Who Are the Makers?

Today we live in a world many of us define as "advanced," filled with technological wonders like smartphones and the World Wide Web. But these gadgets are just the fruit of an entire civilization based on the application of science and technology to our daily lives. Thanks to that civilization, we can live in a warm place, store our food without it spoiling, have light even when it is dark outside, communicate with the people we love anywhere in the world, or travel faster than our legs can carry us.

At the same time, many of these changes—the same ones that have improved our way of living—have limited our lives. Most people may say they cannot live without computers, telecommunications, electricity, and synthetic chemicals. If those technologies were to suddenly disappear, a large portion of the earth's seven billion people would start to die very quickly.

We are bombarded by media that do everything they can to encourage us to consume in an uncontrolled way—to queue in front of an Apple Store every six months, or to buy a new car every two years. And the same media make us feel "out of place" if we do not adjust to all the things advertising intends to inflict on us.

Within this context, products are no longer made to meet the consumers' needs, but to create a vicious circle: objects are designed to last shorter and shorter amounts of time, to break soon after their warranty expiration date (accurately calculated by statistics) so that we have to go out and buy new objects, thus artificially creating a market whose only aim is to support production.

Today governments are concerned only about GDP growth (in Italy, for example, the decreasing curve of the yield spread is, at the time of this writing, a further common concern). Even so, the GDP is a somewhat poor indicator of national contentment, because it also grows during events such as disasters or wars.

But has it always been like this?

The Culture of Reuse

For our grandparents and their parents, everything was different. Those born around, say, 1925, grew up during the Great Depression—a period of high unemployment, job insecurity, homelessness, and even starvation in some of the most advanced countries in the world. They learned themselves—and imbued their children with the spirit—to make do with what they had, which was almost nothing.

This shortage of resources led to a culture of recycling, respect, and reuse. Nothing was

thrown away; instead, everything was ingeniously transformed using whatever tools were at hand. Our grandparents used to build what they needed themselves, and they were happy because they had something we often lack today: the sense of personal reward for having built something with their own hands, seeing their creation evolve from a conceptual idea to reality—from cutting boards, knives, barrels, and sickles to more technological tools (see Figure 1-1).

It was a question of culture: when something was needed or had to be solved, people tried multiple approaches, starting from what was available and often recycling it in previously inconceivable ways, until they found a solution. Then, as now, practice was the only way to actually learn.
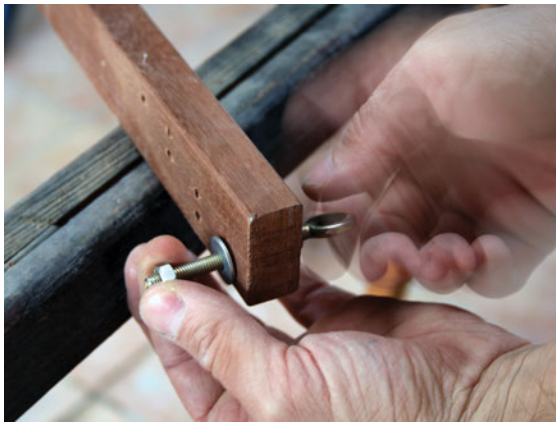

Figure 1-1 *The pleasure of building something with your own hands*

We Are All Designers

As children, many, if not all of us, dismantled some toys to understand how they worked. Some of us even managed to assemble them again. All the toys we dismantled taught us something, allowing us to modify them according to our tastes or to create new ones. In the past, this kind of activity was very widespread among adults too, practiced by so-called tinkerers: people who took abandoned objects and

dismantled, modified, and redesigned them into something new and absolutely wonderful.

Today, technology allows us to do the same thing digitally. The necessary tools are at our disposal, free of charge or at reasonable costs. We can design very different objects following very similar processes. Thanks to our access to all information and to the community's support, learning is very simple, and we can become productive with different tools in a very short time.

Not Only Digital

In the 1990s everyone seemed to suddenly become a web designer: the spread of the Internet and the World Wide Web created a small factory of bits and bytes in many people's homes. With simple editing software, people could create websites. We believe that the immediacy of results and the low cost of entry have contributed to distancing today's young people, the so-called digital natives, from the traditional do-it-yourselfers who are still linked to the physical world.

What has changed recently is a sort of democratization in access to tools like 3D printers and other rapid prototyping machines, which has marked a return from bits (digital components) back to atoms (physical components) easier. These technologies have already been in existence for a long time, but they have usually been inaccessible to most people because of their extremely high costs. Today, a 3D printer can be had for as little as $500, much less than the original laser printer ($3,000). Even if other tools like laser *cutters* and computerized milling machines are still somewhat expensive, there are different services that allow you to use such tools at very low costs. It is like renting a factory without bearing all the startup costs: you only have to pay the manufacturing costs of what you need (plus, obviously, the supplier's mark-up).

This increased access to tools—as well as access to information on how to use the tools—has triggered the return to a culture of making and the spread of the maker movement.

The Maker

The maker is an enthusiastic hobbyist who gradually becomes part of a community of people who share the same interests. More and more he moves out of his field of competence, learning new skills thanks to the knowledge shared among the maker community. Once upon a time people had to apprentice with a carpenter if they wanted to create beautiful wood carvings, or with a blacksmith to forge metal. Today, those people can simply design objects with different shapes and have them created by computer-controlled woodworking machines or laser sintering machines.

Such hobbies are not only an occasion to meet new people, but they also might offer the makers the opportunity to earn some money or to found small companies, and in some cases they even lead to the birth of real phenomena in both cultural and economic terms.

Innovation—which, according to some economists, is the only way to increase a country's productivity—is a constant element for makers, as they always try to outdo themselves and go beyond what is at their disposal. The maker is like a new tinkerer, an inventor with a great deal of possibilities that, until recently, were inconceivable.

With this great power comes great social responsibility. We're fortunate that most makers tend to share the results of their work, and to collaborate with different people from all over the world, no matter their position or professional background.

Our grandparents were all makers. But what about us? Are we ready to be makers?

The Origins of the Movement

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Humans have been makers since the dawn of our history. In fact, you could say human history began *because* we were such prodigious makers. Today, we are experiencing a renaissance in Do It Yourself (DIY) technology: the old maker tools of hammers, chisels, pliers, and tongs are being augmented by tablet computers, collaborative software, crowdsourcing, and desktop manufacturing. Sometimes the act of "making" is more digital, and all of these tools are replaced by a small portable computer.

The last 10 years have seen the growth of hackerspaces, makerspaces, and Fab Labs: workshops where lovers and creators of technology, mechanics, interaction, and art can meet, share their knowledge, and collaborate to create diverse objects (see Figure 2-1). In these places, it is possible to find—and use—equipment that is typically not available to individuals due to its high cost: drill presses, welding equipment, laser cutters, 3D printers, and more. With a reasonably priced gym-like subscription, anyone can access the equipment, which democratizes production.

In the beginning, the high initial cost needed to set up these spaces limited the expansion of this phenomenon, since only a few big institutions were able to finance this kind of workshop.

Figure 2-1 *A hackerspace plate in a picture by Vargson*

Today, however, there are thousands of such places. Even though they are typically found in universities and other institutions, commercial hackerspaces/makerspaces are growing. The most famous is TechShop, which, as of this writing, has eight locations open in the United States.

The Culture of Sharing

The spread of digital technologies in the maker community and makerspaces has allowed the *early adopters* to be active in open source software projects, or at least to be familiar with them and share their philosophy. Sharing and collaborating are at the basis of the early communities that were taking shape within