Future Forces Disrupting Sustainable Business

a full-spectrum thinking approach to building sustainability, 2019-2029
Future Forces Disrupting Sustainable Business

examines the challenge of doing business in a rapidly changing world, where the definition of ‘sustainability’ is broadening and every business wants to build and maintain a ‘sustainable’ business model.

This report examines four future forces that are external drivers of change with the power to upend today’s business models over the coming ten years. We ask readers to grapple with these forces and to consider how each might disrupt their organization—as well as open up new opportunities.

To help you navigate this increasingly complex business planning environment, we introduce you to a full-spectrum thinking approach to building sustainability as a valuable tool.

This report is the output of a 2019 project supported by the members of GEMI, the Global Environmental Management Initiative. It follows a forecast GEMI commissioned from Institute for the Future in 2007. We encourage you to visit that forecast to see how the ecosystem of sustainability has evolved over the past decade.
What to look for in this forecast

• **Dive in** to understand the future forces. Be sure to view and/or print this library, with notes included that explain the slides in full detail.

• **Get comfortable** with the concept of full-spectrum thinking to help you move from looking for the right answer to today’s challenges and instead unlock a range of possible answers that each bring value.

• **Learn to communicate** the four future forces in your own words, and explain how they will have new impact on your organization, as well as your customers and suppliers, over the coming ten years.

• **Scout for additional signals** of change that bring to life the impacts these forces will have on your organization.

• **Develop a community** of people to help you think systematically and imaginatively about the future.
The Foresight-to-Insight-to-Action Cycle

IFTF brings expertise in foresight: looking to the future through a systematic, plausible, and provocative lens. Foresight is not prediction.

Insight arises out of foresight. It is the “a-ha” moment that signifies a new way of looking at the world. Critically, once you’ve had an insight, you can’t go back to your old way of thinking.

None of this matters without Action. As an organization, you must decide how to take action based on your newfound insights.

Finally, this process is a cycle, since any action leads to new developments to assess through foresight.
In 1987, the United Nations gave a modern definition to the concept of 'sustainability' with the publication of *Our Common Future*. This report challenged all countries to ensure that their development efforts “meet the needs of the present without compromising the ability of future generations to meet their own needs.” Similarly, businesses with an eye towards sustainability strive to develop their present capacities while preparing for their futures.

Historically, companies around the world have operated with a centralized business model that aims for efficiency and scale. Intellectual property is a key asset. Planning cycles are faithfully followed, and bonus pools for hitting KPIs are the norm. Businesses and markets are siloed into categories, and improvement is attributed to work effort and market timing.
Yet categorization often leads to a false sense of understanding of the world and the forces that shape our decisions.

In his 2020 book, IFTF’s Bob Johansen forecasts the need for a new skill: spectrum thinking. He writes, “Full-spectrum thinking is the ability to seek clarity and understanding across a continuum of possibilities—while resisting the temptations of premature categorization and false certainty.”
In the future, business leaders will have to grow comfortable with uncertainty. Understanding multiple, possibly divergent, implications and acting on them with clarity will be the norm. This may mean leaving some things undecided while still working towards a goal or outcome—holding on to those goals lightly. Letting go of a sense of right and wrong paths will be foundational.

This is the heart of strategic foresight: opening your mind to hold competing possibilities as equally valid, likely, and worth pursuing. New spectrums—not just one spectrum—of thought will become possible in new ways over the next decade. **Full-spectrum thinking will be required to thrive.**
Fortunately, new spectrums of innovation are beginning to appear already. Full-spectrum thinking is on its way to becoming the norm.

This deck introduces a few of the new spectrums that will become important and scale up over the next decade. It will be a great time to leapfrog past incremental and categorical innovation, and full-spectrum thinking will help us do just that.
The spectrums include several signals of change, a key tool of futures thinking. These signals aren’t predictions or endorsements, but rather real, current-day examples of deviations from the norm that, if they were to scale up, would typify the way that these futures might come to look.

When you read a signal, it’s often useful to take each one as a micro thought-experiment: ask yourself, “What might change about the way the world works (or the way my industry, my organization, or my life works) if this signal were to scale up?”
NEW SPECTRUMS OF meaning
Full-spectrum natives will lead shifts toward more inclusive, diverse, and unusual values

NEW SPECTRUMS OF value creation
Businesses will operate in a world of distributed ecosystems

NEW SPECTRUMS OF time
Organizations will adapt to future back-strategy to navigate competing pressures

NEW SPECTRUMS OF resources
Materials and infrastructure will evolve through deep technology
Political scientists Andrew Gelman and Yair Ghitza found that the political events that people experience during their youth are incredibly influential in shaping their political beliefs and identity over their entire lifecycle. Things that happen later in life, from the mid-20s onward, just don’t have the same influence.

The way young people are normalized has significant effects on their entire lives. And the people who are becoming adults in the age of “always-on” connectivity—the soon-to-be workers, leaders, and disruptors of tomorrow—are already adept spectrum-thinkers.
These young people will be more than digital natives. They’re coming of age in a time in which social media connectivity is ubiquitous, personal identity is inseparable from online identity, and information is cheap and constantly updated.

The introduction of this population to the workforce will have a drastic impact on organizations and will demand full-spectrum mindsets to adapt to that impact.

Traditional workplace roles will diminish relative to constantly shifting roles.

Certifications will diminish relative to inclusive indicators of ability.

Young employees, customers, and investors will require companies to be more open and transparent about their values-operating system.
A rapid increase in access to networked communications—especially open, easy-access, and highly distributed channels of media and communication—has made it so that young people are operating at an entirely new level of communication and building meaning. By nature of their extreme access to information and idea-sharing, they are normalized to environments where spectrum thinking is a necessity.

This cadre of hyper-connected people are currently experimenting and learning how to navigate their world, often by looking towards more diverse, inclusive, or unusual ways of making meaning. This may well lead to a generation of “activist full-spectrum ‘natives.’”

“Young people all over the world are the most active users of ICTs. While 30 percent of the youth population are digital natives today…within the next five years, the digital native population in the developing world is expected to double.”

-Measuring the Information Society
WhatsApp as an education and income platform

What: A young woman in Lagos uses the mobile chat platform WhatsApp to offer classes in makeup and hair design using a mobile payments app to accept tuition from students all around the world.

So What: The impact of finding one’s parent’s experience irrelevant, combined with ubiquitous digital platforms, allows young people to pave new paths and be less loyal to legacy systems.

What’s Next?

Start-up ventures will be the classrooms of the future, concurrently operating as business partners to large corporations, with young people weaving across spectrums of learning and earning.
What’s Next?

Asking a worker of the future what their job title is will seem like a meaningless question. They’ll have a unique spectrum of offerings that will make them extremely tricky to categorize.
Social media leads to new ways to model gender identities

What: A series of interviews by a New York Times reporter found that many young people have been able to express their identities in much more depth through social media platforms, even learning new language to describe themselves and base their core identity on these platforms.

So What: This is one example among many of how digital platforms enable describing oneself along a spectrum rather than in accepted categories.

“What’s Next?”

This concept will spread out from highly personal social issues to a multitude of ways to build one’s identity. The future will be home to groups of people who would never describe themselves as simply ‘liberal or conservative,’ ‘employed or unemployed,’ ‘citizen or foreigner,’ and so forth, empowered in large part by the spectrums offered by digital platforms.

“Hashtags and profiles are influencing an entire generation of people who now often develop their sense of selves online.

“As Turner told me, ‘People are finding ways to articulate how they feel about themselves, and that’s what happened to me too.’”

- Jenna Wortham
One of the ways that young spectrum thinkers are already starting to manifest their way of thinking is through the increasing “value of values.”

Young people are driving the need for organizations to take strong stances on social issues that they may previously have never considered—even those seemingly irrelevant to their core business.

This population doesn’t see a meaningful separation between the operation of a company and the social stance it takes. Just as they see individuals as existing on a spectrum of identity, so do they see organizations.

Essentially, taking a stance as a whole brand on divisive issues will soon become a better choice than staying silent.

The Nike ad campaign featuring Colin Kaepernick was one of the early signals that savvy brands are testing the value of values.
Young people (especially those in the 14–24-year-old range) are currently building the systems and strategies they will use to work, learn, make money, and impact the world. Many of them are doing so quite successfully, in ways that have never been seen before. They are iterating and improving these systems multiple times before they even consider traditional working paths—that is, if they see a reason to consider traditional work.

Operating in a spectrum of meaning means broadening your measure of value beyond categorical signifiers. In a near future of extreme transparency, recognize the value of values in your business. Passivity on social issues may no longer be an option.

### Considering the new spectrum of meaning

### Capacities to build today

- Build in and start experimenting with spectrums of evaluation and meaning creation.
- Learn from your current under-30 staff what conversations they are engaging in.
- Re-think the definition of activist and imagine it as part of self-expression.
- Prepare to take proactive stances on social issues, even those seemingly unrelated to your operations.
NEW SPECTRUMS OF meaning
Full-spectrum natives will lead shifts toward more inclusive, diverse, and unusual values

NEW SPECTRUMS OF resources
Materials and infrastructure will evolve through deep technology

NEW SPECTRUMS OF time
Organizations will adapt to future back-strategy to navigate competing pressures

NEW SPECTRUMS OF value creation
Businesses will operate in a world of distributed ecosystems
In 2008, for the first time ever, more people worldwide lived in cities than rural areas; by 2050, the U.N. anticipates **70 percent of the world’s population will be in cities.**

Accommodating this growth will require building as much new building stock as is currently in all of New York City—**per month.** Mass urbanization, human movement and longevity, infrastructure upgrades: these are all factors that are contributing to growing demands for meat, water, construction materials, pharmaceuticals, and more.
This tipping-point effect is replicated in renewables just as much as in traditional resources. McKinsey’s 2019 Global Energy Perspective reports that “new renewables will be cheaper than existing coal and gas almost everywhere by 2030.”
But while this growing demand is opening up new kinds of global business opportunities, we should not assume that this growth will mirror the ways we’ve deployed resources and infrastructure in the past.
A range of novel materials will make up this spectrum that forward-looking organizations can harness to reinvent the ways we develop, distribute, and manage physical infrastructure and goods.

Spectrum thinking, in this case, means understanding that the values and advantages of inputs will shift rapidly.
Bioengineering advances to create leather in a lab

**What:** Bolt Threads is using bioengineering to grow natural materials under lab conditions.

**So What:** Differentiations between lab-grown and non-lab-grown materials will become an important factor in manufacturing, while enabling leapfrog innovations.

**What’s Next?**

Biomimicry engineering will become an on-demand service, with students and independent scientists banding together to respond to RFEM’s: Requests for Engineered Materials.
Big Pharma contracts AI discovery for one million dollars per drug

**What:** Pharmaceutical company Eli Lilly & Company has offered Atomwise, an AI-based drug discovery company, $1 million per discovery of molecules addressing certain disease targets.

**So What:** Complex technologies like AI that are required to navigate cutting-edge R&D advancements will operate as B2B services for companies who can't take on the risk or burden of doing it themselves.

**What’s Next?**

Quantum computing, deep simulations, and advanced 3D printing will upturn innovation methods at a speed that quickly outpaces traditional labs and regulation.
Signal

The Rise of Wooden Skyscrapers

What: Plans for massive wooden buildings are enabled by a government initiative to promote wooden buildings, a breakthrough in digital design tools, and cutting-edge chemistry.

So What: Gingko and similar companies will give us access to a wide array of novel inputs with limitless customization possibilities.

What’s Next?

A spectrum of building materials and techniques—nanocrystalline cellulose, warping simulations, green concrete, and more—are waiting in the wings and may become overnight successes.
Ginkgo Bioworks’ microfactories grow custom molecules to order

What: Ginkgo Bioworks designs organisms capable of producing cultured ingredients for use in agricultural processing and food ingredient industries.

So What: The next decade-plus of resource advancements will be heavily influenced by too many interacting factors to have a strong grasp on each.

What’s Next?

A cell-programming platform will enable quick pilots to explore new organisms and smart cells as medicines and industrial catalysts.
It is daunting to track every possible technological development. Spectrum-thinkers understand that new developments can be rapid game-changers, and so leave themselves the flexibility to shift gears while simultaneously pushing forward with their current initiatives.

In a future of exponential infrastructure and population growth, engaging with this new spectrum of resources requires flexible thinking on where materials come from, what solutions they can provide, and how quickly they can scale or fail.
In many cases, we'll soon hit an inflection point where sustainably advantaged things will be cheaper to make than their less-sustainable counterparts. There is an early opportunity to invest in sustainability focused R&D now to make these markets yourself, rather than wait around for someone to beat you to it.

Many of the innovations that captured the public eye in the late 1990s through 2010s were focused on consumer software and Internet connectivity. The next few decades will see the rise of sustainable innovation in materials, infrastructure, and related services as the exciting space to pay attention to.

- To empower all built aspects of your business, prepare to jump from the first curve of business models (incremental, categorical innovation) to the second curve (tapping a spectrum of new resources). These jumps may come at different times; gauging when to do so requires tracking the pace of change.

- Commit to scouting for signals of these innovations coming to life.
NEW SPECTRUMS OF meaning
Full-spectrum natives will lead shifts toward more inclusive, diverse, and unusual values

NEW SPECTRUMS OF resources
Materials and infrastructure will evolve through deep technology

NEW SPECTRUMS OF time
Organizations will adapt to future back-strategy to navigate competing pressures

NEW SPECTRUMS OF value creation
Businesses will operate in a world of distributed ecosystems
Present-forward thinking has classically been the default way of strategic operation, and for good reason: it’s intuitive and natural. However, the present is becoming too noisy for present-forward to be the only way to think strategically.

Vast amounts of conflicting data, ideas, information—in other words, noise—are rapidly piling up. Simply looking for the next big thing and how to monetize it will no longer keep your business ahead of the curve.

Organizations that instead approach strategy through a “now, future, next” framework, by making strategic decisions based on far-horizon futures, are starting to appear—and in some cases starting to pull ahead of the pack.
Increasingly, customers and investors will align with companies that work with future-back models, rather than present-forward.

**To get ahead and stay ahead, businesses will switch to a ‘now, future, next’ framework to build both forward-focused and sustainable business plans that are not tied to time constraints.** This framework looks at planning very differently and sees long-term thinking as an ally.
Value of long-term thinking is quantified

What: A ten-year study defined Corporate Future Preparedness in 135 major European companies and linked foresight strength to higher profitability and growth.

So What: This demonstrates the value of thinking long-term and accepting uncertainty as an approach that helps firms outperform their competitors.

What’s Next?

New financial rating systems will incorporate future-preparedness metrics and accept business forecasts offering a range of outcomes.
Terracycle leapfrogs the recycling system

What: TerraCycle’s business model is getting end-users and producers to fund waste diversion research for currently unrecyclable materials.

So What: They are gradually creating viable processes and markets for waste, while building an engaged customer base glad to help fund a solution to their lifestyle.

What’s Next?

Business leaders will imagine new phases of "end-of-life" product partnerships and drive significant revenue while dispose of their products and byproducts.
**What**: Tesla posts their 10 year Master Plan on their website, visible to investors and competitors alike.

**So What**: Demonstrating comfort with toggling between the pressures to maintain a competitive edge long-term and operate within the tight margins of today allows stakeholders to understand the actions of the company today in light of their future vision.

Rather than seen as a limit or impediment to success, long time-spans will instead function as a partner that enables new business models to flourish.

*The master plan is:*

- Build sports car
- Use that money to build an affordable car
- Use that money to build an even more affordable car
- While doing above, also provide zero emission electric power generation options
- Don't tell anyone.

- Elon Musk
What: The LTSE will list only companies and investors that focus on long-term growth and innovation.

So What: The LTSE decreases the power that time holds in business planning while maintaining regulatory transparency.

What’s Next?

Public companies will work with regulators to find new ways to communicate their earnings and potential without quarterly estimates. Blockchain may provide a validation of corporate earnings without granular data open to inspection.
The advantage of incorporating a future-back strategy is just now becoming clarified and validated through case studies and research. In the next ten years, organizations that can create effective strategies for long-term operation (beyond the career spans of individual people) will be the ones that can weather complex and volatile global systems.

Incorporating a clear view of a future ten or twenty years out is easier to do than a future only two or three years out because organizations have a latent capacity to influence those further-out futures more strongly.

Due to the increasingly noisy nature of the present, influencing the future will become a critical capacity. A future-back strategy allows an organization to do this effectively.

Think through the ways these signals of change can inspire your company to address current time-bound challenges and opportunities and shift your strategic planning cycles.

Imagining the future first will cause you to push outside your traditional trust boundaries to open IP, physical assets, and tightly controlled business models to create networks of previously disconnected stakeholders. Simulations will become the norm as they allow massive variable scenarios to be optimized for net-positive environmental and social impact across time-frames.
Capacities to build today

- Create the dedicated capacity to conduct early experiments in future-back planning, letting go of concerns of cost, technology development, and internal capacities.

- Host a “Ridiculous Futures” contest or hackathon to uncover innovative internal thinkers; rate and explore the best possibilities.
NEW SPECTRUMS OF meaning
Full-spectrum natives will lead shifts toward more inclusive, diverse, and unusual values

NEW SPECTRUMS OF resources

NEW SPECTRUMS OF time
Organizations will adapt to future back-strategy to navigate competing pressures

NEW SPECTRUMS OF value creation
Businesses will operate in a world of distributed ecosystems
A categorical mindset of value creation has typified the way we view the world for the past century or more. In this mindset, a business model is built around delivering a specific product or service.

As it becomes easier to enter markets and harder for consumers to differentiate between products and brands (for example, an Amazon search for a common product can turn up thousands of nearly identical results), new actors will also be empowered to create value in novel ways.
Soon it won’t just be companies that comprise the realm of value creation. Increasingly, individuals, communities, digital communities, and (possibly quite soon) autonomous digital agents are becoming empowered to create value outside traditional networks.

These actors will make up the oncoming spectrum of value creation. Not only will they be organized and operate in a variety of ways, they will bring a spectrum of motivations to their work beyond simple financial gain. Companies that wait to react will lose market position by not being proactive.
Two main drivers of change will influence the growth of this new spectrum of value creation:

1. Distributed network technologies such as blockchain systems will allow any given group of people to organize as effectively as a company to meet a goal.

2. Decentralized generation will be enabled both by emerging technologies for production of necessary goods (mesh networks, solar arrays, AI-powered food production, 3D printing, synthetic biology) and by communities motivated to take control of their own infrastructure and production of products and services.
**What:** Artist Jarret Mellenbrunchn published a white paper proposing to create a long-term redwood tree preserve that would restore historic redwood populations and act as a carbon sink. The proposal would be funded by a blockchain platform.

**So What:** Carbon sequestration is a tricky thing for private businesses to profitably address—even if they want to. Blockchain tokenization allows for new types of organizations to arise that operate on the principal of maximizing traditionally non-monetizable or intangible assets, such as carbon sequestration or natural beauty.

**What’s Next?**

People will start pseudocorporate entities that aren’t driven by shareholder profits, fiduciary duty, or even operating costs. Instead, they will be enabled by distributed technologies that let people effectively commoditize ecosystem services.
Microgrid company offers a spectrum of services in Bangladesh

**What:** SolShare creates plug-and-play microgrid components that allow for individual-level energy trading.

**So What:** SolShare makes money on all phases of the cycle while enabling their customers to be producers as well.

**What’s Next?**

Value creation will occur at many levels, and there will be fuzzy lines between who is the producer, the consumer, the buyer, the seller, and so forth. This will be seen in services and products alike.
Orkney Cloud is creating community-led local cloud services

What: The remote Scottish community of Orkney is creating a data-services body distributed over several local organizations.

So What: Technology tools that are more accessible and powerful will allow more communities like Orkney to fulfill more of their needs through community-led comprehensive and specialized networks.

What's Next?

Communities that need a very specific service fulfilled will build more and more complex infrastructure on their own, reaping the benefits and leaving out traditional infrastructure providers.
Dash cryptocurrency operates as a DAO

What: Dash is a Decentralized Autonomous Organization (DAO), a value-creating group that operates without centralized control. The organization is an open protocol, more akin to e-mail than a company.

So What: While they are currently limited to specific domains, a fully-realized concept of a DAO would mean that “self-driving companies” might soon become viable as a organizational structure.

What’s Next?

In a world of successfully functioning, cross-industry DAOs, entire companies will be guided by...no one in particular.
Considering the new spectrum of value creation

Value creation will become a highly diverse process in proportion to the increase of distributed networking and generation tools. Track technologies like blockchain, mesh networking, and artificial intelligence closely as an acid test for how large this spectrum of value creation is growing.

The new ways that organizations, their customers and suppliers, and digital agents are creating value will continue to diverge, meaning that it will be difficult to keep a single perspective on all parts of the value-creation ecosystem. Consider that providing services to a community-led distributed utility will be quite different from providing those same services to a fully-automated, decentralized company managed by smart contracts.

Think through the ways these signals of change can help your company find ways to own yet share the creation of value in your market space.

Look to high-delta markets (communities that are accustomed to thriving in extremely volatile conditions) as potential blueprints for navigating spectrums of value creation. Value is not just creating products but also services: imagine how to build out a business model of services your company is uniquely qualified to offer.

Imagine that regulation caused you to cease your largest product or service. What new ways would your company generate value? Dismantle the categories you see as producing value within your organization and try to uncover valuable new connections.
Capacities to build today

- Understand new ways that people are creating value with assets like yours, and research how new networking and AI technologies could deliver similar services or products at a micro-scale and disrupt you. Be able to succinctly describe the Digital Autonomous Corporation concept.
Future Forces Disrupting Sustainable Business

Four future forces have been presented here:

- New spectrums of meaning
- New spectrums of time
- New spectrums of resources
- New spectrums of value creation

All require that you approach the future with a full-spectrum mindset. Full-spectrum thinking will require discipline and sophisticated use of digital tools. Full-spectrum doesn’t mean letting go of structure. In fact, in some cases, the spectrums arise out of lots of categories running together.

It will be very dangerous if leaders unthinkingly force new threats or new opportunities into old categories that just don’t fit the new circumstances.

The future will demand full-spectrum thinking.
Future Forces Disrupting Sustainable Business

Acknowledgements

**IFTF:**
Quinault Childs, Research Director
Daria Lamb, Ambassador to the Future

Robin Bogott, Art Director
Kelsey Kamm, Designer
Gabe Cervantes, Research Assistant
Mark Frauenfelder, Developmental Editor
Jean Hagen, Executive Producer
Tito Jankowski, IFTF Affiliate
Bob Johansen, Distinguished Fellow
Bradley Kreit, Research Director

**GEMI:**
Kellen Mahoney, Project Director
Steve Hellem, Executive Director

**GEMI Sponsors:**
American Forest and Paper Association
Carnival Corp & plc
CBRE
ConocoPhillips
Dell
Dow
ExxonMobil
FedEx
Gannett Fleming
Ingersoll Rand
Lockheed Martin Corporation
SABIC
Schlumberger
Sealed Air
Smithfield Foods
Waste Management
Future Forces Disrupting Sustainable Business

a full-spectrum thinking approach to building sustainability, 2019-2029