

José-Luis Fernández-Fernández

Education and Qualifications: Ph. D. in Philosophy by Pontifical University Comillas of Madrid. Master's Degree in Business Administration (MBA) at ICADE Business School.

E-mail: jlfernandez@icade.comillas.edu

ORCID: <http://orcid.org/0000-0002-2344-7169>

Primary Institution: Pontifical University Comillas of Madrid. Faculty of Economics and Business Administration (ICADE). Department of Business Management.

Position: Full Professor & Director of the Iberdrola Chair in Economic and Business Ethics at Pontifical University Comillas of Madrid.

Postal Code: Calle Alberto Aguilera, 23, 28015, Madrid, España.

Joaquín Fernández Mateo

Education and Qualifications: Ph. D. by Complutense University of Madrid. Master's Degree in Epistemology of Natural and Social Sciences by Complutense University of Madrid & Master's Degree in Political and Institutional Communication by Ortega y Gasset Foundation.

E-mail: joaquin.fernandez@urjc.es

ORCID: <https://orcid.org/0000-0002-9560-5197>

Primary Institution: University King Juan Carlos. Faculty of Legal and Social Sciences. Department of Education Sciences, Language, Arts and Culture, Legal History and Humanistic sciences and Modern Languages.

Position: Associate Professor.

Postal Code: Paseo de los Artilleros s/n, 28032, Madrid, España.

Alberto Andreu Pinillos

Education and Qualifications: Ph. D. in Economy by Pontifical University Comillas of Madrid. Master's Degree in Business Administration (MBA) at IE Business School.

E-mail: albertoandreu@unav.es

ORCID: <https://orcid.org/0000-0003-1312-0899>

Primary Institution: University of Navarra. School of Economics & Business Administration.

Position: Associate Professor

Postal Code: Calle Cataluña, HUM, 31006, Pamplona, Navarra. España.

A critical review of the sustainable business indices at the beginning of the Fourth Industrial Revolution.

Abstract

Historically, the fields of corporate governance and corporate social responsibility have been studied separately. However, in recent years they have come closer in academic research, and especially on sustainability indices. In fact, the most significant indices handle the matter of corporate governance along with other environmental and social criteria. The objective of this research is to propose, on the basis of the results of previous research, new ethical dilemmas and new questions, deduced from them, which should form part of the Code of Ethics dimension of sustainability indices. As a result, a new synthetic sustainability indice would include, among its variables, the new issues that the digital transformation, from an ethical point of view, should include. In this way, the new questionnaire would include key questions that can be deduced from new ethical dilemmas. Previous research has discovered that the variables included in the corporate governance dimension of the sustainability indices are not equally relevant and material, as shown here. We defend the plausible hypothesis that not all items included within corporate governance on sustainability indices are homogeneous and interchangeable and, therefore, equally relevant. As a consequence of the measurements provided by these indices, they may not be truly representative. Similarly, a future research will discover the most relevant questions that should be asked in the ethical code dimension of sustainability indices, as a consequence of the digital transformation.

Keywords: governance, corporate governance, sustainability indices, boards of directors, digital transformation, fourth industrial revolution.

1. Introduction

Historically, Corporate Governance (hereinafter CG) and Corporate Social Responsibility (hereinafter CSR) have been comprehensively studied as separate dimensions. Academic research has paid scant attention to the interaction between the fields of CG and CSR (Ricart et al. 2005; Spitzeck 2009) although CG and CSR are two sides of the same coin (Bhimani & Soonawalla 2005). This situation represents an opportunity to open up new fields of research and was the inception for the present study. There are already many data that show that CG and CSR are two sides of the same coin: a bibliographical review has revealed that the two concepts have started to

merge together (Money & Schepers 2007; Jamali et al. 2008; Spitzeck 2009; Harjoto & Jo 2011; Andreu et al. 2018).

It has also been proven that there is a positive correlation between CG, CSR and economic performance (Fowler & Hope 2007; López et al. 2007; Harjoto & Jo 2011; Chan et al. 2014; Friede et al. 2015; Khan et al. 2016; Rodríguez, 2016) and that the main Environment, Social and Governance (ESG) rating agencies—Bloomberg ESG Data Service; Corporate Knights Global 100; Dow Jones Sustainability Index (DJSI); Institutional Shareholder Services (ISS); MSCI ESG Research; RepRisk; Sustainalytics Company ESG Reports; and Thomson Reuters ESG Research Data—handle the question of CG along with other environmental and social criteria (Flower & Hope 2007; De la Cuesta et al. 2015; Moy & Comstock 2017).

It has also been shown that there is a feeling of uncertainty and mistrust that separates us from the expectable requirement of objectivity with regard to sustainability indices, due to a series of shortcomings revealed via academic and professional research (Doyle 2018). Prominent among these lacks are the absence of a shared methodology and questionnaire (Fowler & Hope 2007); the different weights assigned to the variables that comprise it (Adam & Shavit 2008; Donker & Zahir 2008; Escrig et al. 2010); the lack of standardisation, transparency, credibility and independence, as well as the existence of barriers and prejudices—including the need to not excessively harm companies (Windolph 2013)—or the inability to adapt to distinct local realities (Searcy & Elkhawas 2012). In short, the presence of subjective matters has been proven in drafting the indices of the ESG rating agencies that continue to be identified even now in the most recent studies, revealing, among other factors: inconsistencies between the measurements provided by the ESG rating agencies' indices, the existence of biases that appear due to the locations of the companies studied—European companies obtain higher scores—their capitalisation—the largest companies obtain better ratings—the sector to which they belong, or an insufficient measurement of risk (Doyle 2018). All of these problems lead to a lack of objectivity that is discovered due to the inconsistency and incoherence of the data provided, which simply are not equivalent. It is normal that from an epistemological viewpoint, they claim that their results do not correspond with the real situation of the object of study. From professional and investor viewpoints, it seems unbelievable that BMW has high ratings despite a large number of controversies, including anticompetitive practices, business ethics violations related to intellectual

property, human rights and labour violations and even animal rights violations. The company faces charges of collusion with Volkswagen, Audi, Porsche and Daimler on several technological and systems problems to evade environmental and safety regulations. In contrast, Tesla ranks below all European automobile manufacturers, including those named above and, in particular, Tesla obtains a lower rating than Volkswagen, which has been involved in an important environmental violation. Meanwhile, Tesla is the world leader in technology for reducing carbon emissions in automobiles (Doyle 2018).

Thus, studying the different relevancy of the variables related to corporate governance on sustainability indices, it is essential to find out their greater or lesser interest and impact on organisations' sustainability (Eccles et al. 2014). This is particularly important because after the financial crisis the investors appreciate corporate sustainability more than before the financial crisis (Rossouw 2012; Baas et al. 2016). This is the reason why we conjecture, as a research hypothesis, that there are items not asked that have more relevance and impact than other items. Likewise, we think that the same hypothesis can guide a research that studies the technologies of the digital transformation from the point of view of ethics at the beginning of the Fourth Industrial Revolution. *The purpose of our research is to discover the most relevant questions that can be formulated in the ethical code dimension of sustainability indices.* That is to say, to extend and develop the ethical code dimension of the sustainability questionnaires—in their governance dimension—by discovering a series of ethical dilemmas that take place in the processes of digital transformation. These ethical dilemmas should be considered and valued by companies, and included in sustainability index questionnaires.

Digital transformation, the use of technology to radically improve business performance, is a key issue for companies. The economic and business world is undergoing a process of transformation. The old industrial ecosystem is giving rise to a new digital ecosystem. In the intelligent factory, new communication systems are applied with cyberphysical systems and sensors that facilitate the decentralisation and automation of decision making. It is the beginning of the Fourth Industrial Revolution (Schwab 2016).

This research aims to extend the results obtained in previous research (Andreu et al. 2018) to discover the questions that should be included in the code of ethics of the

governance dimension of sustainability questionnaires. The innovation clauses of the ethical codes should contain the issues associated with the management of ethics in the new digital age. And these questions should be asked to measure the sustainable performance of companies. Thus, those companies that have an ethics oversight system in the new digital age should be given greater recognition than those that have not developed such an oversight system.

In the aftermath of the financial crisis and the consequent loss of confidence in economic and business organisations, existing codes of ethics have proved insufficient. The corporate universe is in a process of lack of credibility and this has effects on the CSR/Sustainability of companies. With the advent of the Fourth Industrial Revolution, how can we ensure that digitisation promotes greater equity, environmental respect and shared prosperity? Sustainability index questionnaires, if asked the right questions, can be useful tools for measuring company performance, guiding responsible investment and improving corporate governance. In the new digital age, the good governance will generate a responsible organisation and this will enhance the credibility of the corporate universe.

2. Theoretical framework and hypotheses

2.1 Critical review of sustainability indices questionnaires.

The quality and precision of analysts specialising in socially responsible investment has been subject to questioning, producing a crisis of confidence in the sector. The variety of evaluation systems and methodologies (Sun et al. 2011) has given rise to a multiplicity of labels and certificates and seals, making it complex for investors and other stakeholders to compare and decide between different sustainability criteria (Windolph 2013). Consequently, it is increasingly difficult to judge whether or not companies focus on responsibility, sustainability and good governance, causing a scenario of mistrust. However, this mistrust in rating methodologies could be due to the fact that they are still in their initial development stages and are often polemic. Since there are so many ways to evaluate companies' sustainable performance, and owing to the lack of homogeneous standards, there is the risk of investors losing confidence (Delmas & Blass 2010). This makes it imperative to improve the information and deepen studies that will contribute both to the standardisation and credibility of sustainability ratings.

Sustainability indices have been criticised for their lack of a common methodology and questionnaire (Fowler & Hope 2007); for the different weights assigned to the variables that comprise it (Escrig et al. 2010; Donker & Zahir 2008); for the heterogeneity and insufficiency of information and the different definitions of risk (Escrig et al. 2010); for the lack of standardisation, transparency and credibility (Delmas & Blass 2010); for the lack of independence of the rating agencies, which seek an improvement in corporate ratings (Beloe et al. 2004; Donker & Zahir 2008), as well as for the existence of barriers and prejudices and the need to not excessively damage companies (Windolph 2013).

In addition to the methodological criticism about sustainability indices, epistemological criticism is a factor that has not been developed in depth. Business ethics is a hybrid discipline built on the conceptual resources of several fields, including moral and political philosophy, economics, sociology, and social psychology. Epistemological analysis could provide important resources to generate new insights on sustainability questionnaires (Andreu et al. 2018: 13-17). We are referring to social issues on knowledge construction and, in this case, the construction of sustainability questionnaires. From a sociological viewpoint, rating agencies construct a social reality (Berger and Luckmann, 1991) with their sustainability indices. In the knowledge building process, all of the factors mentioned—prejudices, definitions, variables, socioeconomic issues and interests, lack of knowledge and transparency—interact with the reality under study, and the social elements interact with objective elements, causing results that are not interchangeable and that are incoherent and discardable.

To decrease the subjectivity of this construct (Doyle 2018) and obtain a more objective questionnaire (Graafland et al. 2004; Eccles et al. 2014), it is important to conduct fieldwork to assess the relevance of the concepts on the questionnaire. This is so because sustainability questionnaires select values and construct definitions, which open us up to a subjective world, where the only way to leave it is via intersubjectivity, which will reveal the consistency or coherence of that which is asserted as true. Averaging the results obtained via fieldwork is a methodological technique that helps construct objectivity on the questionnaires, increasing intersubjectivity.

From our viewpoint, the different stances of different stakeholders must be weighted to evaluate the relevance of the different criteria for measuring sustainability. The relevance is not the same for academia and investors, for instance, and one sustainability item for organisations is not equally relevant for governance. This crisis

of confidence is a reputational risk but also, as mentioned, an opportunity to improve the search for better evaluation and analysis criteria. This is particularly true with regard to the issues that are truly relevant for companies and their stakeholders. Stakeholders' perceptions are essential for companies' performance (Parguel et al. 2011; Eccles et al. 2014) and can even threaten their survival (Chatterji et al. 2009). Identifying the material issues for a company, those that have an impact on their stakeholders and that can thus affect the value of the company itself, is decisive for good governance and sustainability. For this reason, the earliest studies that analysed evaluation methodologies showed that agencies and sustainability indices handled very generic topics, neglecting the sector's specific problems (Beloe et al. 2004). Given that rating agencies are the link between companies and stakeholders (Schäfer 2005), discovering the relevance of the questions on the questionnaires is key. This research, which starts on the critical review of the corporate governance questionnaires of the sustainability indices (Andreu 2017; Andreu et al 2018), focuses its attention on the code of ethics dimension of the sustainability indices. Once this dimension has been identified, it tries to broaden these questionnaires by updating them in the light of the new ethical problems of the digital society. Annex I highlight and represent the results of these previous researches, which serve as the background for the development of this new field opened by the digital transformation of the organisations.

2.2 Critical review of sustainability indices in light of the Fourth Industrial Revolution

The Fourth Industrial Revolution, a term coined by Klaus Schwab, founder and executive chairman of the World Economic Forum, describes a world where individuals move between digital domains and offline reality with the use of connected technology to enable and manage their lives (Schwab, 2016). Technological innovation and digital transformation have great potential to solve the problems facing society in the 21st century. It is difficult to imagine any segment of society that will not be transformed by any of the technologies of digital transformation, such as artificial intelligence (hereinafter AI) and robotics, in the coming years (Andreu & Fernández, 2018).

In the aftermath of the financial crisis and the consequent loss of confidence in economic and business organisations, existing codes of ethics have proved insufficient. The corporate and institutional universe suffers from a process of lack of credibility. It is necessary to ask about the roots and consistency in which ethical codes flourish.

Furthermore, the composition of these codes is affected by advances in science and technology. And, from an ethical point of view, science and technology are not neutral. Criticism of technology does not run counter to a sincere appreciation of the great benefits of scientific and technological progress. Technology has remedied innumerable problems that harmed and limited the human being; we cannot fail to value and thank technical progress, especially in medicine, engineering and communications. However, understanding technology as a neutral and objective activity can camouflage values, intentions and interests. This happens when the methodology and objectives of technoscience are applied as a paradigm of understanding all human activity. What are the most relevant moral dilemmas posed by the new technologies of digital transformation? How can we guarantee that digitalisation promotes the balanced development of the person and the prosperity of all? What effects on employment will be generated by the presence of robots and complex technological processes, capable of carrying out tasks that until now have been carried out by people in factories and offices?

Sustainability indices are excellent tools for measuring companies' sustainability performance. Measures developed by rating agencies help guide socially responsible investment. With their metrics, investors can choose the companies that best integrate sustainability criteria. However, in the light of the results of recent research, insufficiencies have been demonstrated in the sustainability index questionnaires. In previous research we have found new relevant items susceptible to be incorporated into the governance dimension, which could give rise to a new synthetic questionnaire made up of 65 items (Andreu, 2017; Andreu et al, 2018).

In the light of the Fourth Industrial Revolution, the ethical codes of organizations are insufficient. The innovation clauses of the codes of ethics should contain the issues associated with the management of ethics in the new digital age. Today, we need an research that connects ethical thought with digital transformation, and digital transformation with growing interest in the sustainable performance of companies. Companies are aware that the traditional vision of organisations is insufficient to generate value, introducing corporate sustainability in decision making. Sustainability indices questionnaires, if asked the right questions, can be useful tools to measure the performance of companies, guiding responsible investment and improving CG in the new digital age, because good governance will generate a responsible organisation, and this will improve the credibility of the corporate universe.

3. Conceptual framework

Corporate Social Responsibility (CSR). CSR breaks with the classic model of understanding economic activity. The classic model conceives the company as an organisation with the aim of maximising profits and satisfying shareholders. This view would correspond to liberal approaches (Friedman, 1962; Friedman, 1970; Hayek, 2014) that would defend the deregulation of markets, privatisation processes and the reduction of the tax burden that would lead to a thinning of the State. Milton Friedman (1970) argued that the only corporate social responsibility is to earn as much money as possible for shareholders, respecting the rules of the game in an open and competitive market, without fraud or deception. However, the latter assertions entail serious difficulties; they take for granted something that has yet to be proven. And experience has shown that these market principles are not self-executing. It is necessary to ask about the conditions of possibility of these postulates, their antecedents. Therefore, it is not strange that different ideological models' question, directly or indirectly, these postulates, either alleging the real malfunctioning of the markets or claiming the attention of other non-economic dimensions of human activity. Culture, beliefs and community appear as key conditioning factors for the harmonious development of the economy.

Academic literature has proposed a large number of definitions for the CSR over the course of recent decades', but in general 'CSR can be defined as an instrument for applying the concept of corporate sustainability' (Kleine and Von Hauff 2009). For this reason, for the sake of simplicity and due to the fact that CSR and sustainability concepts have already been the object of detailed studies (Carroll 1999; Dahlsrud 2008; Andreu et al. 2018), in this study the terms CSR and sustainability are used interchangeably and equivalently. Indeed, the scope of the term sustainability, with a meaning oriented toward ecological sustainable development (Brundtland 1987) has expanded toward economic and social factors:

Sustainability also demands fuller acceptance of systemic interconnection. Such a view would see organizations both partially causing and being affected by biodiversity loss, climate change, freshwater scarcity, food insecurity, population growth, persistent poverty, gender bias, and explosion of megacities. Its believers would suggest ways in which organizations could thrive by helping to resolve these global problems (Gladwin et al. 1995: 897).

In this regard, it is closely related to the theory of stakeholders (Freeman 1984), which in parallel is intimately linked to the philosophy of corporate excellence, conceptually crystallised in a business focus that seeks the creation of long-term value for shareholders via taking advantage of opportunities and the efficient management of the risks inherent in economic, environmental and social development (Andreu 2017).

Corporate Governance (CG): CG refers to the entire set of legal, cultural, and institutional rules and standards that determine what corporations can do, who controls them, how that control is exercised, and how the risks and benefits of the activities they do are assigned (Blair, 1995). The OECD expresses it along these lines, a definition we will use in this paper: ‘Practices that facilitate the creation of an atmosphere of confidence, transparency and accountability necessary to favour long term investments, financial stability and integrity in businesses’ (OECD 2016).

If CG was originally about the proper management of companies to meet the needs of their owners and shareholders, broader issues such as ethical supply chains, human rights, bribery and corruption, and climate change become part of corporate boards (Elkington, 2006). Conversely, companies will not act responsibly as long as aspects of corporate sustainability or social responsibility are not addressed from the point of view of CG: who makes the decisions and what the governance structure is. The understanding that organisations are formed and reconstituted by their relationships with different stakeholders modifies the traditional purpose of the organisation (Freeman, 1984; Donaldson and Davis, 1994; Donaldson and Preston, 1995). This favors’ the emergence of a new approach that has led several researchers to theorise on the need to integrate issues related to corporate responsibility into the governance of organisations. With this new frame of reference, there is a need to identify the most important roles and responsibilities of top management (Andreu, 2017). Clarifying these responsibilities is key to promoting the good governance, which involves overseeing the organisation as a whole. Therefore, it is recognised for the governance of an organisation not only to represent the interests of the shareholders but also the interests of the organisation as a whole (Bird, 2001).

Sustainability Indices: They are the tools that try to make the values of CSR tangible. Sustainability indices, like traditional stock market indices, are indicators of the price trends shown by the most representative shares on a stock market. Nonetheless, in this case, the market is limited to socially responsible companies. Investors can exclude

from their portfolios those companies that do not respect human rights and the environment, or that generate profits via ethically questionable activities (Sun et al. 2011). The measurements designed by rating agencies were successful due to initially consisting of an independent judgement of companies' reports and for giving credibility to the notion of socially responsible investment, namely, investing in companies that have integrated CSR/sustainability criteria and that, therefore, have the ability to create long term value (De la Cuesta et al. 2015; López et al, 2007). However, as we have seen, they require a critical review to assess their objectivity.

Forth Industrial Revolution: The First Industrial Revolution used water and steam power to mechanise production. The Second used electric power to create mass production. The Third used electronics and information technology to automate production. Now a Fourth Industrial Revolution is building on the Third, the digital revolution that has been occurring since the middle of the last century. It is characterised by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres (Schwab, 2016). The Fourth Industrial Revolution, Revolution 4.0, will be characterised by the existence of machines and systems permanently interconnected throughout the production process and is based on technologies such as Robotics, Artificial Intelligence (AI), Blockchain, Big Data, Internet of Things (IoT) or 3D printing (Andreu and Fernández, 2018). The mobile internet is vital for a connected production environment, 'for example regarding real-time data capturing and accessibility, object tagging and internet-to-object communication. Cloud technology enables this borderless flow of data as a vital aspect of Industry 4.0' (Santos et al., 2017: 1360). This revolution not only has great potential to solve the problems facing 21st century society, but it will also generate economic prosperity. In a socio-economic scenario influenced by the idea of innovation, digital transformation, the use of technology to radically improve the performance of companies, is a crucial current issue. Executives across industries around the world are using digital advances such as analytics, mobility, social networking, and smart devices to change customer relationships, internal processes, and value generation.

4. New ethical dilemmas at the beginning of the fourth industrial revolution

While technological innovation and digital transformation have great potential to respond to the challenges facing the world, their effects have not been critically

analysed from an ethical point of view. Can we guarantee that digital transformation is a force that contributes to the "common good"? Each age tends to develop a low self-awareness of its own limits. That is why it is possible that today humanity does not realise the seriousness of the challenges that arise, and the possibility that mankind misuses technological power when it is not subject to any rule regulating freedom, but only to the supposed imperatives of utility and security. Technical developments have allowed companies to scale their revenues and grow at a historically rapid rate. On the other hand, some companies are struggling to build purposeful organisations, organisations that have a positive effect on the human condition and the planet. On many occasions, these paths are divergent, and it is necessary to make them converge.

In 2016, the World Economic Forum, and as a consequence of the development of new technologies, raised a series of debates and ethical dilemmas of great relevance. These dilemmas are formulated in the following set of questions (Bossmann, J. 2016), which can be developed in greater depth from the ethical point of view:

Disparity and cognitive bias. In the mid-twentieth century, the traditional model of positivist science was questioned, declaring the inexistence of pure perceptions. In every perception there is a mixture of observation and theory. If theories are fallible, so are the statements of observation, questioning the scientific method understood as a method of verification. The observation is determined by the conceptual scheme of the subject, appearing the notion of paradigm (Kuhn 1996). All people have a predetermined understanding of their surroundings, it is a condition for understanding reality, but also a limit. This predetermined understanding comes from our culture and our personal history. If we are not aware of these biases and limitations, they can be replicated in artificial intelligence systems, even hindering the fulfillment, for example, of some of the ODS (Andreu & Fernandez, 2019). Are our value judgments reproduced in AI systems? How do we eliminate the AI bias, are we aware of the non-universalizable traits of our own culture? These questions allow companies to become aware of processes and take actions that limit the appearance of biases.

Scope of automation processes. The development of AI has been decisive because it has allowed robots to incorporate a good part of the most characteristically human capacity, the recognition of the reality that surrounds us. Machine learning is an advance in AI that allows us to learn from data and past experiences. The use of machine learning allows organisations to improve their growth by optimising their

processes, increasing employee participation and customer satisfaction (Wellers, Elliott, & Noga, 2017). Among the innovations in AI, deep learning allows us to discover patterns of behaviour that machine learning was not able to extract; these methods have dramatically improved the state-of-the-art in speech recognition, visual object recognition, object detection and many other domains such as drug discovery and genomics (LeCun et al., 2015; Najafabadi et al., 2015). These systems can recognise, evaluate and diagnose the environment in which they operate, and make decisions about it. This opens the possibility that they act, or are programmed, in a perverse way. For what purposes are AI systems used, what decisions do they make for us, and who is responsible, how do we maintain control of AI?

Responsibility and Accountability. With the use of big data, "all kinds of human activities and decisions are beginning to be influenced by big data predictions, including dating, shopping, medicine, education, voting, law enforcement, terrorism prevention, and cybersecurity" (Richards, & King, 2014: 393). When a process is formally clarified (think of a mathematical problem or logical reasoning) no one in their right mind is going to question the outcome and make contrary decisions. When are there decisions? When this is not possible, when there is no obvious solution, etc. Today algorithms are increasingly intelligent, but that should not lead us to believe that we are going to live in a purely logical-mathematical world, limited to problems solved by intelligent algorithms. Can we trust the new ethical codes elaborated by technological companies? On what ethical substratum, values and principles are the new technological ethical codes built? on what corrections should be added to the current ethical codes to guarantee greater trust? People must choose, and this act shapes their being (ethos, second nature, culture). It is not a question of abiding or not by a code or set of established norms (morality is that normative code or guidelines of behaviour) but of incorporating these principles into their way of acting. At the base of this movement is the ethical responsibility, which implies the capacity that man has to direct his own conduct, the free actions. A strategic decision requires formalising the decision-making processes, assigning a responsible person, empowering them and, at the same time, demanding accountability from those ultimately responsible.

Singularity and strong AI. Transhumanism appears as the project that celebrates the growth of capacities, a new extreme positivism. For transhumanism, human nature is improvable "through the use of applied science and other rational methods, which may

make it possible to increase human health-span, extend our intellectual and physical capacities, and give us increased control over our own mental states and moods" (Bostrom, 2005). Just as we can technologically transform organisations, increasing their efficiency and potential, so we can technologically improve the human condition. Some scientists claim that AI will continue to develop and new machines will continue to impress with their skills each time, but in narrow fields, being able to perform many tasks, but unable to do everything else. Moreover, we are not free from detection errors or false alerts. How do we protect against unintended sequences? What are the consequences for humans of "strong" AI? How can we protect ourselves from errors? Are we overestimating the capacity of AI? For Ray Kurzweil, uniqueness will allow us to transcend the limitations of our brains and biological bodies. We will increase control over our destinies, our mortality will be in our own hands, we will be able to live as long as we want, we will fully understand human thought and we will greatly expand and increase its reach. As a consequence, by the end of this century the non-biological part of our intelligence will be billions of billions of times more powerful than the weak human intelligence produced by biology. Singularity will be the culmination of the fusion of our existence and biological thinking with our technology, giving rise to a world that will remain human but transcend our biological roots (Kurzweil 2005). In post-singularity, there will be no distinction between human and machine or between physical and virtual reality. Technological uniqueness implies that an artificial intelligence system or a robot could be capable of self-improvement recursively. These iterations could give rise to an out-of-control phenomenon, an "intelligence explosion" (Chalmers 2009). Intelligent machines could design generations of successively more powerful machines. The creation of intelligence would be far superior to human intellectual capacity and control. How do we maintain control of a complex intelligent system? Can an AI surpass us? When will it happen? Is Steven Pinker right in asserting that there is no reason to believe in the event of singularity?

From these new dilemmas, Annex II offers a first approximation to the new questions that must contain the ethical code dimension of sustainability indices (Table II)

5. Conclusion

The novel nature of sustainability indices has been the subject of numerous methodological criticisms. Despite being useful tools for measuring companies' sustainable performance, sustainability indices have been questioned due to lacking

homogeneous standards and criteria. However, this problem opens up a new field of research that will let these measurement tools be improved upon. The questions on sustainability indices do not represent a static reality. Sustainability is a construct, a multidimensional and multi-conceptual reality that should be assessed in terms of the materiality of the components, both for the company and for society (Eccles et al 2012; Kahn et al. 2016). This construct, the result of a dialogue in which different institutions and stakeholders take part, can keep changing over the course of time. For this reason, the questions and their relevance also change, so that we will have to do away with old questions and add other new and more relevant ones. The changes in the reality being studied—think about society’s progressive interest in the relationships between technology and privacy and the responsibilities associated with a senior management level—can lead to the inclusion of new questions on the questionnaires. And, in parallel, new questions can reveal relevant aspects of reality whose meaning has yet to be recognised, because a theory or concept of this dimension of reality has not been developed. Indeed, it is possible that the indices themselves may have improved the questionnaires over the course of our research.

The digital transformation of an organisation is a complicated process that affects the purpose and ethical principles of companies. Decision making in the digital transformation scenario affects the purpose, ethical leadership, communication with the stakeholders, and governance of the organisation. At the beginning of the Fourth Industrial Revolution, data is information and information is power. The misuse of the power of technology compels the existence of new ethical and normative criteria that propose a new system of digital self-government and a new code of conduct that limits what can be done with data. This is why it is necessary to consider where the boundary should be drawn in the use of data, in order to respect privacy, and to make decisions in accordance with these established basic principles. Using technology without transparency and without ethical limitations is one of the major problems affecting democratic societies. Human rights may be endangered by new technologies and large social networks, which have publicly admitted social experiments.

Sustainability indices in their corporate governance dimension are a way of measuring the ethical performance of companies in the new digital age. If we want to avoid this type of behaviour, we must be sensitive to the ethical dimension of technology and, where appropriate, impose higher standards and well-articulated codes of conduct,

based on solid principles and clear criteria. If we want to achieve the SDGs of Agenda 2030, achieve corporate sustainability and build purposeful organisations, organisations must develop a digital strategy that leads us to make the right decisions.

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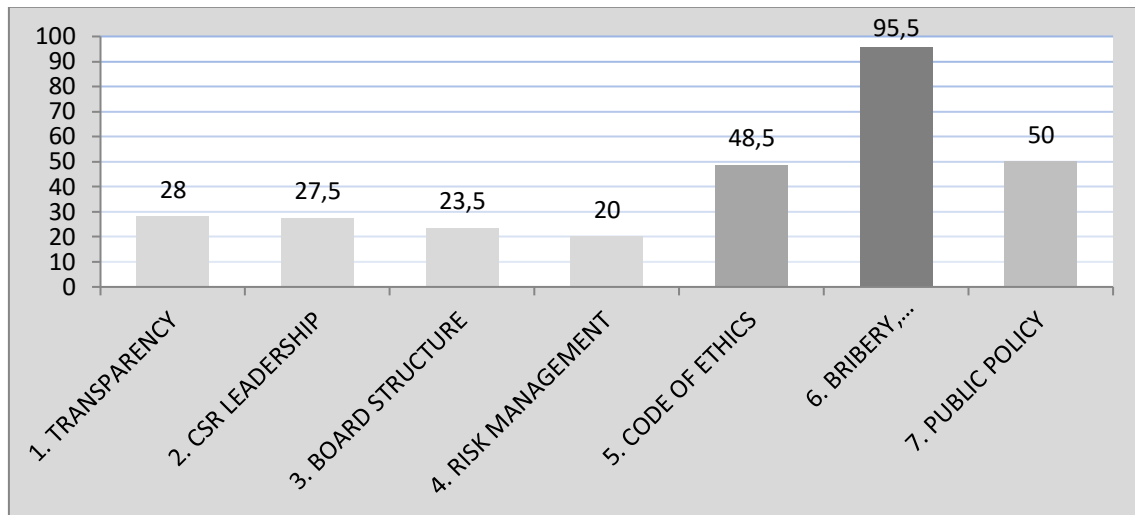
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Annexes

Annex I Measuring the relevance of the code of ethics

Graph 1: Weight of questions (in %) above the cut-off line with regard to total questions on the questionnaire for each category



Source: Andreu (2017) & Prepared by authors (2018)

Table 1: Analysis obtained by area.

The first number following each item is this item's relevance for corporate governance (total average) and the second number is the relevance level for CSR (total average). In normal font items currently included in sustainability indices; Bold type items not currently included in the sustainability indices but identified via the focus group and other instruments and italics, reformulated items considered new for this research. Andreu, Fernandez & Fernández (2018) study "[A critical review of the Corporate Governance dimension in the Sustainability Indexes questionnaires](#)" contains the research questionnaire to read the complete literal text of all questions without relevance dimension analysis.

	GOVERNANCE	CSR	ACADEMIA	IBEX 35	NGOS	REGULATORS	MEDIA	TOTAL
1. TRANSPARENCY								
1.2 Transparency of Board operations	8.9	8.3	0	1	0	1	0	2
1.3 Remuneration: transparency and coherence	8.9	8.4	1	1	0	0	1	3
1.4 Remuneration: CSR criteria	7.7	8.8	1	0	1	0	0	2

2. CRS LEADERSHIP								
2.2 CSR reporting: quality	7.8	8.6	0	0	1	0	0	1
2.3 CSR policy: Board responsibility	8.6	8.8	1	0	1	1	1	4
2.4 Proposal and values: transparency	8.4	8.6	1	1	1	0	0	3
2.5 Supply chain: transparency / supervision	8.1	8.9	1	0	0	0	0	1
2.6 Human rights: due diligence / remedy	8.3	9.1	1	0	1	0	0	2
3. BOARD STRUCTURE AND OPERATIONS								
3.3 Independence of Board members	8.7	8	0	1	0	0	0	1
3.4 Independence of Audit Committee	9.1	8.3	0	0	1	1	0	2
3.5 Independence of Risk Committee	8.6	8.4	1	0	1	0	1	3
3.6 Independence of Remuneration and Appointments Committee	9	8.3	0	1	1	0	0	2
3.7 Board diversity	8.4	8.4	0	0	1	1	0	2
3.8 Minority shareholders: defence policy	8.6	7.7	0	0	1	0	0	1
3.10 Independence of Board members: guarantee procedure	8.8	8.1	0	1	1	0	0	2
3.13 Shareholders' long-term interest	8.7	8.1	1	0	0	0	0	1
3.14 Stakeholders' long-term interest	8.3	8.5	1	0	1	1	0	3
3.15 Existence of compliance division	8.7	8.3	0	1	1	1	0	3
4. RISK MANAGEMENT								
4.1 Risk management: responsible	8.6	8.6	1	1	0	0	1	3
4.2 Risk management: definition / identification	8.6	8.8	1	1	0	0	1	3

4.3 Risk management: transparent methodology	8.1	8.1	0	0	0	1	0	1
4.4 ESG risks: management system	8.3	8.9	0	1	0	0	0	1
4.5 ESG risks: definition	8.3	8.9	1	0	0	0	0	1
5. CODE OF ETHICS								
5.1 Code of Ethics: scope	8.8	8.6	1	1	0	1	1	4
5.2 Code of Ethics: mechanism to assure compliance	8.9	8.7	1	1	0	1	1	4
5.3 High risk countries: breakdown	8.4	8.7	1	0	0	1	0	2
5.4 Code of Ethics: clarity of penalty system	8.9	9.5	0	1	0	1	1	3
5.5 Promotion of ethical culture	8.5	8.7	0	1	1	0	1	3
5.7 Code of Ethics: basic indicators	8.1	8.2	0	1	0	0	0	1
6. BRIBERY, CORRUPTION AND MONEY LAUNDERING								
6.1 Bribery and corruption: exposure level	9.1	9	1	1	1	1	1	5
6.2 Bribery and corruption: mitigation policy	9.2	9	1	1	1	1	1	5
6.3 Money laundering: policy	9.2	9	1	1	1	1	1	5
6.4 Bribery, corruption, laundering: management programme	9	8.9	1	1	1	1	1	5
6.5 Incidents with Code of Ethics	8.7	8.6	1	1	1	1	1	5
<i>6.6 Existence of whistle-blowing channels</i>	8.9	8.8	1	1	1	1	1	5
<i>6.7 Payments to political parties and foundations</i>	9.2	9	1	1	1	1	1	5
6.8 Donations to and sponsorships of public institutions	8.6	8.5	0	0	1	1	1	3

6.9 Public procurement: procedures to delimit responsibilities	9.2	8.8	1	1	1	1	1	5
7. PUBLIC POLICY								
7.3 Taxes paid by country	8.7	8.9	1	1	1	1	1	5
7.4 Incidents with public policies	8.3	8.2	0	0	0	1	0	1
7.5 Transparency of ongoing legal processes	8.4	8.1	1	0	0	1	0	2
7.6 Transparency of final sentences and competition fines	8.7	8.5	1	0	0	1	1	3
7.7 Competition standards	8.8	8.4	1	0	0	1	1	3
7.8 Fiscal policy: responsibility	9	8.6	1	1	0	1	1	4
7.9 Fiscal policy: transparency	8.7	8.5	1	0	0	1	1	3
7.10 Tax havens: activity report	9	8.8	1	1	0	1	1	4

Source: Andreu (2017) and Prepared by authors (2018)

Annex II.

Table 2. Proposal for a questionnaire for sustainability indices

5. Dimension Code of Ethics for sustainability indices in the new digital environment
5.1 Scope of the Code of Ethics in the technological ecosystem. Explanation of the digital transformation technologies used by the company and their possible risks.
5.2 Establishment of oversight mechanisms to ensure compliance with the Code of Ethics. Assignment and delegation of responsibilities and accountability system.
5.3 Explanation of the main points of ethical risk in the digital environment
5.3.1 Protecting the identity and integrity of digital users
5.3.2 Privacy in technological surroundings
5.3.3 Responsible and unbiased algorithms
5.3.4 Consumer assurance in e-business
5.4 Transparency of the corporate system of sanctions in the case of non-compliance with the guidelines of the Code of Ethics
5.5 Promotion of the data ethics culture among employees beyond formal code compliance systems and incorporation of its principles into the formal decision-making process

Prepared by authors (2019)

