



## When The Going Gets Tough, The Losers Get Lobbying

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In the world of innovation, 3D printing is a new kid on the block. What isn't quite so certain is just how deeply 3D printing's impact will be on other industries, and who stands to lose from its development. Its potential is so extraordinary that in May of 2014, a Private Member's Bill was introduced into the Queensland Legislative Assembly for the creation of a licensing regime around 3D printed firearms. The explanatory notes of the proposed amendment of the *Weapons Act 1990 (Qld)* explains: 'There are many positive uses of such technology including for medical, scientific and industrial purposes ...' yet it emphasised that '*laws must keep pace with technology to effectively protect the community and all citizens alike.*' We need to watch for the efforts of incumbent lobbyists and their attempts to constrain industry progression.

3D printing is the process of cumulatively layering materials to form a solid object. It is much like that of regular printing, with an additional vertical axis. Unlike traditional print where users send



text or picture files, users design 3D files in Computer Aided Design (CAD) software. While the original technology printed only in plastics, it has since progressed into metal, carbon fibre, paper and even stem cells. It is an exciting new technology with exciting new applications. And yes, while it sounds much like the Star Trek replicator, lower-end printers are available for around \$400.

3D printing presents widespread opportunities for both consumer desktop printing and commercial industry. As such it is a particularly appropriate example of Schumpeter's gale of creative destruction. In the eyes of Schumpeter, '... (the) capitalist economy is not and cannot be stationary. Nor is it merely expanding in a steady manner. It is incessantly being revolutionized from within by new enterprise.'

Originally developed back in 1984, 3D printing struggled to find its feet for decades, possibly due to the odd two-sided structure of the industry.

For many years, the technology was mainly confined to tinkering and experimentation in garages, hacker-spaces and hobbyist clubs. Recently, commercial companies have entered the space, dedicating millions of dollars into research and development, creating an emerging industry of commercial start-ups searching for entrepreneurial opportunities to exploit.

Wohlers Associates estimates the 3D printing market at a value of \$3.07 billion in 2013, continuing on the path of an average 27 per cent growth rate over the previous 26 years. The industry is expanding: there's no doubt about that. But where and what will it expand toward?

From an economist's perspective, 3D printing presents two particularly exciting extensions from traditional manufacturing. Firstly, 3D printing inherently prints from the 'inside-out'. This is the opposite process to traditional manufacturing, which works from the 'outside-in'. This difference allows for a large extension in complexity.

An example of this complexity is the growing field of topology optimisation (the mathematical modelling of shapes to reach optimum structural design). Until recently, these studies could only theoretically form CAD models with much lighter, cheaper and stronger properties. The problem was that they could not produce them because of the limits within traditional manufacturing. 3D printing makes these shapes a reality. For example, a set of structural rib elements in an Airbus plane saved over 500kg in weight by using 3D printing.

Secondly, while traditional manufacturing often requires a large fixed cost in developing an initial prototype, 3D printing does not. It is relatively quick and easy to modify the original CAD model. This allows for rapid prototyping and hence cheap customisation.

Most optimists are professing the demise of traditional manufacturing through a third industrial revolution—a new era of democratised production displacing the production line as we know it. The minority pessimists dismiss the hype, arguing that useful adoption of consumer 3D printing remains decades away. To them, the industry is still an infant—consumers don't have the ability to create CAD files, materials are too few (and expensive), and the industry is already captured by two commercial giants.



Commercial R&D is being directed towards solving these problems—particularly what can be termed the ‘data problem’. The problem here is that consumers require designs they can print, yet not everyone has the capacity to create them. To combat this, there’s been much work to simplify CAD software (particularly by the firms selling the printers), as well as a growing market in 3D scanners. Many of these scanners allow users (through the use of lasers) to scan an object and automatically render this into a CAD file before printing.

In reality, we’re somewhere in the middle of these two extremes —there are both challenges and opportunities.

The emergence of 3D printing is giving us an opportunity to once again observe Schumpeter’s gale of creative destruction and the consequent struggle between industry emergence and regulatory control. In the modern era, these two come hand in hand.

Schumpeter’s ‘revolution from within’ is most clear with technological innovation, such as 3D printing. Entry of new business models by entrepreneurs drives out the older business models, encouraging economic growth. In this sense, the economy is in a constant state of commotion and turmoil. For example, floppy disks were displaced by CDs, which were displaced by USBs, which now look likely to be rendered obsolete by cloud storage. There are both winners and losers from this process. New business models are born. Incumbents adapt or die.

How does creative destruction relate to regulation? From a positive perspective, regulation exists for the public good. This is the story of citizens needing certainty and assurance; the general story of protecting civil society against itself. On the other hand, private agents may use regulation as a political tool to further their private rents, deploying it as a bulwark against competition. Creative destruction presents a particular case of the tensions and trade-offs between these two roles. Creative destruction is always flagged by calls for regulation. That is: lobbying.

These two are linked because it is the incumbents that lobby. Let’s call them the losers. The losers, attempting to weather Schumpeter’s storm, scramble and lobby in their private interest. Of course, they can’t say that it is in their private interest. So they hide under the guise of the first purpose of regulation—‘public protection’.

This is perfectly exemplified by the current turmoil with Uber and Airbnb, two companies whose services are dramatically impacting on their respective industries. Through its smartphone app, Uber has created a service that easily connects passengers and private drivers. The incumbent taxi industry is lobbying in terms of licensing, under the guise of safety for passengers. Airbnb have created a website where individuals can search for and/or offer their own homes as accommodation for holidays. Major hotel chains are pushing for closure, citing housing and occupancy tax laws.

Quite often, and unfortunately, the arguments for additional regulation (at least in the beginning of the technological trajectory) come through a costly and time consuming process. Governments are forced to regulate the industry by defining the strict legal applications of the technology. This



can have disastrous effects on where the technology *could* have been applied. It also tends to allow the industry to relax a little—there's not as much pressure for innovation once they've been regulated.

It is reasonable to say that if we know who the losers are, we know the direction of the lobbying. So, in 3D printing, who are the losers? This is not as clear-cut as the earlier floppy disk to CD example.

Like electricity and the internet, 3D printing is a 'general-purpose' technology with many potential applications in the medical (prosthetics), educational (libraries and schools), engineering (prototyping), aerospace, and biotech (human tissue replacement) industries. We can be sure that 3D printing has market value, without yet knowing exactly where that value comes from. Billions of dollars are flowing in, the technology is progressing rapidly, and there's no doubt of the awareness of its potential. Yet, distinct, precise market applications remain elusive. Yes, there are the applications listed earlier, but there are those who suggest 3D printing has reached the outer bounds of the industry.

Consequently, no one knows who the losers are. And, more importantly, *the losers don't know who they are.*

We are only at the beginning of a long and expensive legal and lobbyist battle between the incumbents and the new kids on the block. Once the incumbents find out how much they stand to lose (and that's only a matter of time), they will be willing to spend millions on lobbying to block the future of 3D printing. They will demand regulations under the guise of the supposed public interest, yet the logic of public choice economics suggests that private interest and rent-seeking are the underlying motivations.

In other words, the lobbyists are coming!