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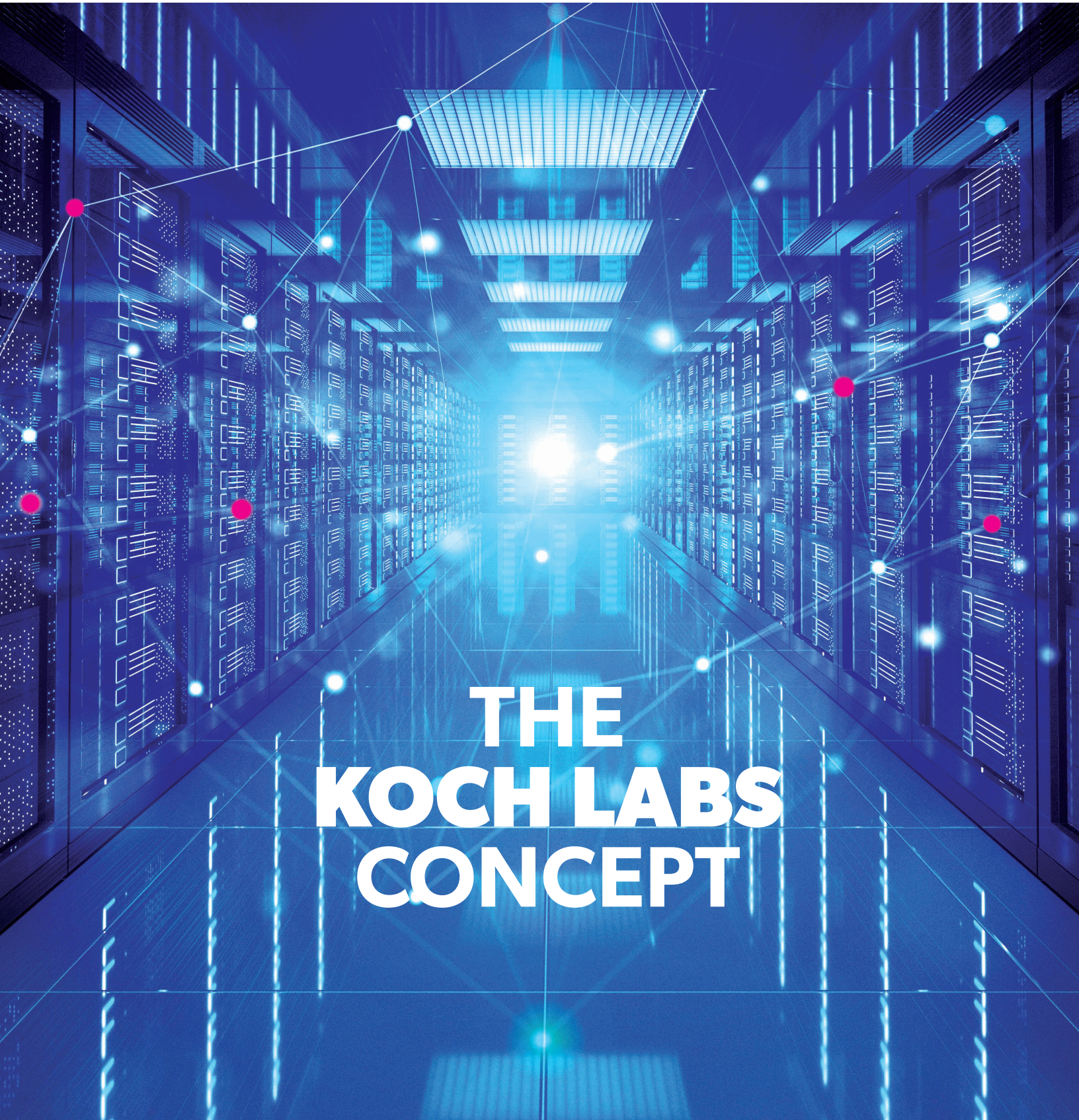


THE KOCH LABS CONCEPT

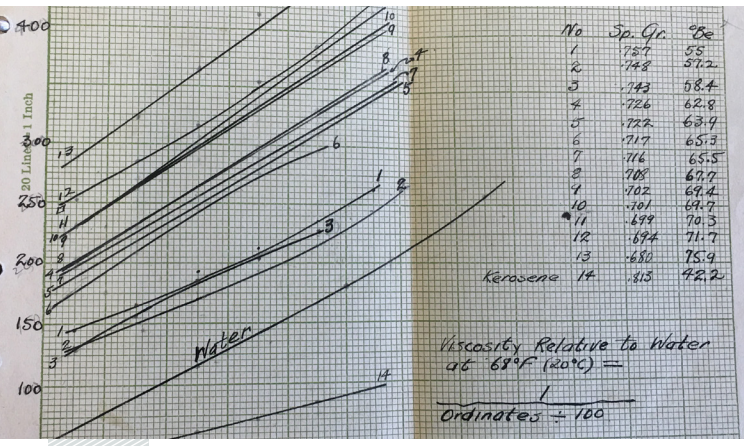
KOCH AS A REPUBLIC OF SCIENCE

My father, Fred C. Koch, was 17 years old and a freshman in college when the Spanish influenza pandemic hit the United States. Then, as now, schools were closed, businesses disrupted and hospitals overwhelmed. In his hometown of Quanah, Texas, getting oilfield parts during the pandemic became such a challenge that drilling operations had to shut down. An estimated 675,000 people in the U.S. and 50 million worldwide lost their lives to the disease.

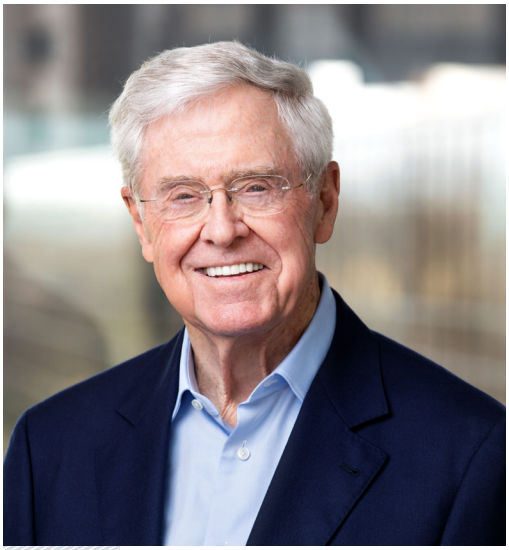
A few years later, after graduating from MIT, my father faced a serious challenge of a different sort. The engineering business in Wichita he had joined as a partner was struggling, even though the overall economy was booming. Both my father and Louis Winkler were talented men, but their firm was undercapitalized and had nothing to offer customers. Business was so bad that my father, unable to afford an apartment, resorted to sleeping on a cot in the drafting room. He was, as he put it, "dead broke."

Prospects improved in 1927, when Fred developed a thermal cracking process that promised major benefits to the independent refiners who were his potential customers — benefits such as increased gasoline yields, less downtime and lower costs.

But there was a problem. Before he could sell his new process, he had to prove it worked.



1928 - Handwritten calculations in Fred Koch's notebook.



Charles Koch, chairman and CEO, KII.

Fred managed to convince the owner of the Rock Island Refinery in Duncan, Oklahoma, to give it a try. When installed, the process performed as anticipated and Winkler-Koch's sales boomed.

That story from nearly a century ago illustrates the importance of our Koch Labs concept. This concept has caused us to make our diverse operations available for engagements ranging from co-development and testing to commercialization and scaling — those from businesses inside Koch as well as outside entrepreneurs in which we have invested. This is mutually beneficial, as the operation often becomes a customer.

"There was a problem. He had to prove it worked."

Koch Labs is an application of the Republic of Science that calls for the sharing of knowledge, which is essential for scientific and social innovation and progress. It is why we strive to continually build knowledge networks of all kinds within the company and throughout the world.

I urge you to continually experiment, innovate and transform yourself and your activities while applying your talents in a spirit of mutual benefit.

AN EXPERIMENTAL PLAYGROUND

Empowering founders to create a could-be world

Money. That's what most entrepreneurs desperately need to develop their ideas and make new concepts a reality. And money is what most hedge funds and traditional investors provide — the intensive capital required for high-risk/high-reward development.

But many entrepreneurs and innovators also need something money often can't buy: a real-world environment and partner for testing their concepts. As Fred Koch learned in 1927 (see page 2), a great idea is just an idea until it is proven. Proving your design for a better dog leash is probably easy and affordable. Proving your new technology for brain surgery is not.

That's why the Vision for Koch Disruptive Technologies includes "To be the preferred partner in accelerating both the value of entrepreneurs' disruptive companies and the transformation of Koch Industries."

KDT was formed in 2017 for the express purpose of finding and funding disruptive technologies with the potential to be truly innovative compared to current solutions or other market alternatives.

Unlike many investor groups, KDT is willing to invest at any stage of a company's life cycle — from early development to commercialization and growth — and does not limit itself to a narrow range of industries or countries. It has invested in medical devices, robotics and automation, 3D printing and cybersecurity to name a few. It evaluates each partnership based on individual merit and timing, rather than taking a more common portfolio approach.

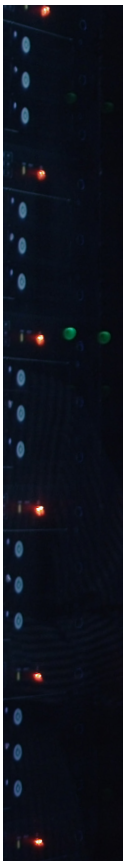
KDT has also been able to provide something most funding sources cannot: an effective laboratory for validating complicated concepts.

"The Koch Labs concept has been well received in the market," explained Chase Koch, president of KDT. "Not only because Koch can help tech founders access such a large part of the economy, but because employees across Koch are accelerating the experimentation with these technologies and demonstrating our philosophy of mutual benefit. The combination of our MBM® philosophy and the Koch Labs model creates a significant point of differentiation for us."

KDT
KOCH DISRUPTIVE TECHNOLOGIES

KDT'S VISION: To be the preferred partner in accelerating both the value of entrepreneurs' disruptive companies and the transformation of Koch Industries.

Chase Koch (top) and Byron Knight of KDT.



As well as offering a diverse group of businesses for implementing and testing concepts, Koch Labs provides entrepreneurs with a wide range of internal capabilities they can leverage, such as product development, operations excellence, engineering, supply chain and logistics management, and technology licensing.

"In keeping with our mindset of mutual benefit, we help entrepreneurs maximize their upside while reducing their risks. We offer them the potential to build a network that includes commercial contacts across Koch. Once they've proved their concepts at our sites, they have a better chance of successfully selling them to a worldwide marketplace.

"Koch Labs extends beyond Koch Industries to include introductions to other strategic partners, potential customers and suppliers across Koch's networks."

CASE STUDIES

"If you're an entrepreneur," added Byron Knight, KDT's managing director, "you realize that KDT is able to offer the depth and breadth of Koch's capabilities. We don't just fund the early stages of your business concept, we provide various use cases across multiple industries to test your concepts. We also offer the capabilities and talent needed in areas from safety and compliance to material science and packaging. It all ties back to Koch's concept of mutual benefit."

The results of KDT's investments in Insightec and Ibotta have already been highlighted in *Discovery,* D-Net and the KochNews website. But those are just the tip of the iceberg. During the past three years, KDT has provided more than $1 billion in essential funding to a wide range of innovators with ideas for 4D sensing, vision-guided warehouse trucks, improved cancer diagnostics and "deep learning" for devices.

Although the names — Automox, Dragos, Strider, Proteantecs — may not be familiar, each company illustrates a fundamental principle: Creative destruction is and always has been inescapable.

SEEING IN 4D

Vayyar Imaging Ltd. first developed what it calls "intelligent radar sensors" as a non-invasive way of detecting breast cancers. Since then, and with the help of KDT's 2019 investment, Vayyar's horizons have broadened to include vehicle automation, home monitoring, signal testing, construction and security.

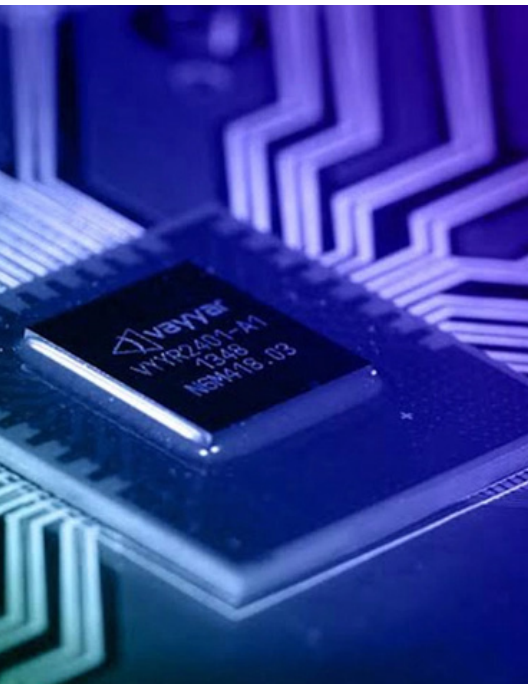
In less than two years, 15 beneficial collaborations and applications across Koch were identified. These have included strategies for improved supply chain efficiency from KBX, introductions to key players in the automotive industry thanks to Koch's public sector capability and data analytics provided by i360.

DEEP LEARNING

Last September, KDT made a significant investment in DeepCube, a company focused on machine learning. DeepCube has developed the world's first software-based inference calculator, an innovation that accelerates how devices "learn" so they can operate faster, more accurately and more independently.

"It can sound strange and complicated," admitted Eli Groner, the managing director of KDT in Israel, "but in essence what we're doing is making it easier for any device to harness artificial intelligence, regardless of who developed the hardware."

DeepCube offers a major boost for semiconductor manufacturers trying to develop leading-edge applications. It also makes data centers more efficient by reducing processing costs and memory requirements while lowering the amount of costly energy needed to power intensive computing. Edge devices (such as security cameras, drones and mobile technologies) can operate with greater speed and security using DeepCube's software.



YOURS OR MINE?

Intellectual property and customized supply chain technology are some of the most valuable assets a company can own. Both are vulnerable to corporate espionage efforts from those who want to steal ideas or disrupt operations. Strider, which received funding from KDT in October, has created a risk identification platform that helps combat these kinds of attacks.

Strider is merging public data and human expertise with proprietary data science into what is called its "Risk Intelligence Platform." Companies can use this platform to proactively identify risks before attempts are made to steal information, as opposed to reactively attempting to stop a breach once it has occurred.

> Chase Koch summed it all up this way: "We are just scratching the surface of what can be accomplished by applying MBM and the Koch Labs model to advance Koch Industries' Vision. All of us can play a role in the Koch Labs concept by leveraging our networks to identify and experiment with new approaches to innovation. That effort and personal transformation can result in truly disruptive technologies that provide great benefits."

METAL 3D PRINTING

If you were an athlete who ran races for a living, imagine what it would be like to be able to run four times faster than your toughest competitors. Then imagine being 100 times faster. That kind of speed is just one of the advantages — real, not imagined — of Desktop Metal, a Koch partner that makes it possible to print complex, three-dimensional parts and shapes out of stainless steel and other metals.

"Compared to our closest competition, we're four or five times faster," said Jonah Myerberg, a co-founder of Desktop Metal. "And compared to more common laser-based printing systems, we're 100 times faster. That kind of speed enables us to produce prototype parts for our customers in hours or days rather than weeks or months."

Although Desktop Metal did not invent metal printing, Myerberg pointed out that he and his partners saw an opportunity because the original technology was never fast enough to be cost-effective. "We transformed that aspect of additive manufacturing." Where other units might need a full day to make a dozen copies of a common part, such as an impeller, a Desktop Metal unit can produce 560 in the same amount of time. "That brings the cost per unit way down and makes the time to market much faster."

In mid-2018, Koch Disruptive Technology's Koch Labs capability partnered with John Zink Hamworthy (a Koch Engineered Solutions company) and Georgia-Pacific to "test drive" Desktop Metal's new state-of-the-art Studio System. These sleek units are ideal for making low volume or one-off parts cost-effectively. They are simple to install and require much less floor space than traditional units. "You can easily set them up in an office or lab with minimal utility connections," Myerberg said.

John Zink Hamworthy installed a Studio System at its Tulsa, Oklahoma, technical center, while Georgia-Pacific tested one at its Collaboration and Support Center in Atlanta. The Tulsa site used it to make one-of-a-kind prototypes and customized parts for combustion units. GP's CSC facility chose to test the creation of "just-in-time" spare parts for its various operations sites. Both test sites enjoyed solid success.

Desktop Metals's Studio System, originally launched in 2018, prints high volumes of metal objects in a minimal amount of time. Studio System 2.0 was launched in 2020 with upgrades co-developed by a KES materials scientist.

A marine burner atomizer (close-up, left, after installation, below) made using 3D printing techniques. It cannot be manufactured using traditional machining methods.

"Additive manufacturing — what the world calls 3D printing — still seems new and exciting to most people," said David Dotson, president of Koch Engineered Solutions. "But even something as new as this is not exempt from transformation. The team at Desktop Metal is very closely aligned with Koch in that regard. We both know that change is inevitable, and we want to drive that change as much as possible."

THE LAST MILE

When the pandemic hit last spring and governments began issuing shelter-in-place mandates, online ordering and home delivery volumes in the U.S. skyrocketed. By one estimate, requests for information on food delivery apps (from grocery stores as well as restaurants) have almost tripled. Another telling statistic: Americans over 50 (who have long preferred shopping at brick-and-mortar stores) are now shopping online in record numbers.

The penalties for those who fail to execute well in this demanding environment are severe. More than half of online consumers are willing to look elsewhere if they are unsatisfied with a home delivery experience.

Your groceries have arrived.

For sellers of all kinds, it's the "last mile" — that portion of a delivery's journey ending at your doorstep — that is the most expensive.

This has long been true. For telephone and cable TV companies in years past, getting a network to your neighborhood was much less expensive on a cost-per-foot basis than getting from your neighborhood to your home.

SRG Global, a division of Guardian Industries, now has a role in testing new ideas for conquering that last mile. That's because some of the same products and technologies it has developed for the biggest names in the automotive industry can be adapted for concepts designed by the biggest names in retail, such as robotic delivery devices that may soon be driving up our sidewalks and driveways.

"We have one client who is discovering the many ways we can help accelerate their innovation," said Merritt Gaunt, the president of SRG Global. "What started with a simple request to quote on the production of an exterior housing for a delivery vehicle has evolved into a true partnership to validate different materials, accelerate time to market, do computer-simulated testing and develop seamless integration of lighting elements on their autonomous delivery vehicles."

SRG GLOBAL'S FOCUS:

The development of innovative exterior and interior products and processes that create value for customers and consumers and a positive impact in our environment and society. Beyond the finish™.

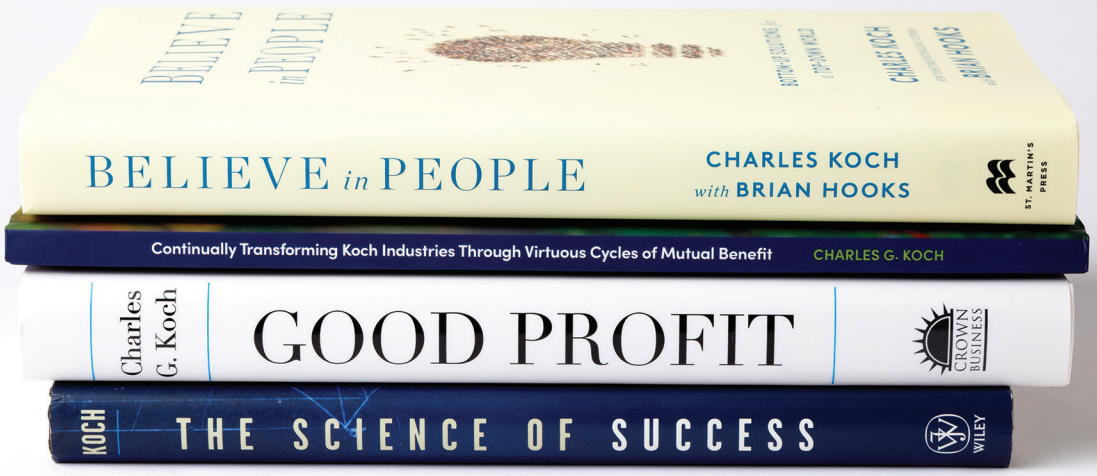
Gaunt emphasizes that testing transformative designs and ideas for companies outside Koch is about more than just proving they can work. "They must not only be functional, they must be something that can be safely and profitably made."

By sharing knowledge with a non-Koch company, SRG Global was able to develop a process for chrome-plating 3D printed plastic parts used for automotive and non-automotive components or products. "That's tougher than it sounds," Gaunt said, "because with most objects that are 3D printed, we don't get good chrome adhesion. We can't always get an attachment point."

SRG Global's success in figuring out a fix for that problem has attracted the attention of a major computer company. "They are very interested in our technology now because it could lead to an entirely new category of electroplated products."

SRG Global has also become a testing ground for concepts being developed by other Koch companies, including Phillips-Medisize and Molex. "We're working with them on electroplating plastics, which is important for preserving the longevity of parts." But plating also brings problems. "Some plated parts need to emit frequencies without interference from coatings. We've been able to offer some important knowledge based on our experience in discovering what will or won't transmit.

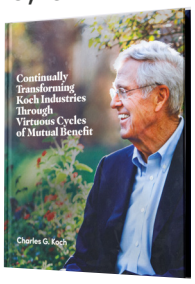
"We see all kinds of big opportunities as a lab for Koch as well as others," Gaunt said. "We're no longer anchored to growing at a certain pace or being a certain size with a set offering of products. Thanks to our change of Vision and the freedom of the Koch Labs concept, our team has already proved we can do some really amazing work."



Over the past 14 years, Charles Koch has written four books, including his latest bestseller, "Believe in People," co-written with Brian Hooks.

"The Science of Success" (2007), "Good Profit" (2015) and "Believe in People" (2020) are available for Koch company employees to purchase at a special discounted rate of $18 at **mycompanystore.shop**.

Koch's self-published book on virtuous cycles of mutual benefit, released in May 2020, is available to employees at no cost other than shipping. To order hard copies, or download electronically, visit **koch.link/MBM**.



The digital version of *Discovery* has been updated, making it more convenient to read on your desktop and mobile devices.

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