



**Self-Perform  
on Steroids**

DesignIntelligence®  
Quarterly



## STACY SCOPANO

Chief Technology Officer, Skender

*A systematic approach to integrated design, construction, manufacturing and strategic partnerships. An interview with Skender's Stacy Scopano.*

**DesignIntelligence (DI): Your career has been spent in the technology space with global roles at Tekla and Autodesk trying to change the industry through software, data standards, process and technology evangelism. You had a brief stint with Skanska. Now, with Skender, you're in a vertically integrated company bringing your technology know-how to bear on an internally-focused mission. What drew you there and what are the differences to your earlier roles?**

**Stacy Scopano (SS):** The answer pre-dates my time in technology. When I entered the industry, I was a draftsman at a steel fabricator and Bill Gates was turning command prompts for hardware into Windows. That's where the story begins because computing and going digital versus analog was not just an industry challenge, it was a global phenomenon, especially in the '90s.

Being a draftsman for a structural steel fabricator, I was close to production. Even as a young professional I got to see a lot of the dysfunction. Faxing RFIs to each

other was our equivalent of spell check for design-process errors and omissions and was an example of the relative ineffectiveness of a GC's ability to coordinate a project.

When we had to punch steel and prep work, we were the project backstop. That shaped my thinking. When Google launched in 2000, there was an arms race for all industries, including ours. I

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came into technology with that mindset, as a young kid putting pencil to paper trying to backstop projects and make them as successful as possible. That shouldn't have fallen solely on the shoulders of a trade. I came into construction, design, and technology with that mindset.

When I joined Autodesk, something else notable happened. From 2000 to 2010, Google and the internet became pervasive. It was no longer analog vs. digital. Mobile technology came online. It was the first couple of years of iPhone and the first wave of iPads in construction. Now, how do we coordinate? How do we communicate? That decade saw those things happening and posed those questions. Is it a technology angle? Is the way we collaborate structural? An industry angle? Lean manufacturing and construction techniques were the result of trying to synthesize those opportunities to advance the industry.

I remember walking off the stage after speaking at Autodesk University in 2015 or 2016 talking about AI, robotics and analytics. I came home and told my wife, "Our industry is going to choke. We're over-supplying technology right now and the industry is trying its best for absorption." That's what drew me to construction.

As an industry, construction, and this statistic is well worn<sup>1</sup>, ranks only above agriculture and hunting in percentage of revenues reinvested into technological advancement. I was looking for the sweet spot of industry capacity, the real opportunities and business models that created an environment to support technological advancement. It was no longer "This button doesn't work." It was no longer the fault of the software or technology. Technology had surpassed the industry's ability to implement it. That's what drew me back into firms like Skanska that had both an integrated development arm in their heavy and civil construction businesses, as well as a history in offsite construction.

Inherently, none of us in the industry went to college to become data scientists or robotics experts. Some that entered the industry in the last five years may have some of that capability. There wasn't any capability inside the industry to absorb this. This capabilities gap is what you're seeing play out. There's opportunity. You saw venture capital begin to flood different markets, and now there is a pullback because of the capacity absorption challenge. Construction's not unique, but it was poised to be one of the problem children from a sector-by-sector analysis, if you look at our traditional stance.

1- <https://www2.deloitte.com/us/en/insights/focus/cio-insider-business-insights/technology-investments-value-creation.html>





*This question about broad brush predictions... all of us need to set those aside and look at individual clients and markets. That detailed analysis will yield a better understanding.*

**DI: The industry choke point was multiple perspectives - mindset, motivation, and a lack of skills? That's what drove you to find a place where those choke points didn't exist?**

**SS:** Yes. What was interesting about my time at Skanska was its breadth, it's volume, resources, and the scale it could bring to bear as an advantage. I enjoyed my time there. When I began conversations with Skender, there was something else I'd forgotten to appreciate. Fast forward to today, and it's what makes our advancement and innovation sing. That's our leadership team. Full stop, we're mobilizing a perspective on re-imagining the industry. More than calibrating management at a strategic offsite event, this leadership team rolled up its sleeves. It looked at that notorious industry

productivity curve. We challenged ourselves with why we're flatlining versus manufacturing.

Skender came at offsite construction from the stance of being a true manufacturer. It recruited manufacturing talent. It started the journey and realized there was more to be had. When we began mobilizing the strategy a few years back most of the other players were a version of a trade contractor inserting themselves as a multi-trade super sub.

It was taking a traditional builder adding manufacturing capability and realizing: Let's go the final yard. We said: Let's integrate with design capability and architects to build an architecture practice. That strategy effectively creates a totally different sandbox for innovation. It

creates an ability for us to sweat what integration and collaboration means in our industry, how they create a learning environment internally and how that interfaces with developers and owner-operators. That's been an area for us to advance our business objectives. For me to embrace a technological design-to-construction handshaking opportunity helped calibrate and articulate objectives that will generate value as defined by the customer, not as defined by the internal team's brainpower or desires.

**DI: Set the baseline. Who is Skender and what do you do?**

**SS:** Skender is a 64-year-old Midwest general contractor. It has a long heritage as a family-based contractor operating in commercial, interiors, and ground-up



hospitality, healthcare, multifamily markets. Over the past couple years, we've grown to include an architecture practice, and now an integrated manufacturing facility that employs modular offsite construction.

**DI: Can I come to you as an owner to do my custom design, but with an integrated prefab mindset?**

**SS:** Yes. If you have your design team and know your standards, we'll work to complement that team and begin to convert those designs for a manufacturing delivery model. If a developer drives that, we're happy to do that.

When we get in the conversation about innovations and opportunities for early engagement, we've talked about the McLeamy curve<sup>2</sup> of moving decision making as early as possible. The same is going to hold true and magnify when you're in a vertically integrated opportunity. The vertically integrated opportunity is for us to give an easy button to a developer so it's just: "Hey, I've got the land, I've got the capital, I've got the objective, run with it, come back and talk to me when we've got keys to turn." We take out the part of our industry that's not core to running healthcare, operating a hotel or getting rents from housing.

But there are many flavors of developers,

investors, and teams that have a long-running history with which we need to complement. That's why we have an 80/20 rule, in terms of being the lead architect

**DI: In contrast to others simply prefabbing and selling their products, you're providing customizable services for customers. So many people are seeing this COVID-19 outbreak as a crisis. At DesignIntelligence, we're hoping people can use that as a springboard to reframe their purpose - as a catalyst to redirect for the future - accelerating the industry change we've all been pushing for so long. You're already doing that. What advantages does an integrated approach like yours bring?**

**SS:** In COVID-19, there's so much uncertainty moving forward. But if you look at the immediate response, there's been a re-prioritization of how we work as an industry. Construction has had to truly put jobsite and workforce safety first. What has been interesting are the conversations we've been having about what are the new normals? How do they affect us in the long run? What's interesting about offsite construction is it's a controlled environment. We can monitor, set up, even enable social distancing, and be very deliberate about it. Especially when we have work centers and production flows through them

versus people moving to the face of the work. Fundamentally, that's an enormous opportunity and trajectory to play itself out.

Top down on the COVID-19 issues being discussed, there's a huge political conversation about trade-offs.

**DI: Lives versus economy?**

**SS:** That's exactly right. What are you optimizing for? Which takes priority? When you make that decision, you will see other outcomes that aren't your focus. They may show your decision making to be sub optimal.

That's a great metaphor. It's exactly what we do every day in a vertically integrated mindset. I think constantly about how we select product as designers. Then we value-engineer quality out based on a pricing decision from a contractor's perspective. But the unanticipated consequence may be that we increased the installation labor needed to offset the substituted product selection.

We sub-optimized on the quality of the product and on the duration. Cost and duration tend to drive everything we're trying to optimize on construction projects. When you're vertically integrated, you can look at those trade-off analyses in a different light. You can say,

“What is the installation cost? What are the real drivers?” And it’s not a “first-cost, how much is this product? I’ll pull it out of the catalog,” analysis. There’s an on-going trade-off analyses mindset when you operate in a vertically integrated business.

**DI: Clear advantages. You said you do 80% of your design work in house. What are the unexpected consequences of that? One would think it’s leaner and more efficient, but are there downsides?**

**SS:** Well, it’d all be a bed of roses and collaboration would be automatic, but the rub of it is that it remains a people-driven business. By vertically integrating, we had presumptions of how smooth a project would be because our architect, our engineering, manufacturing, and construction team all had the same email address. But it still requires rolling up the sleeves, taking an empathetic mindset and looking at what those people were advocating for when they were optimizing their best position, when it became at odds with yours. You had to take a step back and realize, if we are truly a team, what do I have to give on this round to enable somebody else to hit a higher-order objective? What are those objectives? Was it standing up the factory, was it standing up the first project, was it designing our first product as a common denominator to all of them?

In some cases, when you’re investing capital in a new business model, you have to find the boundaries of what you’ll invest in now, versus investing in a higher vision later. You have to choose your battles. Team coordination and calibration don’t just happen by putting everyone in the same room. Even within the same organization. You still have to invest in the culture and the learning environment to reflect, improve and remobilize this new version of construction to have a lean delivery model.

**DI: Once again we have the technology guy, the CTO, coming back to empathy, people and culture. That’s not a surprise, and I certainly don’t disagree.**

**Other similar firms like Katerra and Fed Negro, formerly of WeWork, talk about having a platform and working at**

**scale. That’s different than doing one-off design like architects are taught to do in school. Are you leveraging scale or working at the project level?**

**SS:** We have two dimensions to consider constantly. We have a platform, that develops a product, and we implement that product at the project level. If you think about the window metaphor, that’s exactly what a window manufacturer would do. Well, what happens if I’m an office space manufacturer? What happens if I’m a bedroom space manufacturer? What happens if I take my bedroom and kitchen products and put them next to each other? Then if I stack that? Our project is the implementation of our product.

It just happens we’re trying to get 95% of that project on the back of the truck. We have these constant considerations - the

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journey of going from startup initiative to run rate at manufacturing capacity. How do you navigate those trade-offs? Are we optimizing for the commonality that will go across our portfolio, or having to make trade-offs for project-specific implementation?

When you're at run rate in production, the idea is the majority of your libraries and assemblies are expressed in a way that balances mass production without sacrificing mass customization. Ironically, this is where technology begins to take a seat in the conversation. We have a set of tools and capabilities in the industry in 2020 where we can take libraries and rapidly deploy 80% of design implementation objectives, then skin it outside or inside to give the experience that satisfies customer expectations and demands.

Can we take 90-100% of the product and pull from a standard set of processes to implement and save you cost and satisfy all your design requirements? Yes. And we also have the ability to implement design freedom or hit the aesthetic that makes sense and rationalizes the proforma.

Our industry has a huge spectrum to address. If you're on the affordable housing side of the spectrum, our objectives are to economize, but we don't

want to make housing that optically looks like it was cobbled together to save price. We want to provide dignified housing, even in the affordable housing market. When we shift to a market rate basis for material selection, every real estate broker will tell you it's all about the bones. The bones are what we can develop into that standardized product set. We already know what makes up most walls. We already know all about the conduit running through them. We already know and expect where the plumbing is. That's part of our industry library. We know because of building codes, the dimensionality in relationship to space. Modular thinking is already inherent in our industry. We're just creating a mechanism to deliver it.

Most importantly, treating projects as product is how we fundamentally shift the economic units of measure away from optimizing costs & budgets at the project level, to one that creates an economy of scale potential across all project that incorporate our products. This puts our industry on a pathway to become a major solution to big ticket issues like housing affordability, versus being indicted as part of the "supply-side" problem.

**DI: You have a platform and you have scale. What I'm seeing as the difference is, when you're assembling teams, everybody comes with that motivation:**

**wanting to be systematic, prefabricated, and modular to the extent they can. Whether that's your internal design team, ownership or external partners, they're not at the table unless they want to do that.**

**You've found the right partners and can play your catalog and kit of parts in a variety of customized ways. You embrace the idea of supply chain because you're working at scale. But not many people in the AEC industry think in supply chain terms. What have you learned about that as it applies to external partners? Are you continuing to have to educate and find new ones?**

**SS:** The question already tells you the pain point. I can draw a hard line on just the language we use. We "buy out", right? We already know what we want. We tend to just look for feedback on availability and price. That's the fundamental difference from a strategic partnering perspective. This tension is the opportunity to reframe a strategic supply chain. We don't just sit there and specify and then see what comes back. Most architects see what's available, write it into a spec, and then a different vendor's going to try to come in and seduce a builder to substitute an alternate product. That's a non-strategic supply chain. There's no incentive for innovation for the







building product manufacturer, and it makes the entire relationship transactional as a result. In a strategic partnership, where you're engaging supply chain, you come in with, "I'm at my wit's end. Here's the challenge I have. Here's what I need from a performance perspective, but I'm having a problem because I'm stacking it in the field off a truck."

So now I have a new constraint, a new problem statement, a new opportunity. By asking questions that way, and not prescribing the solution, you're opening yourself up to tapping into things you don't even know are on the back shelf in some R&D lab somewhere or in some expert trade contractor's head looking for a home.

There's also untapped potential hiding in things that don't even make it to the building product catalogs. By vertically integrating and creating a production/product-oriented process we've created a platform that now has an R&D ecosystem. It's not just the amount of capital we throw into our internal box or how smart we are. It's becoming more critical how strong a partner we are with the various aspects of our supply chain. That's a different sandbox. We've seen transactional benefits and performance innovations from it, and none of it was internal to Skender. It was all because we took that, "Please help," stance. We bought resources and expertise, not commodities.

**DI: Most of us are in this**

**industry because we love it and are expert at it, but we treat one another like dummies sometimes - without the ability to transcend the transactional barriers. Tapping the expertise and synergy that can result can be powerful.**

**You got into what you're doing by not being able to take it anymore: seeing the inefficiencies of the shop drawings, handoffs and process. You found your place. Now that you're living in the world of manufacturing and construction instead of software, are you finding a different value set than in your former life as a tech guru? Different values, people types, mindsets?**

**SS:** Your quiver has got to have all the right arrows. It's top-down or bottom-up. The leadership team has to do more than rethinking. They have to start redoing. That's not an indictment for any tech teams. It's that tech innovation was coming in slow turns. Here we're creating a new platform, a new sandbox that advances our innovation initiatives. From the leadership team - and you have to also consider bottom-up in your organization - can your culture digest it? You're going to have tension from that top-down and bottom-up perspective in your organization, and you have to respect that. Also it's going to take capital. Keeping a factory open during the time of

COVID, is not something a typical GC has to worry about. That's can seemingly add risk to a risk management organization.

This is where leaders can realize there's a lot more creativity to be had. Are you going to drain funding? Are you going to partner with somebody? Can you model out what capital you need? In short, what we're doing is self-perform on steroids. It's not foreign to construction, so fundamentally these questions have been asked by many a contractor before

What you end up having to do is create that roadmap to your vision. This is what we're going to self-perform. This is what we're going to grow into. Is it a one-year journey until you turn the lights on at the factory? Do you turn the lights on in the factory and start doing panel work, or do you turn on the lights in the factory and go into full volumetric modular? Those are more of those trade-off decisions. And



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they are not just yes or no, they involve when, timing, and combine to create a roadmap. It'll take a team that's constantly checking in with itself. Did we accomplish that objective? How to recalibrate and stay agile? Because just buying the factory is not a magic silver bullet

**DI: Your point is underappreciated in the rest of our industry - the greater reality of construction. It's hands on, safety, life-and-death, and takes more capital and risk. I've lived and appreciate how hard it is to deal with the codes and struggles designers deal with. But having also lived within a construction world, my respect for the people who deal with the reality of construction has increased.**

**SS:** For the design community, your primary constituents, one of the challenges you have is designers that are going to discount modular construction as a sanitization of design expression. We scratch our heads at that notion. "Are you really in the industry to design a bunch of snowflakes that are uneconomical, uninformed and fail to understand the means and methods embodied in your design?"

I was talking to a group of graduate design students from Northwestern University a few months ago. I shared

with them, in the 2000s and early teens, I attended many conferences where there was an unspoken tension. The question was: Who in our industry is going to evolve to become the master builder?

Will it be the GC that takes on more and more design scope? Will it be BIM that brings constructability to the designer? I laughed and told this group of students: "I'll take one of our junior architects that walks the shop every Tuesday and follows their design, any day." Who do you think is more likely to become that master builder?

In our industry, there's a normal distribution of project types. On one end are the beautiful, complicated, large icons that become monuments. On the other end there's a segment of gas stations. In the middle is the meat of the built environment. Most designers play in that middle, and most of them aren't just trying to go through the motions of filling a portfolio. They're going deep to understand where their opportunities are as designers. I have such a deep respect for our architecture team, that's constantly expanding their craft, beyond traditional constructability and towards a production-oriented mindset, that puts new variables on the table to consider in those trade-offs analyses that I mentioned earlier.



**DI: Your point about doing “self-perform on steroids”, in a more systematic, controlled, logical, scalable way makes sense.**

**SS:** That’s exactly what I meant. You can look at us as an oddity, but if you do, realize you’re constrained by your own mentality, even when I say it can be scary to commit capital. Until you realize, we’ve done this in construction in various increments before. If I buy my tools and rent them back from myself, project-by-project, that’s a tool rental business. That’s a profit enhancement strategy that has been deployed in construction, plenty of times before.

We’ve done things that move the needle so many profitability percentage points,

like brining on a self-performance portion of our business. When you turn into a manufacturer, you see those productivity gains and earn those profitability points, that begin transcend what is common for our industry.

**DI: You’re only a year into your role. Let’s dream. What does your mission look like in 5 years?**

**SS:** Staying at the project level isn’t the lens I want to look at. Look at the factory. Going down one line is a hospitality project. Going down another line is a healthcare project. Then a multifamily housing project. That’s when production is singing. We are code-switching lines, and are agnostic to the end project. Fast forward to those projects in place. We’re

over-delivering on that user experience in the housing arena, in hospitality, in health care and wellness, and supporting the effective delivery of healthcare services, with our facilities

Ultimately if you’re driving by one of our projects, you have no idea it’s premanufactured. It looks natural in place. It’s sensitive to the community and to advancing that community’s development initiatives. In reflection, the modular consideration was just a momentary conversation in time.

**DI: So many great lessons. Even for the most creative designers and builders, to begin to migrate to think in more systematic scalable ways offers promise.**

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Stacy Scopano is Chief Technology Officer at Chicago-based Skender where he is responsible for continually evolving the builder’s technological capabilities and integrating industry-leading innovations across the company. His experience includes a broad spectrum of technologies used by the real estate, architecture, engineering and construction industries. Most recently, Stacy was vice president of innovation at Skanska USA. Previously, he was the senior strategist for building construction at Autodesk, Inc., where he partnered with the global construction community to identify, develop, and deliver innovative digital workflows. He has served as past technology chairman for the AGC BIMForum and is a member of the Social and Economic Policy Advisory Board for RAND Corporation, an international research organization that develops policy solutions to make communities safer, healthier and more prosperous. He holds a degree in economics from the Georgia Institute of Technology.

