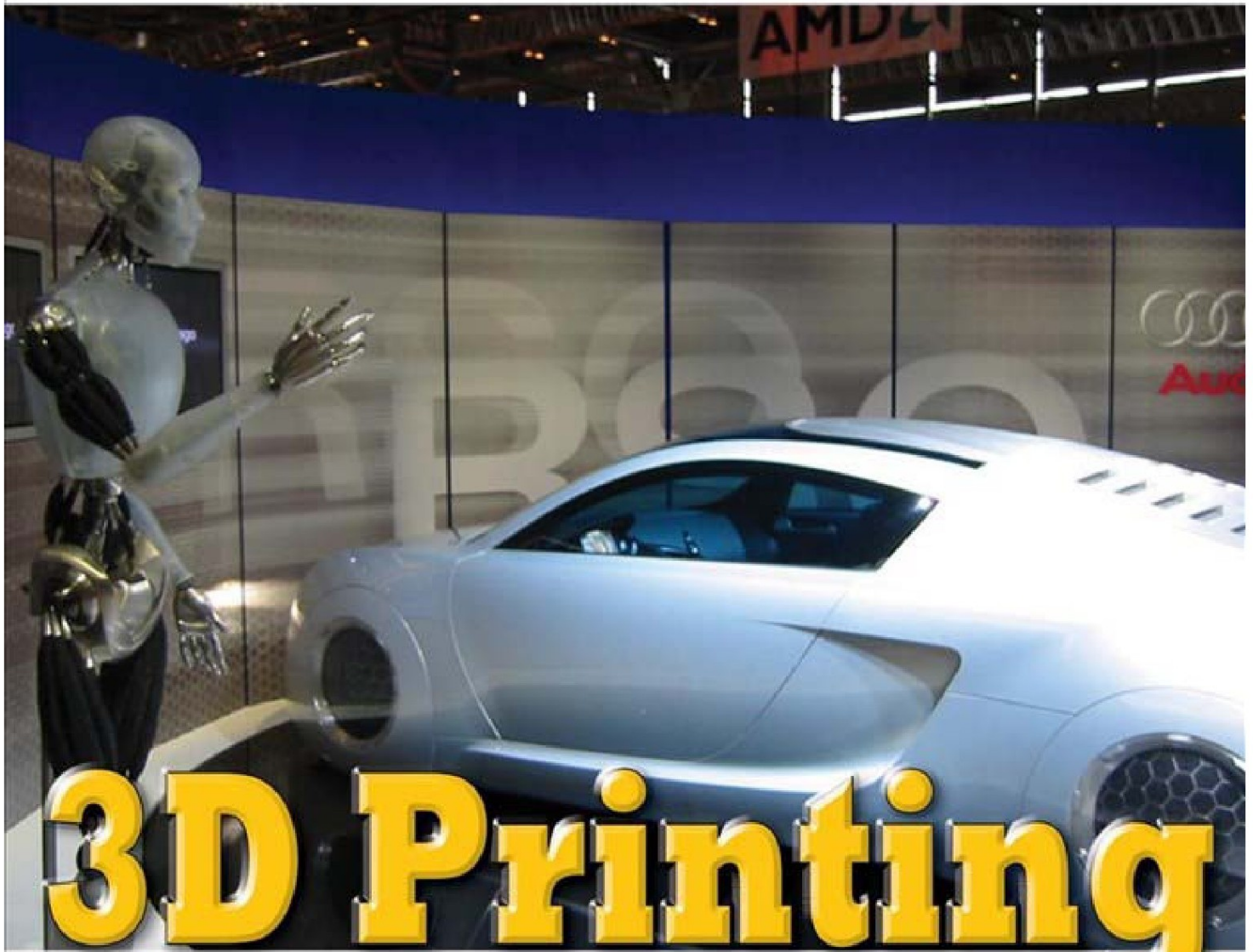




**OPTIMAL MANAGEMENT, INC.**

The premier consultants to staffing companies



# 3D Printing

How The New Industrial Revolution  
Will Impact Staffing





Michael Neidle

# How The New Industrial Revolution Will Impact Staffing

By **Michael Neidle**,  
President, Optimal Management, Inc.

## OVERVIEW

Staffing is on the verge of one of the largest changes to impact our industry. This June's *Wall Street Journal* ran a special section called "A Revolution in the Making", all about the 3D manufacturing which was described as being as significant as the advent of the production line and is being called the **New Industrial Revolution**.

While the first 3D printers came out in 1984, like many innovations such as solar technology (first solar panels in 1956) and the Internet (created in 1970), it too has been slow to reach it's full potential. It now appears that the stage is being set for that to happen.

It is estimated that by 2020, fully one third of all manufacturing will be 3D, initially much of that replacing Chinese imports, but going far beyond that in the years thereafter. This is being called the next trillion dollar sector, which is the size of IT now, or 7½% of our economy. Even if this is a bit optimistic, there is no question as to the importance of 3D printing.

Though 3D represents a trivial fraction of today's production, it is reality and it is now being used to make everything from fabrics to commercial jet engine parts. It can't do everything, but this industry is maturing rapidly and will eliminate a good portion of traditional manufacturing. Most importantly for us, it will be replacing a lot of light industrial staffing, while the demand for engineers, designers, IT programmers and various other creative types will flourish.

This is a result of the convergence of several trends which are now reaching critical mass. These include everything from cloud computing and the accessibility of cheap computing power, to a new generation of electronic sensors and micropro-



cessors to make precision parts. Large scale production and a declining cost curve for integrating these technologies that will drop 3D cost precipitously.

The 3D print head can now lay down almost any physical kind of substrate into complex parts from fibers and polymers to metal and biological materials. There are also

many types of 3D printing technologies from vapor deposition and spray nozzles to literally paint out parts, to bio-manufacturing, robotics, artificial intelligence, nano-manufacturing, and a host of other techniques that are replacing older types of production.

There will now be a mix of technologies of which 3D will capture a larger and larger market share. And typical unskilled, semi-skilled light industrial workers will be in less demand. Those who can adapt to this change will capitalize on events as they always do, while those who do not will see their fortunes decline, but that's progress.

Jet engine nozzle production provides a great example. GE is eliminating 20 separate welds on each of 100K nozzles/year, each part fully formed, weighting 40 pounds less, four times as durable, in less time, with far less scrap, inventory and fewer workers. NASA's new heavy lift rocket engine injectors are operating at 6,000°F are being made via 3D printing at half the cost and in a fraction of the traditional time; clearly 3D is for real.

3D printing typically uses "additive" production, both layering substrates and integrating various elements to make a complete product. With some modification, many of these printers can switch from one production task to another, customizing output.

We are now seeing rather complex products coming out of the same facility with rapid turn around. Prototype parts can quickly be modified to produce units in high volume that can meet the demanding specs. As the software produces the exact dimensions and high tolerances, there is often no waste or problems in waste disposal. With fewer staff there are less labor problems and the overall labor cost disparity between U.S. wages and that of China and

CONTINUED ON 8



(continued from page 6)

## How the New Industrial Revolution Will Impact Staffing

other developing nations that is currently being off-shored is disappearing. According to some, eventually about half of large production facilities in China are planning to move back onshore in the coming years. It is expected that large plants will be replaced by many small micro-plants, many of which will be entrepreneurial starts-ups.

This interestingly is happening just when we have seen a substantial narrowing in labor costs with China's whose relative advantage has been reduced from 72% in 1982 to 28% currently. Interestingly, Mexico has replaced China as the world's low cost production center and their outlook seems rather bright once again. And, where assembly is required, robots do much of the work and this cost has fallen by 50% in the last 25 years and with mass production one sees the application of Moore's law.

Other more complex assembly will still require manual labor, but this will be a smaller component of the overall cost, yet the demand for higher skilled labor within the whole supply chain is a necessity. A small sampling of the companies at the forefront of 3D include: GE, Autodesk, Nike and Adidas, 3D systems, Geomagic and DyeCoo.

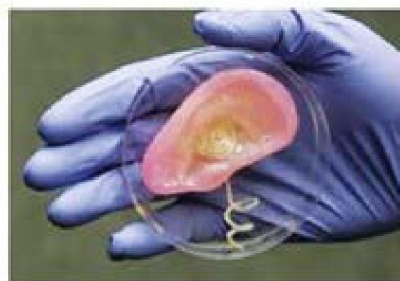
### THE IMPACT ON STAFFING

Back in 1970, nearly 20 million people worked in manufacturing, today it is 12 million, and for a 40% decline this will surely continue to drop further. The fraction of temps in LI has risen, but not nearly enough to take up the massive decline. Temps continue to grow due to many factors such as: providing a more flexible workforce, providing a less expensive alternative to regular employees, reducing a client's liabilities as the temp service is the employer of record, saving the client money due to the new (but delayed) government mandated healthcare laws, etc.

Today, one out of 5% of the people doing manual labor jobs and one out of seven working on an assembly line is a temp. Although in the last four years, before the impact of 3D, temps as a percent of the private

workforce rose from 1.6 to 2.34%, of the overall workforce. But that will be overwhelmed by a market decline in light manufacturing which is in the cross hairs of the 3D revolution.

Staffing has always had to adapt to survive. The client makes a decision how to best run his operation and it is the job of the staffing company to adapt. The more forward thinking staffing companies (the *innovators*) work in concert with



their clients to partner with them in this transition and provide valuable insights as how they can expedite their move into new and lucrative areas.

The next levels of staffing companies are quick off the mark (those who are *proactive*) and are responsive to the needs of their clients, before their competition. The laggards (the *followers and non-responders*) who wait until their more aggressive counterparts come on board are often left with the scraps or miss the wave entirely. We will try to provide a roadmap as to how to best navigate this new technology.

It should be pointed out that while most knowledgeable people believe 3D is for real, there are skeptics as with every new innovation in its early stage of development and accep-

tance. Direct hire and temp/contracting should both be beneficiaries here. Yesterday's 3D printers were play toys, today's are more of prototype and tomorrow's will be a generation ahead. Progress may well be slower than anticipated, but it's coming. Fortunately, 40% of 3D printers are made here, although there is a risk of offshore production. The potential loss of ones intellectual property and the fact that the lure of low cost labor is not a critical component should help U.S. production. Hopefully, we will adopt intelligent tax policies here so as not to overcome these factors.

### THE INNOVATORS

The most successful staffing companies become part of the solution and volunteers how they can make their clients more profitable. Sometimes this may be at the detriment of immediate profits, but with a very real chance at being their long-term partner and share in the winnings. One usually has to have a good relationship with the company as a respected source, but it can just as easily be the outsider who educates their potential customer that the time for innovation has come and that they can change the paradigm and provide them with a better solution than their entrenched competitor who is protecting his profits at the detriment of the clients. Let's say you are either the entrenched vendor or the competitor wanting to take over the account; the strategy is the same.

The client probably already knows that 3D printing is on the horizon, but feels the future is perhaps one or two years off and not ready to bite the bullet and make the investment or not ready to shake things up with his labor force and all the headaches associated with transition.

You first should gather all of the facts and be assured that you can provide the kind of staff that can do the job for them, or at least be prepared to recruit the kind of people that may be needed. You may offer them the opportunity to use your contingent labor to test out a prototype of the new 3D technology equipment whenever they are ready. They

CONTINUED



can use your labor at a facility of their choice if they choose to do so with little exposure if this is important to them.

One does not need to be successful all the time to make this a successful venture, but this is the kind of innovative thinking that can get one to the next level, and 3D is one of those next levels. Progressive staffing companies are now interviewing 3D types and entering them into their data base for assignment. They are ramping themselves up on the learning and knowledge curve so when they make this offer they are ready to deliver.

## THOSE WHO ARE PROACTIVE

One does not have to be the first one to discover something. In fact, the annals are full of companies who succeeded by capitalizing on someone else's innovation is often the winner as they put their money on commercialization of the concept instead of the discovery. People don't remember the names of the first search engines

or internet companies, but we all know who did the best job on being the best at making them most efficient and used by the masses. It was not Xerox, Univac or AOL whose innovations won the races that they started, but those who perfected a better product or business model that won.

So what does one need to do to capitalize on 3D manufacturing staffing? The answer is, even though there is not a huge staffing demand today, one may want to establish themselves as the go to firm for 3D staffing personnel, as Robert Half has done in accounting and finance.

They first need to learn the fundamental skills that will be required as this industry matures. They should then start to establish relations with those who are likely to be players and work alongside with them to find out their timeline for adding staff. Many of these companies will be small and to use temps to save them money could be a good solution for them. There also will be a need for direct hires. One would

CONTINUED ON 22

(continued from page 9)

## How the New Industrial Revolution Will Impact Staffing

then get the specs for the people that they need, which will be a combination of jobs. Some of them we know now, while others will emerge, just as they did in IT, the environmental area and biotech.

Here are just some jobs that we can expect to grow due to 3D. Many of these are traditional job titles that will be applied in novel ways and may require new skill sets: computer programmers, information architects, systems analysts, networking engineers, electronics and mechanical technicians, electrical and electro-mechanical engineers and technicians, hydraulic engineers and technicians, material engineers and technicians (metallurgists, ceramics, polymer), chemical engineers and technicians, hardware engineers and technicians, robotic engineers and technicians, optical engineers and technicians, artificial intelligence experts, testers, model makers, material handlers, physicists and mathematicians, commercial artists, graphic designers, cost accountants, quality assurance personnel, logistics experts, copywriters, ergonomic and creative designers, supply chain managers, highly skilled warehousing and material handlers, technical sales reps and account executives,

technical recruiters, attorneys and paralegals.

We can only guess what new skills will arise and be translated into newly created jobs. Who would have thought there would be hundreds of



sub specialties in IT in the days of the IBM mainframe? It has been just over 30 years from the first IBM PC, to the scores of programming languages, platforms, cloud computing, 4G smart phones and the like we have today. Interestingly, that is about the same time frame from the introduction of the first 3D printer

to the take off point.

Light manufacturing jobs on the traditional assembly line would still be there, but in far fewer numbers. As more manufacturing comes back to the U.S. this will take up some of the slack and there will be demand for warehousing, shipping and material handlers as parts and other goods made via 3D will still need to be shipped, but the need for replacement parts of assembled items will be reduced as we saw with GE and NASA requirements. It will be the nimble staffing companies that recognize opportunity early and tool up for people with the right skill sets that will do well.

Just as the Internet, Job Boards, offshoring, automation, MSP/VMS (including vendor neutral staffing systems) were seen as leading to the demise of staffing, 3D manufacturing is just another innovation that one will learn to deal with if they are to prosper. There are many staffing companies that will be able to wait a long while and still be able to participate in this new technology, including those who will buy their way in via acquisition.

## THE FOLLOWERS AND NON-RESPONDERS

So what will happen to those staffing companies that choose to

CONTINUED ON 28



(continued from page 22)

## How the New Industrial Revolution Will Impact Staffing

ignore 3D printing? The same thing that happens to all companies who choose to stick to their knitting. Some will do just fine in their specialty niche, while others will fail.

Let's look at direct hire vs. temp and contracting for reference. Once upon a time there was no such thing as temps and staffing was personnel agencies that did only direct hire and executive search (collectively known also as perm). The latter was paid for by the employer doing a search (EPF), while the former was typically paid for by the job seeker. This was known as APF, or applicant paid fees. Then came the advent of temporary services and those in direct hire thought the world was coming to an end. For some, their world did end, while others became full service staffing firms (and still generated temp to hire conversion fees). Others capitalized on change by franchising their knowledge, went into payrolling and employee leasing,

while the rest of the survivors hung onto the EPF portion of direct hire and stayed alive, albeit within a smaller portion of the staffing universe. Although their ranks have shrunk, the likes of Heidrick & Struggles, Korn/Ferry and Spencer Stuart are still around and have done well and perm has remained at around 11% of the staffing market from 1990 to this year. But the boom bust nature of direct hire puts it at a distinct disadvantage in severe recessions and has impacted the marketability and EBITDA of many direct hire firms.

### SUMMARY

So what should you do if you are concerned about the impact and opportunities of 3D manufacturing? You have four basic choices depending on your risk/reward tolerance.

1. You can try to be an industry leader in this emerging technology, develop a business plan, find the staff needed to participate and secure the

funds to invest.

2. You can wait until the market further matures and your path becomes clearer before you jump in either via acquisition or organic growth.
3. You can remain on the sidelines within your safe comfort zone and niche where 3D will not impact you. But make sure you keep abreast of changes.
4. You can remain in what you think is a safe and secure niche, but if you do not reassess your situation, your business may shrink down to an unsustainable level. ■

---

**Mike Neldle** is president of Optimal Management Inc. Started in 1994, see [www.optimal-mgt.com](http://www.optimal-mgt.com), LinkedIn Michael Neldle or call (650) 655-2190. Michael mentors staffing owners and managers to maximize sales, profits and company value. He was senior executive VP for two national staffing firms; CEO, CFO, director of planning/M&A and marketing director from start-ups to Fortune 500 corporations. He has an MBA and an engineering undergraduate.