REPRINTED WITH PERMISSION

FEBRUARY 2022

I-Connect007

SMT007 MAGAZINE

SPECIAL COVERAGE

APEX EXPO IPC 2020

PHOTO GALLERY

Reduce Costs With In-House Production, Out-of-the-box Thinking

The Mannifest

Feature Column by Emmalee Gagnon, MANNCORP

Case Study: Tesla's Success Amid Crises

Despite a global shortage of critical components needed for car manufacturing, Tesla's electric car deliveries have increased by 87%. How did they achieve this unprecedented surge in production? Through a mix of vertical integration and ingenuity.

Elon Musk decided to utilize in-house equipment and in-house software engineers. By not outsourcing the manufacturing of their PCBs, software writing, and other stages of the creative and assembly processes, Tesla has retained control over its production.

One report by Rebecca Elliot of the Wall Street Journal states that leaning on "in-house software engineering experts" allowed Tesla to "keep production lines running" and "quickly rewrit[e] the software necessary to integrate alternative chips into its vehicles[1]." Deciding to keep production in-house has helped Tesla deliver over 936,000 vehicles in 2021, while the rest of the auto industry has been waiting for outsourced chips that are slow to arrive.

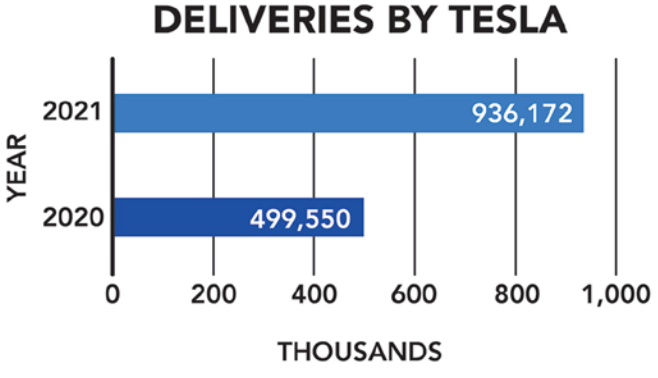


Figure 1: Number of deliveries provides by Tesla in 2020 and 2021.[1]

What can we learn from Tesla's success amid the chip shortage?

1. Use the resources available to you.

Rather than seeing the shortage as something unavoidable or unbeatable, Elon Musk chose to look at what was available instead of what wasn't. Other companies can do the same. Whether rewriting software with on-staff engineers or reworking printed boards to retain and reuse much-needed components (rather than letting them go to waste), there are many resources available when we think outside of the box.

2. Keep as much of your process in-house as possible.

By producing in-house, like Tesla, you will not have to wait your turn as an offshore factory decides if you are a priority, endure ridiculous lead times, or pay the inflated rates present in today's market. Tesla bypassed a lot of the problems facing many in the automotive industry by having an in-house engineering and assembly model, and so can many other forward-thinking companies.

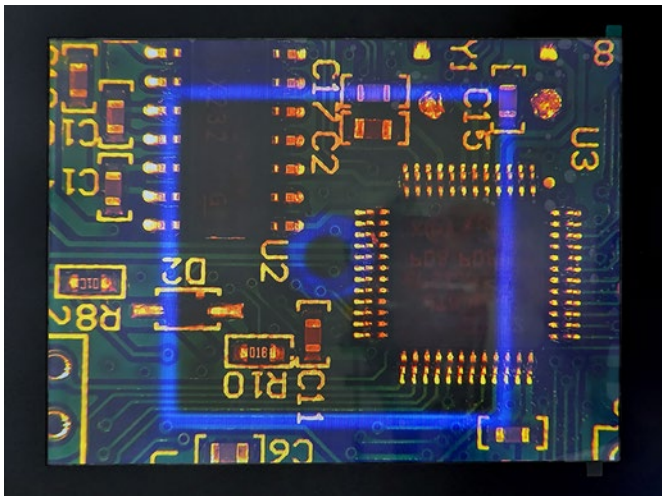


Figure 2: Rework alignment taking place, shown on a PCB.

The True Savings of Owning Equipment

We are not all Tesla. But even if you aren't, owning SMT equipment leads to a lower cost of manufacturing. With production in-house, you are no longer at the mercy of the excuses provided by subcontractors. You have control over the raw materials that you choose to use, and you can be flexible in finding replacements if your first-choice content is not available.

With high-quality machines and a small group of good employees, any business with some ingenuity will be able to achieve:

- Flexibility of output levels
- Quicker product turnaround
- Ability to label as Made in America
- Increased business with local customers

Owning an assembly line can be game changing. If your product relies on surface mount technology, an equipment line will help with your bottom line and your inventory levels. Instead of money going toward subcontractors, fees, and inflated rates, you will only be paying for your materials and labor. According to an article by Tom Beck titled, "Bringing Your SMT Assembly In-House: Case Studies of Its Effects on Lead Time, Inventory, Quality, and Overall Cost," you can save an average of 35–40% by choosing to do your own assembly.

Owning Equipment as a Growing Business

As an example, the aquarium supply company CoralVue Inc., recently moved its pro-

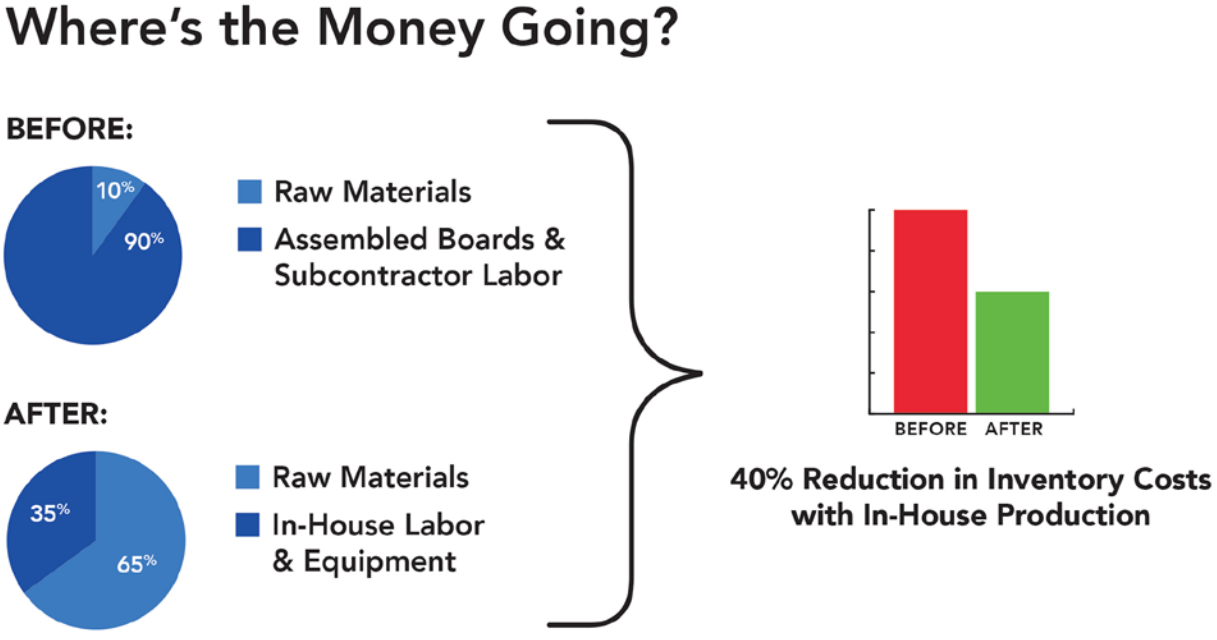


Figure 3: A series of graphs demonstrating a 40% difference between in-house and outsourced production costs.

duction in-house and doing so has drastically improved its process. When asked about their experience, CoralVue CEO David D'Aquin said that while outsourcing production, they were "getting notices of 52-week lead times[2]." These lead times and the rising "cost of using overseas PCB manufacturers" led them to purchasing their own equipment. With in-house production, D'Aquin says they have experienced "flexibility when it comes to inventory" and it has "helped ease [CoralVue's] cash flow."

With an automated SMT line, only a few people are needed to operate it, making it especially advantageous in this time of increased labor scarcity. As a growing business, CoralVue's success provides insight into how a forward-thinking company can take advantage of this opportunity and prosper.

How Tax Advantages Can Lower Equipment Costs

While owning your own equipment will be financially beneficial in the long run, the large outlay of cash at the start can be daunting. It is good to know that there are financing options available, including ones where payments are delayed so you can get set up and start creating revenue before anything is due.

Another helpful tip is to utilize Section 179 when filing taxes. Section 179 can help your company maximize savings by writing off the entirety of your purchase. In 2018, Section 179 made it so companies could receive a deduction equal to the total amount spent on equipment within the past tax year (up to $1 million[3]). This makes it a great option for small businesses, in particular.

Deciding to Start In-House Production

As the U.S. manufacturing sector has been stagnantly demand-driven, with issues appearing in the supply chain, in labor resources, and in delivery from suppliers, many are searching for a solution. The current dominantly successful solution is: Take control of the production that has been moved overseas. In-house production works because it is relatively cost-effective; financing and cost-offset options are available; owning the equipment and directly paying for components and labor results in significantly reduced overhead.

Figure 4: A full SMT equipment line installed at CorvalVue as supplied by Manncorp.

In today's economy, the main issue is you can't sell what you don't have. Companies now have the choice to take advantage of resources available to immediately improve production and experience long-term savings. This will allow companies to shed extraneous burdens of paying for air shipping, overtime, and other expenses in efforts toward getting products to customers quickly. By having your production in-house, none of those expenses will be necessary for reaching demand. Thinking outside the box allows companies to offer consistent, high-quality, quickly delivered goods at a fraction of their previous overhead.

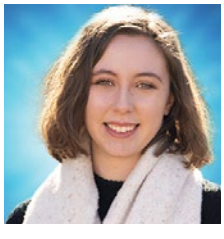
To anyone considering purchasing their own equipment, as in the case of CoralVue, David D'Aquin has some final advice: "Given the state of the world economy and political climate, we felt it was best to take control of as much of our business operations as possible. If PCBs are vital to your business, then an investment in an SMT production line could determine your future success." **SMT007**

References

1. "Tesla Car Deliveries Surge by 87%," by Rebecca Elliot, *Wall Street Journal,* January 3, 2022, pages B1-B2.

2. "How to Ditch Insanely Long Lead Times: An Inside Look with CoralVue on Switching to In-House Production," Manncorp blog post, December 20, 2021.

3. If the amount spent on the equipment purchase exceeds $2,500,000, the deduction begins to phase out dollar-for-dollar.



Emmalee Gagnon writes about SMT-related topics and customer stories for Manncorp. To read past columns or contact Gagnon, click here.

Gartner Says Worldwide Semiconductor Revenue Grew 25.1% in 2021, Exceeding $500 Billion for First Time

Worldwide semiconductor revenue increased 25.1% in 2021 to total $583.5 billion, crossing the $500 billion threshold for the first time, according to preliminary results by Gartner, Inc.

"As the global economy bounced back in 2021, shortages appeared throughout the semiconductor supply chain, particularly in the automotive industry," said Andrew Norwood, research vice president at Gartner. "The resulting combination of strong demand as well as logistics and raw material price increases drove semiconductors' average selling price higher (ASP), contributing to overall revenue growth in 2021.

"The 5G smartphone market also helped drive semiconductor revenue, with unit production more than doubling to reach 555 million in 2021, compared to 250 million in 2020. U.S. sanctions imposed on Huawei resulted in other Chinese smartphone OEMs gaining share and fueling growth for 5G chipset vendors such as Qualcomm, MediaTek and Skyworks. Meanwhile HiSilicon, Huawei's chip subsidiary, saw revenue decline from $8.2 billion in 2020 to around $1 billion in 2021."

Samsung Electronics regained the top spot from Intel for the first time since 2018, with revenue increasing 31.6% in 2021 (see Table 1). Its memory revenue grew 34.2% in 2021, in line with the growth rate of the overall memory market. Intel dropped to the No. 2 position with 0.5% growth in 2021, delivering the lowest growth rate among the top 25 vendors.

Memory was again the best-performing device category, primarily due to increased server deployments by hyperscale cloud providers to satisfy remote working, learning and entertainment needs, as well as a surge in end-market demand for PCs and ultramobiles. Revenue increased $42.1 billion over 2020, which amounted to 33.8% of overall semiconductor revenue growth in 2021.

Within memory, DRAM had the best performance with revenue growth of 40.4% in 2021, increasing revenue to $92.5 billion in 2021. Strong demand from servers and PCs created a DRAM undersupply that drove double-digit ASPs through most of the year.

Problems solved!

SUBSCRIBE NOW