

# The Future of Making

THE WAY THINGS ARE MADE IS BEING REMADE.

Two future forces, one mostly social, one mostly technological, are intersecting to transform how goods, services, and experiences—the “stuff” of our world—will be designed, manufactured, and distributed over the next decade. An emerging do-it-yourself culture of “makers” is boldly voiding warranties to tweak, hack, and customize the products they buy. And what they can’t purchase, they build from scratch. Meanwhile, flexible manufacturing technologies on the horizon will change fabrication from massive and centralized to lightweight and ad hoc. These trends sit atop a platform of grassroots economics—new market structures developing online that embody a shift from stores and sales to communities and connections.

Inspired by the hackers, crafters, artisans, and tinkerers who embody this “maker mindset,” we set out to reverse engineer the future forces behind this transformation. Many of us were already immersed in the DIY culture, hacking code, soldering circuits, creating media, and even tending farms. So to learn more, we reached out to our own communities, brought together innovators at an expert workshop, scoured blogs and magazines, and attended numerous informal gatherings where makers talk shop. It turns out that “do it yourself” may be a misnomer for this decidedly social movement; “do it ourselves” is a more apt phrase. Individual makers are amplified by social technologies that connect ideas, designs, techniques, and, of course, people, to revolutionize the process of innovation and production.

There is much to be learned from the maker mindset of collaboration, creativity, and open access. Yet the maker culture will not replace traditional industry. In the future, traditional manufacturers and maverick makers will be closely linked—sometimes cooperating, sometimes competing, but frequently blurring the boundaries that separate them. Success will occur when the two cultures are woven together in new and interesting ways. We hope that our map will help guide you in those experiments as you engage with the Future of Making.



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# Implications

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Whether your organization deals in bits or atoms, knowledge or stuff, the future forces we have identified in this *Future of Making* map are likely to have a profound impact on your life, at work and at home. At IFTF, we don't make predictions. Nobody can tell you what the future will bring. Instead, we make forecasts—plausible, internally consistent views of what could happen. Our aim is to provoke conversations that will help you make better decisions today. As provocateurs then, we've identified several potential implications that our forecast could have on your organization. There are certainly many more and we hope this map spurs you to come up with your own. After all, the future of making is really yours to make.

## NETWORK YOUR ORGANIZATION:

Many of the best ideas may come from unexpected contributors, including those who are so far outside the organization's own walls that they speak a different language. To succeed in the future, organizations will need to look to both internal and external sources of innovation. Seeking an outside-in perspective on internal challenges may require long-held processes to be rethought, from the design cycle to R&D budgets to intellectual property strategies. Once open to the idea of a networked organization, it's relatively easy to identify and engage with external networks of exceptional people through community R&D platforms such as Instructables, InnoCentive, and NineSigma.

## REWARD SOLUTION SEEKERS:

Many organizations suffer from “not invented here” syndrome, a rejection of an idea because it originated outside. Employees are often rewarded for solving a problem but not for identifying someone else's solution and integrating it. It makes no sense to “reinvent the wheel,” except, of course, when it does. For example, an existing solution may be too expensive or inadequate in some way. Also, the process of reinvention itself can reveal new and valuable information or discoveries: fail early and often. Problem solvers think deeply, but solution seekers think broadly. A good organization rewards both.

## ERR ON THE SIDE OF OPENNESS:

Open-source software usually refers to “source code under a license (or arrangement such as the public domain) that permits users to study, change, and improve the software, and to redistribute it in modified or unmodified form.” In recent years, the open-source mindset has been applied to physical objects, too. Open-source hardware might include circuit diagrams, software that is user accessible, cases that can be opened up with a standard screwdriver, or anything else that invites the owner to roll up her sleeves and look under the hood. This kind of openness encourages lead user innovation and “peer production,” the coordinated efforts of large numbers of creative people. The end result is usually a better mousetrap (or computer mouse). The *MAKE: magazine* motto is, “If you can't open it, you don't own it.” Successful organizations will embrace open-source culture in an authentic, well-considered way that's both good for the customers and for the bottom line.

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#### **4 ENGAGE ACTIVELY:**

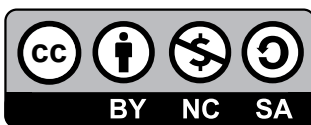
Powerful new technologies for collaborative innovation are emerging, but we have a limited number of hours in the day to collaborate. This rising demand for the attention of makers results in a new “economy of engagement.” Projects must do more than capture and capitalize on the attention of creative people. There must be feedback in the system, intense immersion, and meaningful community in order to create an environment where the participants have a vested interest in the project. The most successful platforms for collaboration may look more like games than serious research projects. Put simply, the most innovation occurs if you encourage the makers’ inherent curiosity, sociability, and passion for the process.

#### **5 GO TRANSPARENT:**

As people’s curiosity and knowledge about how things are made increases, they’ll seek out more information about the products they buy. Where were the materials sourced? How green were the factories? Pervasive computing technologies will enable products to document their own states, locations, and movements, to tell their “own” stories. For organizations, this new realm of “visible” data will be useful in understanding their own products’ lifecycles. But for customers and users, this data is just more “news you can use” when making choices in the marketplace. The best advice is to be transparent every step of the way. Because if you don’t make it transparent, someone else will.

#### **6 CELEBRATE HACKERS:**

Before hacking got a bad rap, the word “hacker” actually described an ingenious individual who pushed technology to the extreme, programmers who came up with imaginative solutions. Hackers explore technology’s edges, making it work the way they want it to, and building better systems from the bottom up. The mods and “hacks” made by these lead users often point to the direction technology may take for the rest of us. At the very least, their efforts reveal what is possible. Instead of litigating against hackers and policing what your customers do with the products they own, organizations would do well to invite hackers to the table and reward them for their efforts. No user-serviceable parts inside? Says who?



# Drivers

## PLATFORMS FOR SOCIABILITY:

Beyond dating and job hunting services, social networks can also be thriving hubs for collaboration and problem solving. The wisdom of crowds is only as powerful as the crowd is wise.

## ECO-MOTIVATION:

The planned obsolescence of today's technology doesn't jibe with the increasingly green aspirations of many consumers. A new mantra is emerging: Reduce, Reuse, Remake.

## RISE OF THE PROFESSIONAL AMATEUR:

The line between amateur and professional is blurred by passionate hobbyists. These aren't passive consumers but active creators whose results often surpass those of accredited experts and big businesses.

# Manufacturers



# Makers

## ACCESS TO TOOLS:

Tools of design and production are following something akin to Moore's Law but for manufacturing. As the cost of tools decreases and their capabilities increase, the barriers to entry for makers come crashing down.

## OPEN-SOURCE EVERYTHING:

From P2P file sharing to open-source software, people have very different expectations about what should be free and open to customization. Their aim is to make technology work the way they want it to.

## QUEST FOR AUTHENTICITY:

To compensate for the inordinate amount of time spent in virtual worlds, from IM conversations to Second Life, many people have developed a new-found appreciation for physical, hands-on experiences. Reality is still where the action is.

# Drivers

# How to read this map

The Future of Making may seem overwhelming, but in many ways, the future is here for you to experiment with today. Like any map, our *Future of Making* map is designed to guide you through unfamiliar terrain. In this case, our map arms you with knowledge of drivers, trends, signals, and examples of how the future is being built, hacked, recombined, reused, rapidly prototyped, networked, and designed today. By providing foresight and insight, our map will help you learn the lay of the land now so you're poised to take action in the future. Think of it as your do-it-yourself guide to a future driven by DIY.



**DRIVERS:** Along each side of the map you'll find the social and technological phenomena driving these trends. The drivers are what make all of these trends possible, and feed into the center of the map. The trends are plotted near the drivers that most heavily influence them, but in the new world of making, all drivers influence each trend in some way.

## LIGHTWEIGHT MANUFACTURING:

From centralized production to ad hoc factories

**TRENDS:** The colored boxes at the center of picture clusters are the six major trends we've identified that will shape the Future of Making. Each trend is accompanied by a from/to statement contrasting where we are in 2008 with where we will be in 2018. Makers are at the bottom of the map—they're the force driving the trends upward and into the world of traditional manufacturers, found at the top.



**SIGNALS:** The images clustered around each of our trends are present-day signals indicating the trends to come. Each image is an example of a company, network, project, product, idea, or innovation that we believe will coalesce by 2018 to give us our major trends. Use the information in the captions to investigate the signals and better understand why they're important.



**MAKE THE FUTURE:** The Make the Future layer of this map offers suggestions for how you can interact with some of the early signals of future trends. These are just a few opportunities for you to engage with these trends and transform yourself from sideline spectator to future maker. What will you bring to Maker Faire in 2018?