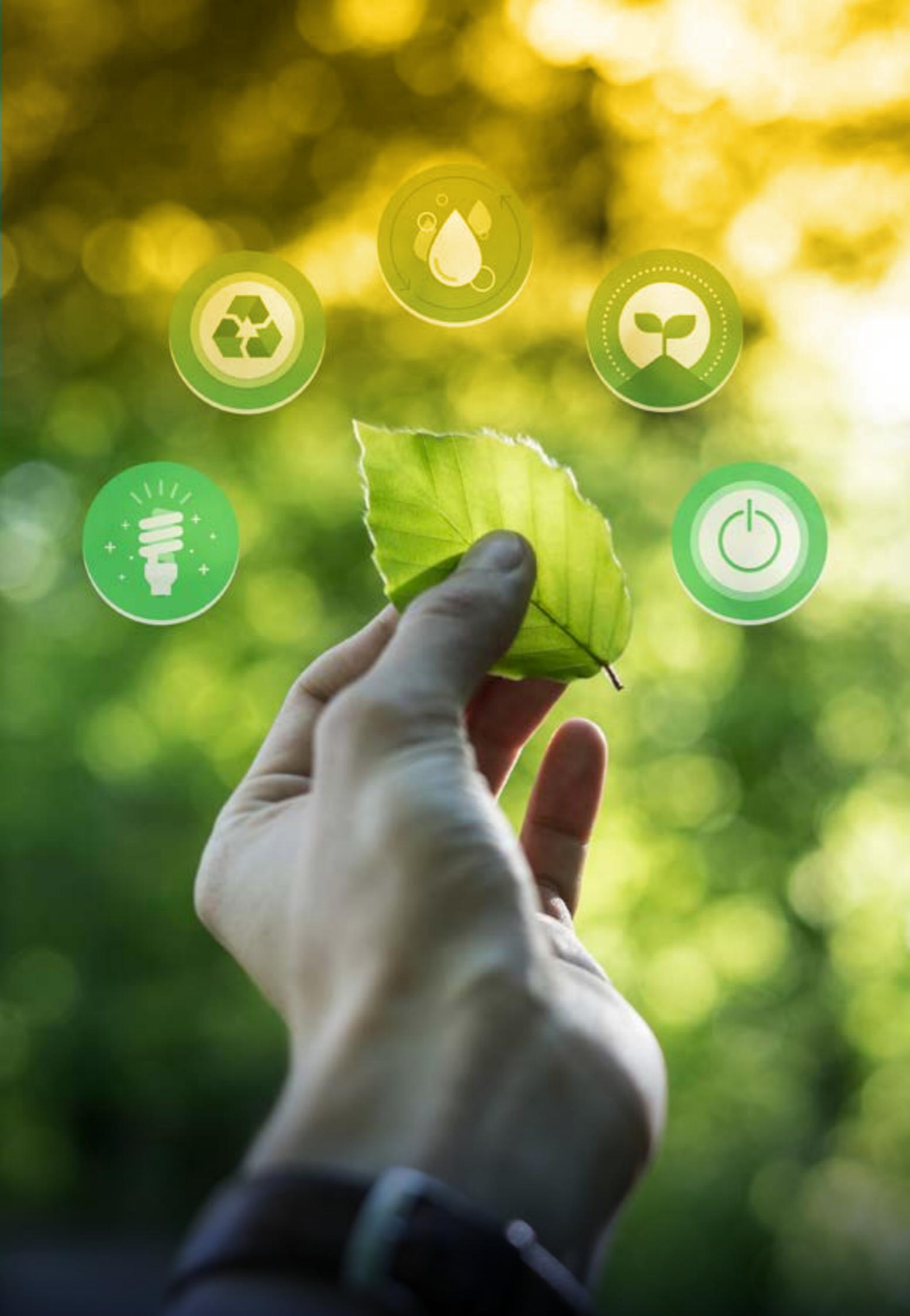


FROM TRADITIONAL BUSINESSES TO SUSTAINABLE BUSINESSES

How to integrate sustainability into business management to generate economic growth with a positive impact on society and the environment

**FUTURE
AT HEART**



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01

A photograph showing a man from behind, riding a black bicycle away from the viewer. He is wearing a dark jacket and glasses. The scene is set in front of a large glass door or window, with a modern building featuring a grid pattern in the background. The image is framed by a blue diagonal shape.

A NECESSARY TRANSFORMATION

01. A NECESSARY TRANSFORMATION

The years 2020 and 2021 have been especially difficult on a social and individual level as a result of the coronavirus pandemic. This phenomenon, related to globalisation, has affected our entire society in many ways, and the extent of our world's interconnection and the degree of our dependence on complex globalised systems has become more apparent than ever. The ever increasing chaos it has wreaked has prompted a reflection on the need to rethink fundamental issues. These issues include the way we do business and consume, and how we value the goods, services and resources on which we depend.

Half of the world's GDP is at risk due to the loss of nature, the decline in biodiversity and integrity of ecosystems, and climate change and pollution. These issues do not appear to have a short-term solution, and will undermine the world's efforts to achieve 80% of the targets set out in the 2030 Sustainable Development Goals. The risks facing society and the private business sector in the next 10 years are immense, but at the same time, there are equally vast opportunities to take action and make strategic changes that have an impact.

Integrating nature into economic models is an urgent task to improve decision-making and underline the critical role nature plays in achieving sustained and fair economic growth, which creates living and liveable environments for society which provide a home for resilient and prosperous companies. To that end, it is necessary to incorporate metrics that evaluate nature's contribution to the other capitals that govern the economy (financial, industrial, social, human and intellectual capital) in order to obtain a holistic and consistent perspective that enables companies, financial institutions and governments to take the natural environment and its biodiversity into account.



In this context, major changes, efforts and initiatives have been launched by governments, regulatory bodies, global organisations, accounting bodies and companies in recent months. This has contributed to creating a new movement in policymaking, in which leaders in the public and private spheres, and of science, business and civil society, have pledged to take action. This movement seeks to reshape decision-making and policymaking towards sustainable development, and as such the United Nations has adopted a new framework that includes the contributions made by nature when measuring economic prosperity and human well-being.

The G7 leaders have decided that human activity must not only have a net zero impact by 2030, but it must also have a positive impact on the environment. This means improving the resilience of our planet and our society in order to halt and reverse the loss of nature for the benefit of people, companies and the world. They have also pledged to take bold steps to achieve ambitious results, at the 15th Conference of the Parties to the Convention on Biological Diversity (CBD) and the 26th COP of the United Nations Framework Convention on Climate Change (UNFCCC), based on the G7 Metz Charter on Biodiversity and the Leaders' Pledge for Nature.

Investors and the financial system need to have comparable high quality data from companies in order to support global objectives related to nature and climate, and thereby respond to the urgent need for a green recovery. We are moving towards a future which is increasingly transparent, digitised and sustainable, which is one in which companies must communicate coherent, comparable and useful information when taking decisions.

The transformation towards a more sustainable economic model inevitably involves incorporating (or internalising, as economists call it) environmental, social and human costs into business production costs. In other words, it is a question of overcoming the barrier and the misgivings involved in evaluating our real performance as a company, and conveying the real impact of our organisations to society.

The regulatory signals in this respect are unequivocal. The proposed EU Directive on corporate sustainability reports published in April 2021 makes it clear that sustainability issues are also financial issues, and must be given the same importance as that information. It also includes the need to report all environmental aspects apart from climate change, including the concept of double materiality (companies with economic, sustainable and sustained growth that have a positive social impact and work in harmony with natural capital).

The ambitious European Green Deal establishes how to lay the foundations for the development of an accounting system that includes this new vision of double material impact, which sets out the transformation towards a business model that includes not only the economic value that a company measures on its balance sheet or its income statement, but also its contribution to human, social and environmental capital.

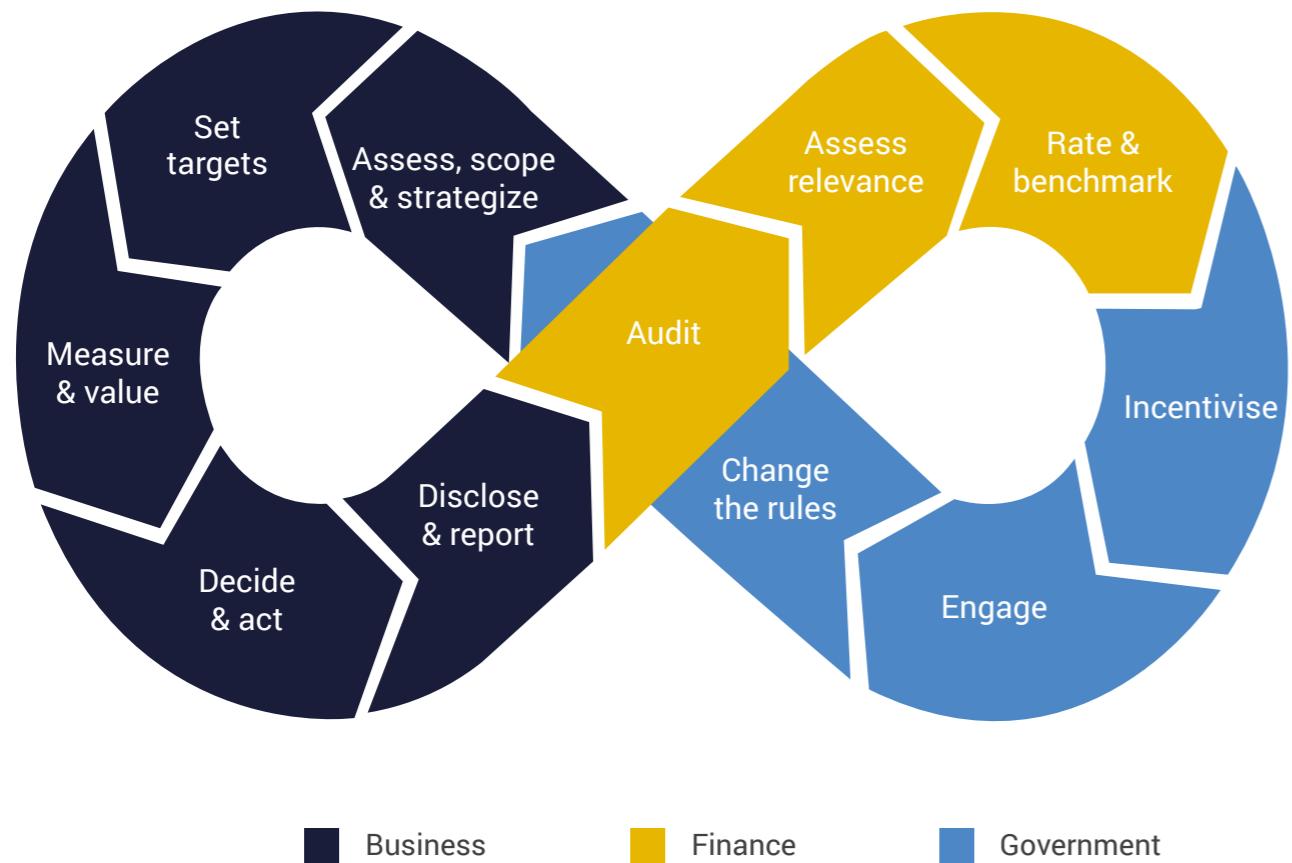


Figure 1

The Capitals Coalition calls this new virtuous circle the *Infinity Loop*. The rules of the game are going to change in the years to come. It is time for the business sector to have systemic accounting models for their social and environmental impact that help define ambitions; evaluate their contribution to the overall positive impact; identify and respond to all the dimensions of risks in order to spearhead opportunities; provide robust, traceable and certifiable information for a financial system that is eager for transparency and for low-risk companies on which to focus its investments.



02

SUSTAINABILITY IN A COMPANY'S SIX CAPITALS

02. SUSTAINABILITY IN A COMPANY'S SIX CAPITALS

Today's sustainability models are constantly evolving. Market, regulatory and financial demands are constantly changing, increasing the need to provide specific information on biodiversity, natural capital, climate change and the circular economy, among many other issues. However, are there a clear narrative and purpose on which the company's transition from business-as-usual to the sustainable business must be focused?

Every business model is a response to six different types of capital [Figure 2]. Any decision made about the management of any one of them will lead to changes that increase or reduce the value of the other capitals. This dynamic set of capitals makes up a company's integrated or real value.

Bearing in mind that a sustainability model's foundations are based on natural capital - which enables the development and well-being of social, human and intellectual capital, and leads to the development and growth of financial and built capital [Figure 3], an integrated framework of sustainability has the potential to add the value of natural capital and social capital to the other capitals which are normally better represented in business models, and consequently to reduce the physical, transitional and systemic risks of the business, turning it into a sustainable business with greater integrated value.

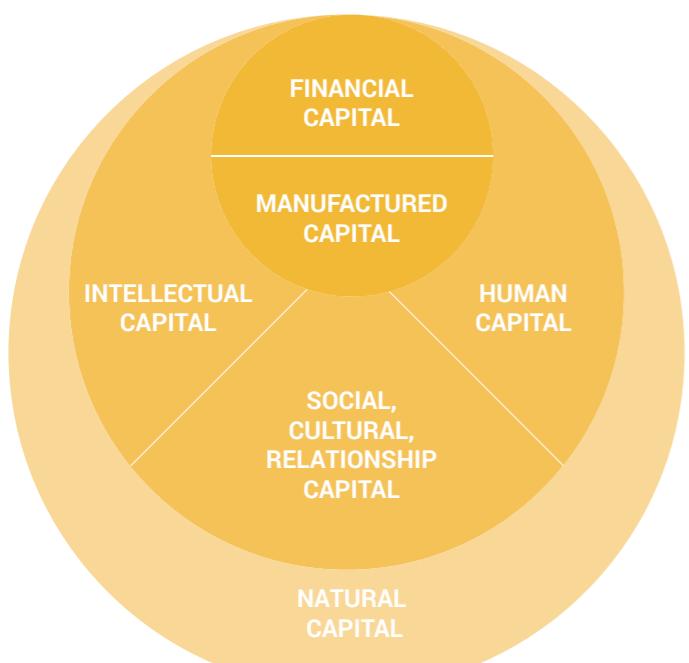


Figure 2



Figure 3

NTT DATA advocates the development of a double material business model, i.e. one which considers both the impacts of the environment on the company and those of the company on the environment, which presents sustainable and sustained economic growth for the company, which generates a positive social impact, and which operates in harmony with natural capital.

Achieving this model requires a transformative change in the way we measure risks, address opportunities, manage information, and make decisions which lead to new models of financing and inflows of investment. This proposal seeks to provide companies with the capacity they need to adapt to the "new normal" of the market, society and regulation, in which increasing demands are being made of a business in terms of transparently assessing and communicating its integrated value and the risks of its capital.

This model of transition from "business as usual" to "sustainable business" seeks to ensure the efficiency of the business model within a safe operating space which makes a positive contribution to reducing the pressure of the business on the stressors of natural capital, while operating above the social foundations that define well-being and socio-economic development.

The concept of a safe operating space defines a conceptual model in which companies integrate social and natural factors into an operational model based on sustainability. The nine stressors determined by our planetary boundaries (climate change, biosphere integrity, changes in land use, freshwater use, biogeochemical flow, ocean acidification, atmospheric aerosol loading, stratospheric ozone depletion and chemical pollution) are the basis for defining the ecological ceiling or the carrying capacity of a natural system. If the minimum needs for sustainable social and economic development are also taken into account, which are twelve social foundations that guarantee that no one is left without the essentials for life, intermediate spaces appear which ensure that resources are provided for all needs, without exceeding the pressure on the Earth's systems supporting life [Figure 4].



Figure 4. The Donut of Social and Planetary Boundaries (2017)

Exceeding a negative impact threshold on any of the nine stressors on the planet means endangering the self-regeneration of the ecological system of biological relationships and functions. This can lead to real risks to the stability of the natural system, with unpredictable consequences in social and economic spheres. Likewise, a failure to reach the minimum threshold for providing for the needs of society as a whole carries risks for social and economic stability as a whole.

The NTT DATA proposal seeks a transition towards a sustainable business model which contributes to the real value of the company by means of a broad-based framework that is operationalised through a common information governance model, and which pivots from operations to the corporate level, by way of business. Based on robust, relevant and timely information, the real contribution of the business and its risks becomes transparent, providing a comprehensive guarantee that in terms of its six capitals, it is not larger than it can be nor smaller than it must be to meet social demands, thereby ensuring its maximum integrated value.



Thanks to the integration of social foundations and planetary boundaries and their alignment with the main areas of work of an operational framework for sustainability (climate change, equality, circular economy, just transition, biodiversity, health, emissions, energy), a framework of relationships is being constructed in which it is possible to predict the company's impact on the social and financial capital, based on any improvement made to the natural capital. A narrative is created, in which sustainability is integrated into the business as an area of value generation which gives a response based on data from the "new normal".

03

**AN OPERATIONAL
SUSTAINABILITY
MODEL THAT PROVIDES
ENVIRONMENTAL VALUE**

03. AN OPERATIONAL SUSTAINABILITY MODEL THAT PROVIDES ENVIRONMENTAL VALUE

3.1. CIRCULAR ECONOMY

Chemical pollution of the natural environment is one of the major problems caused by an overpopulated planet which demands and consumes processed resources. The new geological era of man, the Anthropocene, is confirmation of this. Our transformation of the natural environment and the waste resulting from the consumption of processed materials has left its imprint on the planet. Current management models also contribute to increasing the pressure exerted by other stressors on the planet, thus increasing the impact on society as a whole. Any action aimed at tackling the problem of pollution will therefore indirectly contribute to reducing the pressure on the natural system from other environmental stressors, and will have a multiplying positive impact on society.

Considered in holistic terms, the circular economy (CE) establishes the goal of changing the traditional production model towards a new circular concept, which takes into account not only materials and products, but also other resources such as energy and water, and integrates them into a model of circularity that moves away from a simple pattern of waste recycling and recovery.

We begin with the absolute certainty that the circular economy is not an alternative, but instead the only viable way to continue working within the safe limits of a system that is responsible as regards the environment, which generates viable spaces for social development, and which contributes to sustainable and sustained economic growth. To do so, we must adapt to and anticipate the challenges that society, the regulatory body and the markets pass on to the private sector. Starting to pivot from unsustainable models of resource extraction, production, consumption and disposal to sustainable models of waste reduction, reuse and recycling is no longer an option, but is instead an obligation.

Within the global vision of the concept of circular economy as a model for generating economic value based on the creation of shared value for the natural environment and society, NTT DATA's approach seeks to influence the need to begin a path to transition in the private sector.



01.

First stage - Diagnosis of circularity: This starts with the aim of determining the current state and degree of implementation of sustainability and footprint management strategies and tools within the company itself, in order to establish the starting point for the development of future circular strategies.

Data collection tools based on methodologies such as Life Cycle Analysis (LCA) are used for this. The diagnostic methodology is based on triple helix indicators. Analysis of these provides objective values which can be used to align the actions in a circular economy strategy with other sustainability strategies for the company, thereby establishing a more beneficial broad-based and integrated framework. The diagnosis provides an overall image of the current situation and the potential positive impacts from a threefold view: environmental, economic and social, thereby obtaining a 360° perspective of the starting point from which opportunities for the circular transition can be identified and built, adapted to each case and leadership in the market.

02.

Second stage - Evaluation of opportunities: Based on the initial analysis, which allows opportunities to be discarded, prioritised and redefined while establishing objectives within a timeframe, opportunities are prioritised by constructing ex ante scenarios which simulate the effects of executing circular development strategies and activities. These scenarios are complemented with a SWOT or CAME analysis, which identify the least hazardous and most beneficial scenarios to spearhead the opportunities provided by the system.

03.

Third stage - Plan, strategy or roadmap: The plan establishes the conditions, objectives and scope of the transition, while defining and designing a series of initiatives or actions in the value chain, business model, processes and functions, the participation of key actors, financing requirements and R+D+i actions. This involves estimating the resources needed, planning the implementation and defining the management models (governance, monitoring and follow-up and integration with other strategies).

04.

Fourth stage - Testing: Indicators are monitored and followed up with the implementation of tools and services (pilot tests), in addition to training, awareness-raising and internal information actions, and the strategy for integrating the circular economy plan in the company and its alignment with other existing strategies or those being developed is assessed.

The transition to a circular economy model requires the cooperation of multiple actors, and involves various areas within the company's sustainability departments. Data management is essential for good governance in the circular economy, to enhance communication with stakeholders and to make informed decisions correctly. Implementing bottom-up strategies requires hubs or platforms for cooperation with agents outside the organisation; collaboration with R+D+i institutions; the creation of business innovation programmes in the circular economy, and even the promotion of activities with companies and entrepreneurs around it. All these initiatives simply add to the real value of the company, as they increase the value of its six capitals.

3.2. CLIMATE CHANGE

The report entitled *Climate Change 2021: The Physical Science Basis*, published by the Intergovernmental Panel on Climate Change (IPCC) in August 2021, has once again highlighted the immediate need to implement specific measures to mitigate greenhouse gas emissions, and to adapt to the effects of some deeply worrying climatic scenarios that directly affect the other stressors in the natural system and society. The text reinforces the need to implement the measures initially defined in policies and regulations as soon as possible, including both those necessary at a Spanish level ([Law 7/2021 on Climate Change and Energy Transition](#)) and at the European level ([Fit for 55](#)), which aim to reduce the European Union's emissions by 55% by 2030.

Businesses play a fundamental role in meeting these emission reduction targets, but climate scenarios and the corresponding impacts on capital arising from them also represent a significant risk for companies' business. This means there is a scenario of double pressure for companies: on the one hand, the pressure of regulatory compliance, and on the other, the pressure associated with the direct impact on its income statements arising from physical and transition risks and financial risk, which translates into an increase in the demand for environmental, social and governance information about the companies and projects they finance in order to mitigate those impacts.

The European Commission has also published the [EU taxonomy](#) in the context of the European Green Deal. This is a classification of environmentally sustainable activities, which aims to provide investors and financiers with access to environmental information about companies to help them make sustainable investment decisions, while also ending the phenomenon of "greenwashing".

Climate data have become a major challenge for companies in this new scenario. New performance indicators must be identified in terms of sustainability, which add value to natural capital and social capital, continuous monitoring processes associated with them must be defined, and projects undertaken to improve execution that generate double material value for the company. Finally, all the associated information must be certified and reported to inform stakeholders about its performance related to sustainability.

A clear example of the definition of a performance indicator in the field of climate change is the carbon footprint, which measures the amount of greenhouse gas emissions resulting from an activity in a given period of time. Measurement of the carbon footprint requires an in-depth knowledge of companies' production and management processes, not only internally, but also at the supply chain level. For companies, this entails a need to monitor and manage large amounts of data related to the consumption of raw materials, energy and fuels in their internal processes, as well as their suppliers' processes, which involves a great deal of work at the level of material and human resources.





Technological solutions such as [Meetzero](#), a blockchain tool developed by NTT DATA for recording and support for carbon credit transactions that provides an environment for managing and oversight of emissions reductions, contribute to providing a response to information needs based on data from stakeholders. This type of asset can be used to measure and evaluate exposure to risks, and to estimate the economic impact of a transition model that responds to the dangers and opportunities of the climate challenge, and are reported in accordance with the recommendations of the [Task Force on Climate-Related Financial Disclosures \(TCFD\)](#). These solutions must be capable of:

- Helping companies with their monitoring and reporting processes for environmental, social and governance indicators, thereby facilitating their positioning in terms of sustainability, regulatory compliance and access to financing and investment.
- Calculating the carbon footprint, including scope 3 emissions, which includes indirect emissions related to the supply chain.
- Designing emission reduction plans, setting [Science Based Targets](#) with specific measures enabling companies to reduce their consumption of raw materials, energy and fuels by designing new production processes that are more efficient, implementing renewable energies, and replacing fuels with others from renewable sources in order to increase the value of the company's natural and social capital by using nature-based solutions and emission offset projects that generate added value.
- Developing Net Zero strategies, advising companies on the implementation of emission reduction projects to offset their own carbon footprint or registering them in carbon markets ([CDM](#), [VCS](#), [GS](#)).
- Certifying offset or reduced emissions with the application of blockchain technology and the Internet of Things (IoT), supporting the new carbon markets arising from Article 6 of the Paris Agreement. This ensures the end of double accounting, makes the monitoring, reporting and verification processes of emission reduction projects as efficient as possible, and supports companies and governments in meeting their emission reduction targets and their National Determined Contributions under the terms of the Paris Agreement.

3.3. BIODIVERSITY

All our activities and our way of life depend to a greater or lesser extent on natural capital. We are consumers of nature and its biodiversity. Our means of life, our heritage, culture, source of livelihood, leisure and professional development would be seriously compromised without biodiversity¹.

For many people, biodiversity is an abstract concept with a broad dimension, but its meaning is simple. Biological diversity is the diversity of life. In other words, it is the species of animals (including humans), plants, bacteria, fungi, viruses and other known living beings, as well as genetic, ecosystem and landscape diversity. However, biodiversity does not have the same materiality for all companies, and not all companies relate to the diversity of natural elements defining biodiversity in the same way and with the same intensity.

As far as the market, investors, risk and regulatory institutions are concerned, biodiversity means risk². In the presence of a risk, the response of the various institutions or organisations focuses on the volume and level of detail of the information about biodiversity ([EU taxonomy & Non-Financial Reporting Directive NFRD](#)). Although its integration into business decision-making processes is not currently considered a priority, it represents such a major risk of systemic collapse for a company that stakeholders have increased the need to measure, evaluate and report the company's relationship with biodiversity in general throughout its value chain. This means that knowing the company's real impacts and dependencies on biodiversity is an operational and financial obligation.

A failure to take biodiversity into account as part of natural capital can have a serious detrimental effect on manufactured capital through the operability of the business, and affect financial capital due to the failure to meet the demands of the social capital that represent the market, the regulatory bodies and stakeholder groups. However, confronting the opportunities to integrate biodiversity in the sustainability of the company on a holistic basis more than multiplies its real value, since it has a positive effect on company's other capitals by addressing all the stressors in the natural system in a broad-based manner, and responding to most of the demands of society and the territory.

Bearing in mind that the main driving forces behind biodiversity loss ([Living Planet Report 2020](#)) are the degradation of habitats, overexploitation of natural resources, pollution, invasive species and diseases and climate change, incorporating biodiversity into strategies for the company's sustainability must fall within a broad-based and holistic vision. This is because the positive impact on biodiversity is closely related to the progress made regarding the other stressors of the natural system and the creation of safe operating spaces that generate value for the company, society and the natural environment.

The integrating and broad-based vision of biodiversity which NTT DATA provides is based on the development of operational working frameworks that enable institutions to analyse the materiality of biodiversity in their business model, and by doing so recognise the most important factors generating risk.

¹ <https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review>

² <https://www.transformapartnering.com/davos-2020/>



Once these risk elements have been identified, the company's positive or negative contribution to the five drivers of biodiversity loss is measured and quantified by means of the Life Cycle Analysis. This parameterisation of biodiversity and its transformation into information means that data governance systems can be incorporated, which use models of oversight, monitoring and certification by the implementation of technology to operationalise its continuous management and add value to the company's other capitals, making a positive contribution to the company's economic growth.

With the application of [Science Based Targets for Nature \(SBTN\)](#) the business environment can be evaluated to determine whether the company is operating in a safe space, or if it is generating an impact on biodiversity that needs to be corrected or offset. If this is the case, specific action plans are defined and implemented based on the principles of a conservation or mitigation hierarchy that lead to strategic plans or roadmaps that lead the institution to appropriately manage its risks related to biodiversity appropriately.

Exposure to physical, transitional or systemic risks can be evaluated by integrating the recommendations of the [Task Force on Nature Related Financial Disclosure \(TNFD\)](#), which contribute to developing strategies and action plans that provide a response to the risk or opportunity, and highlight the company's actions vis-a-vis its stakeholders.

Finally, the challenge of economising the value of biodiversity can be met thanks to the accounting and valuation models of natural capital developed by the United Nations within the framework of the [System of Environmental Economic Accounting \(SEEA\)](#). Today, it is possible to implement specific tools with a bottom-up focus that scale the economic value of biodiversity to companies' accounting models. This means that organisations can operate safely in the territory, taking strategic decisions in response to risks, incorporate the value of natural capital and its benefits for social capital into the real value of the institution's capital. It also positions them as a benchmark as regards the market and the regulatory body, generating economic growth and social impact.

3.4. AGRICULTURE

Agriculture and livestock farming have a considerable environmental impact: in global terms, they are responsible for approximately 50% of greenhouse gas emissions; they consume two thirds of the fresh water used; they generate more than 50% of methane and nitrous oxide emissions; and they are the main nitrate and phosphate pollutants of both aquifers and in surface water courses. That is why they are identified as two of the production sectors that make the greatest contribution to increasing the pressure of most climatic stressors, and therefore to generating an incalculable impact on the social demands and needs of the natural system. All these environmental challenges require new solutions, as the old ones are not working.

There is a vast array of requirements in the transition towards a more sustainable business model for the agricultural sector:



Small producers are facing a crisis and a devaluation of the market prices of their products. A transformation to enable them to obtain greater benefits and establish specialised marketing channels is necessary. One proposed solution is to adapt the rural world to this new situation by developing virtual market places, which have to date been more typically found in large-scale distribution. The Internet is a direct sales channel to the consumer, and is open to a world of possibilities.



Together with new consumer trends that seek natural and organic products as a symbol of health and care, the **Internet is a decisive channel** in giving the primary sector major added value. The end consumer is adopting a mentality that values and appreciates knowledge of the origin and the culture behind the product, the natural preparation process involved in the food they consume (its traceability) and even its producer, with whom a close relationship based on trust is valued.



Sustainable and environmentally friendly production is the key to a resilient business which provides differential value to the market and increases the value and profits of production. The incorporation of sensor technology in agro-IoT systems makes sustainable and precision agriculture possible, which enables management of a production model and streamlining processes for intelligent reduction of operating costs or optimising the relationship between producers, distributors and marketers, for example.



Improved logistics chains, access to markets, the development of appropriate management and planning models for crops, relationships with local communities and an increasing number of green services linked to agriculture (multifunctionality) are other economic and social challenges that must be incorporated into the scenario. Given the nature of these challenges and their specific local nature, large companies in the agri-food sector must be provided with strategies and management models that incorporate the provision of skills and training for teams, giving them the organisational structure necessary to meet those challenges in an integrated way, with specific measures that help increase the impact of production processes.



Those involved in the food value chain are constantly increasing their responsibility for the value of natural capital and social capital. Traceability of food products is one of the biggest challenges facing the agri-food sector, not only in terms of guaranteeing food quality and safety, but also to give the consumer and stakeholders all the added values that accompany and make up the final product, which represents an effort in production and management, a production culture and the identity of a territory. Technological developments such as blockchain contribute to building unique and secure networks that administer the traceability of the entire chain. These networks are designed to guarantee the source, quality and safety of food, and include logistical and commercial functions as well as sustainability indicators that certify the real value of the end product. To meet this challenge, NTT DATA has developed **IoTrace**, a solution that offers comprehensive monitoring of the information generated during all stages of the production process, ensuring total transparency of the entire process, and the reliability of the end product.

Advanced data analytics and artificial intelligence are technological solutions that also improve the profitability of agri-food companies. It must be easier for public administrations and large corporations to organise their resources and analyse them, and it must be possible for them to carry out production and price prediction exercises and integrate all the necessary indicators into a control panel.

The challenge to be faced when navigating from a traditional agricultural business model to one adapted to the needs of the natural system is to help producers and industries using tools and services based on digital, energy and analytical technologies which enable improvements in the sustainability of the agri-food companies throughout the entire value chain, i.e. from the cultivation of their products to their transformation and marketing. This is the only way to reverse the contribution of agriculture to the stressors that endanger the stability of the natural system, and the reduction of value that takes place in society.

3.5. WATER

Water is one of the key natural assets for the development of life and the maintenance of a resilient and healthy natural environment for social and economic development. There is no society without water, and without a society there is no economy. For this reason, from the perspective of management, water is a strategic component of the ecosystem, since its natural value encourages growth and the generation of the other capitals.

Given the current heavy demand for water resources for socio-economic development, they must be managed to allow growth that falls below the system's maximum capacities (the ecological exploitation ceiling) and which exceeds the minimum demands for social progress and economic development. Managing water resources also means managing and helping to reduce the pressure on the natural system from other stressors.

Creating an agricultural and livestock farming sector that is better adapted and more resilient to climatic fluctuations and market demands for sustainability requires adaptation to the physical risks arising from climate change.

Improved water efficiency in supply and drainage networks leads to energy efficiency in water networks (management of pressure to reduce energy for pumping), lower levels of greenhouse gas emissions, and the development of circular economy actions in wastewater treatment.

The application of nature-based solutions will contribute to generating a positive impact on other natural resources, thereby increasing the cost-benefit ratio of the actions and exponentially increasing the value of natural capital, and hence its contribution to reducing risks and generating shared value with the other capitals.

The management and action requirements to reduce the stress or negative impact of a natural system and the consequent impact on society and the economy of a specific territory or location include the following priorities:

- Improving water quality by reducing pollution, as a matter of urgency; eliminating dumping and minimising the emission of chemicals and hazardous materials; halving the percentage of untreated wastewater; and significantly increasing recycling and safe reuse on a global scale.
- Protecting and restoring water-related ecosystems, including forests, mountains, wetlands, rivers, aquifers and lakes, is a priority.
- The number of deaths and illnesses caused by dangerous chemicals and air, water and soil pollution must be substantially reduced.
- Resilience and adaptive capacity to climate-related risks and natural disasters must be enhanced in all countries of the world.

The United Nations has established various goals related to universal access to water and drainage for the population. The implementation of technological solutions is an opportunity to generate shared value by applying management systems that reduce the environmental and social risks derived from water management, protect human health and the natural environment, and ensure the availability and quality of water resources.



Increasing water quality by preventing and detecting pollution.



Improving the consumers' well-being and health.

Technological solutions based on IoT systems that capture data from sensors and are processed in the cloud, such as **Swalert**, developed by NTT DATA, have direct applications as tools for the oversight, monitoring and early warning of contamination of drinking water networks, wastewater systems and/or natural ecosystems. Protecting water generates a social impact that reduces deaths and illnesses related to the substances present in it, and contributes to:



Ensuring the water supply for business and social development.





04

A SUSTAINABILITY MODEL CONTRIBUTING SOCIAL VALUE

04. A SUSTAINABILITY MODEL CONTRIBUTING SOCIAL VALUE

4.1. ENERGY TRANSITION

At the global level, there is now a consensus between governments and companies on the need to significantly accelerate the energy transition towards models of energy generation and consumption with no greenhouse gas emissions, and which also help to ease the socio-political tensions arising from the energy consumption necessary to meet citizens' needs.

In this context, the various international institutions are leading increasingly ambitious initiatives to decarbonise energy systems. All these initiatives are based on a profound and disruptive transformation of energy systems that require a paradigm shift:

The electrification of demand, enabling the transition from systems that consume fossil fuels to systems that consume electricity from renewable sources.

The integration of renewables in energy distribution networks (mini and microgrids) by means of cooperation between consumers and network managers (DSOs and TSOs), implementing clean new technologies (renewable generation, storage, etc.) with management and operation systems that make it possible to guarantee the stability and security of the network (demand flexibility, remote control, improvement and adaptation of network infrastructure, etc.).

New energy vectors (power to x) that permit increased integration of renewable energy into the grid by converting it into H₂, methane, methanol, etc. for storage and use in industrial and mobility sectors.

The transformation of consumers into prosumers, giving the consumer the central role necessary to achieve better demand management (demand response strategies and participation in electricity system regulation markets) and allowing them to manage their own generation and storage of clean energy.

Responding to these energy transition challenges is an opportunity to pivot towards more sustainable energy consumption models with a greater social impact. NTT DATA is committed to innovation as the driving force behind the necessary technological, social and environmental changes, and is making a significant contribution to achieving the decarbonisation and value generation objectives for each of the six capitals.

The application of end to end solutions accompanying public and private clients in their energy transition and of value generation plans and strategies entails measuring, evaluating and validating the transition towards energy production and consumption models which involve implementing actions in the following areas:



Strategic consulting and energy transition plans.



Detailed evaluation of energy installation and systems (energy refurbishment of buildings).



Energy audits.



Advanced energy simulation (digital twin).



Economic and technical feasibility studies.



Design of smart grids.



Design and implementation of technological solutions (energy storage).



Renewable generation systems (photovoltaic, wind, green H₂ and CO₂ capture, biomass, geothermal, etc.).



Energy monitoring and management systems (KPIs, dashboards, benchmarking, alerts, etc.).



Energy savings measurement and verification plans.



Sustainability and energy management certifications (energy communities).

4.2. SUSTAINABLE BUILDING

The building sector has traditionally been a nebulous sector responsible for a significant percentage of the impacts on the natural environment, contributing to increasing the pressure on the boundaries of the planet and the socio-economic system. Let us recall that:

- The building sector consumes 36% of energy in Europe (Global Status Report 2018, UN).
- The building sector emits 40% of the EU's anthropogenic CO₂ (Global Status Report 2018, UN).
- 20% of drinking water in Europe is consumed in cities (Global Change Spain 2020/50).
- Construction generates 28% of waste in Spain (2013 State Waste Prevention Programme).

In view of this initial situation, the building sector today has a very important role to play in helping to create safe operating spaces that increase the well-being and viability of the socio-environmental space. Happy citizens living in liveable buildings and environments contribute to increasing the value of manufactured capital, and consequently financial capital.

Defining and demonstrating that an environment is liveable from the perspective of meeting the community's socio-environmental needs and demands, involves collecting and integrating the information generated by the other capitals into the construction model applied. This will confirm that a building model is sustainable because it generates liveable environments for people, which are viable in their relationship with the natural environment, and precursors of equitable and fair development spaces for society's socio-economic growth.

Building models are capable of generating urban spaces with a positive impact on society, the natural environment and the city. Integration of the contribution to the system's sustainability and resilience in a sustainable building management and reporting system means incorporating technological solutions based on a broad-based and holistic Life Cycle Analysis (LCA), and using management indicators to demonstrate the value generated by a management and efficiency model for the consumption of energy, water, waste and green spaces. The information provided by all capitals thereby helps define the real value of a building asset.



NTT DATA is committed to economic growth that goes hand in hand with the progress of social capital and the protection of natural capital, which involves:

- Supporting developers, design teams, construction companies and management and maintenance teams in converting conventional projects into passive and low-carbon buildings.
- Promoting the installation or use of renewable energy sources, and when renewable energy is not possible in situ, considering an external supply of clean energy.
- Integration and communication regarding accredited and standardised methodologies.
- Determining the environmental aspects and potential impacts associated with a product by compiling an inventory of the relevant inputs and outputs of the system; evaluating the potential environmental impacts associated with those inputs and outputs; and interpreting the results of the inventory and impact phases as they relate to the objectives of the study.
- Implementing recognised sustainable evaluation systems (LEED, BREEAM or WELL) that easily and visually convey the reasons why it is a much more sustainable building than others to the end users or owners of a building.

All these measures must be subject to rigorous scrutiny which effectively conveys the benefits provided in the form of data that can be measured, monitored, traced and certified. The real contribution made by a sustainable building model to a safe operation and development space can be valued as a result. This undoubtedly demonstrates the advantages and benefits of generating safe spaces for the growth of viable and liveable environments that add value to society, the natural environment and developers.

05

DATA GOVERNANCE - THE PATH TOWARDS A BROAD-BASED SUSTAINABILITY MODEL

05. DATA GOVERNANCE - THE PATH TOWARDS A BROAD-BASED SUSTAINABILITY MODEL

If coal was the fuel that helped catalyse the shift towards an industry-based society that gives us so many headaches today in terms of sustainability, data is what will enable us to evolve towards a society based on knowledge and a much more sustainable economy. The digital revolution has meant that information and data are generated, moved and consumed much more quickly without us realising it. The availability of all these data and the technological capabilities to cross-reference them has also enabled us to discover information that was not apparent to the naked eye.

Decision-making based on data (or the Data Driven paradigm) as a series of techniques and strategies that enable us to better address the challenges of today's society. Data are crucial to understanding what is happening; when and how it will happen; the action that could be taken on the basis of previous (historical) experience; and the recommendations and warnings that could be given to managers and decision-makers.

Automation is one of the great tools of today's digitisation. The sophistication of technology means that processes that previously required manual, paper-based techniques can now be carried out in different systems by means of fully automated workflows and procedures that behave like just another user thanks to artificial intelligence.

Artificial intelligence (AI) is the technology that has created the greatest expectations for the new data revolution and digital transformation. From the perspective of people, AI is present in our private lives.

Based on the combination of these concepts, and by way of an example, some digital tools allow enable oversight of public policies in the field of sustainability and mechanisms for monitoring CO2 credit markets, etc., thereby integrating data sources capturing the emission of pollutant gases using IoT devices in real time.

In this context, the challenge lies on the one hand in knowing how to convert this huge amount of data into information, which today is no longer simply a technological challenge. And on the other, in how these data (and information) can be used to provide more intelligent and personalised services, how they can even be used to create new services and above all, to improve decision-making and identify trends, impacts, risks, opportunities, etc.

There are three concepts linked to data which are important when using digital technologies in any field and of course, in the field of sustainability:

Evidence-based policies require a transformation that meets the challenges that society poses to governments and businesses. Data is at the heart of this transformation, and organisations must focus on extracting value. We must now work on integrating data silos, and creating data ecosystems and intelligence applications in order to deliver answers with an end-to-end vision. An innovative approach therefore involves using an end to end data management platform that meets this need, such as [DataLaia](#).

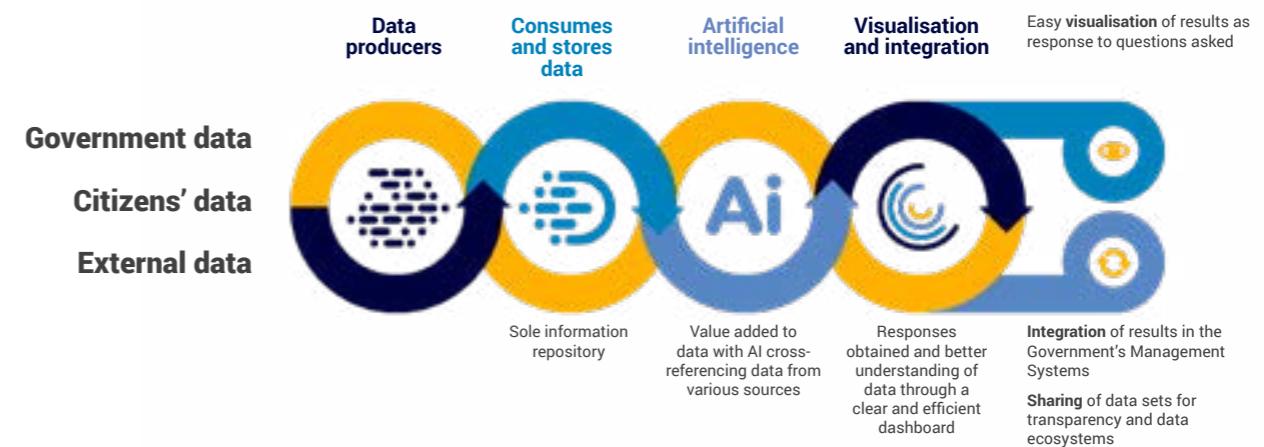


Figure 5. The data lifecycle

With this type of platform, we will be able to address the challenge of designing more personalised public policies which have a greater impact, and which integrate the value of the six capitals, in order to anticipate the response to future challenges and deal with complex questions (forecasting or simulations). Both the private and public sectors can help address the challenges related to sustainability that society and government organisations demand, demonstrating in a robust, traceable and replicable way that the company's entire value chain complies with the sustainability standards required by its stakeholders, and operates safely, reducing risk and spearheading value generation opportunities.

The management of all the data related to this challenge must be end-to-end to avoid corporate greenwashing policies, ranging from data capture to cross-referencing with various sources, by way of processing, storage, the design of advanced analytics algorithms and the delivery of value in response format, the indicator system, etc. Accordingly, the platform must have the following characteristics, among others:

It must be a flexible and modular platform with advanced AI and Big Data capabilities; with coverage of the complete life cycle of the data and its analysis, from production to consumption; and easy to implement with minimal Time to Market.

It should incorporate pre-built cognitive services in order to be able to give pre-written answers to specific questions, with trained analytical modules available.

It must allow efficient visualization of the data, with pre-built applications able to consume information; fostering finally data silos that facilitate an analysis from different perspectives; facilitating the coherent and consistent grouping of information based on the knowledge of the business; and sharing data sets in data space mode.

06

SUSTAINABLE INSTITUTIONS WITH DOUBLE MATERIAL GROWTH



06. SUSTAINABLE INSTITUTIONS WITH DOUBLE MATERIAL GROWTH

A data governance model seeks to identify robust, relevant and timely indicators that demonstrate a business model's sustainability in order to make its management more efficient, increase its value and facilitate its financing, reducing its operational costs, increasing its productive efficiency and meeting the reputational demands of a more demanding market.

The volume of business associated with sustainability criteria (investment with environmental, social and governance criteria (ESG), green bonds, green loans, etc.) has increased exponentially³. However, investors still believe that the information provided by ESG indicators^{4,5} is liable to greenwashing, while the financial rating institutions and regulatory authorities are constantly increasing their demands for information and data transparency. This merely increases the pressure and the resources allocated by companies to reporting and verifying non-financial information, with mixed results.

Establishing a secure operational framework means that sustainable investment opportunities can be identified and executed effectively. Based on a comprehensive data governance model, it is possible to identify management and monitoring indicators that guide and provide information about the workings and interrelation between the six types of capital (human, social, intellectual, manufactured, financial and natural).

A data governance system based on computer and technological processes that facilitate constant monitoring and lead to the integrated reporting of information is crucial for the correct implementation of strategic and management decision-making processes which are a response to stakeholders or market or regulatory initiatives such as environmental, social and governance (ESG) indicators, the [Taskforce on Climate-related Financial Disclosure](#) and the [Taskforce on Nature - related Financial Disclosure](#), among other initially voluntary processes that ultimately have a regulatory impact. To support this strategic decision-making process, NTT DATA has developed **Umbiombu**, a tool based on SAP technology that helps companies in their corporate social responsibility strategies, and which is fundamentally based on three cornerstones: management of corporate social responsibility projects; automation to obtain information, and finally, collaboration and transparency.

Data governance must be guided by the company's material impacts and dependencies on natural capital and social capital, which makes it possible to assess physical, transition-related and systemic risks and opportunities. Materiality and risk assessments identify the baseline for the development of double material corporate sustainability strategies (for both the company and its natural and social environment), which define the objectives and ambitions in accordance with the company's most important international objectives, and are aligned with goals based on science or regulatory bodies in order to fall within a framework of sustainability.

NTT DATA's commitment to sustainability is focused on incorporating technological solutions that establish an integrated framework capable of increasing the company's transparency and good governance, and which improve operational and accounting information, incorporating positive and negative impacts and social and natural risks in making decisions. Being a company with an integrated report which is based on relevant, traceable and certifiable empirical data therefore contributes to reducing costs where it is really necessary, increasing process efficiency, leading market opportunities and contributing to regulatory development from a position of leadership.

The power provided by knowledge based on operational data contributes to improving risk assessments and providing a response by means of integrated solutions that are beneficial at the operational level and which generate shared value (social and environmental). NTT DATA's proposal therefore contributes to encouraging other institutions to transform their businesses towards authentic sustainability and to demonstrate to their stakeholders and to the financial markets that the company's entire value chain is sustainable, safe and secure and generates profits.

Companies thereby generate new revenue inflows by avoiding production costs or from direct benefits as a result of activating new cash flows, which if accompanied by relevant, traceable and certifiable empirical data, make them candidates for attracting funds from sustainable financing mechanisms ([EU Green Taxonomy](#) or [Green Bonds Principles](#)) or attractive to institutional investors interested in high-impact sustainable product portfolios ([ESG Best in class](#)) or other sustainability ratings such as [DJSI](#), [GRI](#), or others) which are attracted by their good ratings for reporting sustainability in rating mechanisms.

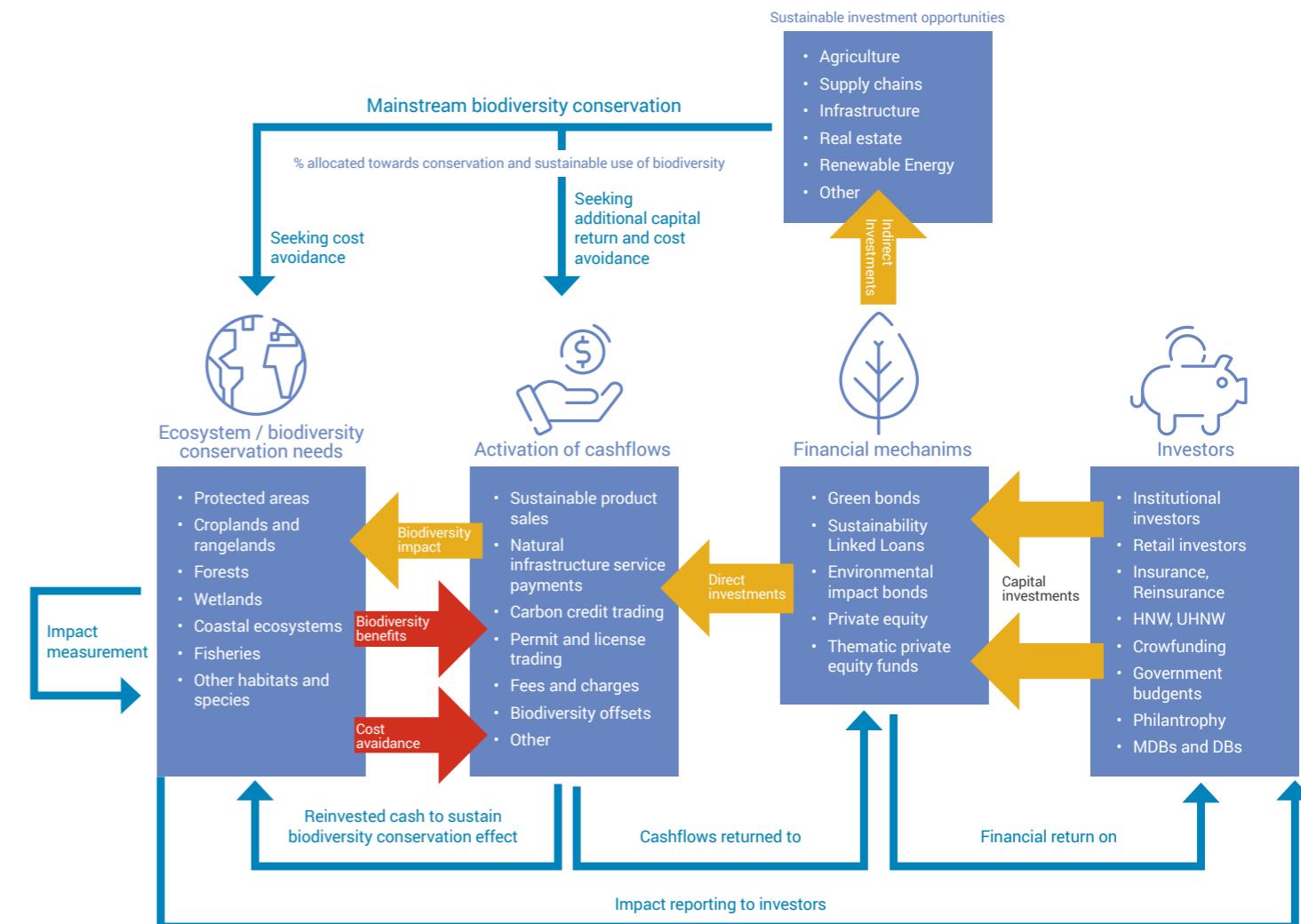


Figure 6. Conceptual framework for investment in natural capital and biodiversity. Source: produced by the authors based on an adaptation of Huwyler et al. (2014)⁶ & Deutz, A., et al. (2020)⁷.

³ <https://unctad.org/news/sustainable-finance-surges-despite-volatile-markets-during-covid-19>

⁴ <https://www.bloomberg.com/news/articles/2021-09-01/regulatory-scrutiny-of-esg-greenwashing-is-intensifying>

⁵ <https://www.internationalinvestment.net/news/4031730/greenwashing-biggest-concern-44-esg-investors>

⁶ Huwyler, Fabian, et al. "Conservation Finance: Moving beyond donor funding toward an investor-driven approach." Credit Suisse, WWF, McKinsey & Company: Zurich, Switzerland (2014).

⁷ Deutz, Andrew, et al. "Financing Nature: Closing the Global Biodiversity Financing Gap." The Paulson Institute, The Nature Conservancy, and the Cornell Atkinson Center for Sustainability) <https://www.nature.org/enus/what-we-do/our-insights/reports/financing-nature-biodiversity-report> (2020).

07

CONCLUSIONS



07. CONCLUSIONS

The transition from business as usual to sustainable business requires the integration and broad-based management of the various stressors at risk of impacting on the value of any of the company's six capitals. Challenges such as climate change, the circular economy, biodiversity, the energy transition and the reduction of emissions and pollutants, among many others, are impacts that are directly or indirectly interrelated, and they must be treated with the same relevance and determination due to the direct impact that they may have on companies' income statements.

Giving this inclusive and broad-based sustainability system a governance and information management model is essential for achieving a positive impact on the real capital of any company. It will only be possible to measure and evaluate the exposure to physical, transition or systemic risks, and possible to spearhead business opportunities by implementing information gathering systems based on Life Cycle Analysis applied to the company's entire value chain, which integrate this holistic view of sustainability (a safe operating space), and which can be monitored and become certifiable.

The risks related to the transition to sustainability and natural capital are increasing for the private sector, and opportunity lies behind the risk. The increase in non-financial information to report, the new national and European regulatory frameworks, as well as the demand for greater transparency by companies in their relationship with natural and social capital, create a challenge for the private sector and entail a significant mobilisation of its resources.

The incorporation of technological solutions for data management and governance to make the reporting and communication processes to the company's stakeholders more efficient is an opportunity for efficient business operations. Enhancing the

monitoring and traceability of the information reported is an opportunity to make better management and good governance decisions, so that any risk of greenwashing or uncertainty about the information has to be countered. Information is power, which means that harmonising it contributes to the development of a common language that enhances communication with stakeholders,

thereby reducing risks and uncertainties that impact on the company's financial capital, and increasing its leadership in the markets.

Current and future strategies, roadmaps and action plans must respond to the current and future challenges of the new sustainability frameworks. These strategies must integrate mechanisms that manage and systematise

information, facilitating the scaling of operations to corporate governance bodies and from there to operations. Only in this way can all the transition risks be covered in time, thereby generating a robust, resilient and leading business sector which meets the needs of the market, the regulatory body and the financial world.

Responding to the challenge and opportunity that the sustainable transition represents for the business sector requires a paradigm shift in governance models. This new normality must be integrated in companies through a confluence between operations and management. Having a double material impact on society, the natural environment and the company requires conviction from corporate governing bodies in terms of facing the challenge of increasing the relevance or materiality of aspects that have never been considered before, such as biodiversity, the circular economy, the sustainability of supply chains and the social impact caused by their activities. What may initially be seen as a significant effort in the short term should be thought of in terms of an adaptation for the sake of business resilience and sustained growth in the face of an increasingly mature market, which is full of opportunities, but which is demanding.





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