

THE ANALYSIS

Consumption is not merely an act that seems to define the age. It is also a way of thinking. The power that lies in money is that of exchange, for the goods and services we want. Those goods and services are offered to us by manufacturers and the brands they play a part in building. The choice may be vast - but it is their choice. Unless you are wealthy enough to commission genuine bespoke, what you buy is not only what you can afford, but also what is made available. The power lies with the producer. A producer may have to convince you to buy its goods over those of its competitors, but the consumers' only influence is where to take their cash, or, more likely in the current climate, their credit.

To change that situation, to lessen the divide between producer and consumer - indeed, to give the power of production to the consumer - would entail a profound shift in thinking for shoppers, makers, marketers and society at large. It would, in effect, be a return to the time before the Industrial Revolution. And that seems to be happening. Where Do It Yourself once meant tacking up sloping shelves and periodically flooding the kitchen before finally calling a plumber, the new DIY - more Design It Yourself - is returning the initiative to the consumer. A combination of technology, the internet, excess manufacturing capacity and, it should be stressed, a certain draining of enthusiasm for shopping in these straitened, unsustainable times, is causing individuals to seize the opportunity to make their own products from scratch. For those keen to command their own private economy and be king of their own consumption, the opening will be there not only to design and provide product for themselves, as they want it, but, of course, to take it to market. DIY means not only new freedoms but also new competition.

The proliferation of the internet and its communities based around niche tastes has already provided a route to market for the individual. But new access to the tools of production takes creativity to a new level - to that of complex design on a large scale. Consumers with a brilliant idea or an original style have typically been stumped by the lack of the means to realise it. There is also a paradox for inventors with a clearly revolutionary product; no manufacturer will risk upsetting the status quo to produce it. But that is set to change. This is not quite yet the world of Star Trek: The Next Generation, in which the replicator machine on board the starship produces whatever the individual wants, atom by atom and only on request. In space, no one can find room for cumbersome inventory or deal with the wastefulness of our industrial consumer complex, which pumps out endless products, often unsure of demand and frequently in excess of it. But 3D printing, for example, is a step in the right direction. Conspicuous consumption became conscious consumption. Now comes controlled consumption - with the consumer in control.

In this section, Viewpoint explores the motivations behind the new DIY, its pioneers and its possible consequences. Many consumers will be nonplussed by the whole concept. It is, after all, much easier to simply buy something than to make it. But many will find making more satisfying than purchasing, maybe even giving consumption an unexpected spiritual dimension, a characteristic that might have been thought impossible. Many will appreciate the practical aspects. Some will even find it profitable. And some brands will discover a new 'enemy' - the very people they are trying to sell to.

YES WE CAN!

THE DIY MOVEMENT HAS MOVED ON FROM HOME IMPROVEMENT TO ENCOMPASS TECHNOLOGY, DISTRIBUTION AND COMMUNICATION METHODS THAT, IN THEORY, ALLOW ANYONE TO MAKE ANYTHING AND BRING IT TO MARKET. THE EFFECT WILL BE PROFOUND FOR CONSUMERS AND BRANDS ALIKE, SAYS ANNA SANSOM



The Radiolaria pavilion by Shiro Studio in collaboration with D-Shape was created using a large-scale rapid prototyping machine



Open-source platform CandyFab by Evil Mad Scientist Laboratories allows users to produce 3D fabricated foods

Patrick Buckley was an independent research scientist when he came up with the idea of the Dodocase, an iPad case. Styled after the Moleskine notebook, with an interior tray fashioned from handcarved bamboo, the Dodocase is handmade using traditional book-binding techniques. Since it launched in April, over 15,000 orders have been placed for what Engadget.com has called 'the Rolls-Royce of iPad cases.' A mechanical engineer with no experience of making luxury goods, Buckley is an example of the kind of DIY philosophy espoused by the Maker Movement in the US. He contacted his local TechShop, a 15,000-square-foot workshop in Menlo Park, California, one of a rapidly expanding chain of venues created to offer private individuals all the education and equipment needed to get their prototypes off the sketchpad. 'Everything is manufactured right here in San Francisco,' says Buckley, who has now hired 15 people just to make the book binding covers. 'Book binding was on the verge of extinction and it's an important thing to exist - even if people are making covers for e-books.'

GIVE ME THE TOOLS

The DIY movement, the growing, US-born subculture that espouses the building or modifying of increasingly complex products without professional intervention, is multi-faceted. It covers a wide spectrum from garden shed tinkering and crafts to, most importantly, the semi-pro amateur with ambitions in, most notably, the high-tech arena. Its explosion is partly thanks to the fall in prices of laser cutters, computer numerical control (CNC) machines and 3D printers. Online stores MakerBot and BotMill now offer self-assembly machines

for under \$1k, although high-quality, ready-assembled 3D printers still cost tens of thousands. Lower prices are not the only factor that is encouraging DIY. Ideas are being shared. Online companies are offering users the opportunity to upload their own designs and download other people's. At Google SketchUp people can learn how to invent a piece of furniture, redecorate their living room and have 3D models made, while MakerBot's sister site, Thingiverse, provides digital designs ready to be realised as physical objects, either for personal use or to take to market.

Economic circumstances are also shaping a new attitude. 'The recession is giving people free time, they're readjusting their values and are deciding to make things again,' suggests Mark Hatch, chief executive of TechShop. The interest in the movement is underlined by TechShop's rapid expansion. It is opening four more stores across the US over the next year, including in New York, and has seen a 70% climb in sales over 2008-2009, with a further 40% rise to \$1m expected this year. 'It's a lot easier to make high-quality, professional-looking things than it was 10 or 15 years ago because the tools have become so much cheaper,' says Hatch.

Thanks to the likes of TechShop, access is also much easier. The idea is spreading. The Massachusetts Institute of Technology's Fab Labs, a TechShop-type chain, now has 52 Fab Labs in 16 countries and plans to open a further 50 in the next 12 to 18 months. The UK's first Fab Lab opened in Manchester this summer. This heralds a profound change in the relationship between consumer and manufacturer, which has been a one-way street since the Industrial Revolution. Now, however, the power of

manufacture is returning to the individual. 'Manchester led the first Industrial Revolution and now it's at the centre of a new industrial revolution where anyone can make anything, anywhere, using digital manufacturing,' says Professor Neil Gershenfeld, director of MIT's Center for Bits and Atoms. 'Fab Labs give people the tools they need to create technology, to be creative and make the stuff that they can't buy in the shops.'

Some 64% of Americans say that they want to make more for themselves, according to John Gerzema, chief insights officer of Young & Rubicam. This offers what Gerzema identifies as a 'huge opportunity in providing the tools, materials and skills to do that.' The internet has also been a huge boon, allowing likeminded DIYers to make contact, bringing the subculture to the fore and allowing it to organise itself and to have ambitions that are greater and more commercial than the craft movement has allowed or demanded up to now. And, thanks to surplus manufacturing capability around the world, to actually have these ambitions realised. 'Something like the Maker Movement has always existed,' explains Eric von Hippel, professor at the MIT Sloan School of Management and author of *Democratizing Innovation*. 'What's new about this is that it's visible on the web, so we can find and see each other.'

THE NEW MODELLING ARMY

The recession, environmentalism and globalisation are prompting consideration of new ways of living that are more personal, more local, downshifted and place product before brand. In this era, the marriage of tools and connections could even rewire the consumer mindset to

become more satisfying. 'Personal value is the kind of value we receive from being active instead of passive, creative instead of consumptive. This energy drives the world's hobbyists,' as Clay Shirky puts it in *Cognitive Surplus: Creativity and Generosity in a Connected Age*.

It may also be shaping a new business model of designer enablement. Companies at the forefront of this new industrial revolution offer user-generated and co-created content that involves direct communication between designers and users. They think big, too. This summer, Local Motors, a carmaker in Massachusetts, launched its first car. Its design, by graphic artist Sangho Kim, was crowdsourced through a community competition, as were its components. Customers do their own final assembly. So far, the company, which has 7,000 contributors, including designers, engineers and amateurs, has one microfactory in Phoenix, Arizona and plans to open two more.

'As a designer, to work with Vitra you need to be very lucky. What we bring to designers is the chance to have their products made in higher volumes,' explains Julien Callède, chief operating officer of Made.com, whose products are made on demand in China and the Far East in factories also used by the likes of Philippe Starck and Habitat. 'Our business model will definitely bring down prices of high-design products.'

It will also go some way to democratising demand; one plan is for customers to vote for which of Made's items go into production. Similarly, New Zealand-based Ponoko enables users to design a product, get an online price and have it made, either in Ponoko's facilities in Wellington, New Zealand, or in San Francisco, or to

COMPANIES AT THE FOREFRONT OF THIS NEW INDUSTRIAL REVOLUTION OFFER USER-GENERATED AND CO-CREATED CONTENT THAT INVOLVES DIRECT COMMUNICATION BETWEEN DESIGNERS AND USERS

commission someone from its creative community to realise the idea and have it made for them. Some 60,000 digital items have been made to date.

This consumer-to-business model skips the intermediary role of the retailer. 'This enables customisation on a mass scale and leads to local manufacturing again,' argues Derek Elley, Ponoko's chief strategy officer. 'It's taking the Ikea model about self-assembling, which seemed a crazy thought 50 years ago, and driving it to the next level.' The company has just launched a partnership with electronics supplier SparkFun, enabling users to manufacture any item that has electronics inside a casing, from lamps to music players. 'Our vision is that at some stage in the future we'll be able to sit in our

living rooms and wave our arms in the air and magically design a product specifically for our own needs and that product will ooze out of a part of the wall.'

That reality may be some time off. 'We're probably not going to get to the stage soon where we'll have machines at home to make objects,' says Andrew Curry, a consultant at the Futures Company. 'And there's a gap between the skills needed and the technology. If you send digital instructions, how do you assemble something?' The London flagship store of British bookseller Blackwell is home to the €142k Espresso Book Machine, which can print and bind books in five minutes. 'It's a great machine but it can only do one thing: create a book,' notes Curry. 'But machines



Open, modular kitchen, part of the OpenStructures project - a 'collaborative Meccano' to which any participant can add a component - designed by Thomas Lommée, Christiane Hoegner, Jo Van Bostraeten, Michou-Nanon De Bruijn, Biogas-E, Unfold and Lucas Maassen

that are generalistic and configured in such a way that you can use them in more than one way will become more valuable as prices come down. What we've seen in every sector where you can send digital instructions – such as music – is that it has transformed the market.'

The potential for 3D printing may be just as huge when prices become more affordable, enabling go-getting individuals, not just businesses, to make initial prototypes. (Nike reportedly uses 3D printers for shoe prototypes while car companies use them for components, for example.) Over at TechShop, where people make 'everything from medical devices to socks, stuffed animals, electric motorcycles or wooden benches', the sky seems literally to be the limit for utilising technology to make inventions; a lunar lander that will compete in Google's Lunar X Prize is being printed on site. The team behind it is one of 22 hoping to become the first privately funded group to send a robot to the moon and transmit data back to Earth.

However, a DIY approach may not be a boon to sustainability. The flipside of printing or 'fabbing' exactly what we want may also be the ability to create with abandon. 'The inevitable consequence of mass-market fabbing will be a huge increase in the amount of non-biodegradable plastic waste clogging

up the planet for hundreds of years into the future,' says Nick Jones, analyst at information technology research company Gartner. 'But if we wait until all the problems with a technology are solved before we permit it, then we waste a decade or two of potential value. And, in any case, there's no way we can predict all the social and environmental issues associated with a new technology before it arrives.'

GO EAST, YOUNG DESIGNER

Mass-market 3D printers may be some time off. More practical for the moment is the new individual freedom to have a prototype or product made by conventional methods that already exist; Chinese manufacturers are increasingly taking orders online. This is partly because the recession has led to surplus manufacturing capability and partly because a spate of factory building outpaced demand. Both factors make Chinese manufacturers more willing to handle small-batch, high-margin custom orders, allowing designers to bring products to market cheaply – the process used by Made.com.

On Alibaba.com, which can translate in real time between English and Chinese, microentrepreneurs can source suppliers, manufacturers, exporters and importers and find out how much it would cost

to have their product made. Ironically, perhaps, this C2B manufacturing capability is, in part, a result of the rise of shanzhai businesses in China. Shanzhai means mountain bandit or fortress in Mandarin Chinese and refers to small vendors who make knockoffs of electronic goods. 'What we've seen over the last couple of years is an acceleration in availability of the components and an advance in standardisation between different products,' explains Timothy James Brown, editor-in-chief of Shanzai.com, which tracks Chinese technology. 'That standardisation process has made it much easier for people who want to make small batches or their own products to be able to put things together.'

It is not all easy, however. Brown stresses that obstacles to one-man manufacturing in China remain. These include the language barrier and the potential lack of trust in long-distance business transactions that are not conducted face to face. Committed microentrepreneurs are already travelling to cities such as Shenzhen and contacting local manufacturers through retail channels there; the owners of both are often related.

Access to the more entry-level aspects of the DIY movement is increasing too. A crafts resurgence, internet-driven through sites such as Etsy and BurdaStyle, is building a likeminded making community. With their community and forum sections, these sites take the networking functions of Facebook and MySpace onto a more profound, business-oriented level. This marks a second internet era that combines social networking with DIY aspirations. Certainly the demand is there. Make, another online portal for makers, organises the Maker Faire, which has seen entries more than double from 200 in 2006 to 475 this year, with visitor numbers also doubling to 40,000 over that time. It is a country fair for the digital age. 'It's important for people to have an annual celebration,' says Sherry Huss, the Maker Faire's director. 'But now they might be bringing along robots instead of pies.'

THE SMALL-SCALE HITS THE BIG TIME

Arguably, a making renaissance has been building for a decade or more. However, its new expression comes backed by enabling businesses, design-democratising technology and a factory system ready to support small orders. During that decade, resentment has been building against the uniformity in aesthetic and function of mass-produced goods, compounded by the homogeneity of global brands – the

sameness of things. Shopping has ceased to be fulfilling (see David Carlson's comment feature in this issue). Compare that with the satisfaction of making. A user survey by sewing site BurdaStyle revealed that making provides not only an outlet for creativity but a sense of accomplishment, according to Nora Abousteit, its co-founder. Such opportunities have flourished: at Sweat Shop in Paris, for example, a Singer sewing machine can be rented by the hour and lessons taken from fashion designers. Etsy, which now has 5.5m users in over 150 countries and 400,000 sellers, is pioneering an eBay for DIY, where people can sell and buy maker products. Demand is such that the hobbyists driving traffic are increasingly making new careers out of it, as evidenced by the site's Quit Your Day Job section.

Counter to globalisation's impersonality, the DIY movement is also returning a degree of the personal to commerce. At Threadless.com artists can submit designs for T-shirts that are voted on by a community of users. 'People want to know the stories behind the product they're buying and know the artist that created it,' says Threadless co-founder Jake Nickell. 'It's a move away from a faceless corporation.' The credibility of such sites with mainstream business is also growing. This year Gap has collaborated with BurdaStyle to create fashion shoots for a sponsored online slideshow, while Threadless has collaborated with Havaianas, the Brazilian flip-flop brand, on a line of sandals and teamed up with computer maker Dell on new PC case decorations, unveiled this summer. 'We wanted to bring the voice of the consumer in,' commented Dell's Rachna Bhasin.

Indeed, in *Makers*, a novel about the rise and fall of a business model inspired by the Maker Movement, author Cory Doctorow points the way to a near future in which pervasive, monolithic, multinational companies are replaced by a network of interconnected, personal business units of perhaps one person each. He imagines a merger of Kodak and Duracell called Kodacell whose chief executive officer states: 'The days of companies with names like General Electric and General Mills and General Motors are over. The money on the table is like krill: a billion little entrepreneurial opportunities that can be discovered and exploited by smart, creative people. Our company isn't a project that we pull together on, it's a network of like-minded, cooperating autonomous teams, all of which are empowered to do whatever they want, provided that it returns something to our coffers.'



The Diamond chair by Nendo, Japan, is built entirely using rapid prototyping technology

WE'RE ALL DESIGNERS NOW ... AREN'T WE?

That could be welcome, if empowerment is what you want. The DIY movement might well be said to be part of a much broader societal shift towards notions of self and community empowerment, which supports the creation of small, private businesses. Daniel Charny, a senior tutor in the department of design products at the Royal College of Art in London and strategic consultant to the London Design Museum, talks of the rise of transition towns. These are communities that break away from governmental systems of running towns and cities and might drive a demand for more locally produced goods. 'These kind of sustainable movements are related to ecological imperatives and that's going to strengthen the DIY movement,' he says.

British Prime Minister David Cameron has launched his Big Society drive, aimed at a 'big advance for people power' and a 'redistribution of power', one element of which will give groups of individuals the freedom to establish their own Free Schools. Similarly, in France, as part of his wide-sweeping economic reforms, last year President Nicolas Sarkozy launched the auto-entrepreneur scheme, which is open

to freelancers, people in employment, the unemployed and retired people who want to try out a business idea. Official figures show that about 40% of auto entrepreneurs are women and that their average age is just over 40 – old enough, perhaps, to have grown tired of standard employment. It remains unclear, however, whether the opportunities the DIY movement affords, such as the chance to open a Free School, are actually in demand. One consequence is likely to be increased self-employment, enabling some amateurs and designers to make a living without needing to have their products produced by a manufacturer, in the same way that media graduates have started blogs rather than joining traditional media groups.

The better DIYers may even prove ripe ground for design company recruitment, if a passion for experimentation can make up for a lack of official qualifications. Yet self-employment typically means longer working hours; 49% of self-employed Americans work more than 44 hours in a typical work week, compared to 39% of American workers overall, according to Gallup. Nor is coming up with an original, useful and marketable idea as easy as the rapid uptake of the movement's opportunities might suggest. Widely



The Bravais armchair by furniture designer Liam Hopkins and artist Richard Sweeney is made from recycled corrugated cardboard, using elaborate computer design technology

MANY PEOPLE WILL BE EITHER TOO LAZY OR TOO INDIFFERENT TO JUMP ON THE DIY BANDWAGON; MANY WILL NEED AN EDITOR OR TASTEMAKER TO CUT DOWN THE NEVER-ENDING PRODUCT CHOICES



Crystallization rapid prototype fashion range by Iris van Herpen, Daniel Widrig and .MGX by Materialise

syndicated TV programmes such as *Dragons' Den* and *American Entrepreneur* attest to this. Just as many prefer to receive services and national leadership in return for their taxes, could the majority also prefer to pay for the expertise and production skills of designers and manufacturers? Many people will simply be either too lazy or too indifferent to jump on the bandwagon. Far from wanting to make for themselves, their new and greater need will be for an editor or tastemaker to cut down the never-ending product choices or to help them make decisions about product customisation options that they lack the time, knowledge or wherewithal to make themselves.

'Most people just don't care enough to make their own things,' says MIT's von Hippel. 'The difference is that the DIYers will create more options to choose from. And there are a lot of very good designers out there.' Nor is the advent of DIY technology likely to affect all industries equally. As prices drop, there is likely to be a proliferation of niche enterprises that will affect some industries profoundly. Blackwell's Espresso Book Machine, for instance, may be too expensive for most independent booksellers, but at a lower price could help revitalise the local bookshop industry with ever more esoteric specialisms. Further still into the future, it could kill off booksellers altogether if home printing becomes the norm.

Another factor is that companies are now working with faster production times, although the level of customer participation remains uncertain. 'A two-year product cycle isn't cutting it any more and companies will be using some of these technologies just to work faster - but not necessarily to give the customer complete

control over what they're making,' says Nickell of Threadless. And the more inconsequential a product is to consumers, either in terms of the time spent using it or the cost to buy it, the less likely there will be a demand to have it made. 'It's unimaginable that we'd all want to make everything ourselves, such as detergent or loo paper,' points out Nickell.

THE GENIE OUT OF THE BOTTLE

The longer-term impact of DIY culture on designers and manufacturers is so uncertain that this summer's Industrial Designers Society of America (IDSA) conference was entitled *DIY Design: Threat or Opportunity?* With DIY, many hope, will come a finer appreciation both of what goes into a product and of what designers do. Consumers will, for example, understand why the cost of handmaking can make a product 'expensive'.

Far from being put out of a job, experts may find themselves more in demand as the guarantors that products are supported by the right credentials. This is not to say that the experts will not have to raise their game. 'Alessi might get challenged by somebody like Joe from Brooklyn who's never designed anything before but has a great idea for a tea kettle that the Alessi design studio didn't think of,' says John Rogers, president and CEO of Local Motors. 'Will Alessi still make good products? Probably, but it makes the world a little bit more competitive.'

'Everybody came out of the conference thinking that the DIY movement was an opportunity,' says Sohrab Vossoughi, IDSA conference chair and founder of Ziba Design. 'Because you can't hide what you do or control the stuff that you're doing,

Digital jewellery by Kathryn Hinton uses traditional silversmithing and jewellery practices, translating tooling and interfaces into a virtual environment



authorship to some extent has gone. The know-how, the equipment, everything is shared and people have access to it.' Vossoughi adds that DIY means that niche is the future. 'The future is the smaller and smaller statement. We're past mass production and the industrial age and we're in this area where people need to customise and personalise. Professional design and DIY face a co-existence. They will inspire and inform each other; neither is going to become obsolete. And the consumer is going to win.'

As John Hoke, vice-president of global footwear design at Nike, points out, you can't put the genie back in the bottle. Nike is just one corporate giant feeling the need to respond, in the first instance by extending its Nike iD programme to allow customers to make even more precisely detailed specifications about the shoe the system lets them design. The company is also rolling out its *Make Something* workshops, now available in California, New York and Boston, where the only inventory is the raw materials that consumers, mostly 15-22-year-olds, use to make products from scratch in more of a making experience than a shopping one.

'Once people get a taste of being able to select and participate in the making, it's going to be hard to go back,' Hoke adds ominously. 'The kids that come to Nike today are not willing to just accept what's being made, they want to participate in the process. The power is reversing back to the individual, who is going to use brands to self-create and self-express. You're going to see more of this; more customisation, more personalisation, with the brand taking a back seat.'

In other words, as the designer Yves Béhar has stressed, mass production will morph into mass individualisation, with brand loyalty a product of the extent to which a company allows its consumers to take charge of the design process. For some companies, however, relinquishing control or empowering users is a scary prospect that could risk devaluing the brand's visual identity.

'Designers and companies need to design an end-to-end experience so that the consumer has the perception that they have control and enjoy being involved with the brand,' says Scott Wilson, founder of Chicago-based design agency Minimal and customisable iPhone case company Uncommon. 'But there definitely need to be some guard rails so that no matter what they do, they can't break it and ruin it. You have to refine that kind of thing over time and make it as simple as possible because if you put the button in the wrong place your sales drop off. In the future, people will be designing products for customisation, like TVs and digital hardware. In the very near future you're going to be able to do on-demand 3D printing and print off, say, an iPhone case that's only a couple of dollars more than buying one made in China.'

JUST WHAT WE NEED - MORE SHOPPING

For the time being, at least, the clearest benefit of the DIY movement is for consumers: somewhat ironically, less in the freedom to make products themselves than in the greater diversity of products to buy that DIY will bring.

Just as the uptake of DIY remains uncertain, so too will the quality of the

movement's early output. 'It's a very creative movement and it's also a diluting process that's going to create a lot of very bad things,' says the RCA's Charny, who also points out there will be less control over health and safety issues. There is, however, a form of inherent quality control. 'What we've generally seen with the internet, with writing as an example of an early kind of DIY it allowed, is that content grades itself quite fast,' notes Curry of the Futures Company. 'The bloggers who write well float to the top and the bad ones are read by their friends.' Just as iTunes has enabled people to listen easily to small, niche labels, we can expect to see relatively niche designers reaching customers. Curry predicts that people will start acting as online aggregators, telling others that, if they like a particular designer, they might be interested in other, relevant recommendations. 'You'll start getting social effects around networks, like a designer having a Facebook presence, with things happening by word of mouth.'

Curry anticipates that this could lead to copying by the giants and copyright disputes that, as with the music and fashion industry, would probably be settled out of court. Perhaps the most important consequence of the DIY movement will simply be a change in mentality. The hacker movement, currently a DIY subculture, could, in turn, become a widely-held attitude. 'There are more and more suggestions online about how to modify things,' says Charny. 'You will be educated in school to look at things as materials, not only as products, and at what things could do, not just what they do do. You might buy a toaster but a hacker will look at the spring mechanism and think "I can make a mousetrap from that."'