Report

5 ways to take part in the circular economy

By Kirstie McIntyre and John Ortiz

Kirstie McIntyre is global director for HP Inc.'s sustainability operations. She and her team address a range of sustainability activities, such as social responsibility laws, takeback and recycling, and global product compliance programs. Kirstie also co-leads HP's circular economy programs and has worked for a number of years on the development of end-of-life programs for various companies in the technology sector.

John Ortiz leads the product stewardship organization for HP Inc. Ortiz's organization drives environmental design of computer and printer hardware products, ink and toner supplies, and paper products to minimize the impact of HP products throughout the product lifecycle. Ortiz is currently championing circular economy thinking in HP Inc.'s print and PC business.

Sustainability—both operational and environmental—is crucial for any enterprise. The pressures on companies are different and more urgent now than they were just ten years ago. Most companies now have business goals based around energy efficiency, reducing waste, and doing more with less. However, the environmental sustainability of a company is now fully intertwined with its operational sustainability. The prices of commodities and resources continue to rise. By 2030, there will be three billion new consumers of technology. The rate at which technology evolves—and becomes obsolete—puts immense stress on a company's ability to stay at pace with competition without creating financial strain or unnecessary waste. And it's forcing all of us to rethink what sustainability really means.

The traditional manufacturing model is linear: take resources, make a product, and discard it when it's of no more use. This has been the model of manufacturing and development since the industrial age. The model is simple and focused on satisfying immediate consumer demands. But it's wasteful and we're now learning how inefficient it is, too. It takes resources for granted and waste is often considered a downstream issue or someone else's problem. While sustainability efforts such

as recycling can make a difference in this model, those improvements are incremental rather than wholesale. While those efforts are nothing to scoff at, they are short-term fixes for a much bigger issue: we need a new model.

That's where the idea of circular economy comes in. A circular model is not just about reducing environmental impact of an existing process. It's about rethinking how we create products, how we use them, how to maintain their value, and how all those goals are interconnected. We must look at processes wholly from how a product is designed, the materials used, the way it's manufactured, how it's maintained, its reusability, and taking into account that outright disposal is no longer a valuable—or viable—option.

Leading the way

HP has a long track record of placing sustainability high on its priority list and is recognized as a sustainability leader, recently receiving a 10 out of 10 rating by Gartner in its 2016 Supply Chain Top 25 rankings. Participating in and leading the circular economy is the next step in HP's sustainability journey. It will help redefine how we function as a company, how our partners work with us,

and how consumers work and live. It makes business sense, by helping us develop longer-lasting, resource-efficient products and new, transformative business models.

But the circumstances have aligned making today the ideal time to consider a new model. Companies have different expectations of how sustainable a product should be or how a service should interact and improve the way their employees work. Also, technology has caught up to allow us to make the most of improvements. The Internet of Things has now connected makers with users in a way like never before. With this interconnectedness, we can better understand how and where products are used, how they are serviced and maintained, what fails and what lasts, and why people are moving on to the next technology. Sometimes we even discover customers use our products in ways we never expected. All of this information allows us to enhance every aspect of making something that helps improve the way people live and work.

We're now working with our partners and customers to help them benefit from our efforts and to apply our learnings to their own processes to make improvements that will truly disrupt the traditional model. And by doing that, sustainability will shift from a "goal we're trying to achieve" to "the way we do things."

How can your company learn from our efforts

Stop thinking linearly, and start participating in the circular economy? Let's look at some questions you can ask your organization to start applying the principles of the circular economy to your operations.

1. Make the end the beginning
Ask your organization: Is there material waste generated as part of the customer use experience? What are the customer's experiences dealing with waste generated, at product end of service? Recycling is a familar and simple place to start.

At HP, we ship millions of products a year and, although we make significant efforts to reclaim and reuse recycled materials, doing so comes with many challenges. At the core of these efforts is our closed-loop recycling process. This groundbreaking recycling innovation diverts millions of pounds of plastic from landfills and reuses it to create Original HP cartridges—satisfying customer demands, reducing environmental impact, and strengthening business.

We not only designed the cartridges, but designed a global program to recycle them. Going on 25 years, HP Planet Partners has helped facilitate recycling of HP print cartridges and HP products around the world. With the help of global partners throughout our value chain, we've manufactured more than 2.7 billion closed-loop ink cartridges during the past 11 years, using more than 3.3 billion bottles and 50 million apparel hangers. We still have work to do, but this model is leading the way for other closed-loop recycling efforts that can be applied to many other HP products, materials, and processes.

2. Consider new business models
Breaking away from the linear model also requires us to look at the relationship between the business, its partners, its customers, and the products in the world. The old model stressed ownership. Once purchased, the manufacturer was removed from the picture and the owner was left to maintain, dispose of, and replace the product. But expectations are shifting. The focus—and—interest—of many customers now is not on ownership, but rather on access.

Ask your organization: How can you offer your product as a service? Chances are, someone out there is already purchasing your product and using it as part of a service. Consider today's car-sharing services, such as Uber or Car2Go. When it comes to cars, it's not that people need a car, it's that they need to get from point A to point B. For some owning a car makes sense, but for others, access to a ride or a vehicle only when they need it is perfect.

HP looked at our own offerings to consider if businesses and consumers need to own the products and services we sell outright, or if ongoing access is a better answer for all. The reality is companies don't need printers. They need printing. That's why we offer business models that increasingly focus on leasing, renting, and other service contracts that provide the ongoing printing a company needs rather than a finite product that they'll want to update in the future.

Through HP Managed Print Services (MPS), we're taking steps towards the circular economy with a print-as-a-service business model. MPS provides a customizable set of solutions, including imaging and printing devices, network print management software, supplies (including paper), support, professional services, and document workflow management. MPS also

offers recycling for printing supplies and end-of-life management for hardware. These solutions are essential to helping businesses meet their technology demands while helping them lower their costs and environmental impact.

We're also establishing PC service models that give businesses a transformative way to access the IT essentials they need. By leasing HP computing products and expertise at any time, organizations of all sizes can get the computing they need, scaled to their current business demands. When a manufacturer is building devices they'll be responsible for over the long-term, it improves their designs. A win-win effect is that product longevity, maintenance, upgradeability, and reliability become top priorities—benefitting both the supplier and the user.

3. Rethink the consumer model
Ask your organization: If you did offer a service, how would it change and improve the customer experience? We've taken learnings from our commercial programs and applied them to our consumer business to create our HP Instant Ink ink-replenishment program. HP Instant ink is a subscription service that ensures that customers have ink when they need it, and that they can recycle used cartridges more efficiently. Through the program, an Internet-connected printer notifies HP when it is running low on ink, and a replacement cartridge is automatically delivered.
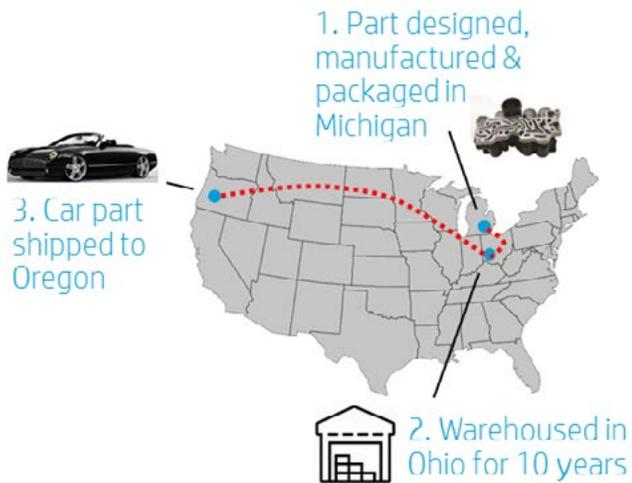
Ask your organization: How would this service impact your product designs to reduce your own costs in the long run? The HP Instant Ink subscription model allowed HP to rethink its cartridge volume and delivery designs. HP can build an expected return into the system, so that higher print yields—and fewer total cartridges—make more business sense. We also factor in expected delivery needs and offer a way for customers to return used print cartridges, which go into our closed-loop recycling process.
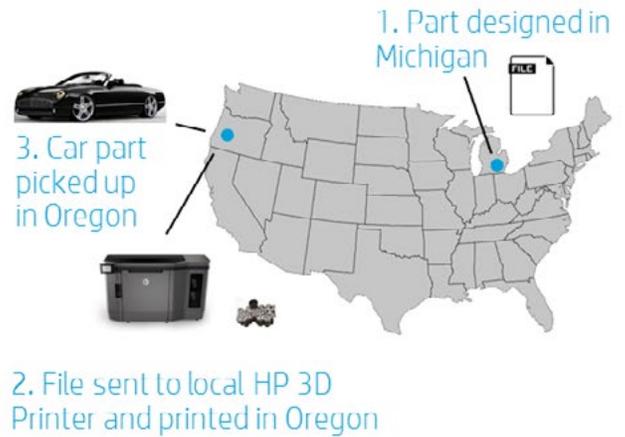
4. Add dimension to the future
The old manufacturing model takes resources from the planet, chops away and remolds those resources into a product, holds inventory in vast warehouses, packages it in boxes, and then ships that inventory across continents and oceans. Each of those steps adds costs, waste and environmental impact. Moving from a linear economy to a circular one requires disruptive innovation. One of the leading drivers of disruption in manufacturing is and will be 3D printing.

How HP 3D printing will reinvent supply chains

Old model

1. Part designed, manufactured & packaged in Michigan

3. Car part shipped to Oregon

2. Warehoused in Ohio for 10 years

With 3D printing

1. Part designed in Michigan

3. Car part picked up in Oregon

2. File sent to local HP 3D Printer and printed in Oregon

Commercial 3D printing is about letting people manufacture on demand. People can move effortlessly from imagination to creation without having to worry about gathering parts from around the world, incurring extra shipping costs, and creating unnecessary waste. And one area ripe for competitive offerings is the business of repairs, maintenance, and spare parts.

Ask your organization: If you don't or can't move to providing a service, how can you extend the life of your products, help your customers maintain their products, and make money at it? This question has helped us rethink how manufacturing and tech companies function at a basic level.

Commercial 3D printing will have a massive impact on replacement parts in any technology. Imagine needing a spare part to repair your car. Today, manufacturers must create extra spare parts, package them in protective boxes, store them in warehouses, and then ship them out once they are needed. All of those incur ongoing costs that build over time and often make repairs, upgrades, and maintenance financially costly. 3D printing can drastically reduce the costs and impact of each of those steps.

HP 3D printing with Multi Jet Fusion™ technology was developed precisely with these commercial uses in mind. With 3D printing, instead of ordering the part from across the world, you'd buy the access to the design of the part you need. Then that part could be "printed" at a local facility and in your hands in a short amount of time. Less storage space, less shipping, less packaging, less cost, more convenient—HP 3D printing with Multi Jet Fusion™ technology is scalable, high-quality, and makes financial sense.

Ask your organization: How can technology and IT enable this spare parts vision for your operations? Can you use 3D printing to create spare parts, upgrades, or accessories? Can you get access to 3D printing through a service bureau? How can you get revenue on the intellectual property of your designs?

5. Take action—it's never too early or too late
So how does a company become a participant in the circular economy? It's about looking inward and ahead. Here are a few rules of thumb:

Figure 1: A conceptual design of HP's first Multi Jet Fusion™ product

• **Have the conversation** – The path to change starts with conversations about what you want and can achieve. These conversations will spur ideas, gather momentum and generate buy-in. Ask your teams to think how they would do things if all the traditional model rules were gone.

- **Start anywhere and be agile** – Don't wait for the perfect opportunity. Instead, look at a process and start making improvements where you can. Learn from that experience and apply it to the next. The transition to the circular economy isn't instant. It's a progression and evolution.

- **Collaboration is key** – A shift of models requires internal alignment and partnership. But it also requires collaboration with your supply chain and customers. How can you improve their experiences? How can you make them a part of the change? How will the change benefit all of you in the short and long term? A circular model requires input, feedback and response at all stages of interaction with your product or service.

The business reality is that the traditional model can't last. This shift to a more nimble, modular, immediate, and circular economy will happen out of necessity. And ultimately, it will be beneficial to us all, both as stewards of the environment and our bottom line. HP's approach to the circular economy means more than just recycling. It means operating with heart, creativity, and energy to fuel our long-term growth. It means recognizing how adaptive IT solutions and service offerings can inspire action and motivate others to make a difference. And it's about helping us, our partners, and customers do so much more, with less.

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