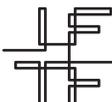




**BEYOND**  
**ORGANIZATIONS**  
new models for getting things done



INSTITUTE FOR THE FUTURE

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# START HERE:

## this is your guide to building a resilient 21st century organization

Organizations are a social technology—a means for getting things done, creating economic value, and maintaining social order and cohesion.

As a social species, we come together to create, invent, make, and exchange goods and services. And for thousands of years we've been inventing and re-inventing ways of doing so, using the tools available to us at the time. Around 300 years ago, the industrial revolution ushered in dramatic changes in our organizational landscape. People increasingly started to conceive of their time and labor as a commodity they can sell for money. We also saw the emergence of formal, hierarchical, scientifically managed organizations as a dominant form of creating value and managing economic activities on a large scale. Today, we are witnessing the emergence of new organizational forms, new ways of getting things done. These organizational forms are more fluid, porous, and distributed. They are often less stable and predictable than industrial era organizations. Enabled by a new set of technologies, these new ways of organizing are forcing us to re-think legacy management structures and approaches.

For example, Wikipedia, which has just a few hundred employees, uses open source project development practices to coordinate the efforts of millions of unpaid, often anonymous, contributors to publish 800 new articles a day. Wikipedia is now the

largest publishing organization in the world. As a result of Wikipedia's success, Encyclopaedia Britannica stopped publishing its print edition in 2012, after a run of 244 years.

Wikipedia, and many other efforts we reference in this map, are signals of networked, distributed, open organizational technologies that are rapidly overtaking and replacing the ones we've relied on for the last several centuries. Not only are the structures and flows of organizations being transformed in this new environment, their function and purpose are, too.

**This map is the result of many hours of research, interviews, and workshops, and is presented in five sections:**

- 1. Drivers of Change** | Three major emerging technologies enabling new ways of organizing.
- 2. Getting Things Done** | Seven powerful affordances of these new organizational functions.
- 3. Future Skills** | Five capacities individuals will need to thrive in future organizations.
- 4. Transformational shifts and early signals** | What's in store for organizations.
- 5. Scenarios** | Four very different kinds of organizations in the year 2028.

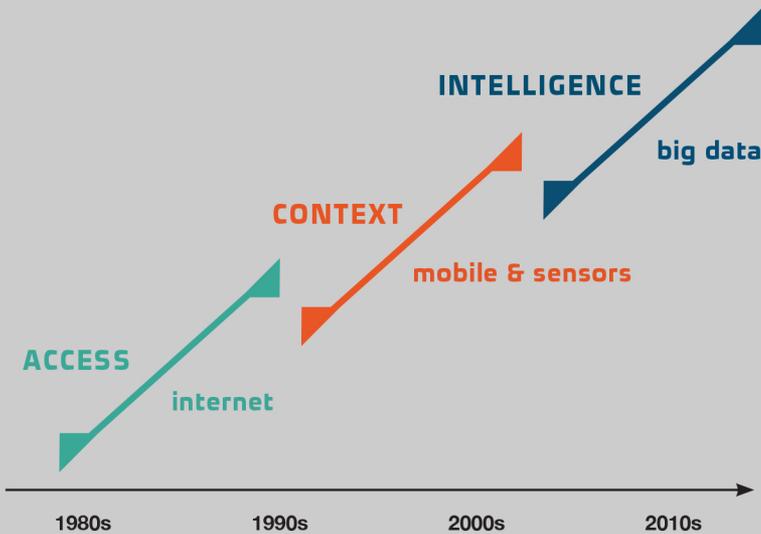
Whether you're a leader in an established enterprise or an entrepreneur starting from the ground up, this map is your guide to building a resilient 21st century organization.



# WHY NOW:

## drivers of change

What's driving this shift towards distributed, fluid forms of organizing? While technology-driven disruption of work structures may feel sudden, it is actually a product of the combined impacts of three major waves of technological advancement, the first of which began in the 1980s:



### ACCESS

During the 1980s and 1990s, we saw the Internet grow steadily and eventually connect people, organizations, and geographies on a scale and at speeds never seen before. By the late 1990s, the network effects from increased adoption of inexpensive email, instant messaging, and website creation and browsing resulted in novel types of collaborations and work patterns with people outside of organizational and geographic boundaries.

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### CONTEXT

The 1990s and 2000s saw the widespread adoption of mobile technologies. Mobile phones connected people to information and resources any place, any time. Most importantly, however, successive generations of mobile technologies came equipped with location and other sensors, giving users increasingly context-rich information about people's location and surroundings. Having detailed information allows us to offer information and services that are highly personalized and responsive to individual needs and conditions.

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### INTELLIGENCE

In recent years, abundant data and machine intelligence (increasingly available as on-demand utilities) made it possible to enlist non-human workers to inexpensively and quickly perform algorithmic matchmaking, analysis, delegation, prediction, coordination, optimization, and response tasks, which greatly increased the possibilities for emerging organizational structures.

## GETTING THINGS DONE:

forecasts of transformation in  
organizational functions

How can we apply the social technology of organizations for specific purposes? Where will it be most effective? What will the second and third order effects from its application be? To help us answer these questions, let's look at how the functions of emerging 21st century organizations differ from traditional ones.

### Planning

from **periodic strategic plans** to **continuous feedback loops**

In the past, planning was an episodic process in which, at regular intervals, outcomes and performance were reviewed, then strategy was adjusted. Today, ubiquitous Internet connectivity is making feedback loops much faster and more continuous across industries and domains, from sales and marketing to logistics, allowing for more frequent iterations and adjustments. Going forward, sensors embedded in objects and the environment will accelerate this process even further, providing organizations with constant streams of granular information to continuously monitor their operations, while advances in artificial intelligence will process the feedback automatically and manage in a just-in-time, continuous, and, in some cases, fully-automated fashion.

### Recruitment

from **resumes** to **reputations**

The conventional way for a person to capture their qualification for a job is in the form of a resume—a list of degrees they have obtained and positions they have held. However, we're seeing organizations look to new signals as evidence of candidates: the skills and capabilities that make them suitable for specific kinds of work. Organizations are now increasingly looking at people's online presence and reputations—consisting of reviews of their work, feedback from peers and customers and even performance in games—when recruiting workers. As more work and learning moves online, these reputations will become more precise and, as analytics reveal new, more specific, and sometimes counter-intuitive, predictors of task or job performance, they will come to include more diverse metrics and evidence of qualifications.

### Resource Allocation

from **managers** to **processes**

Management's primary function in most organizations is to efficiently allocate resources and coordinate activities consisting of thousands of tasks and staff members. Increasingly, however, we are building software that serves this function, identifying who needs what and where and seamlessly connecting those who have such resources and those who need them in real time. Already, ridesharing platforms have swapped human dispatchers for software that automatically routes drivers to the people who need them. Going forward, this will spread to a much wider range of industries, and we will see algorithms take on many of the more repetitive tasks of management, relegating people to making decisions that require more nuanced judgement.

### Synchronization

from **co-located** to **distributed**

Bringing people together in one physical location during the same work hours in factories, offices, and retail environments to coordinate production has long been an essential function of organizations. Increasingly, digital platforms allow people to collaborate asynchronously, across time zones and geographies. Organizations' options for synchronization will only expand in the next decade. Remote communication will run the gamut from simple instant messaging and text to fully immersive virtual reality collaborative experiences. Asynchronous communication will move from simple email and voice to personal bot-assistants and avatars that can act as intermediaries and answer basic questions on workers' behalf. As our physical infrastructure comes online, even tasks that require hardware, such as R&D testing and lab experiments, will be run by people collaborating from thousands of miles away.

### Scaling

from **staffs** to **networks of contributors**

For many organizations, growth has meant hiring more employees to increase levels of production, gain market share, and reach wider populations. But increasingly, scaling doesn't require the formal roles and infrastructure of traditional organizations. As Internet access has spread across the globe over the last couple of decades, networks have formed that allow people to collaborate, contribute ideas, and generally achieve a scale much greater than that of traditional organizations. More and more, small groups and individuals who manage to create platforms and mechanisms for engaging large networks of contributors, beyond staff and employees, will be able to create scale in terms of attention, impact, visibility, as well as enable communities to adapt an organization's products and services to their needs.

### Boundaries

from **closed** to **open**

A key function of organizations has always been to create and maintain useful boundaries—but what constitutes a useful boundary is changing rapidly. With the emergence of global crowdsourcing, we're seeing openness and reciprocity becoming key to organizations of all kinds, from private for-profit businesses to philanthropies. For instance, when Microsoft launched its Kinect depth-sensing camera, it initially kept the source code secret. But when hackers were able to create an open source driver, and various tinkerers unleashed a torrent of innovative new projects with the device, Microsoft decided not to pursue legal action, moving the technology out of its silo and allowing others to build an ecosystem around it. Beyond networks of people, networks of data and machines will require open standards and interoperability. Going forward, the most successful organizations will form reciprocal partnerships with a wider variety of actors, from makers who thrive in an environment of open source and Creative Commons licenses to machines that can speak to each other.

### Compensation

from **money** to **portfolios of incentives**

To engage wide networks of contributors, organizations will need to carefully navigate portfolios of incentives to reward people for their contributions and to maintain their interest. In some cases, and particularly with employees, monetary incentives will continue to play an important role. But as organizations become more distributed, networked, and open, monetary incentives may no longer be viable or sufficient. Contributors might want to engage because they can build reputations in a particular domain, achieve social status, or simply be a part of something that has particular meaning to them. Carefully managing and balancing different types of incentives that satisfy the needs of diverse contributors is becoming a core competency in the new organizational environment.



# FUTURE SKILLS:

thriving in the organizations of the future

As part of our future of learning research, IFTF identified the set of skills that will be important for workers and learners in a world where organizations have become less centralized and more fluid. For each of these skills, we pose a question to help organizations start thinking about how they can empower their contributors to thrive in the coming decade.



## Make yourself known: your data, your brand

In the future, a person's entire life, digitally documented and accessible by anyone online, will serve as their entry to work and other opportunities. People will have to be skilled at building a reputation and finding ways to communicate it across contexts and cultures.

**How can you give employees and contributors the ability to capture data about their accomplishments to build their reputations?**



## Befriend the machines: AI IQ

Success in the future will depend on how well a person works with various types of automated, algorithm-driven systems. People will need digital fluency, an ability to move from one algorithmic platform to another, and the critical faculty to know when to trust and when to test these digital platforms.

**How can algorithmic reasoning be made transparent and adjustable for non-technical people who depend on them?**



## Make sense: big stories

With an over-abundance of data, it is more important than ever to be able to separate what is important from what isn't, and translate the salient signals into stories that can be clearly communicated to others.

**How might your organization's technology teams lead the way in disseminating data literacy and analytics tools more widely?**



## Build your tribe: pop-up communities

In loosely connected, distributed, and shape-shifting organizations, it is important for people and groups to have the ability to quickly scan the environment, identify necessary resources wherever they are, and tap into and organize them to achieve desired outcomes.

**What platforms, tools, and skills does your organization need to build or give employees to enable flash organizing?**



## Keep it going: shared risks/assets

In a task-based environment, it is easy to lose track of not only the ultimate purpose of the activity, but also the social, environmental, economic, and political effects. Ignoring this larger context can ultimately make the organization unsustainable.

**How might processes that match people to tasks optimize for values and passion alignment, not just skills and availability?**





### Make yourself known: your data, your brand

In the future, a person's entire life, digitally documented and accessible by anyone online, will serve as their resume.

► **The Agile Teams project from DARPA**, the United States' military research arm, aims to discover and test predictive and generalizable mathematical methods to structure teams of humans and intelligent machines in ways that optimize their combined cognitive capability.



darpa.mil  
Image: U.S. Army

## Resource Allocation

from managers to processes



▲ **Rethinkery Labs** is prototyping a software-defined organization by automating functions that traditionally require ongoing human management, such as assigning people with the right skills to a particular task.

rethinkerylabs.com

▼ **The Organized Crime and Corruption Reporting Project** uses a global network of independent journalists and citizens to collaborate for unprecedented transnational investigations into organized crime and corruption.

occrp.org



## Scaling

from staff to networks of contributors



▲ **Local Motors** is a mobility company that leverages its community around the world to co-create vehicles such as the self-driving Olli shuttle, for which the company is seeking input on how to make accessible to riders with physical and cognitive impairments.

localmotors.com

### Build your tribe: pop-up communities

In loosely connected, distributed, and shape-shifting organizations, it is important for people and groups to have the ability to quickly scan the environment.



▼ **Digital avatar Hatsune Miku**, developed by Crypton Future Media, has become a household name in Japan because its Creative Commons licensing allows anyone to generate media using the character: over 100,000 songs and 170,000 YouTube videos have featured Hatsune.

ec.crypton.co.jp



## Planning

from periodic strategic plans to continuous feedback loops

► **Qventus** is an AI-enabled "virtual air traffic control" platform for medical emergency rooms that continuously monitors activity to identify potential problems, recommend course corrections, facilitate virtual team huddles, and persuade the right team member to act.

qventus.com  
Image: flickr user usarmyafica



◀ **Steelcase and Microsoft** have partnered to develop a sensor-based system that enables organizations to harness anonymous workplace data to continuously track and improve workspaces to match employees' needs and patterns.

steelcase.com



# BEYOND ORGANIZATIONS

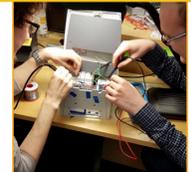
new models for getting things done

## Boundaries

from closed to open

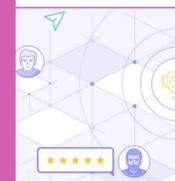
► **The European Commission's bioTope project** is developing standardized open protocols for quickly deploying Internet of Things solutions that operate across silos, and it's creating a roadmap for ecosystem-level governance.

biotope-project.eu



▼ **Colony.io** is prototyping a new organizational model that rewards contributors with tokens that represent merit-based organizational ownership and decision-making power.

colony.io



## Compensation

from money to portfolios of incentives

◀ **Contributors to Github** and other open source platforms generally do not receive money for their work, but are instead motivated by peer recognition and a desire to contribute to a commons.

github.com



### Make sense: big stories

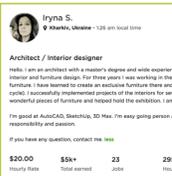
With an over-abundance of data, it is more important than ever to be able to separate what is important from what isn't.

## Recruitment

from resumes to reputations

▼ **Upwork**, a platform for people to post and find freelance work, circumvents traditional resumes with its own skills-testing methods for qualifying new workers and a performance score based on past work.

upwork.com



◀ **Knack** uses mobile games to identify qualities like social intelligence, leadership, and problem solving, then matches players with these skills with open job descriptions.

knack.it



## Synchronization

from co-located to distributed

▼ **Emerald Cloud Labs** enables teams of scientists to design, run, and analyze experiments from anywhere in the world through cloud-connected, robotic life science labs.

emeraldcloudlab.com



◀ **DAQRI's** suite of enterprise-level augmented reality technologies allows people in factories, server rooms, and other locations in the field to collaborate with colleagues for equipment maintenance and repairs.

daqri.com



### Befriend the machines: AI IQ

Success in the future will depend on how well a person works with various types of automated, algorithm-driven systems.

## Creativity Scenario

Makerspaces began as community workshops where makers shared the cost of tools, equipment, and working space. Providing access to 3D printers, laser cutters, and CNC mills was tremendously beneficial to makers, but everyone knew the most valuable resource in makerspaces is the other people there. Makers drew on one another's complementary skills to collaborate on complex technology projects. While makerspaces started as clubhouses for hobbyists, over time, many morphed into grassroots incubators and development labs, where people with similar interests self-organized into temporary teams to prototype commercial products, usually at a fraction of the price that traditional manufacturing companies paid for similar projects. By 2028, this trend had been adopted by companies wishing to optimize for creativity. In some cases, these companies formed partnerships with existing makerspaces, and in other cases they started their own makerspaces. The flat hierarchical structure and lack of formal titles in these organizations means that workers have the freedom to seek out and team up with others who share the same goals.

## Learning Scenario

In 2028 learning has become pegged to a kind of currency that ties together every aspect of our lives and is tracked and traded on a digital platform called the Ledger. It's a complete record of everything you've ever learned, everyone you've learned from, and everyone who's learned from you. The Ledger not only tracks what you know—it also tracks all of the projects, jobs, gigs, and challenges you've undertaken. As a public blockchain, the Ledger forms the basis of a teaching/mentor marketplace. You can pay down your student loan by teaching forward what you've learned. Employers use the Ledger to match you with projects and gigs that perfectly fit your current skill set. There's no need to finish school to have a thriving career. When you master a new skill at work, that goes on your learning record, too. You have a complete record of how much income each skill or lesson you've learned has helped you generate—so you know the exact value of every part of your education. Investors can even help pay for your education. In return, they get a percentage of your future earnings tied to the skills they paid you to learn. This fuels a new speculative economy as people invest in building a workforce for what they hope will be the most lucrative skills.

## Sustainability Scenario

In the early 2000s, scientists collected ocean floor samples and measurements in select places and at specific times. Inferences and projections were based on this spotty information. But by 2018 portions of the ocean floor were instrumented with tiny wireless interactive sensors that enabled scientists (and laypeople) to access continuous streams of physical, chemical, geological, biological, and other data about the ocean. These streams were fed to interactive models that allowed oceanographers to navigate a range of possible futures and test different scenarios: they could "take the pulse" of the ocean and literally experience the future, suggesting powerful interventions when needed. By 2028, the earth itself became blanketed with hundreds of billions of wireless sensors. Their realtime information flows, combined with AI-based data analytic software, allow anyone to create customized virtual instrument dashboards. There's no longer a need for quarterly and annual reports—they've been replaced with up-to-the-second snapshots of an organization's health and trajectory. As a result, strategic planning is no longer about reacting to stale data, but instead is an engaging, vibrant, future-facing, participatory, and continuous sensemaking process that guides and helps organizations navigate and prepare for the future.

## Well-being Scenario

In the same way that healthy cells provide a foundation for a healthy organism, healthy organisms form the basis for a healthy organization. In 2028, you can choose to be continuously monitored by a menagerie of networked bioscanners: sensors built into mobile phones collect your sweat samples and body temperature. Office chairs detect your weight. Laptop cameras measure your pulse and look for symptoms of precancerous skin on your face. Your toilet takes a census of your gut microbiome. Your watch measures galvanic skin response. Your bed tracks your sleep patterns. The data is transmitted to the cloud where AI and big data programs create and maintain a computational copy of your body. Through your phone and voice assistant, you receive up-to-the minute suggestions, nudges, and, if necessary, warnings to change your behavior to achieve peak physical and mental health. Your personal data is encrypted and stored on a blockchain, and you have sole access to the keys to unlock the data, and the ability to control who gets to see the data, how much of they can see, and how long they can see it. Organizations you work with will license this data from you and your colleagues to help them understand the overall health of the organization itself and develop policies to ensure a healthy, happy workforce.

# HOW TO USE THIS MAP

This map is more than a quick overview of the future of organizations and their functions. It's a tool for matching new opportunities to the challenges your organization faces, for developing strategies that will lead to a thriving and sustainable operating environment, and for building future skills that will enable your organization to make optimal use of these new technologies.



## Identify opportunities for your organization

 Start by getting the big picture of how organizations are moving from stable, predictable, and hierarchical structures to more fluid, porous, and distributed models for getting things done. The poster side of this map gives you an at-a-glance view of transformations in 7 organizational functions—planning, recruitment, resource allocation, synchronization, scaling, defining boundaries, and compensating—illustrated by 12 signals of change that exist today.

These transformations are the new ways to organize and achieve outcomes—but what they'll look like in practice depends on how they're applied. This map includes four scenarios to provoke your imagination about the kinds of organizations you might build. Once you understand how these pieces will fit together in the coming decade, flip the map over and take a deeper dive into the forecasts.



## Forge new strategies

 Transformations of organizations' functions will demand new strategies. First, choose one of the 7 organizational functions, such as resource allocation or synchronization, and think about the way your organization does this today. What about your competitors and peers? Next, ask yourself: how will my role, my team, my organization change if this forecast happens in the next 10 years? Then, conduct a SWOT analysis to understand how well prepared your organization is for this transformation. What are your strengths, weaknesses, opportunities, and threats as this future unfolds?

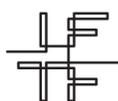
## Build future skills needed to thrive

 In a world where organizations have become less centralized and more fluid, people will need new skills to thrive. Explore the 5 questions in the Future Skills section to start thinking about how you can prepare yourself and empower others to thrive in the coming decade.

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## About this research

Google Cloud commissioned Institute for the Future, the world's leading non-profit strategic futures organization, to take a holistic and systematic view of the impact of emerging technologies on the future of work, organizations, and IT leadership. This map is a part of a series of research findings that explore the ways in which new models of work will change the pace of business and innovation, empowering organizations to be more diverse, dynamic, and distributed.



50  
YEARS

Google Cloud

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