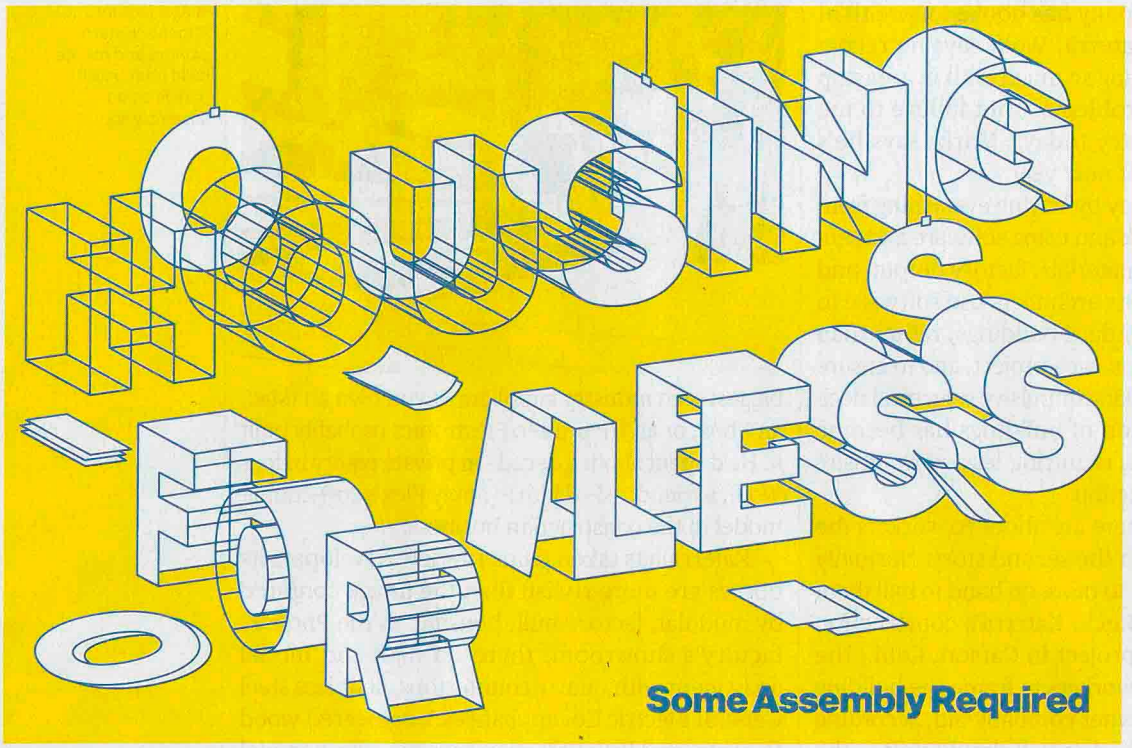

With $1 billion in hand, Katerra is making construction sites look a lot more like Lego kits

Upstairs in Katerra Inc.'s cavernous 250,000-square-foot factory on the west side of Phoenix, real estate developers compare quartz countertops and bathroom fixtures while architects use the company's design software to pick from premade plans. On the factory floor, workers and robots hammer pallets of Douglas fir into finished wall panels and put them on an assembly line, where other machines and craftspeople add windows and plumbing before a crane stacks the finished walls on a flatbed. When the truck arrives in Lodi, Calif., three days later, Amanda Andel, a construction materials manager, uses an RFID scanner to see what's arrived and an iPad to show where cranes should set each piece of a four-story retirement home.

This process is a radical change for the construction industry and a threat to decades of this-is-just-how-we-do-it attitudes. While other construction tech startups try to modernize some parts of the business, designing modular homes or building robot-run factories to make prefab parts, Katerra seems to have the best shot at putting all these pieces together, from design to finished building. It's pitching some of its own appliances, carpets, windows, even engineered lumber. The company wants to control everything from "womb to tomb," says customer Dean Henry, chief executive officer of real estate firm Legacy Partners Inc.

In a little over three years, Katerra has raised more than $1 billion in venture capital, led by SoftBank Group Corp.'s Vision Fund, and says it's collected close to $3 billion in bookings. "Almost everywhere you look, there's money to be saved," says Chairman Michael Marks, adding that he hopes to have revenue of about $15 billion in five years. "It's so inefficient in so many ways, it kind of takes your breath away."

On June 21, the company said it will combine with its biggest Indian counterpart, KEF Infra; the Indian company will receive several hundred million dollars in cash and stock. The deal offers Katerra access to commercial clients (including IT giant Infosys Ltd.) and the massive construction markets in India and the Middle East. The combined company will have about $3.7 billion in bookings across 260 projects.

Katerra is benefiting from housing shortages, advances in automation, and a glut of VC in search of returns. It will need even more spending and excellent timing to remold a highly regulated, highly cyclical industry with thin margins and little interest in change.

The company is the brainchild of Marks, who's a private equity investor, along with fellow leveraged buyout specialist Jim Davidson and real estate developer Fritz Wolff. So far, their biggest customer by far is Wolff himself, whose ▶

Edited by Jeff Muskus and Jillian Goodman

◀ development company has booked more than $500 million with Katerra. Wolff says he recognizes the risks of putting so much faith in a startup with startup-type problems, "but failure to me looks like the industry today." Marks says he's vowed to turn a profit next year.

Katerra saves money by buying everything from wood to toilets in bulk and using software and sensors to closely track materials, factory output, and construction speed. Its architects use software to build a catalog of standard buildings, rather than starting from scratch on each project, and to ensure contractors aren't making impulsive structural decisions. Each generation of buildings has become steadily more prefab, requiring less work on-site and speeding construction.

At the Lodi site, there are about 70 workers the day the walls go in on the second story. Normally there would be about 10 more on hand to nail them together, says Mike Rock, Katerra's construction chief. For a similar project in Carson, Calif., the company will use 25 workers to frame the building instead of the 150 another company bid, according to Rock. Some of that labor will simply shift to the factory, but volumes there are higher.

Before private equity, Marks made his name running Flex Ltd., then called Flextronics International Ltd., an electronics maker that's one of the world's biggest tech industry suppliers. If you own an iMac, an Xbox, or an HP printer, Flextronics probably built it. He'd spent about a decade in private equity before Wolff, a friend, asked him to apply Flex's cost-cutting model to the construction business.

◀ At a factory in Phoenix, Katerra staffers and robots build prefab wall panels on an assembly line

Katerra has taken pains to show developers its homes are more stylish than the image conjured by modular, factory-built housing. In the Phoenix factory's showroom, there's a high-end model apartment with quartz countertops, stainless steel General Electric Co. appliances, engineered wood flooring, and leak-detection sensors, plus a model with lower-end appliances, thinner countertops, and vinyl flooring. A separate showroom features custom carpet samples, faucets, and other options.

Yet here, too, Katerra will lower costs by buying

▼ Katerra wants to cut costs by reducing options and making more of its own materials—even engineered lumber

COURTESY KATERRA INC. (2)

in bulk fewer options than an outside architect would offer. "It's stupid to be infinite," Marks says. And as it plans four more U.S. factories, each twice as big as the Phoenix site, Katerra seeks to engineer more of its own raw materials, sell more of its own gear, and perhaps get into the trucking business, too.

The idea of modular housing goes back more than a century–Sears, Roebuck & Co. sold more than 70,000 home kits from 1908 to 1940–but the construction business has been changed far less by technology than any other major U.S. industry, says Harvard fellow Mark Erlich, former executive secretary-treasurer of the New England Regional Council of Carpenters. Innovators have been foiled by an inability to put together enough capital, enough guaranteed business, or both, Erlich says.

Europe is further ahead, and change is coming to the U.S. BoKlok, a joint venture between Ikea of Sweden AB and Skanska AB, builds affordable multifamily buildings in Scandinavia, and a host of smaller U.S. companies with such names as Prescient, Blu Homes, and Hive Modular also design and sell prefab housing. Venture capitalists have poured $3.9 billion into technology related to construction and real estate in the past five and a half years, according to researcher CB Insights. For now, however, Katerra's domestic rivals look more like small-scale design shops than massive factory operations, says Gary Beasley, CEO of rental marketplace company Roofstock.

Marks says dealing with tech suppliers was tougher than construction, but Katerra has a lot of serious worries. While there are only a few standard models of iMac or Xbox, apartments are beholden to 110,000 U.S. municipalities' building codes, each with its own idiosyncrasies. Regional seismic and weather needs can vary widely. And Katerra's aim to steadily cut labor costs, meaning jobs, won't exactly endear it to the industry. The company concedes that it's so far avoided areas where unions are strong. That'll be a problem if it wants to compete for projects in major cities. Labor leaders may demand that Katerra's factories be unionized, says Ehrlich, the former union official.

Through all the challenges, Marks says, the company's emphasis on speed and savings will stand it in good stead with customers. And its focus on multifamily, senior, and other housing may insulate it somewhat from downturns in demand for, say, single-family homes. "People don't understand it or believe it," Marks says of the company's long-term plan. "But they will." —*Dina Bass*

THE BOTTOM LINE Katerra is using its massive SoftBank investment to steadily cut costs and shrink labor needs with its prefab housing. Its chairman says he'll turn a profit next year.