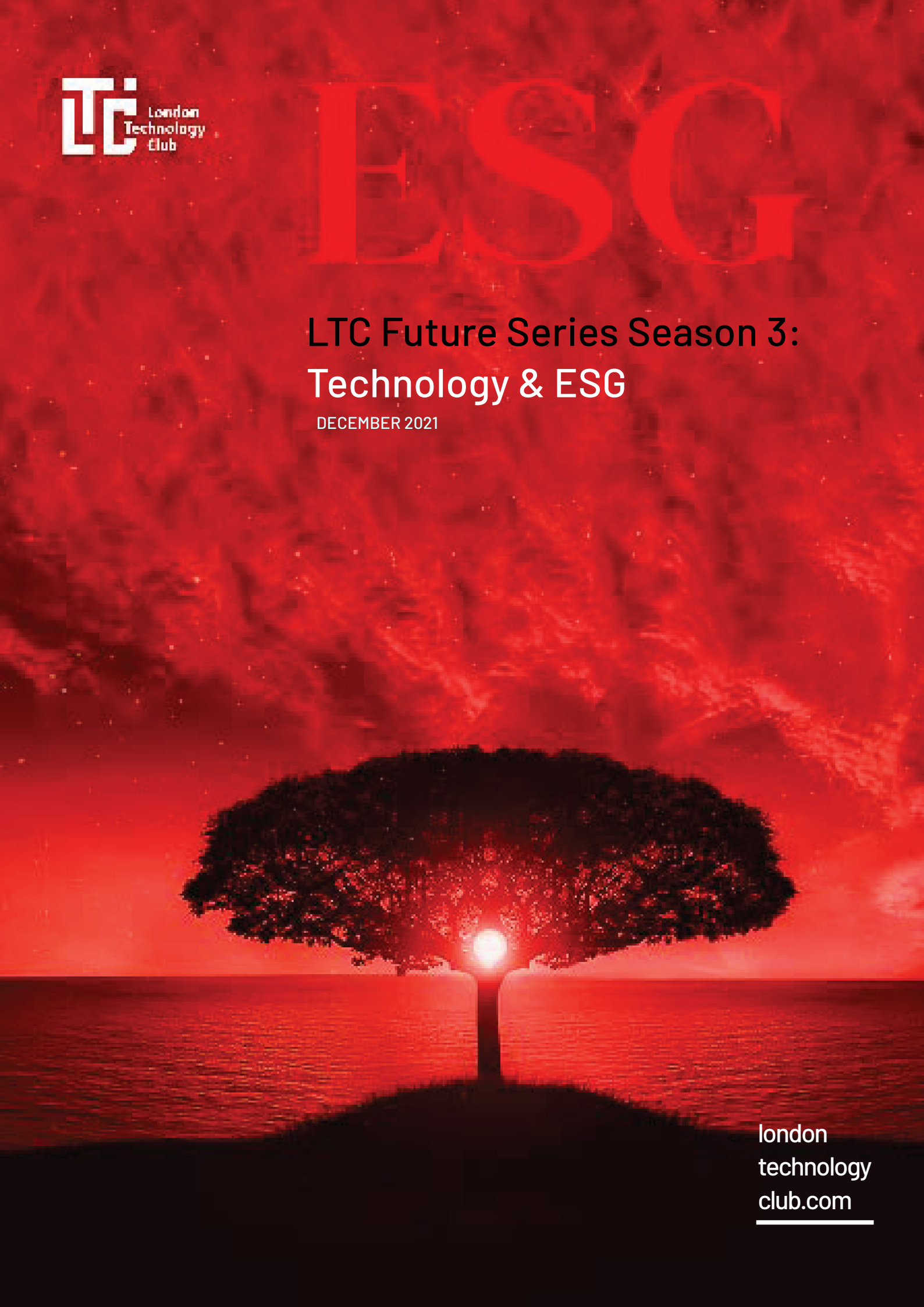
London Technology Club

ESG

LTC Future Series Season 3: Technology & ESG

DECEMBER 2021



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Foreword on the
Future Series Season 3: Technology & ESG

Around the world we face urgent social and environmental challenges – climate change, structural inequalities, environmental degradation, aging populations, amongst many. Confronting these interconnected and complex issues will require trillions of investment – and much more innovative, and commercial, solutions to these issues.

Here private capital is embracing a new role and mindset. Historically, some investors have been unaware or agnostic about the impact our investments make. However, with the rise of new investing approaches that are more ethical, responsible, sustainable, and impactful – we recognise a simple axiom.

The world affects our investments and our investments affect the world.

This is the next evolution in investing. Not since investment risk was recognised as a critical element has there been such a seismic shift to the investment industry. Reinforced by governments, regulators, companies, financial actors, and society, this it is becoming fundamental to how we invest.

Over six years ago, I led the launch of the sustainable investing effort at Barclays Private Bank. During that time, we´ve been advising an increasing number of our clients who seek ways to both protect and grow their assets and make a positive contribution to our world. I'm personally thrilled to see its current traction and momentum, but also realistic that the journey is far from finished.

This London Technology Club report outlines its trajectory and looks ahead to identify critical aspects that will shepherd it into the next stage. First, this movement, and its value to society, will struggle to advance without better quality ESG data and technology that improves decision-making and impact management. Companies that are able to provide solutions in this space will provide value for both their investors and the industry.

As well, the report speaks to the critical role of early-stage, private capital seeking to finance the companies, as the report lays out, across environmental, social, or governance issues. Here are some of the fastest growing markets, where investors have potential opportunities to create long term value for both their portfolios and our planet.

For both, we need more capital to catalyse the changes required. New innovations to be developed, existing ones to scale and novel solutions to be invented, so investors can both invest for tomorrow, and more importantly, influence it.

Damian Payiatakis
Head of Sustainable & Impact Investing, Barclays Private Bank

Welcome to the London Technology Club

The London Technology Club is an exclusive community of family offices, private and institutional investors, venture capital firms, technology experts and pioneers. The club combines hard to access co-investment opportunities, education, and relationship-building opportunities in the tech sector under one live and digital umbrella, providing access to competitive VC funds with attractive returns.

We organise events with leading technology visionaries, entrepreneurs and investors. A number of prominent international investors are members of our Advisory Board, such as Mikhail Fridman, co-founder of LetterOne; June Felix, CEO of IG Group; Jim Mellon, chairman of Burnbrae Group and Martin Gilbert, cofounder of Aberdeen Asset Management and chairman of Revolut.

British greentech billionaire Stephen Fitzpatrick recently said: "Good for the world is good for business". We are past the debate about whether business needs to be good for the world. But defining the 'what' and 'how' of good is something the world struggles with.

In 2019 we wrote The Future Technology in Philanthropy report, one of five reports that year focusing on how technology would impact topics our members are passionate about – with Formula One, Art, Longevity and Wine being the others. It was clear in discussions around the report that the boundaries were blurring around sustainable investing, impact and philanthropy. ESG came up a few times in discussion. Now it comes up in discussions with our members more often than not.

An estimated $30 trillion of assets are invested worldwide that rely in some way on ESG information, a figure that has grown 34% since 2016[1].

> *We have crossed the Rubicon. You will be hard pushed to find a corporate company or financial institution that hasn't had the discussion about ESG in the boardroom.*

For the world's biggest asset managers, such as BlackRock, Vanguard and State Street, ESG is universally top of mind. For policymakers and regulators, ESG makes for increased accountability and legislative pressure. For analysts and researchers, they are providing robust, decades-long evidence of a positive correlation between better corporate ESG performance and stronger returns. Legislative pressure is growing alongside finance driving change.

1 MIT Sloan School of Management

We can no longer look only at financial returns in isolation. Investment decisions can be enhanced by effectively using non-financial information about an organisation's operating practices around material ESG factors. With every business owner being accountable over ESG issues, the cost of ignoring it heightens the risk for all. But the VC industry is slightly later to the party. We believe, however, that we are past the time to 'wait and see' if ESG integration is a worthwhile undertaking for investors.

This report highlights the need to accept this is a positive evolution. The investment world however must realise it needs to walk before it can run. Success must be completely aligned with society's success in addressing the UN SDGs and systemic social or environmental challenges… for profit, but not just for profit. But this report also highlights that there is work to be done.

To paraphrase Phoebe Stone from LGT Vestra, featured later in the report: technology in the future will move ESG from company pledges to accountability, accessibility and data aggregation.

> "Those who are not integrating ESG into the DNA of their business sustainable businesses. VCs are seeing that there are business opportunities."

VCs are seeing this priority as a business opportunity.

The conversation is changing from awareness and disclosure around ESG to accountability and action. Commitments to timelines, milestones and delivery. Consumers and employees are expecting change and impact. No more lip service or greenwashing. Words from the boardroom of corporates and investment houses now need to have led to impact.

Leaders are turning to technology for the solutions. This report looks at what technology will impact the integration of ESG within business, particularly for investors.

Simon Pavitt London Technology Club Chief Operating Officer

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“Technology facilitates accessibility, transparency, verification and open data aggregation for ESG. We went from disclosure and tick box reporting to shared modelling”

Summary: A future day in the life of an investor

Written by Simon Pavitt, London Technology Club

This, in our humble opinion, is a typical day not too far away for an impact investor:

Each day I remind myself of my core principles, ensuring my company, investments and portfolio companies drive environmental and social alongside financial value. I am wanting to positively contribute with my actions and strongly adhere to the universal language of SDG 17 for real-world impact. Luckily the world also found ways to provide a common ESG framework for everyone to adopt and integrate with regards to investment decision-making and business practices. It was a lot easier to work out ‘where we wanted / needed to get to’ (with the sustainable development goals) but now with ESG standardised, we also know ‘how we want to get there’.

It was just in time… as the wall of money expecting ESG sophistication hit the market quickly, there was the recognition that high integrity data was lacking. Many ESG products were exposed as lacking in accountability and were toothless pledges. But then through technology and legislation we saw the ‘great accuracy shift’.

Legislators realised voluntary initiatives weren’t enough for transformational change. Mandatory disclosure enabled by block chain now means all business models are rigorously analysed for compatibility for the netzero economy. Technology facilitates accessibility, transparency, verification and open data aggregation for ESG. We went from disclosure and tick box reporting to shared modelling. Data became not just historic but predictive. I (and we all) can now see whether we are on the right path and doing better and enough.

I check my ESG-Impact Dashboard (combining both risk, internal and external measures, rewards and outcomes) includes climate change scenario analytics. My portfolio consists of carbon capture companies, chemical recycling of plastic waste companies, smart platforms that galvanise natural capital. I see that one portfolio company has slipped in the AI-based projections of its carbon emissions trajectory. At the new trajectory we are moving down to 80% chance of our net-zero targets and timelines- which for me is not satisfactory. I have the decision to actively engage or divest. I prefer to be an activist investor in the ‘bad’ companies and use my influence to turn them ‘good’. Its proven to be provide larger returns. Of course, I also accelerate those that are proving to do good. Lock-step venture. The ESG lens is crucial, both as a risk motivator and value driver.

My dashboard plugs into a companies verified ‘ESG self-portrait’- a mandatory real-time report where transparency is now law. The disclosures (for example distributed ledgers for emissions) are a record of truth that corroborates physical events and services in real time which is time-stamped, stored and shared, disclosing all the relevant data using the common frameworks applied. I shift between macro, real-time globally transparent data to pixel levels of certainty on, for example carbon stock, space based measures of carbon and biomass.

The dashboard also provides climate change scenario modelling- fluid and collaborative. We have come a long way, but I am now most excited about how quantum computing (only a year or two away now) will take solving the world’s biggest problems to the next level – a second ‘great accuracy shift’ in my investor lifetime.

Over lunch I prepare for my virtual Eden board (50/50 i.e., equal male and female members) meeting. I eat a cultured meat burger that has the universally enforced carbon labelling on the packaging. It has hugely affected my consumption choices. I notice its 18th November today. I’m glad to say that #EqualPayDay has moved into the late-Decembers now rather than as early as 18th Nov as it was in 2021… We are getting there…

02 ESG within the Spectrum of Capital

“If everyone looked through the ESG lens at their own company, every single one would evolve to becoming a better business for the benefit of all – people and planet”

Defining ESG

ESG is an umbrella term for sustainable and responsible finance components and standards. It is a framework considering environmental, social and corporate governance factors alongside financial considerations in the investment decision-making process. These standards are the central factors that measure the ethical impact and sustainability of investment in a company. Unlike impact investing, which is squarely focused on the external effects of a business, ESG concerns mostly internal practices and processes that could support both a fund and its portfolio companies to make them more sustainable. Integrating ESG has the potential to move investors and companies to ‘doing better business’.

> *"ESG principles are as much about the internal processes of a fund as the portfolio companies it is analysing or investing in – they should inform the practices of all investors in one way or another."*

Specific definitions of E, S and G are most commonly cited from the Principles for Responsible Investment (PRI). In early 2005, the then United Nations Secretary-General, Kofi Annan, invited a group of the world’s largest institutional investors to join a process to develop the PRI with support from the United Nations (UN). A 20-person investor group drawn from institutions in 12 countries was supported by a 70-person group of experts from the investment industry, intergovernmental organisations and civil society. The principles were launched in April 2006. Since then, the number of signatories has grown from 100 to more than 4,000 and over $121 trillion in AUM..

Principles for Responsible Investment (PRI) definition:

- **Environmental:** Issues relating to the quality and functioning of the natural environment and natural systems.

- **Social:** Issues relating to the rights, well-being and interests of people and communities.

- **Governance:** Issues relating to the governance of companies and other investee entities.

It is important, however, to distinguish between many other terms used in the investment and finance world. Many are often wrongly interchanged or overlapped. Here is a history of how we’ve now arrived at ESG and where it fits in within the world of business and investing versus other definitions and types of investing.

Stakeholder vs shareholder returns: how we arrived at ESG

> "Today it has become clear that exponential The Industrial Revolution of the 18th century was driven by a desire to do more. increases in manufacturing, trade and travel have been achieved at the price of a substantial – and potentially existential – threat to humanity."
>
> – Amer Khan, WH Ireland

The much-discussed American economist Milton Friedman's 1970 essay, The social responsibility of business is to increase its profits, is the reference point to show how far the role of business in society has changed in the past 50 years. The 'Friedman doctrine' was a theory of business ethics that asserted that a firm's sole responsibility was to his shareholders. There was little the private sector was expected or willing to do about something like equality. As such, the goal of a firm was to maximise returns to shareholders. In more recent times, it has become widely agreed that corporate decisions affect and impact all stakeholder groups, not just shareholders. We have accepted that the success of an organisation is judged not only by its commercial performance, but also how it acts for the common good and long term. Businesses can't operate in silos as we have realised and accepted, we are all interconnected.

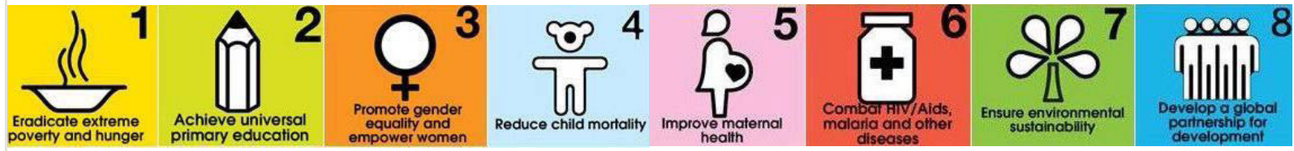
It's a common misconception however that law is on the side of 'only the shareholder', UK corporate law states that organisations are fully responsible to all of their actions. The Principles of the Corporate Governance Code set out by The Financial Reporting Council (FRC) Principle A states:

"A successful company is led by an effective and entrepreneurial board, whose role is to promote the long-term sustainable success of the company, generating value for shareholders and contributing to wider society."

The philosophical shift from shareholder to stakeholder consideration and returns was represented in the Business Roundtable's statement of purpose in 2019, in which 181 CEOs of some of the world's largest businesses committed to lead their companies for the benefit of employees, suppliers, customers, communities and shareholders alike. It was an open expression that businesses cannot put shareholder returns ahead of stakeholders.

Businesses and investors are now seen as part of a world in which everyone has an impact and can be a positive agent for change. Not that investors haven't been ethical, or upheld values based in the past – examples, driven initially primarily by religion, date back centuries. More recently, the changing mores of the 1960s – for example, the push to eliminate the apartheid regime in South Africa – brought socially-conscious investing to the fore. By the 1980s, Socially Responsible Investing (SRI), which focuses on systematically 'screening out' harmful products and practices (such as tobacco or firearms), had a dedicated investor base. Since then, there have also been the following landmark moments that have moved the needle in terms of evolving the definition of the role of business and investing in society:

THE UN MDGs and SDGs



In 2000, leaders of 189 countries signed the declaration at the UN Millennium Summit which outlined eight Millennium Development Goals (MDGs) aimed at eradicating poverty with measurable targets and clear deadlines for improving the lives of the world's poorest people. It was a mass consensus that the problems of extreme poverty, child mortality, poor education and disease needed to be defined and solved.

It represented a moment when United Nations (UN) member states made universal commitments, setting quantitative objectives to be achieved by 2015.

2016 saw the official launch by the UN of the bold 2030 Agenda for Sustainable Development. The new agenda called on countries to begin efforts to achieve 17 Sustainable Development Goals (SDGs). This was a new definition of the world's most pressing problems. Suddenly we had a common language, "a to-do list for people and planet, a blueprint for success", said the UN Secretary-General Ban Ki-moon.

The SDGs challenged and still continue to instruct all enterprises and investors to measure and manage their impact on people and the planet – positive and negative, intended and unintended. They created a more uniform way of reporting, understanding and comparing – a universal foundation. The goals were also backed by 169 targets with quantifiable indicators, and subject to regular review.

These global goals provide a common ground for previously siloed parts of the market, applying to large and small enterprises, public and private capital markets and development finance alike. The SDGs called for a united effort to achieve a shared set of targets and indicators, within which businesses and investors can differentiate and communicate their roles based on their social/environmental goals and performance.

It coincided with (or even potentially fuelled) the emergence of corporate responsibility starting to take an increased significance or focus for business

leaders. Companies could see or decide which goals best represented their activities. What quickly evolved were corporates aligning their 'missions' or 'purpose' against those goals. End-of-year reports were quickly began to include reviews of which activities most closely aligned with which goals. On many annual reports these came in the corporate responsibility section, whereby the company mapped out its products, services and mission against the SDGs. You saw companies aligning with certain SDGs and reporting how they were helping contribute to the specific goals. Banks, for example, typically liked SDG Goal 8 (Decent Work and Economic Growth) and Goal 10 (Reduced Inequalities).

Discussions began to happen not just about risk, but also about the potentially profitable opportunities for organisations who use their business competencies for social or environmental good.

Corporate social responsibility (CSR) departments suddenly rose to significance within businesses, invited to be a part of the boardroom discussions. While it moved the narrative on, whether it has led to transformative actions is up for debate.

The first step in financing the SDGs was to ensure that the capital was deployed where it had true sustainable development impact. According to the World Economic Forum (WEF), despite the SDGs increasing the number of initiatives dedicated to sustainable development, progress has been slow in many areas. A persistent $2.5 trillion annual financing gap (approximately 3% of the world's GDP in 2018) stands in the way of the Goals. In the 2020 UN review, the 2030 target is unlikely to be met.

According to the WEF: "Bridging the SDG financing gap is not a matter of reinventing the wheel. It is about understanding and removing the constraints to the supply of, and demand for, capital and improving how we link the two. We need only 3% of global GDP in investment to close the SDGs financing gap. With it, the world would be one step closer to realising the goals of the 2030 Agenda and achieving the inclusive growth and sustainable development we all desire." [2]

The SDGs however have undoubtedly influenced mindsets of consumers, C-suites and capital allocators.

CSR, Sustainable, Responsible and Impact Investing

As we mentioned earlier, since the 1970s, the shift has been businesses taking ownership of their impact on society.

> *CSR is a self-regulating business model that helps a company be socially accountable – to itself, its stakeholders and the public. By CSR, also called Corporate Citizenship[3], companies can be conscious of the kind of impact they are having on all aspects of society, including economic, social and environmental.*

Corporate Citizenship means operating in ways that do not negatively affect the wider community, employees, consumers or the environment. To engage in CSR means that, in the ordinary course of business, a company is operating in ways that enhances society and the environment, rather than contributing negatively to them.

According to Alva Group: "Once CSR was the clarion call for companies looking to do good, and consumers and investors seeking socially conscious organisations to do business with. But in an increasingly complex landscape, with myriad standards and criteria to judge corporate behaviour against, it has fallen out of step with the sustainability agenda. Enter ESG, the latest evolution of the intentions behind CSR, which provides a framework for greater transparency, greater efforts, and greater good." [4]

2 World Economic Forum
3 Investopedia

So, while business in general accepted CSR as a corporate citizen, and wider stakeholders over shareholder accountability (although this may have just been lip service or a nice bolt-on in reporting/marketing for some), investors began to think more actively about how to allocate capital and for what type of reasons/ returns.

> "Over time, many investors have recognised a willingness to pay a premium for increasing transparency."

However, the broad universe of investors meant a mish mash of definitions and investor types. What has arisen, however, is the mainstream acceptance that a variety of business models can create positive impact.

To try to help both define the different models and then be clear on the different products available to investors, Bridges Fund Management created the Spectrum of Capital.[5]

At one end of the spectrum is a Traditional Investor. This investor is finance-first and is looking only for financial returns. This is aligned to Friedman's shareholder-only responsibilities. There could be a potential negative impact from their investment but they do not try to negate it. Investors are seeking market returns and not considering broader stakeholders.

At the other end of the spectrum are philanthropists. Impact over returns is the sole motivation. They are impact-only focused and often accept full loss of capital (for example, altruistic charitable donations and grants). These funders continue to play a critical role in tackling pressing social or environmental issues where commercially viable solutions are not available. However, we have increasingly seen a 'messy middle' where capital allocators are not quite so extreme in their impact vs financial objectives – most are allocated somewhere along the spectrum.

The 'messy middle' of the spectrum

Within what we call the 'messy middle' are three types of investor that intend to create positive change in response to social or environmental issues, and so are said to operate within the 'Impact Economy'. As the dotted lines along the spectrum reflect, these categories are not mutually exclusive; often they are interdependent, with many investors operating between or across categories. In the past, investor appetite would have been under the broad universe of 'responsible investors' but, as we shall see, the shift has moved more recently to investors evolving to be considered more sustainable investors.

4 Alva Group
5 Bridges Fund Management

Responsible investing

A responsible investor is one that negatively screens for ESG risks. They want to behave responsibly and also acknowledge that they have regulatory responsibilities to meet. It is very hard to justify being a Traditional Investor in this day and age. Some (for example the former chief investment officer for sustainable investing at BlackRock, Tariq Fancy) still argue, though, that in finance profit and purpose don't overlap.[6]

Responsible investors are avoiding companies in industries or countries deemed objectionable. Many would consider this now purely 'hygiene criteria'. Some may also consider ethical investing within this definition. There are a pre-determined set of values and beliefs applied to investment selection. A key defining principle of a responsible investor is that, while avoiding certain industries, they are foregoing the ability to influence them. They are looking to avoid harm and mitigate ESG. It is therefore important to acknowledge that ESG is still a key lens through which a responsible investor can look to reduce risks for people and the planet with their investments, but also their own business practices. The responsible investor is looking to avoid harm and mitigate ESG risks.

Sustainable investing

Sustainable Investing centres on backing businesses that can flourish in a changing landscape. It is distinguished from responsible investing because it focuses not just on protecting value against risk, but also on creating additional value through both investment selection and portfolio management. This is a move on the spectrum towards more impact in the objectives or returns. A sustainable investor is looking to generate positive outcomes for people and/or planet.

Taking this further, and building upon 'best in class' Sustainable and Responsible Investment, some investors have deeply integrated social and environmental factors into their investment analysis and started proactively looking for ESG opportunities, selecting companies they believe will outperform the market because they operate (or have the potential to operate) in a more sustainable way than their peers over time – be it through their environmental management, stakeholder engagement or governance practices.

> *ESG remains within the DNA of the sustainable investor.*

Impact investing

Impact Investing goes beyond responsible and sustainable investing to focus on solutions to pressing societal or environmental issues. This third category includes those investors willing to make investments with an impact approach that requires a trade-off of financial return, and therefore deliver a below-market financial return. This could, for example, involve backing social business models that re-invest some or all their financial surpluses, such as trading charities, mission-driven cooperatives or cross-subsidy models. The impact investor is looking to contribute towards solutions.

Impact investors often focus on one or a cluster of issues, with a deliberate intention to make a positive social or environmental impact. Some want to focus on societal or environmental solutions that can generate market-rate (or market-beating) financial returns. For these investors, there are a growing number of forprofit businesses that help to address a societal or environmental issue through their core product or the place in which they are located. They are looking to contribute to solutions on an ESG issue while still earning a market return (also known as 'Blended Values' as coined by Jed Emerson, or creating 'Shared Value' as defined by Prof Michael Porter and Mark Cramer in the Harvard Business Review in 2011). There is a consideration of the whole impact to generate positive change for the otherwise underserved or the planet.

6 Medium.com

Other impact investors are willing to make investments whose impact thesis may or may not deliver a market-rate financial return – social impact bonds, for example, may produce attractive returns but the product is not yet proven.

Impact investing is squarely focused on the external effects of a business, but ESG concerns such as internal practices and processes that could support both a fund and its portfolio companies to make them more sustainable are still part of the DNA. ESG again is a fundamental lens through which to view impact investing.

The other end of the spectrum that impact investing is moving towards is philanthropy which prioritises outcomes over gains. They are within the impact economy if there is still interest to create economic value by creating societal value.

The above shows that a variety of business models can create positive impact, so the likes of Bridges Fund Management, alongside many others, have designed funds to align with the needs of the set of impact-driven business models and with the financial expectations of different investors, be it responsible, sustainable, impact or philanthropic[7].

The same can be said for Maanch. The company is a high growth certified B-Corp providing Impact Data Management Systems for Investors, Corporates and the Philanthropy ecosystem, bringing to market globally scalable solutions that address the rising demand for impact/ESG data.

Maanch means 'platform' in Hindi and was founded in 2018 with the primary purpose to inspire and enable re-allocation of capital and resources towards a sustainable future through robust technology solutions powered by relevant structured data, intuitive dashboards and collaborative networks.

In 2019, Maanch launched M Give, a digital solution for non-profits, donors, foundations and intermediaries to automate and streamline due-diligence, fundraising and impact measurement and verification to enable philanthropic capital to be deployed strategically and reducing cost of embedded operational inefficiencies.

Empowered by incoming demand from clients, in 2020, Maanch launched solutions for Investors and Companies to enable them to navigate the complex and dynamic ESG space by building a robust foundation by aligning strategy, processes and data systems from the ground up.

Companies are offered a Net Societal Impact Diagnostic, Strategy and Dashboard to measure, monitor and communicate their ESG/ Impact data to their stakeholders with ease and confidence.

The Investor solution - the Engagement Tracker, enables asset managers and investors to automate data capture, analytics and reporting of all engagements with their portfolio companies– resulting in time and cost efficiencies. Investment teams can record issues and interactions to align investment activities with ESG criteria and regulatory requirements. With the Maanch Engagement Tracker, investors are able to capture structured data at the source of an engagement event and generate a digital data trail which is essential to demonstrate responsible stewardship.

By leveraging technology to accelerate the adoption and integration of real, measurable impact in financial decision-making, Maanch empowers their clients to drive positive impact, where it matters most.

7 Bridges Fund Management

The fundamentals for ESG - a summary

Firstly, when looking at investing, the lens is looking at which companies manage the operational ESG issues and opportunities better than their peers.

Secondly, every company has to get its house in order, integrating ESG best practices into its own business operations.

> *If everyone looked through the ESG lens at their own company, every single one would evolve to becoming a better business for the benefit of all – people and planet.*

As you will see from the definitions above, there is no ESG investing. It is not a strictly defined term, because it is about integrating ESG into all investment decision-making.

ESG is therefore as relevant to enterprises and investors focused on risk management as to those focused on positive impact and intended theories of change.

The rise of ESG in the boardroom

In a recent study by Harvard Business Review (HBR), 70 executives from 43 global institutional investment firms were interviewed. It was found that ESG was almost universally top of mind for these executives. ESG is now a priority for these leaders and corporations will soon be held accountable by shareholders for their ESG performance.

According to UBS in its ESG and sustainability survey, 70% of their corporate clients state that they were implementing or revising a sustainability strategy[8]. The recognition is clear about non-financial alongside financial matters.

Five factors driving the change for business leaders:

While as a concept ESG has been around for some time (as we mentioned its origins go back as far as 2005), business leaders, corporate CEOs, SMEs, unicorn founders and startup problem-solvers alike are seeing the revolution from the following stakeholders.

1) Internal staff – especially the millennial workforce. The great wealth transfer will mean millennial investors will also soon be reaching peak saving years.

2) Consumers and the media – looking for and uncovering shallow promises.

3) Shareholder activism – e.g. activist hedge funds protecting / influencing their investments for alpha.

4) Investors – including analysts wanting to know as part of their criteria ahead of investing.

5) Regulators – wanting to 'turn the screw' on financial firms. Across Europe the likes of Sustainable Finance Disclosure Regulation (SFDR) imposed mandatory ESG disclosure obligations from March 2021.

8 UBS ESG and sustainability survey, Nov 2020

Six factors driving the change for investors:

1) Modern portfolio sizes

Institutional investors and pension funds have grown too large to diversify away from systemic risks. It is impossible for them to avoid the environmental and social impact of their portfolios. They are becoming too big to let the planet fail with trillions under management. Pension funds have to take a longterm view due to their portfolio liabilities. There are existential risks that such large portfolios cannot ignore. If, for example, there is no successful transition to net zero, in line with Paris Climate Agreement targets, then the adverse consequences will be economic.

2) Superior financial returns

A wealth of studies looking at performance (for example a famous study by Harvard Business School's George Serafeim and Robert Eccles looking at companies since the early 1990s) found that those that developed organisational processes around ESG outperformed carefully matched control groups. Numerous studies have shown a positive relationship between high performance on relevant ESG issues and superior financial performance. Highest rated ESG companies outperformed lowest-rated firms. Investors have recognised that ESG is connected enterprise value creation and capital market efficiency.

3) Transparency and Accountability

The SDGs provided the framework to see the world's problems. Suddenly a question could be asked – how are you helping? Impact could then be aligned rather than being more subjective. Coupling increases in data to analyse performance and provide transparency has increased scrutiny and accountability. Verification tools will increase the future rigour and scope of accountability.

4) Growing demand

Asset owners are increasingly demanding ESG from asset managers. Asset owners are becoming more sophisticated and more aware of the world's challenges. The conversation has moved from explaining why ESG is important to how to most effectively capture value from ESG integration. High net-worth individuals are increasingly focused on nonfinancial outcomes.

5) The acceptance of fiduciary duty

Regulatory guidelines and fiduciary duties have been redefined in the likes of Canada, UK and Sweden (the US is considered to have been slow). Further legal requirements in reporting and corporate actions are expected in the future. As Will Martindale, head of policy at PRI, bluntly put it to shareholders: "Failing to integrate ESG issues is a failure of fiduciary duty."

6) Trickle-down within investment firms

Senior leaders are making sure that ESG analysis is being integrated into the fundamental financial activities carried out by analysts and portfolio managers. There are fewer barriers between the capital allocators and the ESG group experts.

> *Research suggests that in VCs, the increased focus on ESG is not from the top-down, but more from younger staff within the company pushing upwards*[9].

9 TechCrunch

The flow of capital to ESG

> "moral prospects of ESG investing in light of 2020 saw a record influx of investor capital in ESG-themed funds, bolstered by the the COVID-19 pandemic and positive financial results reported by media organisations and researchers." Harvard Law School Forum and Governance.[10]

2021 is seeing a record year for inflows for ESG funds, with over $21 billion in the first quarter vs $51 billion for the whole of 2020. In 2019 the figure was $21.4 billion, with $5.4 billion accrued in 2018[11].

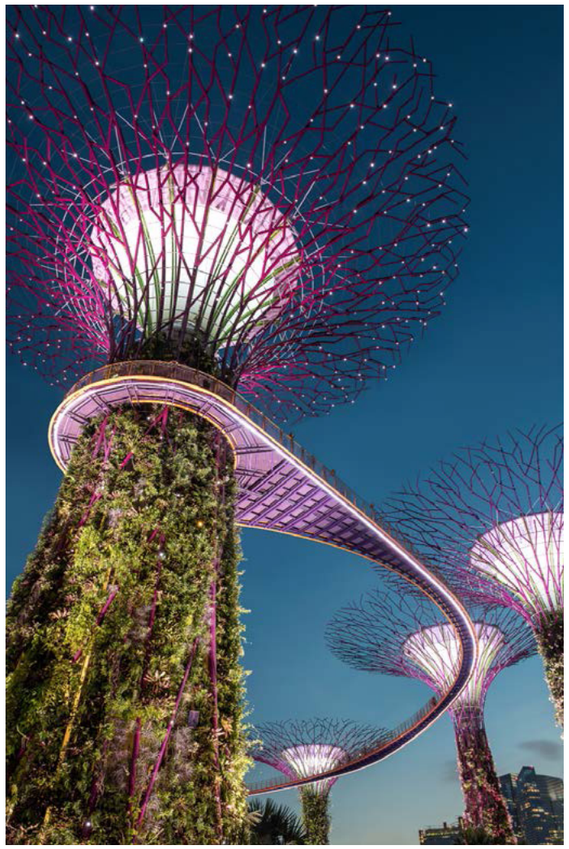
In terms of assets under management, ESG may hit $53 trillion by 2025, a third of global assets ($140.5 trillion projected in total assets under management). This would be up from $37.8 trillion by the end of 2021 (it was $22.8 trillion in 2016, $30.6 trillion in 2018).[12]

ESG product development has been unprecedented (fuelled by both demand and with more than 100 ESG funds launched per quarter, 330 ESG funds launched by Q3). Europe leads the way. accounting for half of global ESG assets. The US has been slow to start but now has the strongest expansion. It will be expected to catch up and overtake to be the leader in 2022 according to McKinsey and the Global Sustainable Investment Alliance. [13]

Europe, however, will still continue to grow. According to research by PwC, in a best-case scenario, ESG funds will experience a more than threefold jump in assets by 2025, increasing their share of the European fund sector from 15% to 57%.[14]

Private equity is also now routinely evaluating ESG factors, with the focus on ESG risks when making investment decisions looking set to continue in 2022 and beyond [15]. Three-quarters of respondents always screen target companies for ESG risks and opportunities at the preacquisition stage, and more than half (56%) have turned down a potential investment or refused to enter into an agreement on ESG grounds.

10 Harvard Law School Forum
11 CNBC
12 Bloomberg 13 GSI Alliance
14 Financial Times
15 PwC's Private Equity Responsible Investment Survey 2021



ESG Ratings: Aggregate Confusion

While capital markets are moving fast to incorporate ESG factors, many are using ratings as a fast way to assess companies. However, ESG ratings is still a young field. Many feel the challenge is that ESG data is noisy and unreliable. The noisiness of the data and the ratings agencies diverge dramatically. A group of companies called the Sustainability Initiative conducted research with MIT Sloan looking at the prominent five agencies: KLD, Sustainalytics, Vigeo-Eiris, ASSET4, and RobecoSAM. They found the correlation among prominent agencies' ESG ratings was on average 0.61. By comparison, credit ratings from Moody and Standard & Poor are correlated at 0.92.

According to Damian Payiatakis, Head of Impact and Sustainable Investing at Barclays:

"It's important to differentiate between ESG data and ESG ratings. Differences in ratings are driven by different data sources, different data metrics, and most importantly by different ratings methodologies and philosophies.

Once one understands that some agencies will, for an absent data point score you peer group average and the other will score you bottom, then you start to appreciate some of the reason the same company may be rated differently by different firms. Credit ratings are a lot easier and systematised therefore variability is low – however arguably the system there drove some of the global financial crises outcomes given the rigidity"

This ambiguity around ESG ratings creates acute challenges for investors trying to achieve both financial and social return. The researchers called it 'Aggregate Confusion'.[16]

The aim is to work around this aggregate confusion through a programme of research to improve the quality of ESG measurement and decision making in the financial sector, towards more rigorous and coherent methods for integration. According the MIT Aggregate Confusion Project, the few tasks common to all are:

- To reduce the level of noise in measuring specific ESG categories such as labour treatment, carbon emissions and product safety
- To understand the effect of ESG-driven investment flows on stock price and firm behaviour
- To develop smarter ways to aggregate ESG factors into composite indices
- To reliably assess investor preferences to enable ESG indices to be more customised and attuned to investors' values

16 MIT Management School

The challenge becomes how to accurately measure a company's environmental and social impact, particularly given that ESG remains an evolving concept and reporting standards are still in their infancy. The challenges are:

- Corporate stock and bond prices are unlikely to properly reflect ESG performance as investors struggle to accurately identify out-performers and laggards.

- The divergence can dampen the ambition of companies seeking to improve their ESG performance, thanks to the mixed signals they receive from ratings agencies about which actions are expected and will be valued by the market.

The demand for ESG ratings and research led to Nasdaq-listed Morningstar Inc's acquisition of Sustainalytics. The company was considered to be valued at €170 million at the time of the purchase. In October 2019, Bloomberg announced Sustainalytics would be available to the 325,000 Bloomberg Terminal subscribers worldwide.

But the financial crisis of 2008 shows how ratings and oversimplification/packaging doesn't lead necessarily to correct business practices or impact for good. Overall, the results suggest it is advantageous to rely on ratings providers, or as some firms do construct independent ratings using the underlying data.

LSEG and Refinitiv

In January 2021 the London Stock Exchange Group (LSEG) acquired Refinitiv[17]. The combination aimed to become a leading global financial markets infrastructure and data provider. The company services more than 40,000 customers and 400,000 end users across 190 countries. The all-share transaction valued Refinitiv at $27 billion.

Now, as part of LSEG Refinitiv strives to positively impact the financial community – be it in trading and banking, investment, wealth, customer and third-party risk, or enterprise data solutions.

It draws on cleaner, richer, more readily accessible data to support the use of advanced technologies like AI and machine learning – helping their customers gain greater insight, fuel more rapid innovation and successfully navigate this time of unparalleled change. Its vision is to create greater openness, connection and efficiency in global financial markets. With core principles of partnership and open access, it provides more choice to customers and gives them greater opportunity to take on complexity, and scale efficiently.

ESG Scores from Refinitiv are designed to transparently and objectively measure a company's relative ESG performance, commitment and effectiveness across 10 main themes (emissions,

17 Refenitiv

environmental product innovation, human rights, shareholders, etc.) based on publicly reported data. Refinitiv offers one of the most comprehensive ESG databases in the industry, covering over 80% of the global market cap, across more than 450 different ESG metrics, with a history going back to 2002. It covers 10,000 companies across 76 countries and 1.8 million officers and directors. Refinitiv offers full transparency via a click-through to the sources of our ESG information.[18]

With regards to indexes, they are designed to provide institutional investors with effective and transparent tools to integrate ESG considerations into their investment process and portfolios.

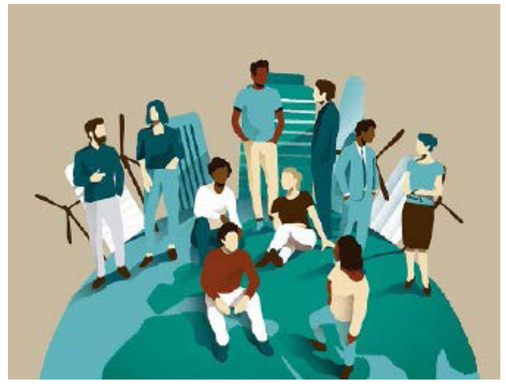
Summary

ESG rating is still a young, nascent field. Many definitions and scores are inflexible and simplistic. The concern is what's important today might not be important tomorrow, and that ratings can remain fluid yet clear. Ratings and indexes may be creating a bottleneck or overly simplified rolled up evaluations or scores that attempt to assign a value to a company.

> *ESG ratings and indexes shouldn't be the 'be all or end all' for investors*

It is questionable whether it is possible to arrive at a single gold standard without compromising credibility or usability. Currently the ambiguity is creating a challenge for the investment community.

18 Refenitiv



03 ESG Approaches for Venture Capital

“The context of emerging technologies, fast-growing teams, defining new markets and the lack of regulation makes ESG an important part of helping to build better tech.”

There has been a frustration within the industry that existing ESG frameworks were not suitable for venture capital. The likes of the British Private Equity and Venture Capital Association (BVCA) have been proactive to try to address this with ESG guidelines, toolkits and Excellence in ESG publications and summits.

More recently, VentureESG was born in 2021, quickly growing to a community of 250-plus VC funds and LPs. Its aim is to drive the industry push on good ESG in the belief that it should be a standard part of due diligence, portfolio management and internal fund management.

> “The context of emerging technologies, fast-growing teams, defining new markets important part of helping to build better tech. We are committed to this cause and to prevent ESGwashing from creeping into VC.” - VentureESG
>
> and the lack of regulation makes ESG an

A key power of VCs is that they are working with founders and helping set a company’s DNA at an early stage. VentureESG co-founder Hannah Leach told Nossa Data: “As arbiters of capital at the super early-stage, we have a responsibility to keep these businesses accountable. We want to help and support them to have the right processes in place. Because if we’re not going to do it at that point, it will become more and more complicated as businesses grow. For venture, we want to get consensus around the meaning of ESG in practical terms, so that as an industry, we can hold one another to this shared understanding.”

Of course, by default, VCs are all investors. Therefore, those leaning into ESG and considering themselves within the ‘impact economy’ (i.e., responsible, sustainable and impact VC investors) have recommended the following frameworks for integrating ESG:

The PRI and IMP

The Principles for Responsible Investment

In early 2005, the then UN Secretary-General, Kofi Annan, invited a group of the world’s largest institutional investors to join a process to develop the Principles for Responsible Investment (PRI).

The six principles provide a global framework for mainstream investors to consider ESG issues.

By applying these principles, signatories are able to better align investments with broader objectives of society. French VC fund blisce/ explicitly states this on their website and in its investor communications:

1. We will incorporate ESG issues into investment analysis and decision-making processes.

2. We will be active owners and incorporate ESG issues into our ownership policies and practices.

3. We will seek appropriate disclosure on ESG issues by the entities in which we invest.

4. We will promote acceptance and implementation of the Principles within the investment industry.

5. We will work together to enhance our effectiveness in implementing the Principles.

6. We will each report on our activities and progress towards implementing the Principles.

The Impact Management Project

Another highly regarded framework is the Impact Management Project (IMP), which began in 2016 as a time-bound forum for building global consensus on how to measure, assess and report impacts on people and the natural environment.

The IMP is relevant for enterprises and investors that want to manage ESG risks, as well as those that want to contribute positively to global goals. It facilitates standard-setting organisations that, through their specific and complementary expertise, are coordinating efforts to provide comprehensive standards and guidance related to impact measurement, assessment and reporting.

The group of organisations has formed a structured network, regularly convening a community of over 2,000 practitioners to share best practice, delve into technical issues and identify areas where further consensus is required in impact measurement and management.

However, according to Hannah Leach, partner at Houghton Street Ventures and co-founder of VentureESG: “To date there has been no wider VCspecific approach to ESG – no understanding of the issues that are really relevant to venture/early-stage companies and no standards/tools/best practice for VCs to use when thinking through these issues.”

There are a number of boards, tools and procedures for specific issues. For example, the Financial Stability Board created the Task Force on Climate-related Financial Disclosures (TCFD) to improve and increase reporting of climate-related financial information. There is also the International Labour Organization (ILO), the only tripartite UN agency, which brings together governments, employers and workers of 187 member states to “set labour standards, develop policies and devise programmes promoting decent work for all women and men”.

VentureESG’s Hannah Leach also notes: “While ESG comprises a complex list of issues (which, in our framework, we call the 'universe of ESG for VC'), approaches differ widely. From a more issue-based view (focusing one after the other on DEI, human rights, the E) to a comprehensive approach trying to embrace ESG principles as a whole, we are seeing a lot of variation in the market. The main issue [is that] a complete lack of standardisation will inherently lead to confusion.”

While institutional investors already invested into potentially harmful companies have to decide whether to engage and look to actively force change in a company (i.e., fight) or divest (i.e., flight), the VC industry has different challenges.

VCs are the first believers in innovation. The companies they uncover, accelerate and scale are usually solving new or difficult problems. Often, they provide the capital that allows the company to develop a proof of concept. At a time when innovation is required for new solutions where previous efforts have failed, VCs have different challenges. For example, inclusivity within super-fast growing companies. Or the threat of biases or destructive superintelligences from companies building AI-based solutions.

ESG Standardisation

According to VentureESG: “We are still far away from standardisation. However, some of the possible ‘standard-setters’, from the PRI to ILPA to regulators, are actively talking about ESG for VC. There is little hope for their interventions to really drive change for another 18 months as the ‘movement’ is maturing. Until then, we at VentureESG are providing guidance around best practice/anti-green/ESG washing and overall a non-competitive, community-based approach to support people in their ESG journey.”

There is a sense that the industry needs to walk before it can run. The likes of VentureESG are conducting projects such as mapping exercises on tools and existing frameworks, feeding into a discussion paper due

to be released before the end of 2021. The aim is not to reinvent the wheel, but that certain standards and standardisation will be required to help the industry evolve to be an ESG leader, both for VCs and how they operate, as well as having a leadership role in the companies they are investing in.

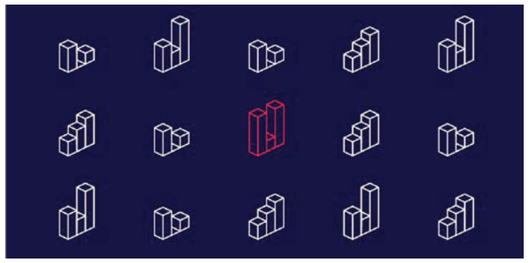
The New Breed of Platforms

Util

Util uses machine learning to measure the real-world impact of every company and portfolio, empowering investors to make more informed investment decisions. The company promotes the fact that it is objective, universal and sophisticated, where its analytics capture the myriad ways in which 45,000 listed companies – of every size, geography, and sector – affect the SDGs and thousands of other sustainability concepts. The result is a value metric for extra-financial performance that sits beside that of financial performance, paving the way for diversified and differentiated sustainable strategies that capture the complexities of the global economy.

ESG data includes everything that goes into creating a product, be it company operations, policies or governance. Util data encompasses information about how the product affects the world around it. Both are important parts of the sustainable investment puzzle.

However, there are current shortcomings within ESG. First, assessments are highly subjective, with scores varying considerably among providers. Second, they often hinge on disclosures, meaning fossil fuel or tobacco companies can score highly on the basis of their transparency. Util evaluates a company’s revenue streams and draws conclusions from 120 million peer-reviewed journals, for access to consistent, objective analytics. Util measures the positive and negative effects of every company on the SDGs and thousands of sustainability themes, in order to capture the entire impact of a portfolio



Nossa Data

Nossa Data was born with the mission to make ESG easy for companies. It was started as the world entered lockdown due to the COVID-19 pandemic in early 2020.

The online platform provides reporting templates, robust analytics, ESG data collection and workflow optimisation, from writing the first report through to conducting peer analysis. Nossa Data uses AI to understand exactly where a company is in terms of ESG data and shows insights to provide best in class ESG disclosure. Its software allows companies to manage and communicate their ESG performance to investors, regulators, rating agencies and for internal ESG decision-making.

It also provides investment-grade data management, analytics and reporting to companies. Nossa Data’s view is that there is not yet one standard to rule all in terms of ESG and sustainability reporting. Until that happens, companies are required to report to multiple standards and respond to varied and ad-hoc questions from investors or other stakeholders.

Nossa Data serves as a hub to bring together both qualitative and quantitative ESG data points. It also provides visualisations to compare to competitors and other industry benchmarks. The methodologies are mapped against the top rating agencies.

Lastly – the software can analyse a company’s entire shareholder registry against investor commitments to show what a company needs to be preparing for. Nossa Data was in the 2021 class of fintech and enterprise tech startups that will join the New York Barclays Accelerator, powered by Techstars.

LTC SPOTLIGHT ON: WHAT IS STILL MISSING? BY JOHANNES LENHARD co-founder of VentureESG

An extract from Johannes's article in TechCrunch [19]:

While lots of progress has been made on the level of individual funds, individual LPs and in baby steps toward a more general industry-wide push, there are still some core elements that are not in place. I believe the five key gaps concern a clear differentiation of ESG from impact, finding the right language, establishing a common framework, agreeing on metrics and real LP commitment.

1. Know what ESG is: Many investors (and LPs) I speak with still don't really know the difference between impact and ESG. In very simple terms, ESG principles are about the (internal) processes (of a fund, portfolio company, etc.) while impact investing is about outcomes (sometimes operationalised through the Sustainable Development Goals). While impact will likely remain a niche asset class for the foreseeable future, ESG principles should inform the practices of all investors in one way or the other.

2. Find the right language: On a related note, finding the right language to talk about what ESG (versus impact) is, might help us to differentiate better. As Sarah Drinkwater of Omidyar Network made very clear in her post from September last year, we simply don't have a good word to describe (and own) what ESG expresses in the world of venture capital and technology — principled, progressive, equitable? Possibly, setting a standard can help with this issue, too.

3. Somebody, set a standard: ESG (and impact) frameworks developed and deployed slowly in the venture industry are still all over the place; they are influenced by all kinds of other frameworks (from other asset classes and related activities, such as impact) and mostly made up by individual funds themselves. There is certainly a risk of green washing if it stays that way; (self-proclaimed and reported) marketing is one thing but if we really want to change the industry, an authoritative body will have to step forward. What the biggest European anchor investor – the European Investment Fund – has done on that front so far with a very high-level questionnaire is not enough. How about, for instance, the UNPRI descends from the plane of high level down to individual industry principles?

4. What isn't measured: One part of what could really lead to an industry standard is a set of widely accepted and benchmarkable metrics; what are the most important measurements across early-stage and late-stage VC portfolio companies? The group of funds in London has for good reason announced that this particularly question will be one of the focus points they are working on next. But how will this again be adopted and spread industry-wide? Another set of players might get involved in that again: LPs. If they make their GPs report on ESG on an annual basis, this will surely shift the industry as a whole and make the next generation of startups more equitable, responsible and stakeholder-focused.

5. LPs really need to bite: So far, we are still missing real LP commitments when it comes to ESG. On the one hand, many GPs I spoke with that have recently been fundraising reported that LPs in general still don't ask about ESG. In fact, some LPs particularly in the US believe ESG might be a distraction from generating returns. In any case, ESG still has not become a must-have but is merely regarded a nice-todo. The ESG questionnaires that do exist – like the EIF framework – are so far really high level and unspecific. When big anchor LPs like the EIF and BBB in Europe or big foundations and university endowments ask about it in their due diligence meetings, GPs will have to comply – all of them. Their influence as agenda setters might in the medium term be the biggest driving factor toward making ESG for VC the normal way of doing business. Given that there is state-money, all of our money, involved here, it seems an absolute nobrainer to take that step.

19 TechCrunch

04 Environmental

"There is no company whose business model won't be profoundly affected by the transition to a netzero economy"

As defined by the PRI: 'environmental' describes issues relating to the quality and functioning of the natural environment and natural systems.

Climate Risk is Investment Risk

In January 2020, Larry Fink wrote in his Letter to CEOs the famous line 'climate risk is investment risk'. He predicted a fundamental reallocation of capital as markets started to price climate risk. He also wrote that he believed the climate transition presents a historic investment opportunity[20].

According to the World Economic Forum climate change is the number one global risk by level of impact and number two by likelihood (after weather)[21].

According to Amer Khan of WH Ireland:

> *"As the urgency of the climate crisis intensifies, investors will increasingly have to seek alpha at the intersection of changing policy, new technology and long-term sustainability. At the same time, the global shift towards lower carbon economies presents investors with an unparalleled opportunity to generate alpha, while actively contributing towards the long-term sustainability of the planet".*

Sixty-one per cent of CEOs reported pressure from customers and stakeholders to act on climate change[22]. Not only must investors adapt to the physical and transitional risks presented by the climate crisis, they must also stay attuned to shifting regulations and consumer preferences.

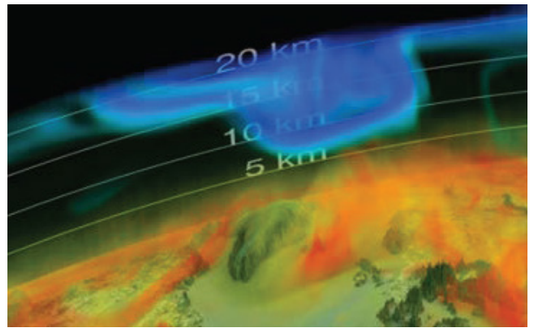
There is no company whose business model won't be profoundly affected by the transition to a net-zero economy. The energy transition will be central to every company's growth prospects; business models will need to be compatible with a net zero economy – that is, one where global warming is limited to well below 2oC, consistent with a global aspiration of netzero greenhouse gas emissions by 2050.

Companies that offer solutions that help enable or accelerate the path to net zero are set to thrive over the next decade. Already, businesses that are aligned to solving the climate crisis have outperformed the market and have benefited from the urgent demand for their products and services.

The huge global shift to a sustainable future will come undoubtedly come from greentech and sustainable finance. This will need to be seismic transformations harnessing new technologies in carbon data and services, mobility and aviation, clean power, sustainable food, energy, clean hydrogen, sustainable materials and buildings, and carbon sequestration.

Mark Carney's Glasgow Financial Alliance for Net Zero (GFANZ), which will soon welcome Michael Bloomberg as co-chair, was a prominent voice at COP26. The organisation announced that its membership of 450 financial firms have pledged $130 trillion in private capital to finance projects that deliver the transition to net zero. This substantial 'wall of money' means that investors will be actively looking for projects and businesses to invest in that show a clear path to helping deliver net zero.

20 BlackRock
21 WEF - Global Risks Report 2020
22 Deloitte CFO Survey, 2020



Climate Risk Analytics

With leaders of governments and companies making commitments to achieve net-zero alongside potential future regulatory requirements for climate-related disclosures, there is a scramble for solutions to help assess climate risk. It's no surprise, then, that when VentureESG conducted an audit, they found more than 140 companies and businesses purely focused on carbon footprints.

Assessing environmental risks requires that investors have access to consistent, high-quality and material public information. All companies have been asked to report in alignment with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) and the Sustainability Accounting Standards Board (SASB), which covers a broader set of material sustainability factors. The past year saw a 363% increase in SASB disclosures and more than 1,700 organisations expressing support for the TCFD. TCFD reports are the global standard for helping investors understand the most material climate-related risks that companies face, and how companies are managing them. There is a push for a single global standard for disclosure and reporting.

For investors, protecting value starts with an understanding of carbon exposure. Thereafter, assessing the preparedness of companies to manage risks, in absolute terms or relative to industry peers. The practice of quantifying climate risk on individual investments and portfolios is still in its infancy, but is something at which we will all need to become more adept at.

In June 2021, BlackRock announced it was acquiring Baringa Partners, with the aim of integrating Baringa's industry-leading Climate Change Scenario Model into its Aladdin Climate technology.

BlackRock wants to set the standard for modelling impacts of climate change and the transition to a low carbon economy on financial assets for investors, banks and other clients. It clearly understands the future is the ability to develop climate-risk models and developing net-zero strategies.

The Climate Change Scenario Model will enhance BlackRock's Aladdin climate platform, which provides end-to-end portfolio management, risk management and operations.

Baringa's solutions support net-zero commitments, TCFD reporting, regulatory reporting, investment and capital allocation strategies, as well as developing climate-risk management capabilities. Its Scenario Model was already informing clients with assets totalling more than $15 trillion. It measures both the impacts of physical risks, like extreme weather events, and transition risks – such as policy changes, new technology and energy supply – at the financial instrument and portfolio levels.

Carbon Delta

Another major climate change risk analytics firm is Carbon Delta. Since being founded in 2015, the company has been quantifying investment risk for more than 25,000 companies. Carbon Delta's Climate Value at-Risk (Climate VaR™) model provides climatechange scenarios with the tools to protect assets from the worst effects resulting from climate change.

In 2019, MSCI, the 50-year-old leading provider of critical decision support tools and services for the global investment community, acquired Carbon Delta. Again, a driving factor was to enable companies to respond to voluntary reporting initiatives such as the TCFD and the PRI ahead of potential mandatory disclosure requirements expected to quickly develop across Europe and North America.

The Carbon Delta integration expanded MSCI's robust suite of climate-risk capabilities with state-of-the-art modelling technology that supports climate scenario analysis and forward-looking assessment of transition and physical risks, as well as extensive company-level analysis of publicly traded companies globally.

Entelligent

Another climate risk analytics platform that measures and manages investment exposure to climate risk is Entelligent. The platform uncovers patterns and signals between climate science and the capital markets through quantitative analysis and machine learning. While many scores and curated guides are constructed with incomplete and inaccurate data – often historic, out of date or potentially made up – technology can now fill the gaps. Entelligent data also helps improve TCFD and other regulatory climaterelated disclosures coupled with better alignment between financial products and globally recognised sustainability targets for climate change.

Integrum ESG

Carbonomics

Integrum ESG is a London-based ESG data SaaS provider founded in 2018 to support investment analysts. Its differentiation is that its data is up to date, with a scoring methodology that is transparent and consistent across every company or country. Intergum ESG wanted to move away from a research model that sends investors frozen PDF reports, with rigid scores that are as much subjective as scientific – so they serve investors with data they can interact with, scored in ways they can customise. This allows them to analyse ESG risk, impact and real-time ESG sentiment through an easy-to-use ESG dashboard that has received praise for its strong UI design.

Goldman Sachs Research provides modelling for two paths to net zero carbon, with two global models of de-carbonisation by sector and technology. The company has a proprietary Carbonomics cost curve. One scenario is consistent with the Paris Climate Agreement's goal to keep global warming well below 2°C, and a more aspirational path, aiming for global net zero by 2050, consistent with limiting global warming to 1.5°C. In its Carbonomics study, Goldman Sachs argues that net zero carbon is becoming more affordable as technological and financial innovation, supported by policy, is flattening the de-carbonisation cost curve[23].

23 Goldman Sachs Global Investment Research

According to Goldman Sachs, four technologies are emerging as transformational:

1) **Renewable power:** The technology that dominates the 'low-cost de-carbonisation' spectrum today and has the potential to support a number of sectors that require electrification, as well as being critical for the production of clean hydrogen longer term ('green' hydrogen).

2) **Clean hydrogen:** A transformational technology for long-term energy storage enabling increasing uptake of renewables in power generation, as well as aiding the de-carbonization of some of the harder-to-abate sectors (iron and steel, long-haul transport, heating and petrochemicals).

3) **Battery energy storage:** Extends energy storage capabilities and is critical to the de-carbonisation of short-haul transport through electrification.

4) **Carbon capture technologies:** Vital for the production of clean ('blue') hydrogen in the near term, while also aiding the de-carbonisation of industrial sub-segments with emissions that are currently nonabatable under alternative technologies.

Goldman Sachs has a proprietary database providing access to detailed financial statement histories, forecasts and ratios. It can be used for in-depth analysis of a single company, or to make comparisons between companies in different sectors and markets.

Quantum computing is likely to run a significant performance improvement in pricing risk by the end of the decade. In September 2021, Goldman Sachs, IonQ and QC Ware announced they had demonstrated how financial risk can be run better and faster on a quantum computer.

Carbon Emissions Management Systems

The market for carbon emission management solutions is expected to grow rapidly from $10 billion to $26 billion in the next five years[24].

Plan A

Founded in 2017, Plan A provides the first software to enable businesses to monitor and reduce their emissions, while improving their ESG performance. The software empowers businesses to manage their carbon accounting, while mitigating their negative impact on the planet, making them the leaders of decarbonisation and the sustainable transition.

24 Plan A Academy

They have seen demand for their solutions dramatically rise as companies look for help to meet scientific targets, worried about looming governmental regulations and ESG reporting fast becoming mandatory. Since inception, Plan A has been looking to transform the environmental accounting burden into an opportunity for businesses, because “the business case for sustainability was not clearly established”.

Plan A is about action around decarbonisation. The company combines the platform’s data-processing power alongside a team of scientific experts to guide companies towards their sustainability and ESG goals. Plan A is focused on helping businesses understand, report and manage carbon emissions. The platform can provide automated decarbonisation plans and uses a certified carbon accounting methodology with scope 1,2 and 3 coverage. Their objective is to reach one gigatonne of carbon under management, effectively moving the global needle on emissions. In March 2021, Plan A received funding of $3 million from investors that included Softbank.

“We do not subscribe to an economy of all against all. Rather, climate change requires an ecosystem of solutions that complement each other and together connect the dots of a complete sustainable transition for our global economy,” said Lubomila Jordanova, CEO and co-founder of Plan A.

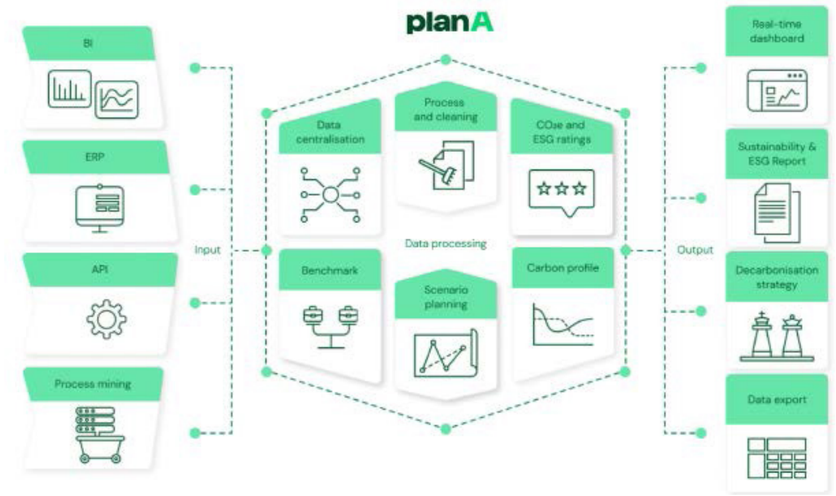
Labelling and Marks, Natural Capital and Recycling Plastics

Most growth has been due to data providers looking to provide their unique methodology and ESG data to seamless interfaces and dashboards so that analysts can quickly get reliable ESG data. It is often shortcuts and curated lists for fast analysis. With that comes shorthand marks for fast understanding of companies that do good.

In October 2019, for example, LSE introduced the green economy mark, which recognises listed companies with 50% or more of revenues from environmental solutions. The mark utilises the Green Revenue taxonomy developed by FTSE Russel and is categorised by 10 sectors, 64 subsectors and 133 micro-sectors[25].

An analogy could be consumer diets/nutrition. Governments and companies (partly also pushed by consumers) began to label food and beverages with ingredients, calories and nutritional contents. Consumers were able to quickly assess what they

25 London Stock Exchange



were eating/drinking, which empowered them to make more informed choices..

The future could well be the same for consumers to have a better understanding of a product’s carbon footprint impact. Carbon labelling would shift the emphasis back onto the producer to be transparent, giving consumers the chance to make an informed choice. This would put pressure on the producers to minimise their footprint in order to remain a top choice for their target customers. Unilever was one of the earliest adopters of carbon labelling on certain products in the US and Europe[26].

Unilever hopes that introducing carbon footprint labelling on products will help to transform customer consumption habits and encourage more sustainable shopping. Similarly, Foundation Earth is a trafficlight style innovative that will be rolled out across food production and retailing in the UK and EU, with the pilot launch in Autumn 2021. The organisation is supported by many major food and beverage companies such as Sainsbury’s, Nestlé and Marks & Spencer, as well as the UK government. The organisation’s mission is to promote more sustainable buying choices by consumers and more climatefriendly food from producers by enforcing a front-ofpack environmental score. The pilot scheme will help to assess how consumers react to the climate-friendly labels.

26 Unilever

Natural Capital

Natural capital is the goods and services provided and replenished by the natural environment. Global consumption currently far outstrips its ability to regenerate. In its simplest form, as part of ESG it enables an understanding of both impacts and dependencies on natural capital assets. The future is investors being able to understand accurate accounting and measurements of natural capital – for example, carbon stock and change with globally consistent direct measurements, providing transparency on the true performance of land assets, from rainforests to managed landscapes.

Boston-based Chloris Geospatial, launched in February 2021, received early-stage funding in November 2021. It builds on almost two decades of innovative remotesensing research and detailed ground calibration by the founding team. Chloris Geospatial provides innovative measurements of natural capital that use cutting-edge remote sensing, machine learning and ecological science. Chloris is already capable of providing accurate, reliable measurement of carbon stock and change globally. Co-founder Dr Alessandro Baccini is a pioneer in the space-based measurement of carbon and biomass for over two decades.

"We established Chloris Geospatial to quickly bring to market data products and platforms that we know are desperately needed at this critical time in the fight against the climate emergency. Our technology can monitor the impact of land management choices on terrestrial carbon storage at speed and scale," said Marco Albani, CEO of Chloris Geospatial.

In an effort to reduce carbon impacts, businesses are also looking at nature-based solutions. Smart platforms are also looking to increase natural capital back into the system. Forestry is one example of a growing asset class. Kenya-based tech platform Komaza has a vision of planting one billion trees across Africa by 2030. Komaza is the largest forestry company in Kenya without owning a single tree

plantation. According to the PRI, the total amount of global institutional investment in forestry has increased to $100 billion from $10-15 billion in the early 2000s[27].

Komaza is tackling deforestation through micro-forestry. The company helps tens of thousands of smallholder farmers grow trees on their previously unproductive land to sell as timber in commercial markets, generating long-term income along with environmental benefits. Komaza turns underutilised land into thriving microforests, connecting the dots from seeding to sawmill into one, integrated business. Its tech provides real-time management of tree assets and enables the microforestry model to scale fast.

Recycling plastics

More than 170 countries have made a commitment to considerably decrease the usage of the conventional plastics by 2030. Europe is introducing strict guidelines to decrease the impact of plastic goods on the environment. The uniquely named LLC <PLAnt_SPACE> is the first producer of biodegradable polymer in Eastern Europe. On completion of the first development stage the plant will be able to produce 30,000 tonnes of the pure polylactic acid (PLA) a stateof-the-art bio-based and biodegradable polymer. Bio-based polymers are replacing or blending with petro-based polymers. With a severe global shortage of biopolymer, LLC <PLAnt_SPACE>'s output is in great demand.

Others, such as investment giant LetterOne, are also investing in the chemical recycling of plastic waste. LetterOne announced in October 2021 it was investing in the world's leading chemical recycling pioneer Plastic Energy. Headquartered in the UK, Plastic Energy's vision is to create a circular economy in plastic by diverting waste away from landfill and the oceans.

The company has become the industry leader in recycling end-of-life plastic waste. Its patented technology has huge potential for transforming endof-life plastic waste (that would have otherwise been destined for landfill or incineration). The equity investment from LetterOne will enable Plastic Energy to expand beyond its existing two recycling plants in Spain. A third is already under construction in the Netherlands, while two more are being developed in France. Plastic Energy is also working with Nestlé to explore the potential for a plant in the UK.

Lastly – UK company Polymateria provides a biodegradable solution for conventional plastic packaging. The Imperial College London-born and based company collaborates with chemical, biological and polymer scientists to develop their proprietary Biotransformation technology. Polymateria have developed a technology that safely biodegrades both fugitive and non-fugitive waste without leaving microplastics. Fugitive waste has been a large problem segment as it is not collected for landfill, incineration or recycling and ultimately ends up un in the open environment. It comprises of a range of 'single-use' packaging such as confectionary wrappers, food containers, drinking cups, straws, cutlery, tobacco wraps and more. This type of packaging sits idle within the environment for hundreds of years eventually fragmenting into microplastics. The company has successfully proven biodegradation of various plastic packaging applications under real world conditions in a period of less than two years. The company are accelerating their partnerships as a credible and scalable solution to the increasingly visible environmental issue.

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GREENWASHING: VIEW FROM PRIVATE WEALTH MANAGEMENT
By Lara Leigh-Wood, Managing Director and Founder of Beacon Gainer and Miolo Advisory Services

Greenwashing is an unethical marketing technique whereby a company attempts to make itself appear actively focused on environmental and sustainability improvements, when in reality it is not. Using misleading language and unsubstantiated claims, businesses use greenwashing to lure in impactconscious customers who otherwise might avoid them. The people who use greenwashing in their marketing are careful not to make explicitly false claims, meaning that it is not technically illegal false advertising or communications, but rather just immoral and deceptive.

At Beacon Gainer, the last thing we want to do is have our clients make financial decisions after being greenwashed. Our proprietary ESG framework is cognisant of that. We have developed a practical assessment method that enables planning tuned to the unique ESG issues that our independent advisory services face. We look at every company on a case-bycase basis and offer bespoke advice that is mindful of their particular goals and challenges.

As more and more clients look for an emphasis on sustainability in the companies they wish to invest in, it is vital to know how to spot greenwashing. We have to take the time to look for warning signs that the ecofriendly business you love may not be so friendly after all – but what are those signs?

Our Miolo platform simplifies the process of selecting advisors who meet our ESG principles, for example purpose towards net zero. Firstly, we only measure factors that are not influenced by law. We believe that ESG standards should be based on criteria that are voluntary – not things are industry standards or legal requirements. For example, many reporting methods list good GDPR as an ESG factor, when in fact keeping on top of GDPR is a legal requirement and should not be considered an ethical standard. We instead try to measure the extent to which a company is willing to go above and beyond what is required of them.

Secondly, unlike many systems, we don't only measure large-scale tangible activities; we also factor in intent. We believe that it is important to recognise the role that intent plays in ethics and social impact. It is common for businesses to do ethical things for unethical reasons – for example tokenism and virtue signalling. Similarly, many smaller businesses value ESG but cannot afford to have a dedicated budget for it. That's why we emphasise ESG activities that require little to no budget or time to implement.

To compile a report, we gather information from a combination of publicly available material found online, and a survey that is filled in by the firm itself. From there, we calculate a final ESG rating which are placed into three categories: Bronze businesses have made a basic commitment to improve their ESG, but don't have the time or money to implement large scale changes. Businesses must demonstrate a genuine intent to improve their CSR. Silver businesses have made a serious effort to improve their ESG, through policies and implemented changes that have had some level of social impact on employees, consumers and/or the local community. Gold is the highest standard of ESG that Beacon Gainer recognises and is awarded to businesses that put ethics at the heart of everything they do, with a mission and ethos revolving around social impact. Businesses that make important decisions with ESG in mind and track their social impact through specific metrics and KPIs.

Climate, VCs and ESG

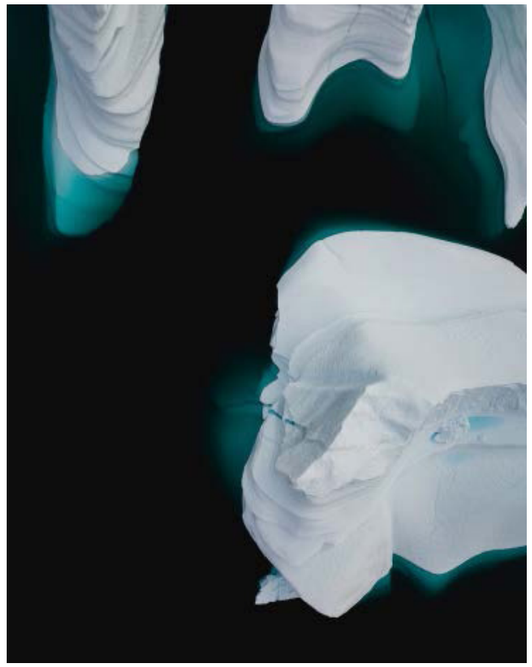
According to VentureESG, climate is not given enough attention. For example, many VC investors in its survey (in partnership with the PRI) reported tracking their own scope 1 (emissions a company makes directly) and scope 2 (indirect) emissions, but very few VC investors in the mainstream market measure scope 3 (not associated with the company itself, but the organisation is indirectly responsible for up and down its value chain) emissions – for example, portfolio company emissions[28]. This needs to change, particularly for later-stage VC investors as their portfolio companies scale.

VCs were ominously not present at COP26:

"We were surprised to find that other than Bill Gates's Breakthrough Energy Initiative, there were no VC funds on the list of events as keynote speakers. There were no events focused on VC. That was in stark contrast to the strong presence from banks, insurers and major PE firms[29] ". Micol Chiesa and Christian Jølck writing for Sifted.

In Summary

All of the above with regards to the 'E' in ESG – that is, measuring, gathering and analysing data alongside example actions for impact – can then be shared through ESG reporting to truly demonstrate compliance with recognised standards, but also a genuine understanding and planning around a comprehensive environmental approach.



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LTC SPOTLIGHT ON: GLOBAL GREENTECH: ENABLING TECHNOLOGIES
By UBS GWM's Chief Investment Office

Global climate goals can only be reached with green technologies as an important enabler, in our view. While most of the technologies needed to achieve the required deep cuts in global emissions by 2030 already exist (e.g., renewable energy, significant energy efficiency improvements), the net-zero emissions path in the following decades will rely on the widespread use of new technologies that are not commercially available or in use yet.

This sets the scene for investment opportunities both in the short-to-medium term, including in listed (Fig. 7) and private equity, and in the longer term. A major acceleration in clean-energy innovation must occur over this decade to bring these new technologies to market in time (Fig. 4). The development and deployment of these new technologies has the potential to create major new industries with commercial opportunities. We focus on the most promising new technologies in the areas of electrification; batteries; bioenergy; hydrogen; and carbon capture, utilization, and storage.

Figure 7

Investment opportunities

Source: UBS, as of October 2021

Clean energy

Clean electricity will play a key role across all sectors—from transport and buildings to industry—and is essential to producing low-emission fuels such as green hydrogen. To achieve this, total electricity generation is expected to increase over 2.5 times between today and 2050.[1] Decarbonizing the production of electricity is therefore the largest opportunity for reducing CO_2 emissions. In its net-zero pathway, the IEA expects that 90% of electricity generation should come from renewable sources by 2050, up from 25% in 2018, with wind and solar PV together accounting for nearly 70%. Falling costs for renewable technology have been one of the key growth drivers for installations in the past years. While wind and solar energy have already become cost competitive with fuel-based or nuclear power electricity generation in many countries, expected further cost declines should soon make them the cheapest way to produce electricity. Significant investment in electricity storage to compensate for the intermittency of wind and solar will be required to maintain electricity reliability, though as discussed below, significant progress is being made with batteries and other storage technologies.

1 IEA (2021) Net Zero by 2050 – A roadmap for the global energy sector. All rights reserved.

Energy efficiency, digitalization

Reducing carbon emissions at a time when global energy demand is rising means that increased energy efficiency will be essential. Many efficiency measures in industry, buildings, appliances, and transport can be put into effect and scaled up very quickly. These will be crucial to curbing emissions until other new technologies have a more meaningful impact. Examples of key energy efficiency measures are more efficient pumps, boilers, air conditioners, motors, and other appliances. The IEA expects that 2–2.5% of existing residential buildings will have to be retrofitted each year through 2050.[1] Further, digitalization will also play an important role in the energy transition as the renewable energy landscape will be much more fragmented and decentralized, with production closer to the point of energy consumption. In the future, renewable power generation will likely still be dominated by the traditional energy providers, as well as by many companies and households that produce, consume, and sell renewable energy to the grid. This means larger amounts of data and an increasingly complex system that will have to match changing levels of supply and demand. New digital technologies like artificial intelligence, big data, and distributed ledgers will likely be critical in supporting that transition. In manufacturing, new technologies like the Industrial Internet of Things (IIoT) and digital twins (i.e., the virtual representation of a product, production process, or performance) will be key to increasing connectivity and automation, and to finding more efficient energy solutions.

Electrification, batteries

Electric vehicles (cars, SUVs, and pickup trucks) have become increasingly popular, especially as battery costs have fallen and are likely to continue to fall sharply. Quickly declining battery costs, coupled with faster charging times and a rapid rollout of electric vehicle charging infrastructure, weaken the case for alternative fuels (biofuels) and technologies (e.g., hydrogen-powered fuel cells). Once these investments are made, batteries are expected to benefit from a first-mover advantage and a superior cost position. Significant progress has been made in battery technology over the past decade. Current lithium-based batteries will remain dominant in the near term, but evolving changes in the field of chemistry will likely result in higher energy density batteries, with new battery technologies like sodium-ion also just around the corner. That said, the future may belong to solid-state batteries (see also our "Smart mobility" Longer Term Investments report) that boast even greater energy density, higher safety, and better end-of-life recycling characteristics, which make them appealing for transportation purposes.

Meanwhile, in many instances, the economics involved in using batteries for stationary purposes are not compelling enough currently. However, we believe this will change. The more decentralized and less reliant power generation becomes, thanks to renewables, the more batteries will be needed. Technologies enabling the storing of the electricity generated by households' photovoltaic (PV) systems or, on a much larger scale, by PV farms will gain ground, in our view. They will be a complementary enabling technology for large-scale applications alongside pumped storage hydro (where applicable) and hydrogen technology.

Bioenergy

Bioenergy is a form of renewable energy including solid biomass (e.g., crop waste, wood waste, food waste, microalgae), biogas, and liquid biofuels. It can be used to produce transportation fuels, heat, and electricity. Bioenergy technologies enable the reuse of carbon from biomass and waste streams. If biomass is coupled with carbon capture, utilization, and storage (CCUS) in the power sector and some industrial sectors, it can even achieve negative emissions, removing CO_2 from the atmosphere.

Hydrogen

Hydrogen has a key role to play in the global energy transition. It balances short-term variations in renewable electricity supply and demand and acts as an option for long-term storage to help offset renewable variability across seasons. It's also the preferred solution for achieving net-zero in energy-intensive, hard-to-decarbonize sectors like steel, chemicals, long-haul transport, and shipping. As an energy carrier, hydrogen is very similar to electricity in that it can be produced by various energy sources and technologies. Efforts are ongoing to evaluate the transportation of hydrogen in existing fossil fuel infrastructure such as natural gas networks. Hydrogen can be produced from fossil fuels, biomass, and water (through water electrolysis). Today, the production is 95% based on fossil fuels, mainly brown hydrogen from coal or lignite or grey hydrogen from natural gas. Naturally, this does not further the net-zero aim, which is why the future is green (renewables energy) or blue hydrogen (fossil fuel combined with CCUS). Today almost all hydrogen is used at the location of production, but this is set to change. The Hydrogen Council estimates that by 2030 about 30% of the production capacity will be transported by ships or pipelines from countries with ample renewable energy resources such as Australia, Saudi Arabia, and Chile.[1]

Carbon capture, utilization, and storage (CCUS)

Carbon capture, utilization, and storage (CCUS) is a set of technologies that involve the capture of CO_2 either at the point of emission (the "tailpipe") from power generation or industrial facilities that use fossil fuels or biomass for fuel, or directly from the air ("direct air capture"). If not being used on-site, the captured CO_2 is compressed and transported by pipeline, ship, rail, or truck to be used in a range of applications, or it's injected into deep geological formations such as depleted oil and gas reservoirs, coalbeds, or deep saline aquifers where it's trapped for permanent storage. Given the need to significantly reduce greenhouse gases in the atmosphere over the next several decades to achieve net-zero, CCUS technologies will have a significant role to play, at least in some major markets. The US and China could be attractive markets for CCUS technology if the cost to build and operate facilities can be reduced. Even the new hydrogen economy stands to benefit, and the so-called blue hydrogen (based on fossil fuels combined with CCUS) could be an attractive way to pursue decarbonization in select regions. Many large companies are actively working to reduce the cost of CCUS technologies, and if they're successful, there could be a significant growth opportunity for these technologies globally. With several new CCUS projects underway across the world, we believe breakthroughs are likely over the next several years.

Other

Intermediaries such as the financial sector have a key role to play in the transition to a more sustainable economy. The sector will be critical in facilitating the financing needed to get to net-zero by 2050 through channeling funds away from fossil fuels and into the energy transition. Nascent technologies will be especially dependent on the supply of enough risk capital if they are to stand a realistic chance of getting through the initial "valley-of-death" stage and becoming market competitive. Innovative lending, investing (private and public markets), corporate finance, and insurance solutions are expected to support companies in adopting and developing low-carbon solutions. Recent UN-convened initiatives such as the Net Zero Banking Alliance and the Asset Managers' Alliance highlight these intentions and could become a catalyst in the next development phase of climate finance.

1 Hydrogen Council, "Hydrogen Insights – An updated perspective on hydrogen investment, market development and momentum in China," July 2021

LTC FOCUS: INTEGRATING CLIMATE RISK & OPPORTUNITY INTO INVESTMENT DECISIONS

By Amer Khan, Head of Climate-Aligned Capital, WH Ireland

A wave of innovation, across every sector, is needed to tackle the global climate change challenge. WH Ireland's Climate-Aligned Capital division was set up to advise growth companies that are developing new technologies which, if adequately funded and scaled, have the potential to restore balance and put the world back on a more sustainable path.

Back in 2019, the UN-backed Principles for Responsible Investment published a concerning analysis for investors in equity capital markets. They had commissioned an analysis of the impact the global transition to a decarbonised economy could have on company valuations. Its conclusion was that markets were significantly under-pricing climate transition risk: "The 100 worst performing companies in the MSCI ACWI lose 43% of their current value… the 100 best performers would gain 33% of current value."

The potential impact of new policies and technology designed to bend the emissions curve back towards a net-zero path was clearly a significant one for capital markets investors.

Unsurprisingly, coal, oil and gas companies that failed to redefine strategies towards cleaner solutions were predicted to lose heavily. On the other hand, petrol heads might be interested to learn that the report predicted car manufacturers with the highest investments in EVs could expect to see their value increase by as much 108%. Tesla's market capitalisation has indeed increased, not just by 108% but by an astounding 1,583% since that report was published.

Want something even faster that can run on electricity generated by wind? Check out Rimac, a Croatian car manufacturer whose Nevera electric hyper car recently set the record as the world's fastest accelerating production car. Want a smart electric charger to match? Try an Andersen home charger.

Clean running, fun, fast cars aside, recent advances in technology have also enabled substantial progress to be made in a wide range of climate sensitive areas, from identifying greenhouse gas emissions to more accurate and relevant integration of climate risk in investment products.

At COP26 this year, more than 100 nations entered the Global Methane Pledge, agreeing to collectively reduce global methane emissions by at least 30% from 2020 levels by 2030. Methane is one of the most powerful greenhouse gases, accounting for around 30% of global warming since pre-industrial times.

One of the biggest historic challenges in reducing methane emissions has been accurately identifying where the leaks are occurring. Next year will see the launch of MethaneSAT, one of the most technologically advanced solutions for detecting and quantifying methane almost anywhere on earth at concentrations as small as three parts in a billion. The satellite will likely provide a valuable new source of snapshot monitoring, down to a facility level, as it orbits the earth every few days. Closer to home, innovative new companies like Mirico have developed class-leading technologies that offer continuous monitoring of methane down to an accuracy of tens of metres. On the ground solutions like this will facilitate the rapid identification and intervention of event-related emissions, an essential component if the Global Methane Pledge targets are to be achieved.

In an ever more crowded climate data landscape, harnessing geospatial technology to both accelerate and validate physical climate risk data and emissions insights is vital. This presents a huge opportunity to businesses and the finance sector.

Fusing data sources across different time scales and layering historical and near real-time data atop the most up-to-date climate models enables more sustainable, granular, climate-aware capital allocation.

One company, Sust Global, is using that technology to deliver credible climate data for a sustainable future. They are building a geospatial product to solve today's climate data issues. Sust Global has product capabilities that deliver high-resolution climate risk data and near real-time emissions insights across global assets.

The E of ESG has to date largely focused on tracking how businesses impact the environment, without necessarily considering how climate change will impact businesses. At climate-intelligence company Cervest, scientists and technologists have developed machine learning models that harmonise climate data and translate it into meaningful and actionable insights for decision makers on the ground.

Through its advanced AI-powered platform Cervest helps users build a detailed understanding of how climate hazards might impact business at the individual asset-level across different future climate scenarios. The system gives users on-demand access to current, historical and predictive views of how combined risks such as flooding, droughts, and extreme temperatures can impact assets they own or manage.

Another key challenge we face in the fight to protect the earth against the damaging effects of climate change is addressing the issue of completeness and timeliness of data. Two areas which have been the subject of much debate recently are how to capture data which covers the full chain of greenhouse gas emissions (i.e. Scope 1, 2 and 3) and how to validate company sentiment and commentary against actual action taken.

Companies like Urgentem are developing AI and Natural Language Understanding (NLU) based solutions that seek to improve both the quality and quantity of currently available data in both respects for financial institutions.

Technology is at the heart of the digital revolution that is rapidly spreading all over the globe. Tens of millions of sensors are already installed around the world with new ones added daily. From monitoring systems at national power plants to residential smart thermostats and meters, and even the apps on our personal phones, the energy we use and emissions we generate are being measured and recorded like never before.

But without open systems and interoperability all that data is not being utilised in the most effective manner – in what is now a period of urgency. We have until 2030 to turn the tide on climate change.

Organisations like Icebreaker One have been specifically set up to help make data work harder. If we are to achieve the ambition of restricting global warming to below 1.5˚C, it is imperative and urgent that technology be used not only to identify and collect increasing volumes of data but also help that data be effectively shared across geographies, sectors and markets.

05 Social

"In looking at examples of 'S' practices among businesses, it was also evident that these practices are a barometer for corporate culture"

A reminder of the definition of social according to the PRI: Issues relating to the rights, wellbeing and interests of people and communities.

Example risks to and operating practices around the following can be considered under social in ESG, according to the PRI: "Company reputation, health and safety policies, employee pay/ benefits, geopolitical risks, talent development, employee turnover and workforce diversity."

According to a recent LGT Vestra report: "An understanding of supply chain management, culture within a business, crisis management and, something so relevant in the current climate, diversity of workforce, are examples of information sets that more and more investors are now keen to capture and integrate." [30]

In recent times, the E of ESG has been very much in the spotlight – heightened further by the global front page headlines of the climate crisis and COP26. But increasing attention is also being paid to the 'S'.

A key element of COP26 was the discussion around a 'just transition', i.e. one that gets us to net zero while supporting developing nations, building a fairer society and ensuring business plays a socially positive role through its operations.

In its post-COP26 report, strategic communications company SEC Newgate, said: "The divide between the global north and global south (with the G20 responsible for around 80% of emissions yet least impacted by climate change) was a clear source of anger for developing nations, activists and politicians at the conference. The role business plays in ensuring equitable development and a fair transition to net zero will be a key judgement made against boards." According to the PRI and VentureESG, social issues are often boiled down to diversity, equity, and inclusion (DEI). Seventy-four per cent of VC investors are tracking DEI across their portfolio companies, but only 25% scrutinise the supply chain [31]. For example, when it comes to working conditions, more focus on other social issues is needed, particularly human rights, according to a recent report by Amnesty International that slammed the VC industry for doing very little on that front.

Last year, the Harvard Law School Forum of Corporate Governance noted that:

> "The scope of 'S' in ESG has progressively widened over the past two decades, which of the 21st century where businesses and markets are increasingly interconnected and interdependent."
>
> reflects the evolving business environment

"In looking at examples of 'S' practices among businesses, it was also evident that these practices are a barometer for corporate culture. Where companies have a strong and shared culture across the organisation, 'S' practices tend to be strong. Where a culture is poor, or considered 'toxic,' 'S' tends to follow the same pattern."

30 LGT Vestra
31 Principles for Responsible Investment

Once again, no one size currently fits all.

> *The S in ESG is a complex set of standards, expectations, risks and fragmented challenges to consider.*

Let's consider a few themes within social:

Female Funding

In 2019, private equity, venture capital and private debt made $4.8 billion in investments focused on benefiting women, up from $1.1 billion in 2017[32]. Venture capitalists are often keen to show their support for female founders, yet they've received just 1.3% of VC funding in Europe since 2017[33].

At COP26, the British entrepreneur and expert on international development Sophia Swire announced GEDI, a new VC firm which stands for Gender Equity Diversity and Investments. In her speech she outlined why GEDI exists: "This is the eleventh straight year where female-founded companies have exited faster than the broader market. But only a shocking 2.3% of venture capital funding goes to female founders, globally. Perhaps, then, it's not so surprising there are more funds run by men called Dave, than by women."

Her thesis is that female-led businesses are more sustainable. They are more stable. They return more on capital, and they exit faster. Women continue to be over-mentored and under-funded. That no amount of advice replaces resources. The VC's investment verticals are the UN SDGs Climate Action, Good Health and Well Being and Quality Education.

Technology can increase and automate mandatory reporting and transparency around female funding. League tables already exist that show the top VCs and the percentage of their capital allocations to female founders – for GPs, LPs and the industry to track and report.

Equal Pay

Interestingly, 18 November 2021 was the day women effectively stopped earning relative to men over the year. While the Equal Pay Act came into force over 50 years ago, women still earn less than men in Britain today, with the current gender gap at 11.9%. From 18 November, millions are effectively working for free till the end of the year, hence it's known as #EqualPay-Day.

Paris-based blisce/ fund is a signatory of the Sista chart which aims at reducing inequalities of funding between male and female entrepreneurs. Partnering with the likes of KPMG and BCG, Sista produces and aggregates data and barometers on the place of women in tech and on the financing of women entrepreneurs.

Diverse Talent

Technology is available to companies looking to affect areas of the employee lifecycle within their diversity, equity and inclusion (DEI). DEI is a key part of ESG factors for a company. According to Thomson Reuters there are more than 100 solutions in the market currently, and the DEI technology market is estimated to be worth more than $100 million[34].

Within diversity, talent acquisition makes up 43% of all DEI-related tech solutions, focused on candidate selection and candidate sourcing. Career advancement and development constitutes about 20% of all solutions. The technology can be used to reduce instances of bias (such as affinity, conformity and confirmation biases) and make more equitable decisions, for example in the hiring process for candidate sourcing and selection.

One successful platform is Inclusively, which provides inclusive job matching and hiring technology. It

32 The Wharton School
33 Sifted
34 Red Thread Research

is a technology-centred inclusion solution and employment platform for job seekers with disabilities, mental health conditions and chronic illnesses.

Serial entrepreneur Charlotte Dales founded Inclusively after successfully selling her previous FinTech company CAKE to American Express. Marquee clients for Inclusively include Microsoft and Salesforce. Inclusively is an example where a VC could back the company as well as utilise its technology to execute its own ESG principles.

Positive Retention, Acquisition and Brand Opportunites

Tumelo was established at Cambridge University, where founders Georgia, Will and Ben campaigned for the sustainable investment of their university's £6 billion fund. They recognised a global problem: Millions of ordinary people contribute to our investment system through ISAs, workplace pensions and other investments. Yet most have no visibility over where their money is going and no voice in the many companies they own through their investments. The result? A society that is disengaged and an investment system that is failing to address critical social, environmental and governance challenges.

The Tumelo software shows investors the companies they own and empowers them to engage in issues they care about. Tumelo therefore is an impactfocused financial technology firm with a mission to enable retail investors and pension members to create and benefit from a more sustainable investment system. By partnering with investment and pension providers, they enable them to provide their customers with transparency over the companies they own and a shareholder voice on issues they care about, such as gender equality and climate change.

The Tumelo solution is white-label software delivered via APIs and/or a user dashboard which integrates with existing investment platforms, improving customer engagement, acquisition and retention for providers.

VC funds putting diversity at the heart of their offerings

Simsan Ventures is a venture capital firm that invests in innovative early stage FinTech and DeepTech startups in Europe and India. Its mission is to unearth, invest in and partner with the best underrepresented founders and support them in creating industry disrupting businesses.

Another factor driving this trend is the business case. Companies in the top quartile for gender diversity were 25% more likely to have above-average profitability than companies in the fourth quartile, according to McKinsey. The boost is even more apparent for firms demonstrating the same top-tier levels of ethnic diversity – they are 36% more likely to have above average profitability than organisations doing the least to variegate their workforces.

This distinction in earnings is growing more pronounced over time as stronger firms pull ahead in the marketplace, increasingly solidifying the connection between DEI and a robust business. Investors who ignore this trend risk making less money while also missing an opportunity to get more capital to women, indigenous groups and communities of colour.

LTC SPOTLIGHT ON: ESG IN OUR DNA TOLTC SPOTLIGHT ON: ESG IN OUR DNA TO ENERGIZE AFRICA'S FUTURE ENERGIZE AFRICA'S FUTUREby Doyin Fadipe, Chief Executive Officer of Central Electric & Utilities by Doyin Fadipe, Chief Executive Officer of Central Electric & Utilities

Currently, there is no streamlined body of regulations that squarely target ESG in Nigeria. Historically, the country has been heavily populated with oil, gas and other extractive business activities due to its natural endowment of fossil and mineral resources. ESG integration has been most present in extractive businesses with more regulatory requirements around the likes of corporate reporting, compliance and environmental legislation. These are implemented, enforced and reported by Federal & State Agencies and MDAs.

Central Electric & Utilities (CEU) is at the forefront of working with expert sustainability stakeholders in Nigeria to build practical programs for ESG, especially the 'E" and "S" aspect in power projects and solar renewables business activities in Nigeria. Our particular focus is in the area of community engagement and carbon-offset of ongoing and historical fossil and extractive activities. CEU was established in April 2018 as the Power Project Development & Services Arm of the Romulus Group focusing primarily on off-grid, distributed and Renewables Power Solution to support and strengthen the aggregated profile of power supply to stakeholders in a manner that is bankable, sustainable and flexible enough to meet demand in electricity supply to targeted Off-Taker (the purchaser of renewable energy) groups. CEU is a wholly owned Nigerian private power development and services company with technical partnerships across the thermal and renewable value chain.

We are focused on implementing ESG at the core of our business, our DNA. As a key participant, we expect ESG to be at the heart of Nigeria's energy transition as we predict the energy landscape in the country to change more in the next ten years than it has in the past 100…

The underlying ethos of our business is not only to close the energy gap in Nigeria but leapfrog many other countries. We are implementing models that fast track the reduction of carbon emission and to offset any carbon activity of other entities within the group structure of the Romulus Group to which we belong.

Our vision is to 'Energize Africa's Future'.

We are on a mission to drive economic growth, improve rural and urban social well-being and unlock youth potential by providing access to electricity by creating reliable, sustainable and innovative solutions and profitable business models. At our core is the combination of a profitable business model without sacrificing our ethos for environmental & social impact and development.

Technology will assist us in two ways with regards to ESG implementation within the Energy Transition. Firstly, corporate operations and oversight- how we do business, and secondly, innovation in product capabilities and systems deployment.

We believe in an optimised mix of our project development capabilities coupled with local business and operational knowledge, alongside creative and innovative solutions from local and global partners. We can harness a new generation of technology companies growing at a high-speed rate in Nigeria. Partnerships are vital for CEU to strengthen our model, especially within digital, cloud & ERP technology, product asset and technology R&D, fintech, EPC, OEM, and ESG Implementor, reporting and other services providers local and global.

We are focused on using solar to close the energy gap, particularly in rural, semi-rural, peri-urban and specific urban locations. In the last two years, we've worked with global experts in the area of patent development and innovation, manufacture and IOT back utility tech to develop what we tagged as the "CEU virtual Power Utility System". The system supports the deployment of intelligent solar home systems in a manner that provides services and support in the same way as a grid utility irrespective of how urban or remote the customer location may be.

Our Renewables strategy is centred around an organic approach beginning with solar solutions and then moving into hydro (including mini-hydro), wind and biomass. Thermal generation is another program of focus, built around captive, off-grid, distributed, hybrid and grid supply solutions.

The focus for tech deployment in the facilitation of our ESG integration is built around:

1. Efficient tech-driven systems to drive optimum operational transparency, predictability, standardisation & communication in implementation, monitoring, evaluation and reporting
2. Basic human cognition to drive energy usage
3. Cost-effective automation without human interference
4. Cost-effective intelligent systems that help in optimal harvest of data and energy deployment
5. Intelligence build-in programs to exceed human intelligence in load selectivity
6. Systems with better diagnostic tools and lower downtime
7. Autonomy via intelligent systems acting on their self-initiative
8. Autonomous data acquisition, storage of information, and know-how to retrieve it

Our product & service systems are AI-enabled to make operating decisions and basic data analytics capability online and offline. Further Real-time division of the day into 4-time slots for optimum solar power utilisation are all AI managed. We are also looking into load selectivity capabilities using the LoRA Technology data collection tooling system in our future products. 2.1.2 Tech and the "S" and "E".

The Implementation, Monitoring, Evaluation and Reporting tech framework in the Environmental and Social Metrics space is growing. As a Power Developer operating in sometimes challenging project execution terrains, it becomes imperative to study and understand the dynamics of project locations and sites. Our biggest challenges are the likes of overseas/ offshore equipment importation and logistics complications. For example, we work in remote, rural areas with a lack of network connections and offgrid electricity. Often data identification of customers and stakeholders is a challenge. When designing, implementing and monitoring the technology systems we are very much mindful of improving fundamentals such as financial inclusion, cultural dispositions and under-education

CEU is partnering with Financial, CSR, OEM and Tech Innovators as implementing partners to ensure that continued access and adaptation to new developments and innovation. These partners can support our deployment of technology systems by allowing us to leverage their R&D capabilities and expertise in core business areas. Such partners include the OOA Foundation, CSR in action, Optio3, Merlin Solar, Waree Technologies, the USAID, GiZ and Power Africa (through accreditation with the world bankAfDB rural electrification sponsored program of the Rural Electrification Agency in Nigeria). The 'S' in ESG is critical to CEU.

The driving force of our activities is to the positive and sustainable socio-economic impact our projects will have on host communities, stimulating both growth in demand and strengthening local talent pools. Our responsibilities include skills transfer & acquisition, youth engagement & development, financial inclusion, social infrastructure, job creation, resource pooling and SME development. Again, the technology and structures we have in place are fundamental to our plans, and ESG is the lifeblood of our plans.

06 Governance

"Having policies and codes of conduct in place is the easy part. Having processes in place that provide confidence that policies are delivered in practice and a board that oversees implementation effectively is harder. "

It is proudly an impact venture capital fund at its core. For the fund, incentives matter a lot, so integral to the design is their remuneration mechanism as fund managers. MSM places equal incentives on both the financial and impact performance of its portfolio. While impact narratives are fortunately becoming prevalent, MSM feels it is fundamental to see an alignment of economic and impact incentives if the sector is serious about driving lasting social and environmental change.

Governance according to the PRI is defined as: Issues relating to the governance of companies and other investee entities. According to Barclays Private Bank, example risks and factors to consider can include, "board composition, disclosure, leadership structures, ownership and control, management incentives, accounting policy, company purpose and culture".

The quality of corporate governance should continue to be a material factor in how well companies can respond to the economic uncertainty and financial challenges to come. Investors should consider structuring and aligning executive compensation in the interests of shareholders, or other stakeholders, and whether these reflect long term, and sustainable, value creation or executives' contribution to this end.

Remuneration structures with lock-step venture

One example of connecting ethical standards with remuneration is Mustard Seed MAZE (MSM). The fund is building a European portfolio of early-stage ventures that are disrupting industries and sectors based on a common denominator: their revenue models are intrinsically linked to the positive social or environmental outcomes that they create. Mustard Seed calls this 'lock-step venture'. As revenues grow, impact grows – and vice versa.

MSM has adopted a mechanism that includes impact performance as a key eligibility criteria for any remuneration. In essence, MSM is only entitled to the performance fee, if, and only if, it reaches a minimum threshold of impact performance across their portfolio.

This is a proactive example of governance that aligns with the view that every investment has an impact, whether positive or negative. MSM's belief is that impact funds should not only be defined by the impact characteristics of its portfolio, but also by the incentive structure underpinning its investment decisions.

Governance and Venture

According to the PRI and VentureESG: "Governance means 'board' issues for most VCs."

Tax and anti-bribery issues are only considered by 35% of investors in their most recent study sample; ownership structures such as dual-class shares (which have already caused issues in IPOs of, for example, Deliveroo) are under-scrutinised[35].

Unlike other asset classes, VC has come under little scrutiny by the responsible investment movement. However, there are several structural barriers that the PRIs discussion paper will explore further.

35 Principles for Responsible Investment

The perennial question for investors

To start with, time and resources are essential for ESG integration, and VC firms are often small and lean. As a result, they rarely have dedicated resources in-house to focus on ESG. Not only that, but the lack of VC-specific guidance, expertise and knowledge is also a barrier.

There is an opportunity for PRI and others such as VentureESG to help convene VC investors and improve practices. Therefore, the PRI is launching a new VC collaboration, including quarterly calls to convene VC managers and asset owners that allocate to VC. blisce/ includes governance into its term sheet with those companies they are investing in – namely through two non-negotiable clauses for ventures: an agreement to carry out an ongoing ESG evaluation every 12 months, and a commitment to interview at least one diverse profile for every open senior leadership position.

According to an article in the Harvard Business Review: "Shareholder activism is on the rise in financial markets – and ESG is increasingly becoming a focus of these interventions."

Divest or engage? Fight or flight? Both are types of catalyst. The lay person might think it is obvious: accelerate and support the companies that do good; ditch or don't support those that do bad. A new study from Stanford University and Wharton, The Impact of Impact Investing, outlines three arguments for engagement over divestment:

1. The impact of divestment on cost of capital is negligible. To affect a 1% change, impact investors must comprise 80% of investable wealth. Better to exercise rights of control to change policy.

2. Where divestment has a meaningful effect, investors miss out on returns. When you sell dirty and buy clean, you move prices accordingly.

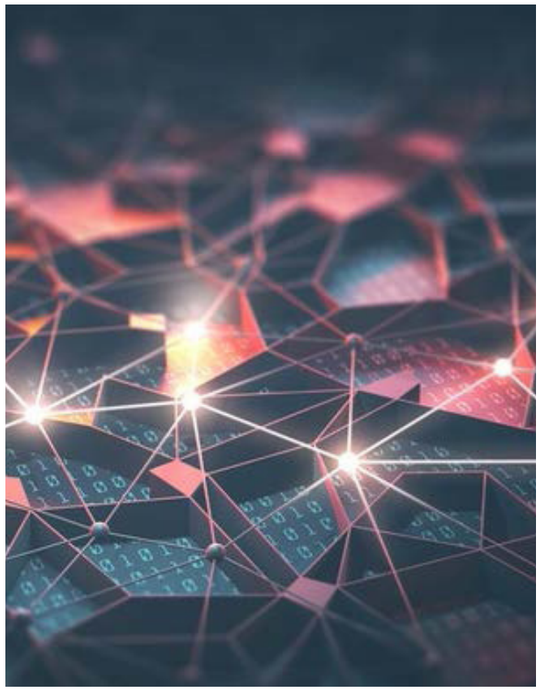
3. When you sell a dirty company, others out of your control will buy it. Probably at a low cashflow multiple and big discount. Probably without a care to ESG, making them less likely to apply pressure that could force change.

We have seen activist hedge funds forcibly secure three seats on the board of ExxonMobil to launch a campaign to reposition the company for longterm value creation. BlackRock announced that in 2022 they would give institutional clients greater say in voting on investments in order to increase engagement for sound corporate governance. Royal Dutch Shell is under pressure from activist investment firms to split into the legacy business and another for renewables.

Technology is becoming a tool to spot and predict risks such as activist stakeholders or and early warnings on reputational challenges. For example, SEC Newgate have developed a new AI tracker tool for social media monitoring in partnership with Milan University called TRUE. This technology is a semantic analysis system and reputation management tool, and is designed to gauge a company's reputation by using AI-driven behavioural psychology. This tool reads the evolution of an organisation, brand, product or service perception from its stakeholders.

The paper also suggests that investors who espouse ESG principles will achieve little by selling their shares in ESG-unfriendly companies. Instead, investors could have more impact if they buy those so-called 'dirty' stocks and then engage with those companies' managements to adopt ESG-friendly policies[36] .

According to Jules H. van Binsbergen, a finance professors at Wharton: "To have impact, instead of divesting, socially conscious investors who want to have an impact should invest and exercise their rights of control to change corporate policy. With that, you drive up the stock prices of clean companies and drive down those of dirty companies. But that means going forward, clean companies will have lower returns. You'll make less money by investing in green stocks, and you will make more money by investing in dirty stocks. Not only do you as a green investor get lower returns, but on top of that you are rewarding investors that do not care about being green with higher returns. If you sell stocks in a dirty company, somebody else will buy them."



36 Knowledge@Wharton

By Jane Siebels, co-founder of Highover Capital

INVESTING AND GOVERNANCE: FINDING ALPHA

By Jane Siebels, co-founder of Highover Capital

over the past few decades: 'It's All to elect the board. The proxy problem magnifies any About the G'. Too many times, governance is overlooked alignment governance problem. or assumed to be in order. Investors typically depend upon national legal systems to regulate the governance of companies instead of making sure all stakeholders, especially shareholders, are protected. One can argue that the assumption of laws regulating governance instead of shareholder diligence is the root of all ESG problems.

Governance is not only about laws but people and processes. Having policies and codes of conduct in place is the easy part. Having processes in place that provide confidence that policies are delivered in practice and a board that oversees implementation effectively is harder.

The UK CFA Certificate in ESG studies claims that in practice, corporate governance "comes down to two As: accountability and alignment".

Accountability is being held responsible for the consequences of decisions and the effectiveness of the work delivered. The board is responsible for ensuring senior executives are accountable. The shareholders are responsible for ensuring the board is accountable to them. This is the point where accountability breaks down.

There are many factors that have contributed to the breakdown of accountability between boards and shareholders. The chair also being the CEO is one factor, as the chair and board's job is to oversee, challenge performance and strategic plans, influence succession planning and debate executive remuneration. All of these are impossible to do objectively if the chair and CEO are the same person.

Another factor in board accountability to shareholders breaking down is proxy voting which has allowed shareholders to pass their responsibility of governing the board to management. The same management the board is supposed to govern. No wonder boards are often more accountable to senior executives than to shareholders, as it is these executives that hold the proxy voting power

For me as an investor Remember, alignment is the second 'A' in governance. Alignment of interests is challenged by the fact that interests of senior executives or managers do not align with the interests of the shareholders, or owners of the business. This is known as the agency problem and was pointed out in the 1932 paper The Modern Corporation and Private Property by Adolf Berle and Gardiner Means. They wrote that the inevitable consequence of the separation of ownership and control leads to managers maximising their own interests and not the interests of the owners. This is why the only ESG investment strategies that add return alpha, historically, are those of activist funds that take board roles in bad companies in order to solve the agency problem, or those that short bad companies, which leads to the greatest ESG impact but is rarely offered or practiced.

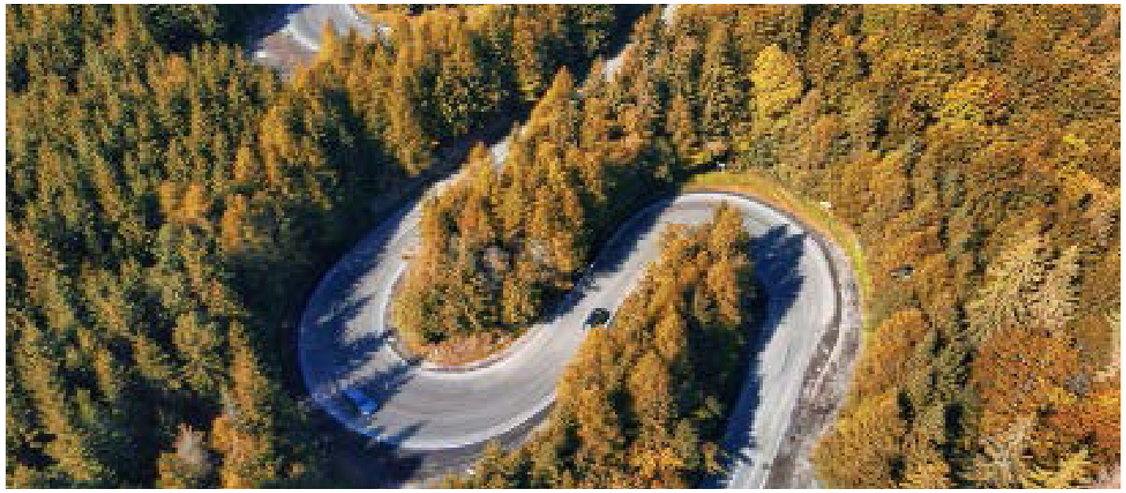
It's ironic that investing in 'good' ESG companies has not improved returns and does not take away market risk – however, investing in bad companies does. Hence the title of this article, as it is governance that controls a company's environmental and social policies. It is governance that generates return alpha. It is also governance that ensures accurate accounts to judge performance. It is governance that aligns interests between shareholders, workers, customers and the general public. It is governance that ensures value is not destroyed by managers for their self-interest. Therefore, perhaps the real solution to ESG investing is as simple as not allowing the senior executives to govern themselves and impose their values on the company.

We are developing technology that matches deals with investors and managers with allocators. In this way, we are using technology to express investors' values and risk/return.

I would say the future is activist impact funds, that not only take active roles in voting stock, but also measure the impact of their actions.

07 Final Thoughts

"Soon, access to capital will require ESG to be fully embedded within one's business"



What's next for VC and ESG?

There is no doubt ESG is a complex topic. There are still those that believe that profit won't overlap with purpose in mainstream finance. There are those that argue ESG is a distraction that lets governments off the hook, delaying their action. There are question marks over whether businesses are really backing up their words with actions; whether they are being honest in their material impacts. Bloomberg reported that of the $35 trillion invested sustainably, $25 trillion isn't doing much.

We must be alert to what BNP Paribas recently described as the perils of the 'race to restriction' where investors[37] just look for one-upmanship to exclude what appear to be 'negative impactors' from within their portfolio. But there are potentially large negative unintended consequences to be considered for any actions. With the wall of money coming towards the impact economy, the accusations of ESG being a ruse and nothing but marketing may gather pace.

But let's be 'glass half full' for a moment. ESG is not new. All businesses since the beginning of time have had to pay attention to how they make a profit. It's strong, bold, positive business practice. Now the expectation is to consider the full impact of what it does, and how. Everyone has a part to play in the seismic shift needed in changing the world. Technology will play a fundamental part. From the mandate to transparency, the integrity, sharing and analysis of data, not to mention the solutions for better integration of ESG in business practices. Technology can help alignment on the methodologies, to avoid a jungle.

VCs also have the potential to accelerate the companies that can provide the technological tools for better ESG, as well as the solutions for impact around the SDGs. The SDGs are a clear single framework while ESG currently is a multitude of frameworks operating in silos. There needs to be a move towards standardisation and improvement of processes. Clearer definitions and sharing of a standard common language is required; perhaps then the belief will be that ESG isn't just compliance or box-ticking. ESG needs to work hand in glove with SDGs and the impact economy.

The world must change, and it won't if we continue to do what we've always done. The wall of money needs new ideas and innovation. Soon, access to capital will require ESG to be fully embedded within one's business. Increased focus on ESG for business leaders and investors will lead to both better risk management and positive impact.

37 The Times

LTC SPOTLIGHT ON: ESG'S WEB 3.0 MOMENT By Phoebe Stone, head of Sustainable Investing at LGT Vestra

The use of blockchain technology moves the conversation on from company pledges for better social and environmental practices, to accountability and accessibility of ESG data aggregation.

Track and trace

Blockchain's power lies in the distributed ledger technology. By connecting devices such as sensors that capture and produce data, a record of truth that corroborates physical events and services in real time is time-stamped and stored. These connected devices enable data operating across commercial supply chains to be tracked and verified. As a decentralised database, through blockchain, it is possible to trace raw materials back to source by means of digital certificates. With blockchain, data and transactions can be stored at every point along the supply chain to track where materials have come from and the conditions under which they were produced.

Indian company Welspun India, which is a global leader in home textiles, has patented end-to-end traceability technology to help stakeholders – from farmers through to manufacturers and end retailers – to track raw materials through the supply chain. The company tracks data such as water usage, gender equality and fair pay across all of its product lines, using blockchain.

The use of blockchain as a tool to ensure authenticity and traceability is also at play in other sectors. The pharmaceutical industry uses it to detect counterfeit pills and diamond companies use blockchain to confirm source and location of the gems to avoid the risk of fakes. Companies sourcing raw materials such as commodities like lithium are interested in the sustainable credentials of the metal, and even oil companies are using smart contract solutions to measure carbon emissions produced by specific rigs.

This provides valuable analysis on the environmental impact of operations, but also aids more efficient cost management of different sites.

Blockchain's fundamental principles of traceability and transparency, because of its protocol-based function, avoid the biases prevalent in human-based platforms. These principles of tracing and tracking can be used by consumers to access information about which goods are purchased from where, as well as environment-specific information such as carbon data and biodiversity impact.

Consumers are certainly not the only interested parties. Modern supply chains are complex and, as we have recently seen in the case of Boohoo, often the companies themselves outsource to the point where they lose touch with which business they are even using to manufacture their products.

Blockchain within sustainable investing

The investment industry needs better ESG data. Larry Fink of BlackRock made this clear in his annual letter to CEOs, citing the need for more accurate information to enable the improvement of emission disclosures and as a way to set and achieve rigorous short, medium and long-term reduction targets. Blockchain technology will enable enhanced ESG data collection and verification. Blockchain provides a foundation for accurate data across complex, multi-supply chain management. The use of this technology moves the conversation on from company pledges for better social and environmental practices, to accountability and accessibility of ESG data aggregation.

It is currently incredibly challenging to accurately amalgamate sustainability information on a business – made even more difficult by the fact that it is

usually static data, whereas businesses are constantly changing and evolving.

The use of blockchain in ESG data management has the potential to bring significant value to both fund managers and lenders in looking to decide whether to finance a company. Using blockchain in conjunction with machine learning within ESG data processing, both dramatically enhances transparency and drastically reduces the time taken to collate and analyse the metrics. It even allows for the processing of real-time data.

With concerns around greenwashing increasing, the use of blockchain could also force companies to be more honest about their sustainable claims. Environmental data (e.g., carbon emissions) and social data (e.g., safety and quality information, labour management and diversity statistics) can be verified and timestamped.

It is particularly helpful when looking at ESG data examples like carbon. Carbon emissions are calculated through a company's own operations, the energy that the company purchases and the supply chain, products and services the company uses. Through the use of blockchain technology, clarity, consistency and accuracy can be brought to this currently complex web of different sources.

While it's still relatively early days, blockchain projects have the propensity to inspire trust. They are on the one hand collaborative, and on the other decentralised consensus-making processes. They also require the broad buy-in and support from a community of users and stakeholders.

Reporting against universal standards

Internet of Things (IoT) devices such as sensors and satellites can collect different sources of physical ESG risk data and impact data, which can be fed into a central platform to provide end-to-end monitoring. The raw data can be refined to global sustainable reporting standards, progress on which was made at COP26 through the launch of International Sustainability Standards Board (ISSB) by the IFRS accounting standard board. The ISSB will develop a global baseline of sustainability disclosure standards against which blockchain-delivered data can report.

The establishment of a platform that provides tamper-proof digitally processed data that can be connected to various certification bodies, enables full traceability and transparency of entire business value chains. It also facilitates the shift away from annually produced data (primarily taken from company reports) to continuous data, and therefore potential monitoring by auditors.

Quantifying impact

A key challenge the sustainable investment industry is currently grappling with is measurement of impact. This can currently be done in two ways; firstly by using widely available environmental data published by all companies, such as carbon, which is only one lens to measure impact. Or, secondly, by manually calculating the impact a business is having by looking through different reports and data sources – for example, the amount of plastic that has been recycled rather than sent to landfill.

One application of blockchain's features is 'impact tokens'. These represent a UN Sustainable Development Goal-related impact in a quantified unit-based measurement metric. These tokens can substantiate claims on supporting SDGs, or track impact through supply chains. This would provide a broad and scalable way to translate and verify impact delivered by a business.

Carbon credits

Blockchain can also be used to verify carbon credits. Bringing increased transparency and accuracy to carbon offset marketplaces is a focus of Mark Carney, former Governor of the Bank of England, and was a critical part of the COP26 agenda.
Auditing and verifying carbon transactions is tricky because it is difficult to identify whether the carbon was sequestered or not. Some studies demonstrate that 90% of examined credit projects fall short of meeting accepted criteria for data verification and off-set calculation[38] . There are even examples of deforestation receiving offset funding. Carbon offset markets are also riddled with transaction costs, all being taken by various middlemen within the process. Blockchain can pull emissions data directly from IoT devices and provide full verification and traceability back to the source of the credit and enables automated reporting to regulators. We have seen the enormous rise of the non-fungible token (NFT) art market in recent years; however, the tokenisation of carbon credits and off-sets may be the NFT market of the future.

A more transparent future

Blockchain-enabled data collection, transmission and reporting sets a new and very exciting bar for those parties interested in real-time, verifiable sustainability data. This will help deliver better sustainability standards, higher levels of transparency and, importantly, accountability, not just to those in carbon credit markets, but across all sectors.

Important information

38 Compensate

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