizational tool.

In this sense, the Italian Council of State has recently highlighted that the «algorithm is a sequence of instructions, well defined and unambiguous, so that it can be executed mechanically and produce a certain result. This notion, when applied to technological systems, is linked to the concept of automation and to systems suitable for reducing human intervention, which depend on the complexity and accuracy of the algorithm that the machine is called to apply. However, artificial intelligence is a different concept, since, in this case, the algorithm contemplates machine learning mechanisms and creates a system that is not limited only to applying software rules and preset parameters (as the “traditional” algorithm does) but, on the contrary, constantly processes new criteria of inference between data and makes efficient decisions based on such processing, according to a process of machine learning (on the basis of the provided distinction between the notion of algorithm and of artificial intelligence, the Administrative Judge considered that, in order to obtain the supply of a medical device with a high degree of automation, it was not necessary for the Public Administration to make express reference to the notion of artificial intelligence, stating that the reference to the specific concept of algorithm is completely sufficient, since the latter can provide an efficient degree of automation)»⁷⁶.

The purpose is to assess the AI as a «maieutic» tool aimed at the emersion of a data science culture throughout an analogic administrative function.

⁷⁶ Council of State, sec. III, 11/25/2021, n. 7891.

Even if some authors dissent from the necessity of a new legal regime of the automated administrative proceeding⁷⁷, we deemed it urgent to draft (or to adapt) special rules of administrative conduct (and also automated indicators for monitoring their implementation), on the acknowledgement that the current regulatory regime can't fully ensure efficiency, impartiality and transparency of the public action.

The said analysis should not concern so much the issue of the digital or digitalized administrative act, i.e. with the acquisition of a «digital-formal guise» of the administrative function, but rather the elaboration of legal rules that autonomously regulate the algorithmic administrative procedure, in order to guarantee the formal and substantial correctness of the decision-making process (and, obviously, of the administrative decision that arises as its natural *output*)⁷⁸.

Nowadays, algorithms can manage, follow and implement all the phases involving the discretionary public power and this implies a need to proceduralize the decision, starting from the assessment of facts, and to draft operational rules which could allow also to trace and analyse any significant risk of maladministration.

In fact, concerning the investigation phase, we find that AI systems may be also very useful in order to select and classify facts which appears to be significant in order to provide empirical concreteness to an imprecise administrative rule, which result from a legislation by principle rather than by analytical enumeration of relevant facts.

⁷⁷ See, among others, N. PAOLANTONIO, *Il potere discrezionale della pubblica amministrazione. Sconcerto e stilemi. (Sul controllo giudiziario delle "decisioni algoritmiche")*, cit., 813 et seq.

⁷⁸ N. MUCIACCIA, *Algoritmi e procedimento decisionale: alcuni recenti arresti della giustizia amministrativa*, in *Federalismi*, 2020, 10, 344 et seq.; E. PROSPERETTI, *Accesso al software e al relativo algoritmo nei procedimenti amministrativi e giudiziari. Un'analisi a partire da due pronunce del TAR Lazio*, in *Dir. e Informatica*, 2019, 4, 979 et seq.; See also, Council of State, sec. III, November 25th 2021, no. 7891.

In order to prove and select a subsumable fact within a legal provision the AI systems may learn from previous classification and label the new facts by identifying a probabilistic threshold of truth.

Given the fact that interpretation and fact-ascertainment mutually and circularly condition each other, especially in relation to indefinite-imprecise norms, the use of AI in the preliminary investigation phase is therefore crucial to identify new factual inferences and to gain knowledge, linking certain known behaviors/facts to unknown facts by a predictive capacity that can be disproved (proof contrary).

In such cases the truth become quantitatively measurable and consequently subject to error percentages, which over time take on decreasing values.

Similarly, the *unsupervised algorithms* may define a series of connections between multiple public databases, that the human decision-maker is not always able to grasp, defining new connection of the *inputs* (establishing a *data-clusterizations*), which can be evaluable as new evidentiary perspectives.

In a nutshell, AI appears to be in several ways as an amplifier of knowledge and an uncertainty reducer, especially in the investigation phase.

Consequently, *quaestio facti* may no longer be a grey area entirely left to the unintelligible discretion of the decision maker, but an area of knowledge governed by the mentioned operational rules compatible with AI systems.

The mentioned process is also capable to guarantee an effective automated monitoring of the enforcement of the AI rules, pursuing the aim of not crossing the anthropocentric threshold of human controllability and of achieving the subjective imputation of a given event to an agent, from a material and legal standpoint.

The procedural model of administrative action, operating since the phase of ascertainment of the factual premises of public power and supporting the decision-maker in the management of the inferential connections between the data, may guarantee transparent

and objective *criteria* for a minimum threshold of acceptability of the reconstructive hypothesis of the fact subsumed within the norm.

This may also safeguard an effective right to access to the algorithmic procedural model and to the technical features by which are managed the inferential connection between input and output (in light of an enhanced transparency), and to guarantee that a real adversarial between the parties may become possible and may tend to a constant improvement and update of inputs, pursuing a permanent data quality.

This approach will ease a new form of algorithmic administrative action by which, in addition to the drafting of new rules, the rules in force, related to transparency, efficiency, protection of individual rights and good administration, will be enhanced and adapted.

However, the transition from a deterministic-deductive algorithmic decision, related to constrained power, to a probabilistic-predictive one, involving the balancing of public and private interests, imposes the acceptance and the management of margins of error (and also risks).

Therefore, the AI systems involve the concept of risk under various point of view (essentially, we can recall the mentioned *summa divisio* between the management of «*the risk of AI*» and of «*the risk through AI*»).

Such risks, in any case, cannot result in a decision-making paralysis or, on the contrary, in assigning to the decision-maker an area of unchallengeable arbitrariness.

For this purpose, it appears unavoidable to use a risk-based approach, by establishing qualitative and quantitative evaluation criteria, useful to identify and classify the risks and to plan the contrasting measures⁷⁹.

Indeed, only a complete «algorithmic proceduralization» may be capable to mitigate the risk that in a discretionary decision – characterized by a continuous comparison between input elements and experiential data, with cycles tending to infinity – the empirical premises and the legal provision can be totally confused among themselves and the investigation ends up being simultaneous to the decision, in an indistinguishable way.

It would also be possible to better avoid the risks related to the subsumption process of the concrete fact under the administrative rule of discretion⁸⁰.

This requires the development of *in-itinere* automation systems ‘through organization’, enhancing criteria and rules able to give, through the mass management of data incoming into the system, a representation of the intellectual process rather than a mere deductive anticipation of the decision-making process.

It is necessary, by digitally overseeing all the phases of the decision-making process, to generate a measure that safeguards the formal and substantial correctness of the act itself⁸¹.

⁷⁹ See the EU Commission, Proposal for a Regulation on a European approach for Artificial Intelligence, 2021/0106, available at the following link: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0206>.

⁸⁰ L. MUSELLI, *La decisione amministrativa nell'età degli algoritmi: primi spunti*, in *MediaLaws*, 2020, 1;

⁸¹ S. DE FELICE, *Artificial intelligence and “Disability and justiciability before the administrative court”*, in www.giustizia-amministrativa.it, July 2021.

Another problematic profile regards the possibility of dominating the algorithms⁸², resulting by self-machine learning (with a continuous input process not controllable by a human manager), in order to guarantee comprehensibility and transparency in the programming phase and, then, a possible review during the exercise of power and also the evaluation of the consequences, even on a merit basis that involves the balancing of interests.

Moreover, the administrative algorithmic decision should still be motivated, even if it is the result of an algorithm independently generated by the computer system, and the Administrative Judge should not avoid to perform a strengthened review in these hypotheses of technological complexity, which sometimes appear unknowable (as pointed out by the Italian Council of State)⁸³.

And this seems even more relevant in the proceeding in which artificial intelligence can allow a certain predictive degree of the outcome of decisions⁸⁴.

There is no doubt that the mentioned framework places legal scholars, once again and even more, in front of the need to analyze the co-existence between the pervasiveness of technological evolution and the need to preserve the humanization of the administrative proceeding.

⁸² M. CORRADINO, *Artificial intelligence and public administration: concrete challenges and future prospects*, in www.giustizia-amministrativa.it, September 2021.

⁸³ See Council of State, sec. VI, 02/04/2020; n. 881; sec. VI, 04/08/2019, n. 2270. A. VALSECCHI, *Algorithm, administrative discretion and discretion of the judge (Note to Cons. State, sec. VI, sent. of 4 February 2020, n. 881)*, in *iusininiere*, September 14th, 2020; C. NAPOLI, *Algoritmi, intelligenza artificiale e formazione della volontà pubblica: la decisione amministrativa e quella giudiziaria*, in *Riv. AIC*, 3, 2020.

⁸⁴ G. TERRACCIANO, *Automazione e processo amministrativo: una convivenza difficile?*, in *Amministrativ@mente*, 2022, 1, 25 et seq.; ID., *I.I.A. (intelligenza artificiale amministrativa) e sindacato giurisdizionale*, cit.

Along with the tendency to de-humanize administrative action we can find points of connection with virtual, automated and valueless actions, regulated by machines that act following an uncritical imitation of a «deep learned pattern».

Nevertheless, as previously said, the ethical concerns cannot generate a prejudicial refusal of the 4.0 revolution of P.A., which today has become a pervasive phenomenon in every field of human existence.

It appears undeniable that, in the present era, the process of data collection through inferential connections cannot be easily constrained to a preliminary phase which is reduced to a merely servant role, but naturally tends to decisively anticipate the discretionary content of the measure, as well as the outcome of the balance of interests. The algorithm, in this perspective, may result in a proposed measure to be submitted to the human decision-maker and on which it is necessary to establish an adversarial phase with the third parties involved.

It is not by chance that the EU, in the Proposal for a Regulation of the European Parliament and of the European Council introducing harmonised rules on artificial intelligence (Artificial Intelligence Act) of April 21st 2021, pursues a risk-based approach, classifying the AI system as high-risky and non-high-risky.

The principal risk is clearly the absence of dominance, since the process of continuous self-learning and constant reprocessing of the data originally entered generates an endless series of automatic inferences, less and less intelligible, accessible and questionable.

In this regard, the case-law, especially of the Council of State, after an initial *self-restraint*, enhancing the EU Regulation of the GDPR as well as the national and supranational

soft-law, has shown a gradual opening towards algorithmic decisions in administrative proceedings, including discretionary ones⁸⁵.

The Council of State has established the limits and conditions of admissibility of the automated administrative decision which can be identified in: the knowability/transparency/accessibility; the non-exclusivity and human dominance of the decision; the non-discrimination of the data entered into the system.

However, there are no similar reflections regarding the entire process of decision-making automation, which intervenes from the evidentiary phase, is capable of carrying out an autonomous prognostic judgment and of grasping new factual inferences, with positive effects in terms of efficiency and uniformity of decisions and, ultimately, of legal certainty, but also with significant risks of distortions and discrimination⁸⁶.

This shows another risk of algorithmic proceeding: a decision based entirely on self-learning mechanisms (*deep machine learning*) would run the risk of crystallizing a

⁸⁵ See the recalled decision of the Council of State, sec. VI, no. 2270/2019, 8472/2019, 881/2020.

⁸⁶ There is also an «inductive» current of thought that, in application of the *Fair Division Theory*, leans towards an «equitable algorithm» as a dispenser of fair and just decisions in court, advocating increasingly neutral with respect to the heteronomous values of normative positivism often declined in broad norms, which are considered an obstacle to automated application. These procedures have as their final objective the efficient equitable composition of the instances for the protection of rights disposable by the parties in their negotiating autonomy, through the exclusive balancing of the interests and values of the subjects involved (so-called «equitable algorithms»). See F. ROMEO, *Algoritmi di giustizia ed equità nel diritto*, in *www.i-lex.it*, 2021, 1; G. TUZET, *L'algoritmo come pastore del giudice? Diritto, tecnologie, prova scientifica*, in *MediaLaws*, 2020, 1.

*dictatorship of the precedent*⁸⁷, as entered into the *database*, preventing any *revirement* or evolution.

Furthermore, significant problems arise with regard to the controllability of the decision and the accountability of the decision-making process, especially where the application of rules, elaborated through indeterminate concepts, is required in order to *individualize* the decision.

Consequently, it would not be easy to provide guarantees of challengeability of a decision based on artificial automated strong systems, which may involve the use of a sort of «second-degree algorithm», responsible for a purely technical verification of the decision of the previous level of judgment.

In a future perspective, however, it would be difficult to imagine that these risks of algorithmic decision could end up relegating it to a mere operational aid of the discretionary decision, since the pervasive evolution of A.I., which is making great steps towards a more analytical reproduction of even the most human aspects of the intellectual process, requires to be prepared and to manage the change.

And so, it seems inappropriate to think of «weak» artificial intelligence, as an aid to decision-making, and of «strong» intelligence, as a real decision, in a light of strong contrast, but there is an urgent need of integration of the said ones in the course of the administrative proceeding.

In order to address the problem at a systematic level, it is necessary, mainly, to rethink the *summa divisio* between the automated procedures in which the algorithm is «servant», that is able to systematize, collect and process the data only in order to

⁸⁷ S. GABORIAU, *Libertà e umanità del giudice: due valori fondamentali della giustizia. La giustizia digitale può garantire nel tempo la fedeltà a questi valori?*, in *Questione giustizia*, 2018, 4, 209, who refers to the «dittatura del precedente».

facilitate human decision-making, and «*decision-taking*» AI algorithms, which are able to self-learn and autonomously draft the content administrative measure, replacing, with abductive, deductive and predictive function, human determination.

A solution may be found in implementing a new shape of artificial administrative intelligence, by digitally tracing and re-designing all the phases of the intellectual-decision-making process, selecting the essential data of each one, and allowing *machine learning* to enhance its algorithmic inferences.

The decision, seen in the described wide declination, must be able to rely on a solid, pre-processed, controlled and discussed *dataset*, which prevent the risk that *algorithmized* fact become obscure and unpredictable.

In other words, it is necessary to refer to an automation system *in progress*, which is able to enhance a *dataset*, not mechanically entered in an analogic system or proceeding phase, but acquired within the system itself.

On this basis, the data selection and acknowledgement should originate within the system and not forcibly entered from outside the decision-making process.

The importance of ethics in automated administrative action results, therefore, into the need for a proper legal status of the production and use of artificial intelligence to which the decision-maker must comply.

In other words, the digitalization through tracking of decision processes should not be considered detached from the current structural organization of the P.A., which is perhaps already unconsciously predisposed as to methods and behaviors related to the collection and storage of information and attempts to describe documents and their legal regime (the so-called '*knowledge management*').

In the same way, the enforcement of the said procedural rules and protocols is needed to pursue the difficult balance between the guarantees of the individual rights and the consequent use of algorithms as an informative support to the human decision.

It should be outlined the decisive contribution that algorithms may offer in the preliminary phase of the ascertainment of the premises of the public power, through the management of *evidentiary* standards, assessing the level of truth and falsifiability of the factual hypothesis of subsumption under the indeterminate norm and enhancing the algorithmic concatenations of *machine learning*.

Only a renewed interest in proceduralizing the preliminary assessment of the fact will result in the development of scientific alerts by which empirically test the evidence mechanisms.

The basic idea is, therefore, not to lower automation through AI in separate compartments, using it in a coercive way only in some specific segments of the proceeding, but to intend the algorithm, as remarked by the Council of State, as a procedural and organizational module, verifiable, constantly controllable and correctable by the human being.

The described *automation through organization* could also allow a fair degree of traceability and transparency, necessary to ensure fairness and non-discrimination and the reviewability of decisions in court.

It seems therefore necessary not to pursue a digitalization by which the algorithm becomes an obscure generator of imponderable decisions using inaccessible technologies developed by private subjects, but a *digitalized environment*, in which the circular processes involving fact-finding and rules interpretation and application phases, can be conducted by enhancing the enormous cognitive heritage of administrative action and grasping the possible algorithmic data-connections in a predictive sense.

In this sense, Luciano Floridi highlighted that *if home is where our data is, then we have been living for a long time on Google Earth and in the cloud. Artificial and hybrid agents, that is to say partly human and partly artificial (such as, for example, a bank), now interact as digital agents with digital environments and, since they share the same nature, they can operate with each other with much more freedom and control capacity. We*

*increasingly delegate or outsource memories, decisions, routine tasks and other activities to artificial agents in ways that are increasingly integrated with our lives*⁸⁸.

4. PRECAUTIONARY PRINCIPLE AND ARTIFICIAL INTELLIGENCE: POSSIBLE LINKS

As emphasized above, the use of artificial intelligence, especially with *unsupervised machine learning* features, involves in various shapes the concept of uncertainty and risk.

At the same time, it cannot be ignored that AI systems reveal to the human decision-maker «a reasonable degree of self-understanding and autonomous self-control, the ability to solve a variety of complex problems in variety of context and learn to solve new problems that didn't know about the time of creation»⁸⁹.

On this basis, the algorithmic analysis of law (also known as *Law&Tech*, which needs to be distinguished by *Legal Tech*, referred to a mere supporting and organizational tool for daily legal activities)⁹⁰ imposes to humans, in order to avoid anti-historical prejudicial closures which lead to inertia, to manage and oversee the extraordinary potential of AI, that

⁸⁸ L. FLORIDI, *La quarta rivoluzione: come l'infosfera sta trasformando il mondo*, Milan, 2017, 59, «Se casa è dove sono i nostri dati, allora viviamo da tempo su Google Earth e nel cloud. Agenti artificiali e ibridi, vale a dire in parte umani e in parte artificiali (come, per esempio, una banca), interagiscono ormai in quanto agenti digitali con ambienti digitali e, dato che condividono la stessa natura, possono operare tra loro con molta più libertà e capacità di controllo. Deleghiamo o esternalizziamo in misura crescente ad agenti artificiali ricordi, decisioni, compiti di routine e altre attività con modalità che sono sempre più integrate con le nostre vite».

⁸⁹ B. GOERTZEL, C. PENNACHIN, *Artificial General Intelligence. Cognitive Technologies*, Springer, 2007.

⁹⁰ See F. DI PORTO, *La regolazione di fronte alle sfide dell'ICT e dell'intelligenza artificiale*, in R. CAVALLO PERIN, D.-U. GALETTA (e.b.), *Il diritto dell'amministrazione pubblica*, cit., 278 et seq.

inevitably tends to «operate autonomously, perceive their environment, persist over a prolonged time period, adapt to change, and create and pursue the best expected outcome»⁹¹.

In fact, it has been appropriately pointed out that AI, even in the exercise of a discretionary public power, shows an adaptive and evolutionary feature, which is related to the capacity of the machine to autonomously continue its learning, and also a transformational nature, regarding the capacity of generating disruptive changes in the legal environment⁹².

This implies, on one hand, to perceive AI as a strong knowledge-supplier, which counter and reduces uncertainty in the investigation phase, by helping human to select and attribute value to relevant factual inferences and grasp connections among them often uncatchable by human, and, on the other hand, to deal with the concept of risk, as to establish an acceptable threshold of error (and, thus, an acceptable level of minimum knowledge), which minimizes risks and responsibilities arising from the human decision to take.

As stated in the previous paragraphs, the application of the precautionary principle within administrative proceedings results in an aggravated burden in ascertaining and selecting complete, comprehensive and reliable facts and data and places the public administration in front of the difficulty of following a single path for the assessment of the available evidences and of the cause-effect connection.

Consequently, scientific uncertainty makes the fact-finding activity more complex and the precautionary principle, as a principle of administrative activity, influences the course of the proceeding in concrete terms, requiring additional investigative effort.

⁹¹ See S.J. RUSSELL, P. NORVIG, *Artificial intelligence: A Modern Approach*, 2010, 1-5, 4.

⁹² G. COMANDÈ, *Intelligenza artificiale e responsabilità tra liability e accountability. Il carattere trasformativo dell'IA e il problema della responsabilità*, in *Analisi giuridica dell'economia*, 2019, 1, 169 et seq.

In addition to the described additional investigative effort, the application of the precautionary approach should determine an aggravated procedural burden in order to promote a greater participation of all parties involved, resulting in a more transparent and accountable decision.

At this point, the question could be: can the AI help public administrations to better perform the mentioned additional investigative effort and ensure the respect of the principles of the administrative action? If so, how?

In order to provide a reasonable answer, a first element to consider is that public authorities may reach an increased level of data knowledge due to the fact that digitalization breaks down traditional physical and geographic barriers, significantly easing and instantly allowing the decision maker to navigate through databases holding data from all over the world.

Another element to take into account is the added value arising from the interconnection of the database through the automated systems: indeed, as stated by the doctrine, *the ability of machine learning to classify the data made available to the algorithm allows to identify similar characteristics and to subdivide the data into classes, improving future decision-making ability as the knowledge base (historical) provides meaningful representations of reality that the machine needs in order to process future decisions*⁹³.

⁹³ R. CAVALLO PERIN, I. ALBERTI, *Atti amministrativi e procedimenti digitali*, in R. CAVALLO PERIN, D.-U. GALETTA (e.b.), *Il diritto dell'amministrazione pubblica digitale*, cit., 138, who specify that: «la capacità delle tecniche di *machine learning* di classificare i dati messi a disposizione dall'algoritmo consente di individuare caratteristiche simili e di suddividere i dati in classi, raffinando la capacità di decisione futura, poichè la base conoscitiva (storico) offer rappresentazioni significative della realtà che servono alla macchina per elaborare decisioni future».

Furthermore, it should be considered that the potential of AI lies in the ability to increase its knowledge by an interaction with the surrounding environment.

This determines that the learning cycle is continuous, changes through experience and constantly acquires new information. As a consequence, the said continuous learning cycle allows the acquisition of new information and generates also new connection between the acquired information, generating new useful knowledge in order to support the decision⁹⁴.

The increased amount of data provided by the AI system as a result of the learning cycle is not only a collection of data aimed at a mere historical representation of the reality, but it is a tool to conduct the fact-finding phase in order to perform a factual judgement which is oriented to ascertain the «administrative proceeding truth». The recalled truth is necessary

⁹⁴ See the comprehensive explanation provided by G. COMANDÈ, *Intelligenza artificiale e responsabilità tra liability e accountability. Il carattere trasformativo dell'IA e il problema della responsabilità*, in *Analisi giuridica dell'economia*, cit., 172-173 where the Author exposes that the process of learning of an AI analyzes data, identifies patterns in them based on the correlations found and then creates new patterns, recursively, which are then applied to the new and “old” data that generated the patterns. It is a continuous cycle in which the analyzed data allow the creation of models that are immediately tested on the same data and with the information acquired (the model indeed). Like a series of forks, perpetually ramified along a path, an artificial intelligence system progresses through an iterative analytical process to identify and incorporate new information. The Author assumes, in order to clarify with an example, the learning process of an algorithm to recognize human faces through the analysis of a substantial number of photographic images. In analyzing the first images the AI will look sequentially at each pixel in the photo. At some point the algorithm will learn patterns, meaning it will find correlations and on the latter it will evolve its learning process. For example, by understanding that a face has eyes, that the nose is between them and the mouth is below the nose, and that the ears are equidistant from the nose, the algorithm will no longer search pixel by pixel anymore but will hunt for correlations becoming progressively more efficient, accurate and rapid in an iterative process that leads it to learn, precisely autonomously, how to accomplish a purely human task such as recognizing a face in a photograph. The described way of proceeding and programming, as explained by the Author, enables profound transformations in every area by allowing it to replace humans in many intellectual activities and to do so with far superior performance.

in order to assess the empirical prerequisites for the exercise of public power, as identifiable in the undetermined legal rule⁹⁵.

The rule is usually formulated according to indeterminate legal concepts that determine a circularity and a mutual conditioning between *questio iuris* and *questio facti*.

This is even more true in the application of the precautionary principle, since the concepts of hazard and risk may be classifiable as indeterminate legal concepts and also risk presents a greater degree of indeterminacy.

Similarly, in the presence of situations of risk, the conditions for the exercise of the power are indeterminate, thus leaving the public administration the power to concretize that indeterminacy.

The precautionary principle, as stated in the recalled Rio Declaration of 1992 and Communication of the Commission of 2000, does not apply in the event of already identified risks known to be harmful, but it applies to hypothetical risks based on clues of which there is only a partial knowledge.

The assessment shall not be based on purely hypothetical risks but on circumstantial evidences which do not offer an unequivocal representation leading to the scientific certainty of a possible danger to the interests protected by the administration.

Therefore, in cases of scientific uncertainty, it is not possible to unequivocally and exhaustively assess the degree of risk and probabilities of verification of a harmful event.

⁹⁵ For an overview of the fact-finding phase in the administrative proceeding and process, see G. TERRACCIANO, A.M. COLARUSSO, *L'indizio nella decisione amministrativa. Teoria e prassi dell'inferenza probatoria nell'esercizio della funzione amministrativa e del potere giurisdizionale*, Naples, 2021.

It is precisely in this area – which is not a situation of absolute scientific uncertainty and consequent total absence of facts to be valued as empirical assumptions of administrative decision – that the relevance of the function of supporting the decision-maker performed by the knowledge generated, increased and enhanced by artificial intelligence in the interconnections between facts, is even more remarkable.

AI, therefore, allows to guarantee greater solidity and greater analyticity to the phase of ascertainment of the fact: a *super-visioned algorithm* can identify a new knowledge, correlating certain known behaviors with other facts of non-direct assessment, which, as *iuris tantum* presumptions, are characterized by a predictive capacity, that in the case of the algorithm is also measurable quantitatively through a measurable degree of error, which gradually may assume decreasing values⁹⁶.

AI also allows to better process the phase of risk assessment, dividing it into evaluation segments, each with its own autonomy, which can be controlled by artificial intelligence.

For the scope of the present paper, is not by chance that the European Commission provided a proceduralization of the risk assessment related to the precautionary principle, dividing it into the above mentioned four segments: hazard identification, hazard characterization, appraisal of exposure and risk characterization.

Therefore, the ability of artificial intelligence may ease the factual assessment in each of the mentioned segment of the process.

⁹⁶ The shareable thought is expressed by authoritative doctrine: R. CAVALLO PERIN, I. ALBERTI, *Atti amministrativi e procedimenti digitali*, in R. CAVALLO PERIN, D.-U. GALETTA (e.b.), *Il diritto dell'amministrazione pubblica digitale*, cit., 137.

Shall the AI systems ease the risk assessment phase, it seems coherent to affirm that the efficiency of the administrative action is strengthened and that the duty of non-aggravation of the proceeding is also respected.

The described process that enables a qualitative and quantitative increase in knowledge in the administrative risk assessment phase, could allow a slide of the precaution towards prevention.

Indeed, the more knowledge is increased, the more the uncertainty of the risk decreases, the more the decision-maker is able to assess a known risk and adopt preventive measure. Following this pattern, the distinction between precaution and prevention could be significantly and quantitatively reduced and the two principles could overlap.

5. NEW PERSPECTIVES FOR AN EFFECTIVE BALANCE BETWEEN SCIENTIFIC UNCERTAINTY AND ADMINISTRATIVE DECISION

Despite the extremely appreciable potential of AI described so far, we could say, with Shakespeare, that *all that glisters is not gold*.

Indeed, the interpreter should also consider some issues related to artificial intelligence: given the fact that AI helps the administration to select and update, in real time, evidence-based circumstances, the mentioned features generate also a risk of bias in fact finding.⁹⁷

- *automation bias*, by which individuals totally rely on the automation, even when they know that it could be wrong;

⁹⁷ See L. FLORIDI, *Etica dell'intelligenza artificiale. Sviluppi, opportunità, sfide*, Milan, 2022, 159 et seq.

- *translation bias*, referring to possible adverse effect of the use in a different context of a system which is perfectly trained in a specific context and that can be usable only in similar context⁹⁸.

The European Parliament Resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics has focused on the robot's autonomy, as an undeniable issue of the allocation of liabilities, defining the autonomy as the ability to take decisions and implement them in the outside world, independently of external control or influence; whereas this autonomy is of a purely technological nature and its degree depends on how sophisticated a robot's interaction with its environment has been designed to be.⁹⁹

In order to counteract the aforementioned biases and to guarantee a reasonable threshold of acceptability of the reconstruction of the fact, the algorithmic decision could be hypothesized as a provisional, traceable and transparent proposal of administrative decision, subject to a subsequent adversarial phase.

This appears to be in accordance with the reflection of a sharable doctrine, which outlined, although referring to the judicial phase, that *discussions on the use of algorithms in the legal and judicial fields are often prejudiced by a polarization, between those who consider them extremely useful and advocate a wide use of artificial intelligence in the legal field and those who consider them fatal and defend the traditional autonomy of the human decision-maker. The former often add considerations of procedural economy, on the advantages of using algorithms in terms of time and procedural costs. The latter insist on some of the objections mentioned above (one above all: who programs the programs?) and trust the traditional capacity for human judgment, including attention to the particularities*

⁹⁸ See G. COMANDÈ, *Intelligenza artificiale e responsabilità tra liability e accountability. Il carattere trasformativo dell'IA e il problema della responsabilità*, in *Analisi giuridica dell'economia*, cit., 176.

⁹⁹ European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)), cit., Introduction let. aa.

of each individual case and the sense of fairness. Now, if the polarization reaches the point of presenting a sharp alternative, between algorithms that replace judges and judges who do not use algorithms, this is clearly a dead end. Instead of discussing a sharp alternative and postulating a dichotomy between human decision and automated decision making, it should be more constructive to discuss about the possibilities of an interaction between algorithms and human decision-makers. One possibility that seems to me at hand is to use algorithms as information tools, to support human decision-making¹⁰⁰.

The participation and the adversarial on the algorithmic proposal could allow to guarantee the anthropocentric approach, avoiding to incur in the general prohibition of exclusively automated decisions (as required by art 22 of GDPR¹⁰¹).

This would also make it possible to reduce the opacity of the decision-making mechanism through artificial intelligence (the mentioned «*black box effect*»), allowing to correct mistakes and to acquire and increase the input data and to correct the weight assigned to each data in order to reach the output.

¹⁰⁰ G. TUZET, *L' algoritmo come pastore del giudice? Diritto, tecnologie, prova scientifica*, in *MediaLaws*, cit., 54, who exposes that «Le discussioni sull'uso di algoritmi in ambito giuridico e giudiziale sono spesso viziate da una polarizzazione, fra chi li ritiene sommamente utili e caldeggia un largo impiego dell'intelligenza artificiale in ambito giuridico e chi li ritiene funesti e difende la tradizionale autonomia del decisore umano. I primi aggiungono spesso considerazioni di economia processuale, sui vantaggi dell'uso di algoritmi in termini di tempo e costi processuali. I secondi insistono su alcune delle obiezioni ricordate sopra (una su tutte: chi programma i programmi?) e confidano nelle tradizionali capacità di discernimento e giudizio umano, fra cui l'attenzione per le particolarità di ogni singolo caso e non ultimo il senso di equità. Ora, se la polarizzazione giunge al punto di presentare una secca alternativa, fra algoritmi che sostituiscono i giudici e giudici che non usano algoritmi, si tratta evidentemente di un punto morto. Anziché discutere di un'alternativa secca e postulare una dicotomia fra decisione umana e decisione automatizzata si dovrebbe più fruttuosamente ragionare intorno alle possibilità di un'interazione fra algoritmi e decisori umani».

¹⁰¹ For an analysis of art. 22 GDPR, see D. SANCHO, *Automated Decision-Making under Article 22 GDPR: Towards a More Sustainable Regime for Solely Automated Decision-Making*, in M. EBERS, S.NAVAS (e.b.), *Algorithms and Law*, Cambridge University Press, July 2020, 136-156.

The progressive and continuous correction and improvement of the cases included in the database (so-called «*data lake*»¹⁰²) is also essential to guarantee the quality of the data over time and to allow their constant update.

In this sense, the participation and the adversarial on the algorithmic proposals during the risk assessment phase could also satisfy the need of participation which is desirable in the administrative proceedings based on the scientific uncertainty.

Furthermore, AI could also mitigate a further problem linked to the principle of precaution, which lies in the difficulty of carrying out constant monitoring of scientific evolution and the change of the factual situation.

As highlighted by legal doctrine *the precautionary measures, in fact, are provisional and are subject to review in the face of the acquisition of “new scientific information” or in correspondence with the evolution of the “best available technologies”*¹⁰³.

The flexibility of the precautionary choice is also required by the principle of proportionality¹⁰⁴ as the measure adopted in the context of scientific uncertainty is

¹⁰² See, also for an overview about the notions of data and informations, G. CARULLO, *Dati, banche dati, Blockchain e interoperabilità dei sistemi informatici nel settore pubblico*, in R. CAVALLO PERIN, D.-U. GALETTA (e.b.), *Il diritto dell'amministrazione pubblica digitale*, cit., 197.

¹⁰³ A. BARONE, *Amministrazione del rischio e intelligenza artificiale*, in *European Review of digital administration and law – Erdal*, 2020, I, 67, who states that «*Le misure precauzionale, infatti, sono provvisorie e sono soggette a riesame di fronte all'acquisizione di “nuove informazioni scientifiche” ovvero in corrispondenza dell'evoluzione delle “migliori tecnologie disponibili”*».

¹⁰⁴ Legal doctrine over the proportionality principle is very broad, A.M. SANDULLI, *La proporzionalità dell'azione amministrativa*, Rome, 1998; D.-U. GALETTA, *Principio di proporzionalità e sindacato giurisdizionale nel diritto amministrativo*, Milan, 1998; S. COGNETTI, *Principio di proporzionalità: profili di teoria generale e di analisi sistematica*, Turin, 2011; D.-U. GALETTA, *Principio di proporzionalità*, in M.A. SANDULLI (e.b.), *Codice dell'azione amministrativa*, Milan, 2011, 111 et seq.; S. VILLAMENA, *Contributo in tema di proporzionalità*

provisional and shall be adapted to factual situation on the basis of the information available at a precise historical moment.

In this sense, AI makes it possible to offer an updated scenario of scientific evolution in a timely manner and, therefore, increases the power of the administration to adopt the “best” and less harmful measure in the concrete case.

The algorithmic proposal based on the enhancement of inferences between data selected from interconnected databases, in order to produce new knowledge, is the natural result of a probabilistic decision that is subject to a margin of error.

This margin of error, on one hand, can be progressively reduced thanks to the rapid and constant adaptability of artificial intelligence systems and, on the other hand, it can be isolated as a threshold and then used as an automated alert mechanisms during the monitoring phase.

In this context, AI generates a new kind of knowledge, which seems different for its quantity – thanks to the appreciation of a broad set of data mutually interconnected and the consideration of new variables constantly updated – and for its quality – thanks to the fact that the AI systems are able to appreciate empirical circumstances which may not seem relevant to human’s eye.

Furthermore, in order to guarantee an acceptable degree of transparency and mitigate the opacity of the automated decision-making process, a possible solution, to be technically assessed, may be to transpose such knowledge in a digital environment

amministrativa, Milan, 2008; S. PUGLIESE, *Il rischio nel diritto dell’Unione europea* tra principi di precauzione, proporzionalità e standardizzazione, Bari, 2017.

participated by the decision-maker, the technical bodies and the private stakeholders potentially affected by the precautionary decision¹⁰⁵.

In order to carry out the contradictory in the mentioned environment featured by AI systems, it seems appropriate to exploit the technical opportunity to pre-test and discuss the rules and measures before its large-scale diffusion and adoption.

This by promoting, in a digital-designed environment, the collaborative interaction between all the parties involved in the exercise of the discretionary power that is the essence of the administrative procedure already analogically regulated by Law no. 241/1990, as an interest «clearing house» that intervenes in the final decision phase¹⁰⁶.

The described idea of AI – which requires models of action, designed to ensure process of validation, discussion and pre-test of the *output* decision – seems even more useful in order to adapt the administrative power to scientific uncertainty.

In addition, the design of the said automated environment may also ensure an effective and real-time monitoring of the precautionary measures, using alert mechanism, in order to discuss and revise the decision and the linked threshold of risk, considered acceptable in order to avoid the so called «zero-option» of the paralysis in pursuing public interests or

¹⁰⁵ For this purpose, we could refer, with the appropriate adaptations to the specific case, to the innovations represented by the AI sandboxes and by the metaverse, as a new digital environment in which the PA may exercise its power, that, if read from the perspective of administrative action, especially for the management of unknown risk, could allow to test quickly adaptable procedural models of action and to safeguard the contribution in terms of value of the human decision-maker.

¹⁰⁶ L. FLORIDI, *La quarta rivoluzione: come l'infosfera sta trasformando il mondo*, cit., 106: «siamo organismi informativi (inforg), reciprocamente connessi e parte di un ambiente informativo (l'infosfera), che condividiamo con altri agenti informativi, naturali e artificiali, che processano informazioni in modo logico e autonomo. [...] tali agenti non posseggono la nostra stessa intelligenza, ma possono essere facilmente più in gamba di noi in un numero sempre più elevanti di compiti».

in allowing the beginning of new private activities, which is subject to conditions ensuring health and environment protection¹⁰⁷.

In this regard, we share the suggestive reflections of a doctrine, who highlighted the opportunity to experiment and test AI systems in administrative proceedings, outlining that a controlled automated testing is positive for all the actors involved in order to acquire data and variables useful to the decision-maker and to reduce training errors and bias.

It has been highlighted, indeed, that automation could intervene in the phases of proposal and evaluation of the decision, possibly supporting the activities of the responsible of the proceeding¹⁰⁸.

This would allow to guarantee an anthropocentric approach and to use multicriterial methods of AI with a HITL (human-in-the-loop) approach during the investigation, that is, enabling an intervention of the human responsible for the procedure in the preliminary process of analysis and – if necessary – evaluation, defining the criteria, and preferences, the precautions, not only by design, but also with a constant relation in the sequence of the decision-making process¹⁰⁹.

In this regard, the said doctrine prospects the possibility to implement *administrative sandboxes*, structures where to test new products, services, models and technologies for a defined period for administrative activity, also having adequate disciplines for the selection of appropriate actors and research places different in experience, type of activity and

¹⁰⁷ A. BARONE, *Amministrazione del rischio e intelligenza artificiale*, cit., 67.

¹⁰⁸ P. FORTE, *Diritto amministrativo e Data science. Appunti di intelligenza amministrativa artificiale (AAI)*, in *PA Persona e Amministrazione - Ricerche giuridiche sull'amministrazione e l'economia*, 2020, 1, 293-295.

¹⁰⁹ *Ivi*, 295.

approach to the market: for example, innovative startups, traditional operators, investors and research centers¹¹⁰.

In this key, the distinction between servant and non-servant AI seems no longer useful, but it seems preferable to rely upon a concept of integration: ‘*the integrating-AI*’.

6. CONCLUSIONS

The conclusions of this paper, which analyzes only the multiple issues of risk society and precaution in the (automated) fact-finding phase and, thus, represents only the starting point of the authors’ reflections, can be summarized in the following short bullets, ordered in sequential points:

a) in the current framework, scientific uncertainty and relentless technological progress seems to walk along together, forcing the public decision-maker to rapidly address and manage new and variables shapes of risk;

b) when, more and more often, science is unable to prove the probability of occurrence and the severity of an adverse event to protected interests or its evolution and harmful effects, the precautionary principle compels public authorities, which are bonded to pursue the public interests, to adopt a decision with a structured approach to the analysis of risk;

c) the risk-based approach implies the investigation phase of the collection, selection and qualification of facts, aimed at reducing the informational *vulnus*, the lack of accuracy and of exhaustiveness of available scientific informations;

d) the said investigation phase may be re-designed in an automated form, using AI tools, not as mere servant organizational module, but as a digital environment in

¹¹⁰ *Ivi*, 257.

which draft a proposal of measure, based on generating a new form of knowledge, that is qualitatively and quantitatively improved thanks to the inferences and the interconnection acquired of data from the database of public administrations;

e) the mentioned new form of knowledge may be able to mitigate scientific uncertainty, given the fact that in presence of situations of uncertain risk, the conditions for the exercise of the power are indeterminate, leaving the public administration the power to concretize that indeterminacy, conducting a circular hermeneutical process, in which *quaestio iuris* and *quaestio facti* are mutually conditioned and often confused each other;

f) by reducing scientific uncertainty, also establishing an acceptable threshold of error which may be automatically monitored as a result of the acquisition of new relevant data, the precaution may shift to prevention, re-attributing to fact-finding phase an autonomous statute, through the proceduralization of risk-assessment made possible by AI tools;

g) in order to protect the systems from the AI-bias that the human decision maker can encounter in the design, enhancement and monitoring of automated models, and also to preserve the anthropocentric approach, the automation can't be forcibly placed in a single segment of the proceeding, but features the entire decision-making process;

h) in order to do so, and to mitigate the opacity of automated decisions, a possible technical solution may be to transpose the knowledge generated by in a digital environment participated by the decision-maker, the technical bodies and the private stakeholders potentially affected by the precautionary decision, exploiting the technical opportunity to pre-test and discuss the rules and measures before a large-scale diffusion and the adoption of the measure;

i) this collaborative interaction between all the parties involved in the exercise of the discretionary (and precautionary) power is the essence of the administrative

proceeding¹¹¹, already analogically regulated by Law no. 241/1990, as a «*clearing house*» of the interests that intervene in the making of administrative action and, thus, it seems necessary to evaluate the possible integration of the law no. 241/90 taking into account the non-exclusive analogical nature of the administrative proceeding.

Abstract. *In the current framework of the risk society all the sectors of the public administration are affected by an increasing need of digital transition. Within this context and after the global Covid-19 pandemic, public administrations apply precaution as a primary and ordinary guideline in the exercise of their discretionary powers and, therefore, the precautionary principle appears to be a carrier of a new normality. In this light, the paper aims to investigate the interconnections between precautionary principle and artificial intelligence in order to investigate if and how artificial intelligence could be an effective and sustainable tool to manage and contrast the increasing unknown risks of the new normality. In particular, artificial intelligence may intervene and support the administrations during the entire decision making process, selecting relevant facts and available scientific evidences, identifying the potential negative effects, tracking the potential risks and the possible outcomes of the decision process. In this context, the paper explores the critical questions that arise from the links between AI and precautionary principle and outlines some possible rules and patterns in order to guide the exercise of the public power in the described scenario.*

¹¹¹ See the Italian Constitutional Court, 06/23/2020, n. 116 which stated that «il procedimento amministrativo costituisce il luogo elettivo di composizione degli interessi, in quanto “[è] nella sede procedimentale [...] che può e deve avvenire la valutazione sincronica degli interessi pubblici coinvolti e meritevoli di tutela, a confronto sia con l’interesse del soggetto privato operatore economico, sia ancora (e non da ultimo) con ulteriori interessi di cui sono titolari singoli cittadini e comunità, e che trovano nei principi costituzionali la loro previsione e tutela. La struttura del procedimento amministrativo, infatti, rende possibili l’emersione di tali interessi, la loro adeguata prospettazione, nonché la pubblicità e la trasparenza della loro valutazione, in attuazione dei principi di cui all’art. 1 della L. 7 agosto 1990, n. 241...: efficacia, imparzialità, pubblicità e trasparenza. Viene in tal modo garantita, in primo luogo, l’imparzialità della scelta, alla stregua dell’art. 97 Cost., ma poi anche il perseguimento, nel modo più adeguato ed efficace, dell’interesse primario, in attuazione del principio del buon andamento dell’amministrazione, di cui allo stesso art. 97 Cost. (sentenza n. 69 del 2018)».