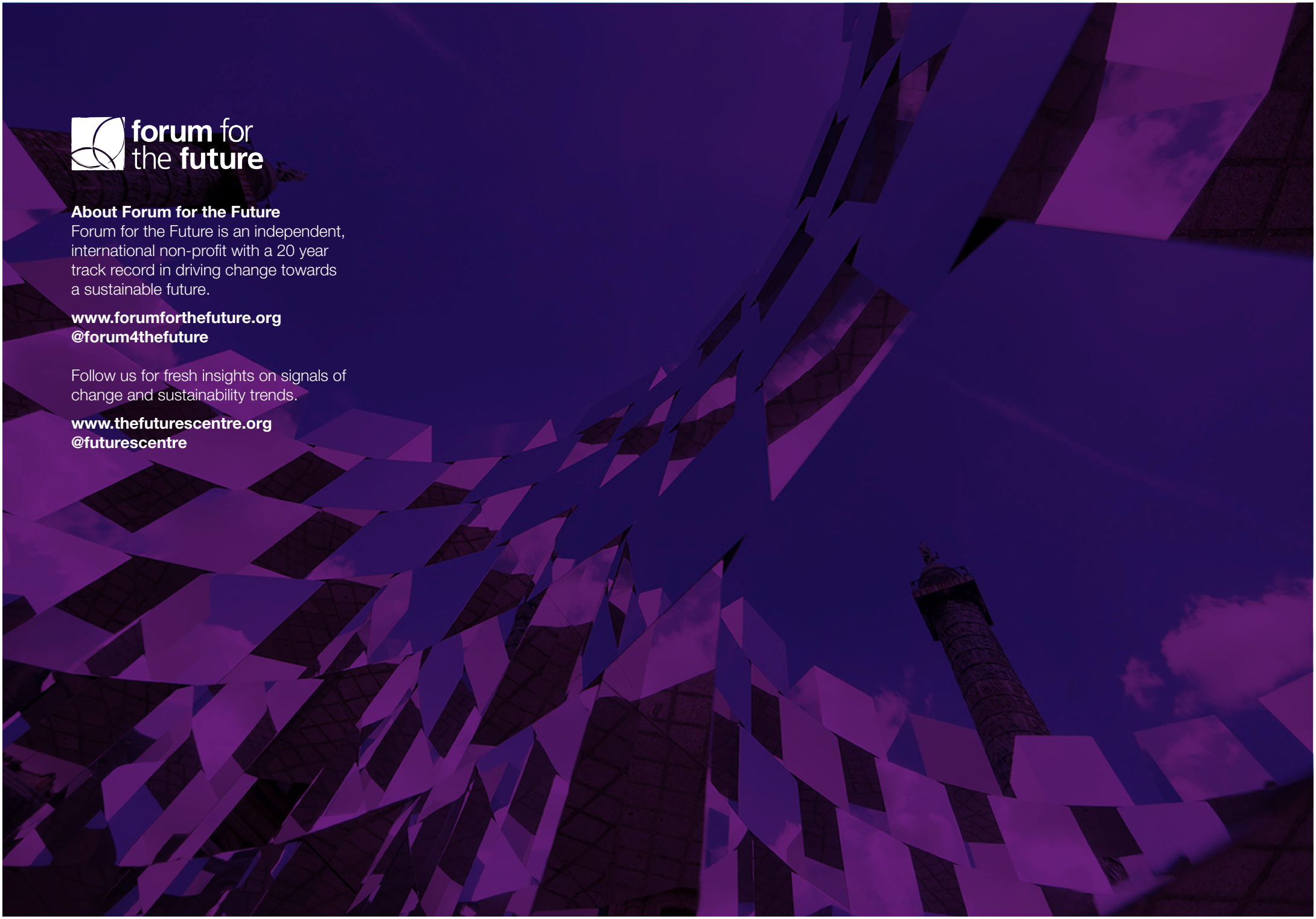
forum for the future

Future of Sustainability 2018

# Living in nonlinear times

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# Living in nonlinear times

While linear change is smooth and relatively predictable, non-linear change confounds our expectations with shifts that can be very fast, even abrupt. And in 2017, we were surrounded by it.

Extreme climate events are commonplace – witness three hurricanes over category 4 strength in just one season. Catastrophes like the forest fires in Borneo barely make the news – they have become the 'new normal'. And plastic pollution has been revealed to be far more pervasive than previously suspected, contaminating the water we drink, the food we eat, and even the air we breathe, everywhere on Earth.

Fortunately non-linear change can lead to positive outcomes, too. We have selected seven areas we believe are particularly dynamic now, and which present rich opportunities to develop radically more sustainable behaviour and practice, through 2018 and towards the 2020s.

The mobility system is about to change more profoundly than it has for a century.

Farming may follow in time, with the case for a more productive, regenerative approach strengthening quickly.

The response in 2017 to the plastics crisis has been astonishing, from civil society and from business.

We're seeing signals of a system-side shift for a retail model at its limits.

New ways of organising are growing in power, but what values will they bring?

How might new sources of livelihoods emerge as changing norms combine with extraordinary new technology?

Finally, we look at blockchain again. Hype reached a peak in 2016; now we're asking, is it really a source of radical disruption?

**Our observations are based on a year of contributions to our Futures Centre[1], research into the future of a range of sectors and issues, as well as work designed to drive transformative change with our partners across the globe.**

For each area, we describe the signals of change that we see and explore the implications for system change and a sustainable future.

None of these developments is happening in isolation, and we explore how they come together to create a complex picture of change in one specific industry - the fashion industry - where rapid shifts in technologies, consumer attitudes and long-term impacts of landscape-level trends could converge to create the conditions to shift this system.

Each of the seven areas we explore demands a response from different actors. Understanding and harnessing these dynamic areas will help you and your organisation navigate uncertain and complex times, and contribute to a sustainable future. But we need change at a more fundamental level. As we explain in our closing section, new business models and new technologies will never be enough. The 'future of sustainability' depends on thinking and acting differently at every level of society, so that we can learn to live with and shape change.

Being sensitive to the world around us and how it is changing is part of this. And so we are sharing our outlook with you, and ask you to keep sharing the changes you see with us.

# Our shifting landscape
## Warning lights and beacons of hope

### Environmental stress continues to intensify

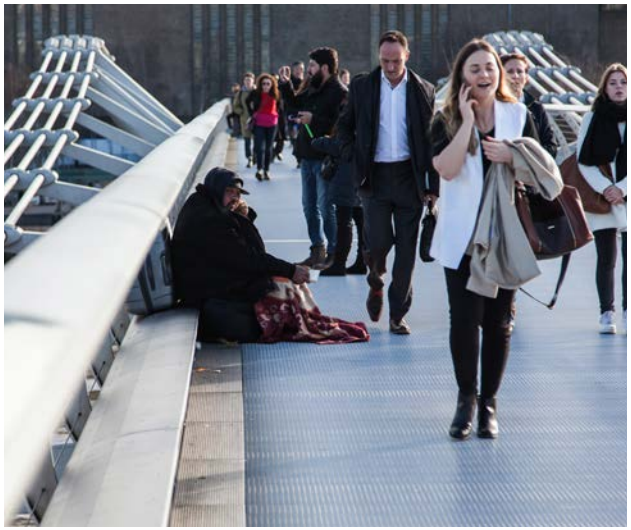
Data from across nature reserves in Germany found an alarming 75% decline in flying insects over the past 25 years[2], likely due to widespread pesticide use and destruction of natural habitats.

### Global population may not peak this century

The UN projects that the global population will continue to grow, reaching 11.2 billion in 2100, despite declining fertility levels. Africa holds a key role in the world's future as a quarter of all the world's children live there now, rising to 40% by 2050 and more than half by the end of the century.[3]

### Global $CO_2$ emissions increase, dashing hopes of a plateau

Three years of flat global emissions ended in 2017 as rates jumped by 2% and the amount of $CO_2$ in the atmosphere increased by the largest amount since measurements began.[4] Increased coal use in China and reduced hydroelectric power due to poor rains are thought to be the main causes.[5]



## Measures emerge to address structural inequality

The World Economic Forum's 2017 global risk report ranked inequality as the greatest risk for the global economy, while news of offshore investment prompted outrage.[6] Emerging measures include Portland's CEO tax, based on the ratio of highest to lowest pay in publicly registered companies.[7]

## The energy system continues to shift

The world's largest oil exporter, Saudi Arabia, announced plans for a 100% renewables-run megacity. Business models integrating solar, batteries and electric vehicles are making clean energy cheap and affordable.[8]


## Increasing social division and political polarisation

In the United States, the common ground between the two main parties is diminishing.[9] UK 2017 election data showed widening political divisions by generation and location.[10] Political parties of the far right and left have enjoyed electoral success around the world, while religious divisions are hardening.

# Seven Dynamic Areas

How did the future change in 2017, and what new opportunities emerged for sustainability?

# **Mobility** faces as radical a shift as horse to motor

A wave of commitments to electric vehicles (EVs) in 2017 from nations and manufacturers, coincided with investment in infrastructure, the rise of new business models, journey tracking apps, improved maps and traffic analytics, making a wholesale revolution in how we move not just possible but imminent.

The human consequences range from huge job losses to autonomous vehicles (AVs), to the very design of our cities and road networks, affecting not just road safety but who lives and works where, how communities interact, and how goods are exchanged.

The divide between public and private transportation looks set to collapse, as Mobility as a Service (MaaS) emerges, with a shift from private vehicle ownership towards subscription-based models. This impacts the design of vehicles, parking, roads and buildings, requiring massive infrastructure changes – with wider lifestyle implications. The shift towards EVs and AVs compounds this fundamental system-wide redesign challenge, and its impacts for economic, social, cultural, and political systems – particularly as we move on from fossil fuel dependence. Air pollution is currently one of the major drivers for scaling EVs, reducing emissions as electricity generation becomes more efficient and renewable. The race is on to develop affordable, safe and sustainable batteries to support future demand.[11]

## Signals of Change

- **Elon Musk released his second master plan for EV-manufacturer Tesla: integrated energy generation and storage**, where some vehicles will include a solar roof with battery product enabling energy generation on the go. Tesla will continue to develop safe, effective autonomous vehicles and plans to integrate vehicle sharing by allowing owners to add their vehicles to a 'tesla shared fleet' that others can access while the original owner is at work.[12]
- **The Organization for Economic Cooperation and Development (OECD) forecasts that fleets of self-driving vehicles could remove up to nine out of every ten vehicles on urban city streets.** This is made based on models of Lisbon, Portugal, and is in accordance with other studies of New York, Ann Arbor, Michigan, and Singapore. However, the scenario assumes that everyone rides in an autonomous vehicle and participates in ride sharing. If only half of a city's population participates in ride sharing, total congestion could actually increase. Additionally, total emissions could increase as people use autonomous vehicles to facilitate longer commutes.[13]

- **China is poised to become one of the world's largest MaaS markets**, according to ARK Invest. Mobile app based ridesharing services have grown rapidly in China, as has the urban population. ARK estimates that the market for MaaS in China could rise to $2.5 trillion by 2030. China is particularly poised to embrace MaaS due to: a majority population unlicensed to drive (80%); low average income relative to vehicle prices; and the difficulty of obtaining a car in China.[14]
- **Cities and countries ban fossil fuel burning cars.** Paris voted to ban petrol and diesel burning vehicles by 2030 to curb air pollution from fossil fuels, with France to stop selling fossil fuel cars by 2040. China, the world's largest auto market, followed suit with a 2040 ban; countries setting similar targets include India, Britain and Norway.[15] More immediately, emitting vehicles will be banned in Oxford's city centre from 2020.
- **Electric car owners share battery with energy companies and drive for free.** Nissan and a UK energy supplier, Ovo, have teamed up to offer a vehicle-to-grid program that will enable Ovo to manage the battery's energy, buying during off-peak periods and selling during peak periods. The programme is intended to incentivise the adoption of cleaner vehicles and help power grids manage green energy growth.[16]

## Implications

**MaaS, AV and EV will result in a changing urban landscape everywhere, from Europe to the US and Asia, as well as a lifestyle shift.** A great deal of policy change and infrastructure investment is needed to avoid the dangers of societal disruption due to job loss, congestion in poorly managed transitions, and urban sprawl with longer commutes. Good management could be rewarded with breathable, livable cities, significant reductions in carbon emissions and congestion, and major efficiency gains.

**For business, changing transportation systems will impact supply chains and product delivery as distribution networks become more efficient and autonomous**, requiring the skills of mechanics and software engineers rather than drivers. In advance of vehicle bans and to meet other expectations and incentives, companies will need to update their fleets. In the long run, electric vehicles are cheaper to charge than buying the equivalent amount of petrol, leading to cost savings, but charging infrastructure, affordable and sustainable batteries, and grid capacity could lag behind EV supply.

**How will you be part of the transition to a new mobility system, and how can you support it to be a sustainable one?**

**How will the redesign of cities and road networks to accommodate shared vehicles affect communities? Can it support equality and access to services?**

**How will the shift away from individual car ownership change the way we work, travel and spend our leisure time?**

**What programmes can support workers to build skills for a world that no longer needs drivers, pilots, or sailors and how do we plan for that now?**

**What collaborations are needed to ensure that there is sufficient infrastructure for the production, use, and end-of-life of electric vehicles?**

2

# **Regenerative agriculture** grows in momentum

A range of alternative approaches to farming that put more into the environment and society than they take out could converge and scale to create an entirely different food and agriculture system.

Currently, emissions from agriculture represent some 10-15% of the global total, with land use changes representing a further 4-14%. Dominant practices degrade soil, reduce water quality and impact biodiversity. The nutritional content of food continues to decline, as demand rises. There have already been calls for businesses to assess their exposure to risk should soil productivity continue to decline.[17]

Regenerative agriculture takes advantage of soil as a carbon sink, improves soil quality, produces more nutritious food, and improves the wellbeing of those who produce it. It is underpinned by principles and techniques such as intercropping (cultivating two or more crops together), carbon sequestration in the soil (aka 'carbon farming'), keeping living plant cover on soils, and using insect predators instead of chemical pesticide, and can be complemented by the use of data and even robots.

## The data

- **One-third** of the world's soil is moderately to highly degraded due to erosion, acidification, salinization, compaction, chemical pollution and nutrient depletion.[18]
- The impact of soil degradation and rising $CO_2$ levels on the nutritional quality of food could put an additional **150 million** people at risk of protein deficiency by 2050. Over **1.3 billion** people are living on degrading agricultural land.[19]
- Around **80%** of nitrogen and phosphorous applied fertiliser is lost through irrigation and rain, polluting rivers and seas, causing eutrophication, algal overgrowth and 'dead zones'.[20]
- Past estimates have put the potential savings in $CO_2$ emissions from soil sequestration at anything between **10%** and an extraordinary **100%** of global emissions.[21]
- Of 20 top solutions in Project Drawdown, 'the most comprehensive plan ever proposed to reverse global warming', **12** relate to food

and land use changes, such as regenerative agriculture and intercropping.

## Signals of Change

- In the US, **commercial poultry farmers are using rotational grazing** to allow pastureland to recover quickly and retain more water and to eliminate vaccines and antibiotics.[22]
- **Legislative efforts to promote regenerative 'carbon' farming are afoot** in Hawaii, Maryland, Massachusetts, New York and Vermont. Hawaii passed an act to create the Carbon Farming Task Force,[23] which will develop incentives for Hawaii's farmers and ranchers to increase the soil's carbon content.[24] The state of California is spending $7.5million to store carbon in the soil, as a way of boosting agricultural potential.[25]
- Leontino Balbo from Brazil, **the world's largest organic sugar cane farmer**, has boosted yield through new harvesting techniques that reduce soil compression and soil loss and increase biodiversity and water retention. His company Agros Fortis is now developing a weed control robot to spread similar practice to the conventional sector.[26]
- Singapore-based start-up VRM Biologik is marketing a 'microbial slurry' that is formulated to **rebuild the bacterial health of degraded soil**.[27]
- The 4p1000 Initiative, hosted by the Consultative Group on International Agricultural Research is created following findings that **just a 0.4% growth per year in soil carbon would halt the increase in atmospheric $CO_2$**. It will coordinate research and create partnerships to increase the amount of carbon held in soils.[28]

## How automation can support regeneration

Carefully applied automation could help to scale regenerative agriculture, by decreasing soil disturbance, enhancing monitoring, and enabling high yields with low input, in terms of both labour and pest-control. The internet of things, remote sensing, artificial intelligence and a revolution in robotics are coming together to make low-input, data-driven automated agriculture at scale a real possibility. In Britain, 60% of farmland is being managed by some kind of precision method, including sensor systems, cameras, drones, microphones, virtual field maps, analytics and GPS-guided tractors.

A growing number of software firms aim to provide farmers with individualised prescriptions on how to work each field down to a fraction of an acre, using data collected on soil, weather conditions, use of crop chemicals and yields. **Farmobile in the US also pays for data from farmers** – the 'fitbit' of farming.

**Harper Adams University (UK) trialled a 'hands free hectare'**, in which everything from preparing, fertilising and drilling the soil to monitoring, maintaining and, ultimately, harvesting the crop, was performed by self-driving tractors, robot combine-harvesters and drones.

Start-up Blue River Technology has developed **a system to distinguish between crops and weeds**. Combining computer vision and AI, it can reduce inputs by as much as 90%.[29]

McCain Foods Ltd (the world's largest manufacturer of frozen French fries) recently invested in Resson, a fast-growing data-driven agriculture technology company that uses near **real-time predictive analysis for crop management** by integrating data analytics with sensors and robotic platforms.

The EU has funded multiple projects in robotic farming, including cloud-based MARS (Mobile Agricultural Robot Swarms) and RHEA, a scheme to develop a fleet of tractors and **aerial robots for targeted herbicide application**.

## Implications

Our current food and agricultural system is under pressure to nourish more people more effectively with a declining resource base. **Regenerative agriculture presents huge opportunities for businesses, producers and governments to develop a system that is productive and sustainable in the long term.**

**How might your organisation contribute to the scaling-up of regenerative agriculture?** If you are connected to the food and agriculture industries, can you make the case with your suppliers, partners, and to major brands and regulators?

**Adjacent industries to agriculture can enable or hinder growth in regenerative agriculture.** For example, retailers with purchasing models or logistics systems that are optimised for monoculture will need to rethink their approach.

**Automated, data-based farming could make a significant contribution to regenerative agriculture**, but could alternatively be implemented in a way that excludes people and communities. How can we ensure that we use new technology to be socially as well as environmentally regenerative?

**Has your organisation reviewed and identified how it might contribute to the regeneration of ecosystems and communities, delivering a net positive impact?**

# ‘Success in regenerative agriculture depends on collaboration’

Global brands, such as Guinness and Johnnie Walker, are part of complex social, economic and environmental ecosystems.

At Diageo, we recognise that these brands will thrive in the long term only because these systems and communities thrive, and so we act individually and collectively to support every aspect of their sustainability.

DIAGEO

diageo

The health of agriculture as a sector and the natural environment is crucial to our success. This recognition underpins the challenging environmental targets we set ourselves and our work to support farming and the environment throughout our supply chain. This is especially visible in Africa where we are working with small farmers to build skills and empower communities leading to better productivity, better livelihoods and a more resilient supply network.

We are increasingly shifting from focusing primarily on managing environmental impacts to taking a holistic approach across social, economic and environmental arenas. This includes better agronomy and land use, and leads to farming methods that improve the ecosystem, such as effective rotation for soil health and crop selection for climate resilience.

As well as improving environments, we see an imperative to improve livelihoods as a critical foundation for such work. Many farmers are now seeing better yields and income that give them and us the ability and confidence to go further. This also supports broader sustainability, for example in the social context where we are also empowering women farmers through our work with partners such as CARE and Oxfam. Regenerative agriculture, at its best, works concurrently in all of these spheres, rightly so given how they are interdependent.

Approaches like this require not just long term perspectives and the drive to achieve these, but also collaboration. Nowhere is this more apparent than in support of water catchment area management, critical for all stakeholders whether farmers, the wider community or, indeed, drinks and other companies. Our Water Blueprint and stewardship approach help to support the water catchment that we and others depend upon, and success depends on collaboration.

Regenerative agriculture can be viewed as conceptual and challenging to implement at scale, but I see no alternative for the future of our brands. There are tangible rewards to be gained if the principles are integrated into existing schemes, and as more organisations understand the value created and how it can be achieved. The more examples, the faster we can all reap the rewards!

In the short term, if regenerative agriculture is to succeed and gain impactful scale, we have to balance tensions that can exist between the different spheres of activity, to support sustainable growth, environmental improvement and social impact. Collaboration at scale continues to be difficult to achieve, and yet has to be a goal: no single sector or actor can address the multiple issues and interdependencies that are part of this complex system. However, I see an increasingly shared vision and agenda, aligned with this report and its focus areas. This should be a source of confidence and for shared action going forward.

**David Croft, Global Sustainable Development Director, Diageo**

3

# Action against **pervasive plastic pollution**

## Action to address the impacts of plastic waste, particularly for marine life but also for human health, lurched towards the mainstream in the last year.

Chemicals from plastics are present in our blood and tissue, ingested through our food and water, and – scientists fear, even through the air we breathe.[30]

Plastic pollution has been linked to cancers, birth defects, endocrine disruption, and obesity.[31] In September, the Guardian reported that 83% of tap water samples from a dozen nations across the world were contaminated with plastic fibres. The highest contamination rate was in the US, at 94% of samples, with the lowest rate (in the UK, Germany and France) still as high as 72%. We are also consuming microplastics when we eat fish and seafood: researchers from Plymouth University found plastics in a third of UK-caught samples, including cod, haddock, mackerel and shellfish.

The Ellen MacArthur Foundation reports that at 8 million tonnes of plastic leak into the ocean, 'the equivalent to dumping the contents of one garbage truck into the ocean every minute'. Awareness is growing through high-profile campaigns such as UN Environment's Clean Seas, backed by 30 countries at its launch, and documentaries such as *A Plastic Ocean*, available on Netflix, *A Plastic Paradise* and *The Smog of the Sea*.

## Signals of Change

- **Microplastic contamination has been found in tap water in countries around the world**, leading to calls from scientists for urgent research on the health implications. Experts have suggested that microplastics could release the toxic chemicals they absorb in the body.[32]
- **Across the world, countries are introducing plastic bans.** First India's capital Delhi, and then the whole of Costa Rica, committed to ban all single use plastics. Kenya, France and Italy also banned the production and sale of plastic bags, with Kenyans facing the toughest penalties: up to four years in prison or $40,000 in fines.[33]
- **Media giant Sky has made three major commitments** as part of its Sky Ocean Rescue Campaign: to eliminate all single-use plastics from its operations, products and supply chain by 2020; to launch a £25 million Ocean Rescue Innovation Fund to invest in technology to eradicate single-use plastics; and to partner WWF to safeguard Marine Protected Areas in Europe.[34]

- **Supported by Imperial College London, British company Polymateria has developed a cost-effective method for producing plastic products which are 100% biodegradable**, while releasing zero toxins in decomposition. The process involves using prodegradant additives in production, which support a predetermined shelf-life, and also oxidising small parts of the polymer. Plastic is converted back to its basic compounds of carbon dioxide, water and biomass after six months.[35]
- **The Ocean Conservancy has developed a strategy to prevent plastic leaching** by improving coastal waste management in China, Indonesia, Philippines, Vietnam, and Thailand. These five countries are collectively responsible for a large percentage of plastic mismanagement and release into oceans.[36]

## Implications

**Action to address plastic waste demands a systemic and full lifecycle approach.** As well as attempting to reclaim plastics from oceans and shores, we need to tackle their production and use in the first place, as well as the pollution that occurs through leakage as they are used. Some partial solutions, such as creating upcycled textiles from plastic waste, may ultimately contribute to the problem, as microfibres leak from washing machines into water systems.

**Where can you help to stem the flow of plastics?** If you're a retailer, can you take steps to minimise the presence of plastics in your supply chain, as leading retailers have in banning microbeads? Or can you support the design and scale of sustainable packaging alternatives, such as biodegradable and even edible containers?

**Do you have the opportunity to interact directly with citizens and consumers, influencing mindsets and behaviours?** The Marine CoLABoration's London-based campaign #OneLess is encouraging people to consider their use of disposables, with the immediate goal of reducing the amount of plastic water bottles entering the ocean from the city of London.

If you're an urban developer, can you help to improve water treatment systems, tackling the problem of contamination in drinking water, and minimising leakage into the oceans?

**What will you do to make 2018 the beginning of a post-plastic era?**

4

# **Retail shifts** and changing consumerism

The current retail model is at its limits. After years of growth, online retail is becoming mainstream, accounting for 9% of all retail sales in the US and 17% in the UK. Resource scarcity looms while, globally, demand for quality, convenience and speed is increasing. As these trends converge, new and disruptive approaches are emerging. Businesses that can harness this dynamism can actively shape a new, more sustainable, retail system.

Consumerism globally is booming and is becoming every more seamlessly integrated into our daily lives. While retail sales continue to grow worldwide, traditional bricks-and-mortar retail is undergoing huge disruption; household names are going bust, staff are being laid off and sales are shifting online. Across the US, Europe and China, the ubiquitous mall and offline retailers seem just a few clicks away from irrelevance unless they can adapt to emerging consumer trends, such as subscription to FMCGs, a move from ownership to access, the sharing economy, and a shift towards spending on experiences over products. For agile businesses, however, big box retail is 'not dead just different.'[37] Physical shops are changing purpose; purchasing is being done online and stores instead focus on product experience and showcasing.

## Why is this happening?

Demographics has a big part to play. Millennials are coming of age and reaching their prime consumer years. Digital-native and with shallower pockets, this generation wants maximum convenience at lowest-cost. They are stimulating the peer-to-peer sharing economy, favouring access over ownership, and are pushing retailers and brands into e-commerce, a trend predicted to grow with millennials set to constitute 75% of the workforce by 2025.[38] Combine these emerging models with huge growth in consumption in emerging economies and the shape of retail will be permanently transformed.

4

The shift away from bricks-and-mortar towards seamless online consumerism is being propelled by a handful of super-centralised platforms. In China for example, the world's biggest e-commerce market, Alibaba's Tmall platform dominates with a 53% market share and 97% of online shoppers using the platform.39 The scale of these companies means they are freer to take risks and innovate, such as with AmazonGo, the contactless, cashier-less supermarket.

In emerging economies new models are also appearing that contradict the traditional view that ownership rises with income. Leapfrogging the developed world, consumers increasingly rely on digital infrastructure for ecommerce, to share transport, goods delivery and for services, so much so that Time declared 'collaborative consumption' to be one of its '10 ideas that will change the world.'4

## Signals of Change

- Just months after Amazon opened its first checkout-free Amazon Go store in early 2017, China's Jingdong unveiled **its first unmanned convenience store in Beijing**. Shoppers simply scan their smartphones upon entering and 'just walk out' technology will detect when products are taken off of the shelves. Customers can exit the store without queuing and their account is automatically charged.[41]
- In Rio de Janeiro's Lapa district, Refettorio Gastromotiva is a restaurant which trains chefs from disadvantaged neighbourhoods across Brazil, **using surplus food from the Olympic village** to feed hungry locals, led by three Michelin-starred Italian chef Massimo Bottura.
- British tech company, Smarter, has unveiled **FridgeCam, a device to stock up your fridge for you**. A small camera device snaps a photo of what's inside and integrates this with an app that adds products to a shopping list automatically. If the camera integrates with a grocery ordering site, items can be automatically ordered and replaced.[42]
- Analysts at Credit Suisse expect the total number of **Bricks and Mortar store closures in the US to reach 8,600** before the end of the year. During the 2008 recession, 6,163 stores shut down, previously the worst year on record.[43]
- Amazon has released proposals to – between 200ft and 400ft from the ground – for **high-speed automated delivery drones**. The company is looking to use drones to deliver customer's orders to their doorsteps within 30 minutes of them making the order.[44]

4

## Implications

**Retailers must start to view their physical assets flexibly** – designing stores around experience and rethinking the function of their spaces, creating a sense of place that goes beyond transactional shopping and provides a deeper interaction than is possible online. For example, **how might stores become physical manifestations of sustainability pledges?** How might they showcase sustainable food and living, support communities, or contribute to urban food production?

Innovative companies like Amazon and Alibaba succeed because they see retail as a system of new and different ways to give customers what they want. Retailers and brands must be agile: experiment, unlock shared value across the sector, and embrace new ways to engage consumers. **Critically, for long-term success, they must also solve environmental and social challenges, so that consumption becomes part of the solution, not the driver of the problem.**

**Redefining purpose is also key; retail is ultimately about access – to nutrition, to fun, to self-esteem.** As the sharing economy canters ahead, and peer-to-peer platforms grow, consumers can now get the same product straight from producers, from an aggregator platform, through purpose-led start-ups, or via a platform where the same product has been rated by a friend. Retailers must understand that their relevance in these scenarios will be limited unless they add value to the consumer and suppliers in terms of experience, trust or additional services.

**Successful online retailers must ask themselves sooner rather than later how long the positive impacts of job creation associated with warehouse and delivery jobs will survive the threat of automation.** And with just a handful of super-centralised platforms controlling a much of our personal data, how will brands ensure our data is safe and not compromised, undermining privacy?

All the ingredients for a system shift are lining up. Changing demographics, rising global consumption, flourishing ecommerce, new forms of consumerism and innovative retail models stand against a backdrop of huge resource pressure, digital exodus and rising debt. **The mainstream is being disrupted, the question is, can this be harnessed for sustainability?**

5

# New ways of organising catalyse societal action

People are organising in new ways that have the potential to be more democratic, involving more people and responding more directly to their needs and concerns.

This is facilitated in large part by the advent of online collaborative platforms, which can build momentum and solidarity with communities in real life ('IRL') in parallel to online memes and viral campaigns. Although growing in profile and use, these methods are not in themselves new. What is new is the potent combination of online networks with cooperative models for distributing decisions, and the capacity to understand what needs to change by harnessing data and system mapping tools.

In other words, it's not just how we organise that's changing: it's what we might achieve. However, not all collectives are organising for positive change. Online networks can also work to amplify social divides.

## Signals of Change

- **Across the world, new alliances are forming through guilds, unions and community-level initiatives.** In the US, the Tech Workers Coalition is enabling highly skilled professionals to reflect on the ethics and implications of their work, as well as challenging definitions of who the 'tech workers' are, to include the entire ecosystem, from cleaners to coders.[45] In the UK, unions such as the Independent Workers Union (IWGB), the Bakers, Food and Allied Workers Union (BFAWU) and United Voices of the World (UVW) are organising precarious workers, from Uber and Deliveroo drivers to McDonald's workers.[46]
- **White supremacists, men's rights activists, neo-Nazis, and other hate groups are 'building a new internet' to better communicate with members.** Many of these groups rely on sites such as YouTube and Facebook to organise. As mainstream sites such as Google, Facebook, and Twitter have started monitoring hate speech, alternative social platforms such as Gab.ai have emerged where hate groups can engage in anti-semitic, racist, and sexist speech as well as organize. Gab.ai has 240,000 users and was crowdfunded, raising over $1 million to support a 'safe space' to communicate and organize.[47]
- **"Flash organisations" are growing in power and possibility.** For example, in November 2017 Stanford University researchers designed software to help designer Daniel Steinbock produce his new card game True Story. The program worked by team leaders creating a blueprint organisation outlining the different roles and hierarchies and then software automatically filled these positions with qualified workers from the platform Upwork. After the positions were filled the workers were onboarded and explained their roles by the software.
- **Viral campaigns are changing laws.** In 2015, The Story of Stuff launched a campaign to ban plastic microbeads from personal care products. The campaign against microbeads grew to form a coalition of over 100 groups and active citizen engagement to push for a ban. This message was spread through social media platforms and through pressure on industry. Resulting legislation makes it illegal in 2017 to sell a product with plastic microbeads.[49]
- **Research conducted by the Harvard Divinity School** into the rise of religiously unaffiliated millennials is showing that religious affiliations are being replaced by 'organizations that blend a sense of community, a sense of self awareness, and a resemblance of religion' through ritual meetings around shared values – from fitness and yoga clubs, to lifestyle communities (such as #vanlife or Burning Man festival) and cyclical social events (such as Grub Club).[50]

5

## Implications

Social media, collaboration, campaigning and crowdfunding platforms are tools that can be used by groups as diverse as environmental activists and white supremacist groups. A growing number of voices is arguing that the design of these tools is not value agnostic – and **a much needed conversation about ethics is needed at the stakeholders ecosystem level, from platform coders to regulators.** As machine learning and AI research advances, these are conversations that we need to be having now.

**It is easier than ever for civil society to rapidly respond to government and business**, due to the immediate nature of social media and the rise of campaigning and crowdfunding platforms. But as every action has a reaction, it's also increasingly easy for 'uncivil society' to organise via similar means.

Hate groups and trolls can dominate online spaces, drowning out more nuanced or insightful opinions.

**What degree of intervention is needed to ensure civil society tools support healthy dynamics? And whose responsibility is this?**

# **New livelihoods** in low income and emerging economies

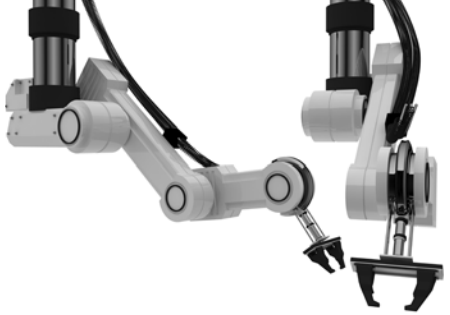
How people make a living is changing fast across the world as the gig economy goes global, demographics shift and automation is implemented. The impact could be more disruptive in developing countries, where there may also be more fertile ground for systemic shifts.

In developed economies, gig platforms like Uber are disruptive because they are de-formalising. In emerging economies, the opposite dynamic is in play – the informal market is becoming semi-formalised and more accessible. For example, Uber drivers are registered and rated; as such, they don't need to be part of a local cartel: this changes who can drive: we're now starting to see female taxi drivers in Nairobi driving with Uber.[51] There are parallels here with the adoption of mobile money in East Africa: a flexible new infrastructure can expand quickly as there is little existing formal infrastructure. There are still concerns around exploitation and discrimination on current gig economy platforms, but there is also potential for new, more inclusive models to emerge, particularly if platform cooperatives mature and provide more equitable structures for gig work.

However disruption to jobs from automation presents significant challenges to long-term formal employment in developing countries. The projections for formal job loss in countries such as India and Ethiopia are eye-watering – 69% and 85% respectively in one recent study[52] – as automation is enacted in manufacturing, ICT services and agriculture. Even if these are only half correct, it's clear that new routes to development and sustainable livelihoods will need to be found.

The online global knowledge economy could potentially offer new livelihoods to graduates in developing countries. A plethora of online platforms offer to link up international workers with online knowledge work, but research has found that the area is currently affected by a mismatch of supply and demand and a lack of frameworks to ensure the fair treatment of workers in developing countries.[53] If these issues are tackled, this area could mature with interesting long term implications.

Rural livelihoods could also transform in both positive and negative ways. Automation is already affecting tea pickers, and the livelihood potential of global agribusiness may shrink significantly as automation costs fall. If the biotech brewing revolution takes off, smallholders such as vanilla farmers risk being



marginalised by cheap synbio versions of artisan products. However, carbon negative regeneration of ecosystems and degraded agricultural land could offer new livelihoods. Civil works programmes for terracing, mass reforestation and watershed restoration could create rural jobs as well as incalculable environmental benefits, and can use the existing structures for Public Employment Schemes in countries such as India and South Africa. The model here is Costa Rica, which has successfully found a route to inclusive development based around positive ecosystem management.

Unconditional Basic Income (UBI) is a subject of investigation for developing economies. Both India and Kenya have implemented pilots, and findings so far indicate multiple benefits, from increased food security and welfare to higher levels of equity, emancipation, entrepreneurialism and economic activity. In contrast to expensive rich-country UBI schemes, they are far more affordable, particularly if spending is switched from existing subsidies. Earlier this year the Indian Chief Economic adviser called it 'an idea whose time has come' and noted that the sums add up. While a major challenge would be getting it to the unbanked, cashless mobile payment systems could overcome this hurdle in the near future.

## Signals of Change

- **Automation is already a factor behind job losses in developing economies. In India's ICT sector**, AI is taking over standardised tasks previously performed by software engineers and call centre operatives.[54] While in Kenya, EMROK tea growers threatened to replace workers with tea plucking machines, citing the need for cost savings, following disputes over pay.[55]
- **Andela is a company that trains up African software engineers and employs them to work remotely** for international companies, offering graduates in developing countries a way into the online global knowledge economy.[56]

- **The world's largest basic income pilot is being run in Kenya by the charity Give Directly.** The study involves over 6000 people, and will run over 12 years with the intention of testing the long term efficacy of unconditional basic income schemes in a developing country context.[57]
- **Social collaboration platform Colony enables users on a team to contribute their skills to a project, and pays people in proportion to the amount of work they contribute.** The platform assigns tasks to the best candidates and crowdsources important decisions. It enables the formation of globally distributed companies that are transparent and non-hierarchical.[58]

## Implications

**Traditional routes to development for emerging economies through manufacturing and agriculture are being eroded.** There is a need for all stakeholders – governments, workers representatives, corporations, development INGOs and relevant academia – to collaborate to identify new routes to development and prosperity, such as those scoped out in recent work by Forum for the Future and BOND. What new policy frameworks are needed? What research needs to happen? What needs to change in current practice? The wider context must also be factored into thinking and planning: what difference will demographics, social change dynamics, action on climate change and technological trends make?

**Business that are planning to implement automation need to think carefully about wider social consequences**, and be able to demonstrate that they have done so – or risk backlash.

**Supply chain managers need to ask how they will be affected by the proliferation of new work structures such as gig economy platforms.** What are the risks, and how can safeguards be built in for workers?

Online global knowledge economy platforms operate in an ambiguous space with regards to jurisdiction; **which legal frameworks are applicable if workers are isolated in different countries and the work undertaken is in yet another country?**

**Is there scope for the development of a widely accepted 'fair work' framework**, and more equitable versions of gig work platforms, such as cooperatives or decentralised businesses that share ownership benefits with users, perhaps relative to contribution?

7

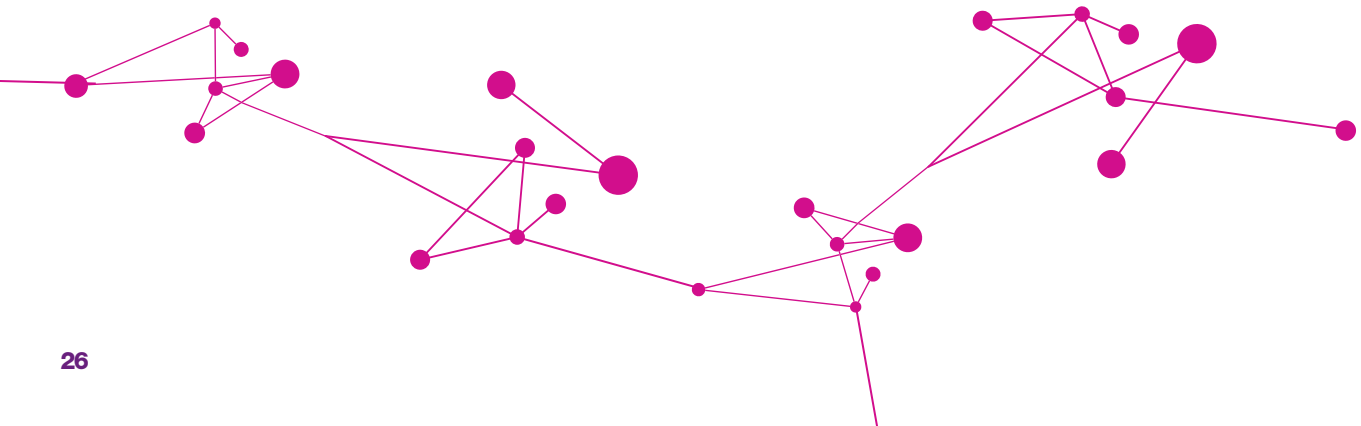
# **Blockchain** impacts beyond the hype

Last year, we explored the potential of blockchain to accelerate sustainability, identifying transparency and decentralisation among its revolutionary promises.

Now we are working to find out what is really changing, and to what extent the improvements go beyond incremental gains, in supply chain efficiency for example – focusing in particular on agriculture and the food sector. Approaches using blockchain are still in an experimental phase: there is much promise but solid evidence of positive impact has yet to emerge.

Blockchain is lauded for its ability to make all transactions open, tracked, and transparent. The core of blockchain is no more than a digital ledger: a decentralized database that records transactions and enforces constraints. While the initial applications were for financial transactions of cryptocurrency, many have forecast that cryptocurrencies peaked in 2017 and that prices will go down this year. Blockchain is now being used in many other applications from open supply chains to new models of governance.

Blockchain is most powerful when combined with other technologies, such as with the Internet of Things (IOT), enabling specific items to be logged along complex journeys (from farm to plate, for instance), or with drone surveillance, enabling decisions to be taken by decentralised robotic systems (such as acting to quell a forest fire after detecting smoke from multiple sources). Where is the advent of decentralized and accessible information already enabling positive change?



## Signals of Change

- **Akshaya Patra, an Indian NGO that runs the world's largest mid-day meal program of its kind, is teaming up with Accenture to use blockchain to improve meal delivery to schoolchildren.** The system ensures accurate invoicing and reporting, and facilitates real-time feedback leading to better service provision. The efficiency gains will allow the group to provide one million more meals per year.[59]
- **Walmart, Unilever, Nestle and others have teamed up with IBM to explore blockchain applications for food supply chains.** They aim to use blockchain to maintain secure records of their supply chains for important commodity products such as chicken, chocolate and bananas. Not only will the supply chains become easier to track, but issues such as an outbreak of foodborne illness, will be easier to mitigate.[60]
- **Provenance, a blockchain start-up, raised $800K in seed capital to create digital histories for specific products**, enabling business and consumers to trace and verify origins and ownership across a product's lifespan. The technology could be used for a number

of food and product supply chains in order to provide greater transparency. Complex commodities that span many geographies, such as cotton, are now traceable.[61]

- **The Energy Web Foundation uses blockchain to accelerate renewables and cut costs.** Utilities involved include Singapore Power, Royal Dutch Shell, and Tokyo Electric Power. Blockchain will enable direct and secure transactions between multiple parties and thus facilitate the integration of renewable energy sources onto the grid. Different sources and companies will be able to transact easily with one another, cutting costs, and it will become easier for participants to consume, generate and sell energy.[62]
- **Finnish start-up MONI is using blockchain to support paperless refugees.** It issues accounts and cards to carry payments of government benefits, which MONI says are neither cheap nor safe to deliver. When the refugees eventually get jobs, their salaries can be paid to MONI accounts as well. The system is currently being tested by the Finnish Government.[63]

## Implications

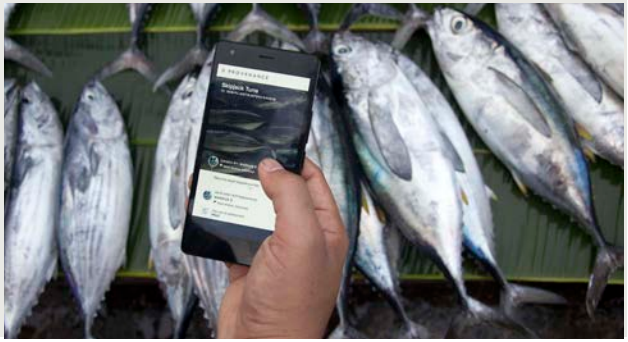
**The ability to track complex product supply chains for goods such as coffee, tuna, and diamonds can lead to more sustainable practices**, but there are also concerns about the greater administration and knowledge burden that logging transactions places on smallholders and suppliers. How can their time be factored into their payment? Does visibility and transparency necessarily mean the transaction becomes fairer?

**The hope is that consumers and NGOs will be able to identify responsible and fair supply chain actors and put pressure on bad ones to improve labour conditions and support sustainable practices.** How can smaller players be protected meanwhile?

**For companies, increased supply chain transparency will mean greater efficiencies in production and less material waste.** Organizations will be able to better collaborate with others and create a more circular economy. It will be easier to pinpoint issues such as contaminated food or factory safety within a supply chain, and rectify problems as needed.

**Larger applications of blockchain within the food and energy system, such as the ability of small producers to contribute energy to the grid, could lead to more decentralization.** This could bring both greater resilience to the system and greater power and choice to small players. Is blockchain expected to lead to a future of self-organising networks, with no central coordinator? How could this disrupt different sectors?

**The data requirements of blockchain-based systems already consume vast amounts of energy.** Bitcoin mining consumes 22.5TWh of energy a year, the equivalent of 13 million barrels of oil: how can this demand be met sustainably?[64]



# The apparel sector in flux

## Case study of a system under pressure

The dynamic areas we explore here don't operate in isolation, but combine in complex ways to challenge and open up opportunities for transformation. The apparel sector is a great example of this. Increasing demand, 'fast fashion' and low-cost production models are placing greater pressure on diminishing resources and livelihoods. There is a huge amount of innovative activity across the system, but this has yet to link up to create significant change.

case study

## Early signs of a regenerative agriculture approach

Some in the apparel industry are becoming aware of the potential for better soil management. Research has demonstrated that organic cotton growing has already sequestered significant volumes of carbon and has the potential to sequester much more, and this is being talked about in sector-wide forums.[65]

There is also increasing awareness of the impact of specific textiles. For example, cashmere production is associated with overgrazing of grasslands that hold huge amounts of greenhouse gasses – in Mongolia in particular.

Patagonia is one pioneer of regenerative farming, having adopted organic practices in 1996.[66]

## Plastic pollution a huge challenge

Several companies are making polyester from PET bottles, as circularity becomes a more mainstream idea. For example, Spanish company Ecoalf is partnering with fishermen to remove plastic litter from the Mediterranean sea bed, working in 32 ports with 440 boats to recover around 150 tons of marine plastic, as a feedstock for clothing made entirely from recycled materials.[67]

But the bigger issue of plastic microfibre pollution has yet to be grasped in a coherent way, or even properly acknowledged by many parts of the apparel industry. Synthetic microfibres have been revealed to be a much bigger problem than previously suspected.[68] Millions are shed every time a synthetic garment is washed, as well as in every day wear. Filters can reduce the problem to some extent, but require mass retrofit to millions of washing machines to have any effect at scale. There currently does not appear to be a sustainable long term solution beyond a move away from petrochemical-based synthetic fibres entirely. Cellulosic and other bio-based fibres do not cause the same issues as they can biodegrade.

## Livelihoods under threat in emerging markets

Automation is a key area of concern as the apparel industry is a route to development for countries in South Asia such as Bangladesh, Pakistan and Vietnam. The signals here are worrying: Adidas is piloting the reshoring of manufacturing to Germany, using robot-staffed ‘Speed factories’. In Atlanta, the ‘Sewbot’ is being developed by Softwear Automation,[69] which aims to automate the entire clothes-making process. A key driver for such automation is that it permits the relocation of production closer to end customers – allowing more rapid response, and more frequent production cycles.

While commercial application of Sewbot technology is still some years away, the consequences for Bangladesh – which relies on the textile industry for 82% of its exports – could be severe. The threat of automation may also hinder attempts to improve worker pay and conditions by creating a cost ceiling.

## Blockchain promising more supply chain transparency

Transparency in supply chains is key to achieving sustainability in an industry as complex as apparel, with multiple steps from agricultural fields to finished garments at point of sale. Consumers currently have to take brands on trust – and trust is in diminishing supply. Recently, Zara was hit by allegations of profiting from clothes made by an unscrupulous supplier, when unpaid workers slipped pleas for help into items.[70]

Campaigns such as #whomademyclothes continue to increase consumer awareness of the opacity of current arrangements and the need for change.[71]

Blockchain could provide a solution here, and initiatives are beginning to happen. The designer Martine Jaarlgard is piloting the use of Provenance's blockchain platform to provide total transparency and traceability for each individual piece of her knitwear collection, from the rearing and shearing of the alpacas to the finished item.[72] Brands can see this as an opportunity to put transparency at the heart of their conduct and story.

## People organising for change

Community groups are emerging with the aspiration of zero waste lifestyles, finding ways to repair, trade and upcycle consumer goods. For instance, Circular Community HK shared a full guide to a DIY zerowaste Halloween costume via social media, alongside a photography exhibit of the costume modelled. Online subscription models are also emerging, to challenge the notion of a privately owned wardrobe, such as Singapore's Style Theory, an 'infinite wardrobe' which combines extensive user feedback with algorithms to provide the best fit to its clients.[73]

## What does this mean for the future of apparel?

The apparel sector is rich with innovation and change, but the fast fashion model, with its intensive resource use and inequitable supply chains, still dominates.

Investment in circular economy models are important, but run the risk of undermining livelihoods by reducing or moving the manufacturing base, and of increasing plastic microfibre pollution. Regenerative agriculture has great promise for improving production of natural fibre in the long term, but can it support the ever-increasing demand of fast fashion? It might also boost livelihoods, but probably not in urban areas where textiles production is concentrated. Blockchain can build transparency and trust, but again doesn't in itself challenge the fundamentals of the system.

There are no simple or straightforward solutions.

Organisations like Fashion for Good, a major investment by C&A Foundation, the Better Cotton Initiative or Forum for the Future's Cotton 2040 programme, are making progress by increasing demand for more sustainable fibre, experimenting with different innovations or building public awareness. But to accelerate change, a system-wide view that connects up the different positive initiatives, and a compelling vision of an alternative, more sustainable system, are needed.

# Four areas to watch

1

# **Data and surveillance** gets deeply personal

## The combination of Big Data and AI is accelerating surveillance capability, with potentially alarming implications.

Anonymising of data is no longer enough to protect privacy, as geographic data alone from smartphones is sufficient to create a detailed picture of a person and even identify their name.[74]

And deeply personal information can now be inferred with surprising accuracy by AI systems that deal with facial recognition. A 2017 Stanford University study found that an algorithm could correctly identify the sexuality of a person, based just on their photograph.[75]

But these capabilities are not restricted to research labs. The facial recognition capabilities on the latest iPhone can capture involuntary micro expressions.[76] These are the facial expression that occur within 1/25th of a second and reveal a person's true emotions; everyone flashes them. Such information can be used as a form of 'mindreading'[77] – to detect deception, or to hone desired responses to advertising or propaganda.

Governments are already using big data in attempts to influence and control whole societies. China's ambitious social-credit system is structured as a panopticon that will 'allow the trustworthy to roam everywhere under heaven while making it hard for the discredited to take a single step'.[78]

### What does this mean for the future of sustainability?

The advent of such tools is deeply worrying for both individuals and societies. Autocratic states have increasingly powerful and precise surveillance capabilities at their disposal, raising the prospect of digital totalitarianism. Democratic societies are also affected as these tools are available for use by large corporations and may strengthen unhelpful aspects of the 'surveillance capitalism' model pioneered by facebook and Amazon.

How will these tools affect our societies – particularly with regards to trust, empathy, social cohesion, collaborative action and consumer behaviour? What are the prospects for individuals and groups to escape increasingly powerful and subtle means of monitoring and manipulation?

2

# **Space** as the next frontier of sustainability

## Human activity in space is growing quickly – will the benefits outweigh the risks?

In February 2017 India launched 104 satellites in one go, beating the previous Russian record of 37. The payload consisted of one large satellite and 103 nano-satellites, massively increasing the number of satellites in orbit – 1459 at the end of 2016.[79]

Most of the satellites in that launch were for private sector customers, illustrating a shift from the 'old space' industry of big public funded programmes motivated by big power politics, to the 'new space' of small-scale profit-driven enterprise.[80]

Later in 2017 the Luxembourg government became the first to recognise the right of private companies to make profits from materials extracted in space. Asteroids could be a rich source of metals and minerals, one that Luxembourg-based Planetary Resources has its sights on. The moon is rich in an isotope of Helium that could be fuel for nuclear fusion power, and may harbour rare earth elements that are much prized by high tech industry.[81]

### ? What does this mean for the future of sustainability?

Space tech is already integral to gathering data about planet Earth, improving telecommunications, how we monitor supply chains or fishing on the high seas, how we plan and run cities, farm our land or coordinate humanitarian efforts. As satellites become cheaper and easier to launch, more and more people, organisations and countries stand to benefit from this. But there are always privacy and security concerns attached to so much surveillance. And might a seemingly limitless supply of celestial resources, from gold to nuclear fuel, hamper our attempts to rethink our society and economy, by making the notion of planetary boundaries appear meaningless?

3

# The increasing importance of **place**


## Strong economic and political forces are combining with a greater capacity to produce and consume locally to change how people relate to the place where they live. Could rooting sustainability in the local context be the key to future impact?

Since well before the UK voted for Brexit and the US for Donald Trump, commentators have remarked how globalisation appears to be slowing or reversing, protectionism emerging and national or regional political identity, exemplified by the recent Catalan experience, strengthening.[82]

It's also becoming evident that, rather than heralding the 'death of distance' and distributing wealth and opportunity more evenly, the digital revolution is allowing wealth and opportunity to concentrate where it is generated, usually in well-connected cities, with universities and a young population.[83]

Meanwhile, it's increasingly possible to provide more of life's necessities locally.

Community energy is booming around the world – in a wind power auction in Germany this year[84] community energy cooperatives were successful in more than 90% of cases.

Local food systems are appearing everywhere – like Supr Daily in India which matches local supply and demand for uncontaminated milk and other staples.[85]

In the UK there is a resurgence of place-based activity, like local currencies, locally-made beer, community energy, hyperlocal news, local festivals and community business. Meanwhile government is devolving power to cities and local authorities and funding community-based social action.

These grassroots initiatives reviving place-specific activities are matched by a growing number of climate change resilience networks seeking to connect local activity with a globally-minded outlook. Networks such as C40 Cities and 100 Resilient Cities are working with policy makers, local governments as well as NGOs and community groups to devise and implement place specific strategies for curbing climate change. For example, Boston's climate change resilience plan focuses on tackling social inequality, acknowledging that it augments the environmental effects of climate change.[86]

### ? What does this mean for the future of sustainability?

There may be huge benefits to reap from a greater affinity with place. People tend to care more for the people and things that are immediately within reach. A greater emphasis on community may help build social cohesion and increase social capital and wellbeing. More localised systems may be more resilient – as recently in India when floods hit power systems and villages with their own micro-grids were easier to keep supplied with electricity.[87] There could be an opportunity for more effective, targeted services for people and more democratic involvement and power for individuals to shape their environments.

But capitalising on this shift will need careful attention from public and private sectors.
The flipside of localisation is division. Different organisations will have different roles to play to prevent the growth of insularity and inequality of opportunity, and maintaining common sense of purpose across community divides.

4

# The tipping point approaching on **plant-based diets**

## Social attitudes around meat eating are shifting rapidly, and far faster than expected. Could we see a global transition to plant-based eating in the next decade?

Multiple factors are combining to signal a tipping point for plant-based diets. Firstly are the growing health concerns around meat consumption, such as the WHO's warning of the correlation between cancer and meat, and the risks to antibiotic effectiveness.[88] Secondly, with livestock farming responsible for around 15% of emissions and causing ecological degradation, the environmental impacts of our diets are also shifting attitudes.[89]

As a result vegetarianism, veganism and flexitarianism are seeing a surge in adoption, including among influential celebrities and chefs, who in turn influence consumers and set dietary trends. This isn't just a Western phenomenon; India and Taiwan have some of the highest rates of vegetarianism in the world,[90] and, although in China meat consumption is rising as it is still seen as a status symbol, the government aims to curb the country's meat intake by 50%.[91]

Environmental, welfare, cultural and health concerns alone are not enough to disrupt the market. What's needed to catalyse change is for meat-alternatives to be cheaper, more convenient and tastier. There are strong signals this is happening – the food industry is listening, recognising the opportunities for innovation and growing market for plant-based diets. The cost and quality of alternative proteins is also improving fast, helped by investment from companies such as Tyson (US meat giant), Nestle and Danone.[92]

### ? What does this mean for the future of sustainability?

The implications are huge – a major shift in diets away from meat will seriously disrupt the agriculture and livestock industries, changing communities, economies and livelihoods across the world. Could livestock farming even become a niche area in the long term?

For business, expect increased competition in the alternative and plant-based protein sector. First-mover businesses such as Pret, Unilever, Nestle and even McDonalds and Tyson foods are investing and innovating already, and less agile businesses could miss a golden opportunity. There is a reputational risk too; as the trend of awareness and transparency increases, the animal protein industry will come under scrutiny for welfare, antibiotic use and even the environmental impact of feed crops.

# ‘You can’t change systems without changing yourself.’

Geoffrey Bateson, social scientist

# Thriving in an uncertain world

Change is ever present, but the past year has felt particularly volatile. Shocks and chaos surround us. Many systems that we rely on seem to be reaching a state of crisis.

## But this is also a time of opportunity.

As the study of living systems shows, systems need disruption to evolve. The pathways may be rocky, but the long term outcomes can be positive.

A theme running through our report this year is the growing importance of the human and social dimensions of sustainability. To be sure, we need new technology like blockchain, new tools and techniques like regenerative agriculture, but it takes people to develop and apply the new tools and approaches in ways that support sustainability.

Some of the social shifts we're witnessing are worrying from this point of view. Polarisation, exclusion, the politics of identity and social atomisation could undermine the ability of communities at every level of society to work together.

The new ways of organising we look at in this report can be a source of hope, but they are not enough on their own. We need change at a deeper level, in how we as individuals think and act. We need to go beyond single issues, technologies or business models, and develop the capability to live with and shape change.

As one commentator put it, we need to shift the emphasis 'from designing things to designing the capability of the constructed world (and of human activities) to support the positive co-evolution of human and natural systems'.93

When working to change systems, we need to be:

**Continuously innovating and learning:** this means responding to the change we experience, taking action in response and learning from the impacts of that action.

**Resilient and adaptive to change:** this means working with multiple and diverse relationships, and is why collaboration and creating new forms of organisations based on trust and deeper engagement are critical to addressing sustainability challenges.

**Aware of whole systems:** This means recognising that we are embedded in dynamic systems that are in constant flux.

We need to develop these capabilities at different levels: individually, as Forum seeks to do through our School of System Change; organisationally, as we are through Forum's partnerships; and at a wider systems level, an approach which informs our collaborations to transform systems like protein, tea and cotton. The table overleaf sets this out in more detail.

There are many definitions of sustainability out there. This is ours:

'Sustainability is a dynamic process which enables all people to realise their potential and to improve their quality of life in ways that simultaneously protect and enhance the Earth's life support system.'

As such, sustainability is a continual aspiration, not a goal that one day we will reach and our work will then be over. Change will always be with us, so let's build the capabilities to shape it.

# The capabilities for sustainable systems[94]

| | People | Organisations | Society |
|---|---|---|---|
| **Innovation and learning** | Are bold and ambitious | Ensure learning and feedback are central to decision making and development of new practice. | Encourages Innovative learning institutions to thrive in society |
| | Continually experiment with new ideas and approaches | | |
| | Actively seek feedback from others | | |
| | Are intentional about their choices | Value innovation and accept experimentation and failure. | Has governance that builds ongoing feedback into decision making |
| | Are reflective | | |
| **Resilient and adaptive to change** | Value all perspectives, and can convene and work with diverse groups in different ways | Use participative and conflict resolution processes internally and externally. | Provides strong support for collaborative working between different organisations and interest groups. |
| | Are authentic and honest in their actions | Create spaces for people to feel safe in their different views and bring their whole selves to their lives and work. | Makes resources available to support a diverse and civil society to thrive (e.g. funding, time, spaces, facilitation, skills) |
| | Have compassion for themselves and others as they deal with change. | | |
| **Aware of whole systems** | Perceive the world as multi-layered, recognising that change takes place over multiple time horizons and in different arenas. | Delegate responsibility so that the organisation can benefit from where knowledge is held. | Understands social and environmental value as integrall to economic value |
| | Are conscious of their own beliefs, values and worldview, and can challenge their own assumptions. | Allow self-organisation in governance and decision making. | Operates to restore and regenerate our ecological life support systems. |
| | Are comfortable with emergence and uncertainty. | Cultivate a strong sense of purpose and values that are lived throughout | |
| | | Have a futures orientation that helps them deal with changes in society | |

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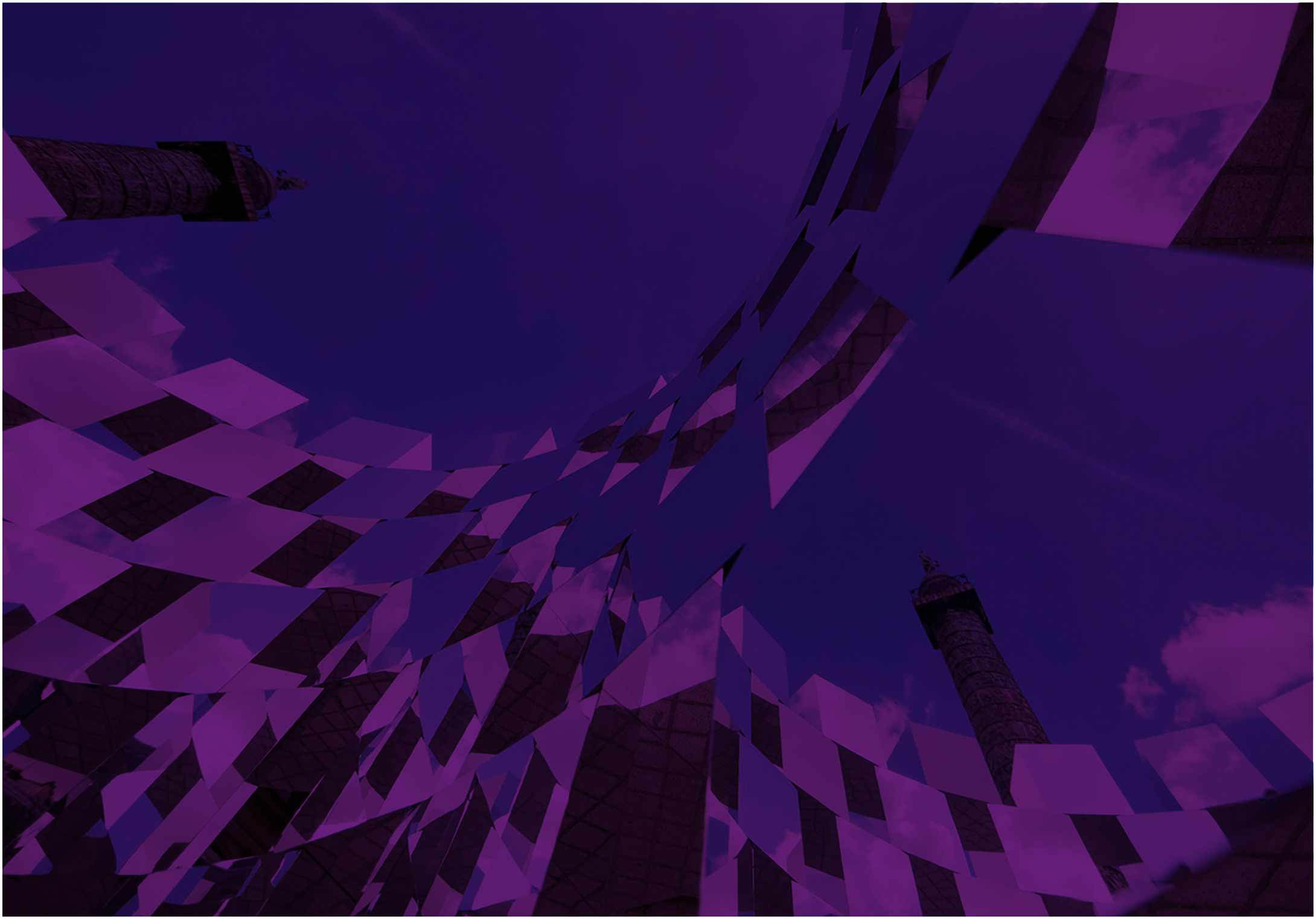

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