



DesignIntelligence Quarterly

DAVE GILMORE

President and CEO

DONNA PENNELL

Production Director/Senior Editor

MARY PEREBOOM

Principal, Research and Administration

BOB FISHER

Principal and Editor at Large

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From the Management and Editors

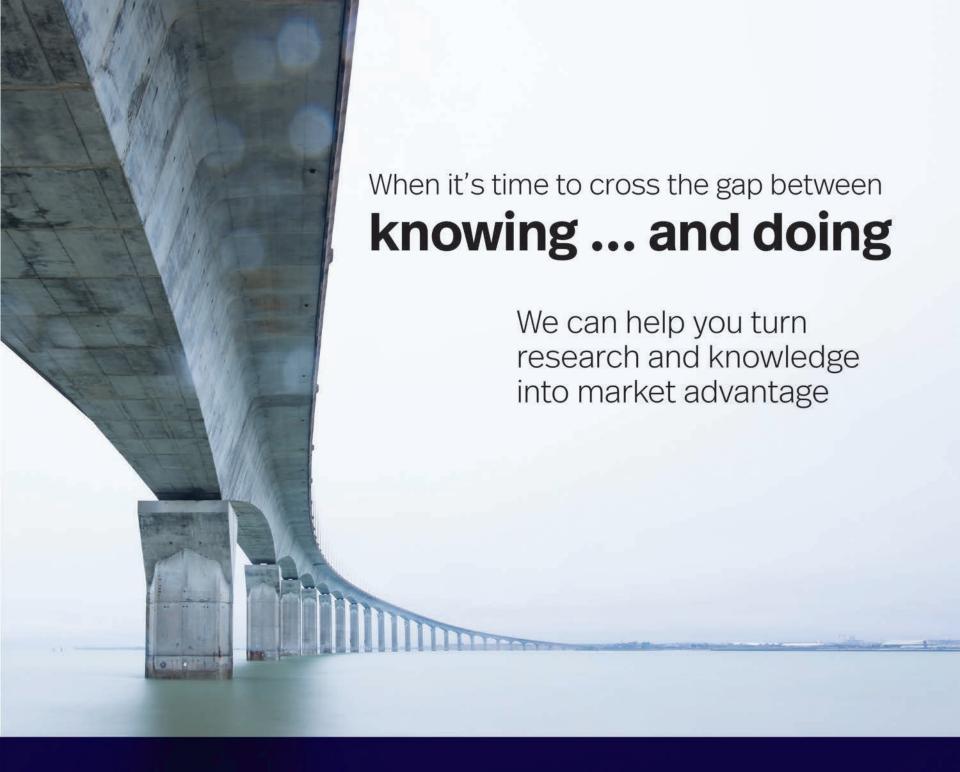
As first quarter 2019 comes to a close, it seems that the view ahead is no clearer than even a few months ago. Whether we are talking about geopolitics, economics, technology, a global outlook and other topics that we cover, the most consistent thread seems to be that change (or even anticipated change) is in the air.

This year's Foresight survey, conducted by DI Research, asked senior leaders for their perspectives on 2019, as well as their sentiments on the top challenges, risks and opportunities for the year. We asked about market sectors, backlogs, leadership advice and more. We've included an executive summary of the survey within these pages, with the release of the full report due out mid-April. (We will send you the link to the report; you can also go online to www.di-publications.com.)

2019 marks the 25th anniversary of DesignIntelligence/Design Futures Council. In this issue, Jim Cramer talks about the DFC's founding, its original mission and some of its early members. The images in the DFC photo spread on pages 82–83 are from some of the earliest Design Futures Council leadership summits. And we interviewed Dave Gilmore—current CEO and president of DesignIntelligence—about what drew him to DesignIntelligence, his vision for the future, and new initiatives on the horizon.

The 1Q 2019 edition of *DesignIntelligence Quarterly* provides insights into authentic leadership to help you build a better business. Articles on industry innovation and immersive technologies; investment in sustainable design and education/practice partnerships; the transactive network and tackling climate change; the road to refounding and the death of the architecture firm; a look at the future of the construction industry and innovation in the market—these are just some of the highlights of this edition.

As always, we are grateful for your continued support. And please feel free to share *DesignIntelligence Quarterly*.



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BUILDING A BETTER BUSINESS

The Way of Authentic Leadership – Part I

Over the past twenty-nine years, I've been an intentional observer, writer, and speaker regarding leadership. The journey has taken me to large and small places, large and small personalities, and large and small thinkers.

DAVE GILMORE

long the way I've encountered big voices requiring cotton-stuffed ears to get through the exchange and quiet voices requiring a lean-in posture to capture every word whispered as if each was a golden nugget of inestimable worth.

I've discovered and confirmed innumerable times that authentic leadership begins and ends with values—values considered, values articulated, values actioned. For the record, let's define values for the common exchange.

Values are those things we hold precious, those things we guard. Values are where we run to when trouble occurs. Values are what we keep with us through life and living; they're what we cling to when life's journey draws to a close. In summary, values are what we live for and what we will die for.

Given this definition, much of what we see in listings of "corporate values" don't comply accordingly. Most of what organizations list as values are really hoped-for aspirations, the ambitions of behavior and achievement that organizations stretch toward.

When we consider a typical list of values taken from a random list of websites, we encounter the following sample:

- Collaboration
- Culture
- Design
- Clients
- Environment
- Community

Honestly, are any of these what you would hold precious, run to when the crap hits the fan, live for, and will die for? As noted earlier, these are the aspirations that we hope mark our organizations as meaningful, but these themes don't qualify as core values.

The collective personal values of an organization's leadership define the values of the organization. And it's to this value-set that employees, partners, and clients are either attracted to or repelled from. Therefore, special attention and care ought to be taken to understand the values of leadership. When leaders can identify, articulate, coalesce and speak out of their values, the organization then responds in like manner. A values-led organization coalesces around the values and operates under the security of a values-centric culture.

Leadership values that are identified and committed to and then are betrayed results in disillusionment, organizational confusion, and ultimately, cultural cancer unless direct action



I've discovered ... innumerable times that authentic leadership begins and ends with values—values considered, values articulated, values actioned.

is taken to address the betrayal. Far too often we see misalignment with what leaders say about their values and how they act. Yet we also witness corrective inaction more frequently than not. It seems that peer leaders and boards are hesitant to take corrective action that could redeem the offender as well as further reinforce the organization's value-set.

For years, the senior-most leadership of "ACME AEC" (a possibly fake firm for example's sake) spoke openly about the firm's commitment to honesty, integrity, and relationship. Every large group gathering of the firm included a "Values Focus Moment" highlighting some positive example of a leader or employee expressing one or more of the values. For example, Maryanne was highlighted for reconciling an aberrant payable and returning over ten thousand dollars in overpayments to a client. This was a clear example of the honesty-integrity-relationship value-set in action.

When we encountered this organization the first few times, all seemed positive and culturally cohesive. Yet the more time spent with managers and employees, the more we discovered what we came to call "advanced cultural cancer." You see, the spoken value-set of leadership was radically unreconciled with their actioned value-set. "Say one thing, do another" was the whispered sarcasm among employees regarding leadership.

Our drill-down time with the leaders of the firm revealed gaping divides between each of them. Some openly lied about others in their absence. Others passive-aggressively operated under the "Go Along to Get Along" modus. Open discussion regarding trust, or the absence thereof, was foreign to this team and so mistrust framed their interaction. None of this behavior spoke to honesty, integrity, or relationship to one another. Yet all of this behavior spoke mistrust, unreliability, and hypocrisy to the employees.

A transition of leadership occurred in the past few years at ACME AEC. I was brought in as an outside advisor to the process. When asked about the best approach, I suggested we start with values. After some obvious discomfort in the room, we were able to address a framework for getting to authentic values followed and supported by relationship accountability.



Leadership values that are identified and committed to and then are betrayed results in disillusionment, organizational confusion, and ultimately, cultural cancer unless direct action is taken to address the betrayal.

The overall organization was delighted by the process. Most celebrated was the new leadership's commitment to transparency, communication, and accountability. I'd like to say they all go this well . . . they don't.

Many are so deeply set in a paradigm of misaligned values behavior that it's the norm, the strangely comfortable operating posture of leadership. People can grow comfortable, in a functional sense, with pain and dysfunction and consider it normal. The idea of confronting it as unacceptable and then working through to a healthy normal is seemingly not doable, too large a challenge to encounter, or just not worth the effort. As one leader told me last year, "Dave, just let sleeping dogs lie."

Authentic leadership begins and sustains with articulated, lived values. Leaders of sustainable consequence will commit to the journey and hold both themselves, their teams, and their organizations accountable to saying what is meaningful and living meaningfully.

Editor's Note: This is part 1 in a multi-part series.

Dave Gilmore is the president & CEO of DesignIntelligence.

"THE DETAILS ARE THE VERY SOURCE OF EXPRESSION IN ARCHITECTURE. BUT WE ARE CAUGHT IN A VICE BETWEEN ART AND THE BOTTOM LINE."

Arthur Erickson

The Influencer Mindset Growing Relevance in the Face of Change, Challenge and Opportunity

Irrelevance is the bête noire of professional service firms.

In the past two decades, we have seen the rise of BIM, generative design, digital twins and other technologies that are fundamentally changing the design process and construction documentation. The traditional roles, relationships and power dynamics within the design and delivery process have shifted, hastening the commoditization of design services. These and other challenges raise concerns about the future viability of standalone architecture and design firms.

Our fears may or may not come to pass, but it probably behooves us to act as though they will.

BOB FISHER

f course, I am not suggesting we panic. But the power of an existential threat can help sharpen our focus and galvanize efforts to combat the risks that truly are embedded in all of these changes. The threats themselves can also hold keys to how we might avoid them.

The opposite of the irrelevance we fear is not merely relevance; it's influence. Firms that are influential are listened to, and their views result in industry-wide change. Influencers are neither hobbled by changing power dynamics within design and delivery nor are they prone to commoditization.

By definition, influence is interwoven with the idea of power. It is "the capacity or power of persons or things to be a compelling force on or produce effects on the actions, behavior, opinions, etc., of others." The power of influential firms is felt in the opportunities they create and how they shape the industry.

Levels of Influence

The world of architecture and design provides good examples of the varying degrees of influence. There are firms that have a short-term impact, creating stylistic trends that for a time dominate industry publications and propagate through practices that value novel forms, materials and approaches. Their work, and often their charming founders, seem to be everywhere, then are gone.



The opposite of the irrelevance we fear is not merely relevance; it's influence.

There are other firms whose work is emulated over longer periods, even as their approach to design changes and evolves. Such firms influence through their ideas and point of view as much as their aesthetic faculties, and their impact is more enduring. You can see evidence of their innovations in the work of other firms and hear the echo of their ideas in the architecture and design discourse. Such firms remain hungry, doggedly pursue new challenges and continue to produce work that is born of fresh and original thinking.

Their innovative spirit does not stop with architecture and design, per se. They often lead the industry in application of technology and the development of research. Clients ask them to solve an increasingly broad scope of problems.

While no firms are invulnerable, influencers have negotiation power within situations that seem to get the best of others. They have enviable control over their destinies: they have the pick of the world's top talent and seem to choose only the work they want to do. They command the type of fees that allow them to reinvest in their success, and they manage their businesses well.

These firms are true influencers within the industry.



The power of an existential threat can help sharpen our focus and galvanize efforts to combat the risks that truly are embedded in all of these changes

The Ingredients of Influence

It is easy to separate ourselves from the influencers, assuming their success is due to some advantage just out of our reach. But a position of true influence is achievable.

It begins with the right mindset. Committing to building influence focuses us and shapes how we see our firm's place in

the world. Even if unconscious, the effect can be powerful. When we seek first to influence, we think differently, we make decisions differently and we present ourselves differently to the market.

Embracing or striving for the role of influencer, combined with the right other ingredients, is a potent combination.



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Ingredient 1: A vision-driven, expert point of view
The first question is, how do you want to have an impact?
Like water rushing through a funnel, focus amplifies the energy applied to building influence. The most effective focus stems from a strong vision, set by leadership, of what the firm wishes to be and the positive change it wishes to create in the world. Once vision is set, it drives a point of view that informs not only a firm's design approach and output, but also the way it communicates its ideas to the market.

Ingredient 2: Communication power

Our view of communication power is perverted by A/E/C's long history of charismatic individuals. We can all think of luminaries who have had loud voices in the public conversation. Such individuals are exceedingly rare, and we can neither replicate nor scale the model of individual industry stars (who are often the founders of firms). The key is to embed communication power into the DNA of an entire organization, building the reputation of the firm over any individuals within it. Firms that have communication power speak more frequently into the market, and the quality and variety of their communication artifacts is head-and-shoulders above their competitors.

INGREDIENTS OF INFLUENCE

- 1) A vision-driven, expert point of view
- 2) Communication power
- 3) Leadership of the discourse
- 4) Continual reinvention around an enduring core
- **5)** Commitment, persistence, and relentless energy

Ingredient 3: Leadership of the discourse

Communication power amplifies the voice of a firm, positioning it to take leadership of the discourse on design, technology, sustainability, or any area in which the firm wants to exercise influence. Social scientists have long studied the effect that framing an issue by one party has on how the issue is perceived by others (including on a mass media scale). The upshot is that the one who sets the context of a discussion has the greatest influence on the outcome. Those firms that take leadership of the public discussion of key topics have a real opportunity to shape how the market itself perceives those topics.

Ingredient 4: Continual reinvention around an enduring core Firms that influence over longer periods have mastered the balance between fresh perspectives and staying true to who they are. In other words, they do not shift their identity to continually be seen as on top of this or that trend. There is an incorruptible core to their point of view, but it does not keep them from original insights on important issues or new approaches to problem-solving.

Ingredient 5: Commitment, persistence, and relentless energy Because it requires both extraordinary ability and frequent exposure, influence does not happen overnight. It must also be continually renewed through the evolution of a firm's thinking and a roots-deep commitment to continual engagement with the market around ideas and design. Consequently, leaders of influencer firms must be prepared to invest in those areas of the firm that maintain and grow their influence, such as research, design and marketing.

Firms with enduring influence certainly claim benefits for themselves in greater opportunities for better projects and a positive impact on the market. The more firms strive for and achieve influence, they better the situation for both themselves and the professions. The stakes are high. In our current environment of flux and fundamental change, what could be more important?

¹ dictionary.com https://www.dictionary.com/browse/influence

Bob Fisher is editor at large of DesignIntelligence and managing principal of the Strategic Identity practice of DI Strategic Advisors.



When we seek first to influence, we think differently, we make decisions differently and we present ourselves differently to the market.

TECHNOLOGY

Increasing Industry Vitality Through Innovation

Thornton Tomasetti is a 1,500-person E/A firm with the audacious goal to be the global driver of change and innovation in our industry. To accomplish this, we need to be ambidextrous. What that means is we need to focus on our current business and results while at the same time, make relevant bets to insure our future.

RAY DADDAZIO

n 2017, the Boston Consulting Group (BCG) working with *Fortune Magazine* introduced The Fortune Future Index. This index is a ranking of global companies with the best prospects for long-term profitable growth. Leading companies demonstrated both steady execution and forward-looking strategic nimbleness. BCG developed a model to evaluate companies through publicly available information. None of the public companies in our A/E/C space is near the top of the list; this is not surprising since a 2014 *Harvard Business Review* article ranked construction last in the adoption of innovation out of 40 different segments of our economy.

Thornton Tomasetti engaged BCG to take a deeper dive into our operations and culture in order to develop a quantitative measure of our vitality. We saw what we did well, we saw where we could do better, and we've taken these findings to heart. For example, rigor in our approach to innovation and its efficient dissemination throughout our firm were highlighted as areas that we need to improve.

Since innovation is the foundation of our big goal, we hold innovation tournaments a couple of times a year. Participants bring five ideas to the tournament—so, if you have 20 people that means there are 100 ideas coming out of the gate. Everyone has to pick their top two, and then make a quad chart (one sheet divided into four quadrants) that explains the idea, how it will be executed, what resources are needed, and its benefits/return on investment. We hang the quad charts on a wall, and participants

get to vote for their favorite ideas. The participants then form teams and work to develop the top four ideas. They spend a few hours developing the work plan and putting together a brief presentation. We generally fund the labor and equipment to realize these ideas over the following six months or so.

We have program reviews to track their progress; some ideas have the potential to develop into a phase two or in some cases, the technology could be spun-out though our innovation incubator, TTWiiN. Our intranet is the repository of these captured ideas—every single idea generated over the last three and a half years is there for people to see.

As we look to the future, and to encourage wider participation, we are making our innovation tournaments regional instead of larger global events. We'll have one in the United Kingdom, one in India, one on the West Coast, and one in the Midwest—it will be beneficial to have them a little more dispersed, and we are eager to see to how this shift in scale may foster different types of innovation.

We are fans of McKinsey's three horizon model for innovation where innovation is categorized as incremental, adjacent, or transformational. An incremental innovation such as a new button on a Revit toolbar can combine several mouse clicks into one operation. This won't win a Nobel Prize, but if 100 engineers save several mouse clicks multiple times a day, they will be a happier and more productive workforce.

We've also spun-off separate, independent companies. One of them is called Konstru which began about ten years ago as a nascent interoperability platform that enabled information to be exchanged between BIM software and structural analysis packages, entities that didn't talk with each other. In-house, our CORE group developed approaches such that all of those programs could push and pull information from each other.

Over the years, the capabilities of Konstru have been extended to provide faster model updates, easier collaboration, more software plugins, and reliable change management for BIM models. Konstru saves time and improved the quality of our deliverable. In 2016, we spun off Konstru as a separate, independent company through our TTWiiN technology accelerator, and it became one of TTWiiN's portfolio companies.



When we start a job, we try to facilitate taking a fresh approach to how it is undertaken. Each of our ten practices has created an evolving list of items which the global practice leaders consider a fresh approach to the problem.

Getting back to vitality, when we start a job, we try to facilitate taking a fresh approach to how it is undertaken. Each of our ten practices has created an evolving list of items which the global practice leaders consider a fresh approach to the problem. Typically, many of those items are related to the tools you might use in working on a project. The principal

in charge of the job sits with their project manager, and as they're thinking about how they're going to execute that specific job, they specify which tools/approaches from the freshness list they are using. We don't mandate anything, but we keep track of whether people are using what the global practices think would be the better and more efficient way to do things. If they're not, we can ask why. We do this to make sure people are aware that there is a potentially different and better way to execute a part of the job, and this approach allows us to better track the quality of our product.

Communication on these types of issues can be difficult; no matter how many times you say something, you probably need to say it ten more times for it to take hold in the company. If you take a group and train them on how to use the latest and greatest piece of software, it is human nature to forget if you don't use the software on a project right away. It's really best to do that training around a current job. We are fortunate to have our data-rich intranet that is used throughout the firm to share approaches and ask questions. We also send out a newsletter once a month from our CORE group that highlights successes, new innovations, and different applications.

I would love for this approach to vitality to become an example for our industry to help push us up the innovation curve so that we are no longer ranked last. In the United States, construction is a \$1.3 trillion industry, and we need to become more efficient, more innovative, and provide better deliverables. We can do better, and if we prioritize communication and the technological advances that come from innovation and improved efficiency, we will.

Ray Daddazio is president of Thornton Tomasetti, the international engineering design, technology, and forensics firm.

The Evolution and Future of Immersive, Real-Time Technologies

Up until now, we in A/E/C have spent our careers working through a layer of abstraction—a two-dimensional screen. We design and build something that is three dimensional, but the 2D screen acts as the interface between us and what we're designing. Removing the 2D layer of abstraction has proven to be an effective solution and is revolutionizing the industry.

JOEL PENNINGTON

de're entering a new era in technology as industries will move away from the WIMP (Windows, icons, menus, pointer) paradigm to a fundamental 3D experience in the computing platform. To that end, VIM AEC is building the next generation of immersive technology products with the goal of making them more accessible.



At VIM AEC, we're testing ideas where, with Magic Leap, we can give someone an immersive experience in life-size and see an augmentation of BIM in the real world. It's more accessible for people who aren't comfortable going into a myopic experience like virtual reality.

How did we get here?

A key breakthrough in real-time immersion began in 1968 with University of Utah computer scientist Ivan Sutherland's Sword of Damocles, funded to test the idea of presenting the user with a perspective image which changes as he moves. In 1985, NASA's Dr. Michael McGreevy noticed RadioShack's

new Citizen Watch Co portable TVs were LCD-based. He decided to put these lightweight screens on astronaut's helmets, so they could engage in virtual reality training programs.

A few years later, new prototypes like Autodesk's Cyberspace enabled new users to visualize a building before construction, with the aim of helping reduce ambiguity and bridge the gap owners often feel when trying to make sense of 2D drawings. Virtual Reality also hit a stride through established corporations like SEGA and Nintendo.

Unfortunately, the bubble burst, and the immersive technology failed because the ancillary technology required to make it work well wasn't ready yet. Nintendo sold three-quarters of a million VR units before pulling its Virtual Boy product as users complained of motion sickness.

By leveraging technology from a booming smart phone market a couple decades later, the next generation of VR immersive technology includes Google Cardboard (2014); Oculus Rift (2013); and HTC Vive (2015). HTC's business leadership was so bullish on VR that it sold its phone business to focus entirely on VR. Facebook bought Oculus and continues to drive for consumer adoption, while the main gains in VR adoption have been in the enterprise space. This is because consumers are fickle and driven by how quickly and easily they can be entertained by a device;

the lowest energy needed is currently via a smart phone. When a VR or AR provider wants consumers to access their experience, it requires so much activation energy by the consumer, that its experience needs to be 10 times better than simply watching something on a smart phone. This is a very high bar to pass, and a factor in why consumer VR and AR has not taken off.

In 2012–2013, a good VR experience meant paying an expensive Unity or Unreal artist for a creation that allows a designer and a customer to look at rooms together. Today, we can have a collaborative, multi-user experience where people are either remotely or physically together, collaborating in the same digital space. They're using tools that allow them to section the model, change finishes, make notes, do RFIs, and more.

At VIM AEC, we're testing ideas where, with Magic Leap, we can give someone an immersive experience in life-size and see an augmentation of BIM in the real world. It's more accessible for people who aren't comfortable going into a myopic experience like virtual reality.

Time and money

In the A/E/C industry, two important considerations are time and money. For every \$25 million spent on a project with access to immersive technology, often in AR, these are potential ROIs:

- Site analysis, up to \$10,000
- Designer view options, \$10,000
- Design mock-up visualization, \$100,000
- Construction documents, \$10,000
- Coordination and detailing, \$10,000
- Pre-con visualization, \$25,000
- Pre-fab visualization, \$100,000
- Pre-fab assembly, \$100,000
- Layout, up to \$1M
- Installation, \$100,000+
- Verification and quality control, \$50,000
- Commission and testing, \$25,000
- Operations, \$1M+
- Maintenance, \$1M+
- Emergency first responders' safety analysis, \$1M+

At Skanska's Tampa office, value engineering work specialists using Autodesk went from a table-based, Excel-type experience to VR. When these specialists put owners in a room and allowed them to change the floor or the ceiling finish, they could see the cost change immediately. Business development account managers began using VR for winning projects—increasing their win rate by up to 50 percent, all because they could offer VR. The result was \$400 million in extra revenue.

In adjacent industries, Bell Helicopter used VR in the design review, multiplied their speed by ten, and designed better helicopters. In shipbuilding, Newport News used AR to reduce inspections from 36 hours to 90 minutes, resulting in savings of \$80 million a year.

In A/E/C, VR is very impactful early in design. But AR takes over quickly and lives on throughout the life of that building, helping it operate more efficiently and reducing the lifetime costs.

The technologies under the hood

The majority of AR and VR apps and experiences rely on two core pieces of technology, Unity and Unreal. Neither is designed to work with parametric design data, BIM, or CAD files, but they've been successful because access to their technology is readily available. There are more than seven million third-party software developers split between these two game engines. Anyone can go onto Upwork or Fiverr and, within minutes, hire developers ready to start building real-time experiences.

Unfortunately, trying to convert parametric models or solids into what the game engines need—lightweight, clean polygons—is a big task. It takes money, time, and expertise, as well as the potential loss of data. The industry has discovered it can take hundreds of hours to develop products before the experience is even usable.

At VIM AEC, we are building a new data platform that understands design intent from parametric design tools like Revit. This allows our customers to automatically receive lightweight, clean polygons for use in the game engine

quickly and effectively. With this breakthrough, new experiences will be possible without having to spend a lot of time manipulating data.

Where we're headed

In 1982, Autodesk had the first CAD application for the IBM PC, but it took more than a decade before they became a real player thanks to Intel and Microsoft, who weren't angling to democratize the A/E/C platform but simply make computers more accessible. Luckily companies like Autodesk leveraged that new platform well. At VIM AEC, we have heeded this as a warning and make keeping up with adjacent technologies and their impact on A/E/C a priority.

In the video game and film industry, concept artists are building in virtual reality rather than desktop design software because it's a fundamentally better way to work. Instead of a 2D screen, they're building in 3D for 3D-like sculptors. Concept artists love this because they don't have to be perfect with their lines; they can just be creative with no filter.



In A/E/C, VR is very impactful early in design. But AR takes over quickly and lives on throughout the life of that building, helping it operate more efficiently and reducing the lifetime costs.

You might say that A/E/C has rules—unlike a video game or movie, we have to actually construct a building. Unreal engine and Rhino know this, which is why they have funded Gabriel Sorento's Mindesk, a real-time VR parametric modeler connected directly to Rhino that allows designers to conceptually build with rules. Because enterprise solutions for VR and AR are key, you can bet Google is right behind them, along with Facebook, Microsoft and some startups.

I am excited about how we can enable the next generation of designers to design and build. As responsible human beings, we have to manage the consequences of this technology ourselves. We can't count on government rules to fix it for us, but I do have hope that it will solve real problems in the enterprise business space. If it reduces the time of design and construction and gives owners more information so buildings run more efficiently, then maybe the good we're doing outweighs potential consequences.

Editor's note: This is an adaptation of Joel's presentation at the 2019 Leadership Summit on Technology & Applied Innovation, sponsored by Design Futures Council.

Joel Pennington is head of product at VIM AEC. He oversees product vision, strategy, design and development.

SKENDER AND VIM AEC COLLABORATE ON A REAL-TIME AUGMENTED EXPERIENCE FOR MODULAR UNITS

Skender is drawing up plans to manufacture and build the modular units for a 10-story, 144-unit multifamily building in Uptown Chicago, as well as a 7-story, 122-unit multifamily building in West Loop. "We know we'll get this done 40 percent faster than anyone else, and at a higher standard," said Skender Chief Design Officer Tim Swanson.

VIM AEC will be collaborating with Skender on real-time augmented experiences for the modular units. Virtual Information Modeling will augment the physical space in Magic Leap to help people experience what the finished product will represent when completed.

Source: vimaec.com; therealdeal.com

"I'VE ALWAYS SEEN ARCHITECTURE AS A HEALING ART, NOT JUST AS A BEAUTIFICATION ART."

James Polshek

Sustainable Design: A Worthy Investment

As a venture capitalist, I believe creating a more sustainable environment is an investment opportunity that is not only profitable, but necessary for our future. Our physical world is under increasing pressure, and not living sustainably now will perpetuate future problems.

JESSE DEVITTE

or example, today the largest contributor to landfills is construction waste. The operation of buildings is the largest consumer of energy in most markets, yet 40 percent of office space is underutilized. This is happening while global population growth is increasingly urban and placing more pressure on the cities of the world—and it is not sustainable.

So, we must improve how we design and build our world. Companies with missions to make this a reality are becoming increasingly commonplace. There are founders with dreams and crazy, evolutionary ideas coming from all over the world—we've never seen anything like it. The growing priority of creating a sustainable environment has resulted in a market ripe with investment opportunities to protect our planet ... and as investors that's a "good thing."

Our mission is to build companies, because we realize that if we just invest in technologies, it could lead to a dead end. In a perfect world, we could predict the future and we'd know exactly who to give to and how much. The reality is, the best we can do is to see how far down that path we can get. While it's great to apply our industry knowledge, we also like to have investment partners who are not from the industry because they are not cowed by its history. By having a combination of different approaches, it creates a different dimension that can usher in true change.

Business models can be tricky in this industry. While technology remains a very important element of any business model, our focus is not just design, build and operate; we've also added an emphasis on the data that technology allows us to collect. Recently we began to see new types of companies with data in their business model vs. point-solutions for initiatives like authoring apps. We also began to partner with a whole new group of investors who are beginning to size up their synergy for potential, too. Without the ability to share data, it will be almost impossible to design and build in the way the world will require us to, but one of the challenges of implementing technology is accepting that only so much can be done. Bill Gates once expressed that it is best to think of it, along with building a business, like an early stage in a video game; every time you reach success you go to the next level. You will face



While technology remains a very important element of any business model, our focus is not just design, build and operate; we've also added an emphasis on the data that technology allows us to collect.

more battles, but you continue to advance. To succeed you must be committed to growing through those challenges.

As an example, a young entrepreneur mentored by an industry veteran and working in a sustainability consulting practice recently had an idea to collect and share sustainability data through technology for real estate assets. In three or four years, this company—called Measurabl—has grown from an idea and two people to 50 people working in a great business with some of the largest asset owners in the world as customers. Imagine if someday they could deliver a sustainability score for every building in the world.



Cities are the key to saving the planet. Michael Bloomberg

As another example, we've been talking about the industrialization of construction, which we coined our own term for: *constructuring*. Imagine if the construction process shared the predictability and efficiency of manufacturing; in fact, it may be the only way we can meet the world's demand for new buildings to meet the needs of 9 billion humans by 2050.

There are many effective, easily accessible resources available now that advance the cause of sustainable design and construction. Mike Bloomberg wrote his book *Climate of Hope* to encourage readers that all was not lost after the U.S. withdrew from the Paris Climate Accord. In it he says, "Cities are the key to saving the planet," and he believes the single best thing we can do for the earth is to improve how we design and operate our buildings. Unfortunately, this idea doesn't get as much attention as something like saving the rainforests, but I share his belief.

This market is ripe for change we haven't seen before. Three or four years ago, no one was tracking startups around real estate, construction tech, smart cities, or design tech. They weren't even categories. Now this has become its own investment space with thousands of new startups. In the mergers and

acquisitions world, new billion-dollar players like Katerra and ProCore have emerged while traditional industry leaders like Autodesk, Oracle and Trimble have spent billions in the last two years in acquisitions to improve their market positions. This represents an unprecedented level of capital investment and a unique moment in time for what has always been considered a sleepy industry on these fronts.

In the last year, we have looked at more than 1,000 company proposals—which is unprecedented in this industry—and the rate just continues to go up. We get a wide range of proposals, and even though we don't know how viable they might be, we look at every one as a potential investment. For example, we made an investment in a company in Seattle called Blokable, which is targeting the affordable housing space. They had an idea to create a manufactured good for beautifully designed affordable housing at scale, so they pulled together \$5 million, built a small factory, hired some architects and churned out the first units. Now these units are in demand in places like San Francisco, where previously they couldn't get through the system to process the permitting. We found another investment opportunity through a project at Google around geothermal energy; some young entrepreneurs there had an idea to bring the benefits of geothermal energy to residential scale at a much lower cost while refining the approach to drilling and the new business model—and Dandelion Energy was born. Another company, SmartVid.io is using machine language and AI along with the wealth of available construction site imagery to create the industry's first predictive safety models for construction.

There are many more viable investment opportunities now than ever before. In the last six months, we've even seen a handful of business plans where we've had to ask if they were a technology, architecture, or construction company—which indicates there is innovation on the business model front as well, and that's very exciting. Many industry companies are even launching their own internal innovation programs. The number one piece of advice I have is that if you've advanced something internally and you believe it needs to be a business on its own, then it needs to be a business on its own or it won't succeed. Many people try to hold things like that close

ADVANCING SUSTAINABLE MATERIALS MANAGEMENT

As Jesse stated earlier, "Today the largest contributor to landfills is construction waste. We must improve how we design and build our world." On epa.gov, in their "Advancing Sustainable Materials Management Report" (released in July 2018), we found that 548 millions tons of construction/demolition debris was generated in the year 2015.

Construction and demolition (C&D) debris includes steel, wood products, drywall and plaster, brick and clay tile, asphalt shingles, concrete and concrete asphalt. These materials are used in buildings, roads and bridges and other structures. The generation estimate represents C&D debris amounts from construction, renovation and demolition activities for buildings, roads and bridges and other structures.

548 Million Tons

of C&D debris was generated in 2015.

Source: epa.gov

to the vest in order to get an edge—which can make sense, but you have to let it loose into the marketplace if you want it to succeed as a standalone business.

For any investment that we make in this industry, the company must do everything humanly possible to support the existing systems already in place. This better enables the different parts to work together well, to collaborate and share data—which is logical and appropriate in a fragmented, siloed and project-based industry. It's also important to have risk partners, including the owner or the ultimate operator, involved

in the project from the beginning. This industry has lacked an effective way to capture intellectual property and monetize it broadly to help the industry help itself to move forward. My hope is that one day, the industry is served by a platform or a company or some combination that enables that to happen. Bigger, better decisions involving more stakeholders made earlier in the design and construction process is the goal.

Some of our investments will result in startups that are often acquired by larger companies. After a business is acquired, one common challenge is the integration of its products and people into the existing company. Antibodies tend to come out when something new enters an organization, and sometimes large companies pay a lot of money for talent and technology that is never utilized and ends up being buried. Most of the time, it's just organizational dynamics that get off track and frequently, strategies change as well. Ultimately, in these cases the market has to speak to these companies to make sure it's done right; if subscriptions aren't renewed, the market is speaking up, and that's how to get people's attention.

A sustainable future is a worthy investment, and as time goes on, the opportunity is only increasing along with awareness, technological advances, and the availability of data. I am excited and optimistic about all the possibilities surrounding the industries—those that exist today and those that are to come—supporting this movement.

Jesse Devitte is co-founder of Building Ventures, a company that provides capital, mentorship and industry connections to entrepreneurs working on innovative solutions to design and construct a better built world.



In the last six months, we've even seen a handful of business plans where we've had to ask if they were a technology, architecture, or construction company.



Searching for Connections—For the Future of Education/Practice Partnerships

A recurring question about any professional school is "What is the primary goal of the education process?" Are universities supposed to equip students with a foundational knowledge of a profession or are they supposed to prepare a student for practice and exploration? Or, as most of us now practicing have learned to ask, "Is architecture an art or a business?"

TROY THOMPSON & DAVID FERGUSON

he values and technology now driving the practice of design and construction are breaking down the decadeslong view of the either/or nature of being an architect (or any professional) in today's world.

Design schools and professional offices need increasing interaction in order to find mutual benefits as we all face the rapidly changing social, economic and environmental shifts.

Now is the time for the academy and the practice to intentionally partner to better secure our future. Our goal should be to integrate and align appropriate shared values across education and practice and to understand that this shift is culturally based and technologically driven. What are these shared key values? For starters, sustainability, resiliency, integrated design processes, performance-driven design, equity and inclusion in the design process as well as a heightened empathy for users and those affected by our work.

These values, as an integral part of foundational preparation, need to be inculcated in design school processes and modeled and reinforced by practitioners. This learn-see-apply process underscores the immersive pedagogy at Ball State University where a major emphasis is placed on highly

engaged, hands-on learning across all academic areas of campus through "immersive learning" courses. At the same time, the current explorations described below aim to increase and accelerate the trajectory of student experience to better prepare them for the design and construction professions' need for students who are comfortable and adept in a professional setting.

The College of Architecture and Planning at Ball State University and SmithGroup are creating a new collaborative model that includes multiple types of interaction between college and firm around the primary ideas of integrated design (largely a practice-driven issue) and immersive learning (largely an academy-driven goal) in order to affect change in both cultures.

How can professionals and schools work together to create synergy and mentoring that produces relationships that accelerate learning, leadership and the sharing of the best of both worlds?

Ball State's College of Architecture and Planning (CAP), in pursuit of forging closer and more lasting bonds with alumni, wrote a grant proposal in 2017 for what it dubbed a "Firm in Residence" program. The private sector partner was SmithGroup, an international, 1,300-person design firm with multiple disciplines and markets across 14 offices. While recently updating Ball State's campus Master Plan, SmithGroup made themselves available to the College of Architecture and Planning's Landscape Architecture department by participating in the annual Design Week event and helping to lead a design charrette. SmithGroup also has a number of Ball State CAP grads working across the firm in various disciplines so there was a natural fit with the Firm in Residence idea.

As the Firm in Residence program unfolded, four areas of interaction shaped the partnership: guest lectures, interdisciplinary design studio participation, student/professional mentoring and joint research.

SmithGroup provided keynote lectures as part of the 50-year old CAP Guest Lecture Series. Lecturers from SmithGroup addressed multi-disciplinary practice issues—a timely topic for the college, which had just added Construction Management and Interior Design Programs to the already existing Architecture, Landscape Architecture, Urban Planning, Historic Preservation, and Urban Design programs.

Through the GLS, SmithGroup also provided a straightforward look at the future of the design office, focusing on the likelihood of change in the business model and therefore the job market, practice opportunities, different needs for student preparation and related powerful impacts.

A second feature of the FIR model was the development of interdisciplinary studios, which has now spanned three semesters over 2 academic years. The process began with a charge to find an opportunity that would allow students and firm members to work out of one of the SmithGroup offices on a pro-bono project that engaged multiple disciplines. This was considered a particularly immersive way to reinforce the changing values that drive design.

In the SmithGroup Chicago office, Urban Designer and Landscape Architect, Kris Lucius put forward the Chicago Stockyards as a candidate site. The stockyards, a square-mile area made famous by Sinclair Lewis in his book, *The Jungle*, were



The stockyards project for me was an interesting and challenging project where we were able to collaborate with practicing professionals and learn from their experiences to help shape our project. It was nice to have access to both the people at SmithGroup along with their offices. This interaction with the people at SmithGroup was a driving factor in how I approached my project during the semester.

Adam Freeby, CAP Architecture student

KEY COMPONENTS OF ALL THE STOCKYARD STUDIOS PROJECT INCLUDED:

- Developing a framework that focused on revising the legacy of the site. The main emphasis became a holistic food/urban food/urban ag-based economic model
- Respecting social justice aspects, especially regarding adjacent long-time neighborhood groups
- Finding new approaches to urban design corridors
- Adapting a wide range of appropriate housing prototypes
- Responding to the need for artful building infill

UNEXPECTED OUTCOMES OF INTERACTIONS BETWEEN NINE STUDIOS OF STUDENTS AND SMITHGROUP OFFICE:

- Attraction of students to the office environment and increased interest of students in committing to internships or hiring at the Firm in Residence
- Cross fertilization among disciplines within the college
- Stakeholder interaction with students & stakeholder invigoration from interaction
- Involvement by the city and community leaders due to high profile nature of project
- Easy connection between a variety of professionals (marketing, engineering, landscape architecture, architecture, planning, urban design) and the students
- Ongoing relationship that both partners are motivated to find ways to expand



As a Ball State alum and leader of an interdisciplinary urban design team at SmithGroup, the opportunity to collaborate on this effort was deeply personal for me. The outcomes exceeded my expectations and set precedents for how we should practice and educate in the future.

Michael Johnson, SmithGroup, Ann Arbor

once the economic engine for Chicago, processing most of the meat that fed the nation. But since 1978, the property has sat idle for the most part. The SmithGroup office has been supporting a number of local organizations and political leaders in their attempts to define the problem and understand potential frameworks for the rejuvenation of the entire district. The project became the first test case for the joint studio model.

Over the summer and fall of 2018, nine different studio sections from Architecture, Urban Design and Urban Planning, at both graduate and undergraduate levels, visited and worked on the Stockyards project with input from SmithGroup staff. The first studio, a summer graduate urban design studio, created a stockyards framework plan that defined and contextualized the projects that were then picked up by eight undergraduate studios last fall. While studios worked largely independently, structured touchpoints along the way allowed student sections to interact with each other. Visits and design charrettes in the SmithGroup Chicago office were common events for each section. While the studio cohorts were at different levels (graduate and undergraduate) and from different disciplines, there was considerable convergence in themes of the projects. Studio cohorts were significantly influenced by the contact with other disciplines within the college and firm along the way.

The joint studio model has created value for both partners, but both parties wanted to increase professional-student contact, the third component of the FIR model. Conceptually, the goal was to emulate what happens when a student is "taken under wing" by a professional mentor. The benefits of such relationships often stretch beyond the studio project to longer-term relationships that can accelerate a student/recent graduate's trajectory and success in the field.

During spring semester 2019, our collaboration has turned to testing this relationship building, using technology to connect professionals with students over the course of a semester. Three small studio design teams have been formed to work with three SmithGroup integrated critique teams, each consisting of an architect, an engineer and either a landscape architect or planner. These video critiques are building relationships and person-to-person rapport.

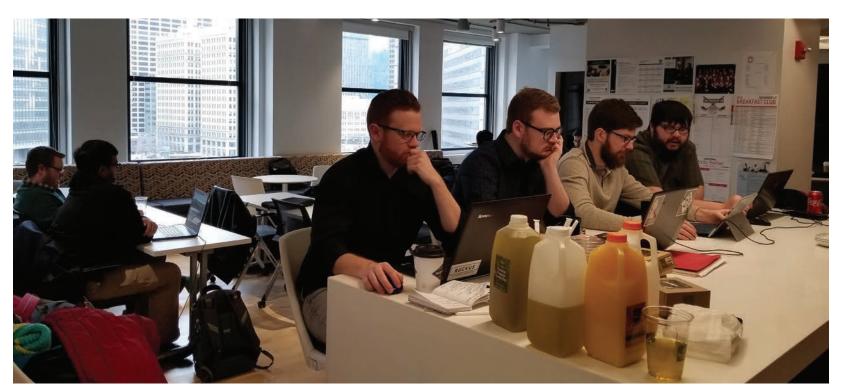
This model provides a framework that is highly scalable across the college and could easily include a wider array of professionals. All the collaboration and interaction is remote via new collaboration technologies on campus and SmithGroup's own infrastructure. Most large firms now regularly collaborate over space and time, so this is one more element of how students need to learn to work with both clients and peers.

The idea of a firm-in-residence can easily be duplicated with both local and national firms and can be adopted at other institutions of all sizes and complexity. The platform offers the types of lasting relationships that can create and drive shared values and more quickly respond to change in both education and practice. Finally, it supports immersive learning in the academy and affords practitioners the opportunity to learn from and mentor the next generation of our industries.



We tried this collaboration as an experiment and it has dramatically exceeded our expectations. We believe this type of partnership will become increasingly effective in moving our programs forward while engaging us in meaningful dialogue about future models of practice.

David Ferguson



Charrette by Ball State University students at SmithGroup's Chicago office (from left to right, from table by window to counter):
Steve Himebrook (MUD), Imran Khalid (MUD), Alex Minor (MArch),
Nick Entrekin (MArch), Colby Cline (MUD), Zander Franklin (MUD)

What have we learned so far?

- A model to advance interdisciplinary process in design education. Integrated design is our daily culture in practice, even though we were all trained in silos. Most schools don't have the breadth of disciplines to create an integrated design culture.
- Real-world, immersive planning and design opportunity with client interactions.
- Growth in design criticism culture in the SmithGroup office by involving engineers and junior designers in academic critique.
- Ability to be involved in urbanism discussions about a part of Chicago that isn't currently getting much attention (or funding) for real projects.
- Enhanced synergy and local relationships that connect SmithGroup thought leadership and community activities in Chicago.
- A tested model that other firms can participate in and that is transferable to other universities and professions.
- Students are drawn to real-world, high-impact projects that solidify their commitment to becoming (licensed) practitioners.
- Students develop another avenue for creative input for projects while potentially gaining mentors for their professional lives.

Troy Thompson, AIA, LEED AP, is one of three Managing Partners leading SmithGroup. In this role, he is responsible for innovation, design quality, discipline tools, research, IT and staff development. SmithGroup is a fully integrated design firm with over 1,300 staff in 14 offices.

Dave Ferguson is interim Dean for the College of Architecture and Planning at Ball State University. His background includes experience as lead designer and Director of Marketing for private practice design firms. As a professor in the College of Architecture and Planning for over 30 years, Dave has conducted research on the future of cities and sustainable design, and teaches in the Landscape Architecture and Master of Urban Design programs.



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Nancy Kohout, Mechanical Engineer; Kris Lucius, Landscape Architect; Jason Smith, Architect. *SmithGroup Chicago Office*

ENVIRONMENTAL & SOCIAL RESPONSIBILITY

The Transactive Network: Supporting New Building Paradigm

In 2015, Pacific Northwest National Laboratory (PNNL), a U.S. Department of Energy (DOE) research facility, conducted a study for DOE on buildings of the future and developed a vision framework.

DR. NORA WANG

ive key building interactions were considered, based on the roles a building should and could play in the future:

- Building and environment
- Building and utility
- The building system
- Building and occupants
- Building and community.

A list of metrics and targets was developed to inform building research, development, and design for the next century.

In order to determine the future needs of buildings, three influencing factors also were considered. One factor pertains to today's challenges and potential future challenges, such as population growth, urbanization, climate change, and energy demand. The second factor is the centric human desire for health and wellness. How can buildings support their occupants' health?

The third factor is today's rapid technology advancements. There's no way to predict what technology will look like or how it will shape society over the next century, so spaces must be designed to be flexible enough to accommodate those changes. For example, telecommunication has challenged the traditional concepts of offices and retail structures. Multi-use buildings that can adapt to future innovations will be needed. Clearly, this requires architects to think about modular, flexible designs that can be easily reconfigured to embrace

advances in building technologies and materials. Understanding technology trends will help architects provide better services and inspire their creativity.

There's also a need for more integrated designs that consider buildings in time, not just space. Much of the design community still thinks of a building as a snapshot; when it's built, it's done. There may not be much thought given about what happens to the building and its occupants after 10 years, 20 years, or 50 years. Buildings that are limited by their structural and system designs can be expensive to retrofit and therefore lose their market value before their expected service life ends. This leads to resource waste in the long term. Instead, thought must be given to a building's life over time, almost as if it's a living object.

Reimagine Energy Demand and Supply

One of DOE's current research and development (R&D) investment areas exemplifies the need to design future buildings to accommodate groundbreaking technologies and methods. This effort at PNNL involves development of a transactive network between buildings and the power grid that allows buildings to actually negotiate for energy and other services. The network will help buildings become more active participants in energy distribution—like living objects, not just end-point consumers.

Currently, the interaction between a building and the grid is just one way. A building consumes energy based on its own need at any given moment. Where demand-response (DR) programs exist (allowing utilities a limited level of control over operation of building devices), the grid can signal the building and exercise DR to reduce peak demand on the energy system and maintain grid reliability. In commercial buildings, an aggregator works with building owners to temporarily reduce a building's load, which might include steps such as partially shutting down cooling systems or elevators.

The residential sector is slightly different. Homeowners sign up for an energy utility's DR program, and the utility controls home devices, such as heating, ventilation, and air conditioning (HVAC) systems or water heaters based on the grid's need. During peak times, the program shuts down the home equipment and the homeowners receive a small amount of incentives in return. The problem is, energy savings could be secondary for many homeowners. People don't want to lose control of their home's systems, especially during peak times. On a hot day, for example, everyone wants their air conditioner (AC) running. Participating in the DR program also means that homeowners need to actively "manage" conditions, such as closing the blinds on a hot day to keep the room cooler when the AC is not available. People may drop out of the program because of the inconvenience and lack of control.

The transactive network would enable two-way communication between the grid and smart devices in buildings or homes. With this network, a local control agent software understands the priority of the "connected" devices and can predict their energy use at any given moment. It can automatically place devices in reduced demand mode for a short time to provide support to the grid with minimum interruption of the home inhabitants' activities. In return, the home receives incentives and benefits of home automation.

How does this work? Every home is used by different occupants at different times. For example, if no one is home, it's likely that everything (HVAC, water heater, etc.) could be shut down for two hours. For the next-door neighbor, however, the water heater might be more important than AC, but for the homeowner across the street, the living room AC unit is more important than the one for bed-

rooms. Under a transactive network, home inhabitants have ultimate control. A homeowner presets preferences and priorities and decides which devices participate in transactions. The devices also learn more about preferences with time. A person can change the priorities if he/she suddenly starts working at home on Fridays and needs all devices working. Simply stated, a transactive network is value-based, with the value (cost, comfort, convenience, etc.) defined by its participants. The whole point of a transactive network is to make it effortless for the user so it becomes a natural part of daily life.



Much of the design community still thinks of a building as a snapshot; when it's built, it's done. There may not be much thought given about what happens to the building and its occupants after 10 years, 20 years, or 50 years. Buildings that are limited by their structural and system designs can be expensive to retrofit and therefore lose their market value before their expected service life ends. This leads to resource waste in the long term.

Better Than Money

In addition to being effortless, the network has another benefit users will love. Even though it is designed for energy, it allows other services to be delivered through secured data exchange among devices. These other services might offer such futuristic features as the ability to detect problems in an AC unit and automatically alert a service provider before the unit needs a major repair or fails, or perhaps right-on-time delivery of home supplies based on laundry and dishwashing habits. There are no boundaries to the imagination.

The network will provide convenience and flexibility, making life easier and more comfortable. Ultimately, users' comfort, health, and wellness are major drivers in energy efficiency. With a new way for buildings to interact with their occupants, other buildings, the utility network, and building services, architects are empowered to create new building prototypes.

Gaps in the Market

Current home automation systems fall short of what a transactive network could do. Whole house automation is a closed system restricted by proprietary information exchange channels and with little consideration of energy consumption. Devices can't easily talk to each other—that is, a home's smart thermostat doesn't know or care what the hot water heater is doing.

With the transactive-based control and coordination network, DOE and PNNL are developing an open-system platform that allows different devices to come to the secured in-home message bus to exchange information and interact with each other. Third parties can provide their services through that same platform.

PNNL is closely working with utilities because these entities realize the aggregated value of demand reduction. They have the responsibility and the funds to develop energy efficiency and demand reduction programs. PNNL envisions that utilities will work with vendors to ensure that the products are suitable to participate in the transactive network, and also incentivize homeowners to purchase, install, and enroll their connected devices to benefit power grid operations. So utilities might work toward infrastructure as the starting point, getting all the tech-savvy or energy-savvy early adopters on board and then others will follow.

Users need to be assured of security and privacy, always important factors in developing technology. There's no existing, secure, open-source platform for the aforementioned purpose. The goal is local control, because local communication is always more secure than data leaving a home. Once benefits are demonstrated, utilities can show vendors the value of opening up their systems to enable this local communication.

Testing, 1, 2, 3, Testing

To test, PNNL is working with a few utilities across the country to gain access to sample homes. The technology (a software platform and an in-home load control agent) is installed on an off-the-shelf gateway device as a prototype solution that is suitable for installation in homes for testing. It also serves as a reference design for commercializers to create products with similar capabilities. The gateway device (the size of a laptop power adapter) plugs into the wall, connects to the home Wi-Fi, and talks to connected devices.

Right now, the focus is on big devices that have higher potential for load reduction, such as electric heating and cooling systems, water heaters, and pool pumps. Efforts haven't yet addressed washers, dryers, ovens, lighting, or other plug loads, because these smaller loads are used in shorter periods and are less predictable. It's also expected the industry will come up with various control and automation solutions once the transactive network is validated.

The testing and evaluation emphasis is on the user experience and predicted savings. Once it's shown that the installation process, user experience, and predicted savings meet the expected outcome, the next step will be expanded testing, going from a few homes to a larger number of field trials, evaluating the aggregated results. Similar work is under way on commercial buildings. The concept is the same, but with much larger devices and bigger loads. Testing of office buildings on the PNNL campus has shown promising results and gained interest from industry and utilities.

Once the fundamental R&D is enabled, others can use the new capability to provide services that lead to healthier, more productive built environments. Lighting quality, air quality, and the thermal environment can be optimized based on what matters most to occupants. All of the device data are not only collected in real time, but also exchanged in real time and fully utilized to provide more efficient and truly integrated system operation.

Transactive Network Challenges to Overcome

One challenge is working with existing building systems. Building turnover is an extremely slow process. Effective solutions are

needed for what's already installed in buildings. For example, equipment performance can be very unpredictable. The manufacturer may claim certain equipment efficiency levels, but in the real world, with different maintenance, operating environments, and ambient temperatures, those performance predictions tested under standard conditions can prove unreliable. Sometimes the equipment malfunctions; sometimes it's just old. A method must be identified for working with existing equipment, and control algorithms must be developed that learn and adapt over time.



The design community plays a significant role in seeding and stimulating changes in the built environment.

For future buildings, the HVAC zoning and layout design pose significant challenges for adopting advanced sensing and control. Taking homes as an example, one can install temperature sensors in multiple rooms, but if the hot or cool air is delivered to these rooms at the same rate and time (because they are on the same HVAC unit without room-level automated adjustment), it is impossible to make all rooms comfortable and energy efficient. When multiple room sensors talk to a smart thermostat, the thermostat will have to choose to meet only one temperature setpoint, leaving other rooms too hot or too cold. In commercial buildings, open floor design allows flexible tenant build-out; however, the lighting or HVAC design layout may limit what can be achieved within a reasonable cost and comfort need. The future design paradigm calls for modular or flexible designs for both space and building systems, so buildings can be more easily reconfigured and retrofitted to support different functions and conditions and to adopt future technologies.

Dollars and Cents

How will the transactive network affect design and construction costs? For new constructions, it will probably require more complicated designs that can be flexible. The challenge will be retrofitting existing buildings today and in the future.

Making physical changes to existing buildings, such as tightening the envelope, insulating better, and putting in energy-efficient appliances or systems will optimize the performance of the system. These all give a building the flexibility to turn on and off its mechanical and electrical equipment without greatly affecting comfort and convenience. The overall operational efficiency not only saves energy, but can help underpin building owner acceptance of the transactive network. That's more complicated than one can imagine.

At the same pace, the infrastructure of the utility system will need to change to accommodate the transactive network. The grid will need the digital setup. The system will need real-time reading and feedback, better communications, and standardized protocol. All of this is expensive, and it's not going to happen overnight.

Roll Out

Two industries that are notoriously slow to adopt new technology are building and utility, but if consumers get excited about the network, it will happen a lot faster. If they see the benefits and drive up demand for services offered on the network, capabilities will roll out more quickly. The network provides a much-needed solution for energy efficiency, but ultimately consumers need to embrace it. The design community also plays a significant role in seeding and stimulating changes in the built environment.

Nora Wang, Ph.D. AIA, is a chief engineer at PNNL. She has led a variety of research projects that are critical to improving nationwide building energy efficiency while improving health and resilience, bringing next-generation buildings to reality.

"ARCHITECTURE HAS RECORDED THE GREAT IDEAS OF THE HUMAN RACE. NOT ONLY EVERY RELIGIOUS SYMBOL, BUT EVERY HUMAN THOUGHT HAS ITS PAGE IN THAT VAST BOOK."

Victor Hugo

On Climate Change and Hope: Despite rising carbon dioxide emissions, we can still tackle global warming

The design profession, in its many guises, is resolutely optimistic. For a designer, no challenge is so large that he or she can't develop a solution that will both overcome it and enhance the human experience.

RIVES TAYLOR & BRENDEN JACKSON

et, given the recent onslaught of disheartening news regarding climate change, maintaining such optimism becomes something of a daily test. First, in August of last year, there was the *Proceedings of the National Academy of Sciences* article titled "Trajectories of the Earth System in the Anthropocene." Penned by 16 climate scientists, the article warns that we're much closer than previously thought to achieving the "hothouse" trajectory—i.e., a warming of 4 or 5 degrees Celsius—which poses "serious challenges for the viability of human societies." That was followed in October by the much-publicized United Nations Intergovernmental Panel on Climate Change report stating that at



Along with innovative new processes and materials, our industry can look to further explorations into the use of IoT-enabled components to make buildings that much more sustainable, smart, and responsive.

our current rate of warming we could potentially be just 12 years away from hitting the tipping point—1.5 degrees Celsius above pre-industrial levels—that would trigger the most horrific aspects of climate change. Now, thanks to a January 8, 2019 *New York Times* article titled "U.S. Carbon Emissions Surged in 2018 Even as Coal Plants Closed," we can add to the litany of bad news this fact: "America's carbon dioxide emissions rose by 3.4 percent in 2018, the biggest increase in eight years."

It would now seem that the alchemy required to turn our dire situation into a golden outcome has grown substantially more complicated. Yet the big leaps on a number of fronts regarding climate change enable us to maintain at least some optimism.

For example, as reported in a December 18, 2018 *Forbes* article titled "6 Renewable Energy Trends to Watch In 2019," more than 100 cities across the globe get at least 70 percent of their energy from renewables, and more than 40 operate on 100 percent renewable electricity. Scores more cities are working toward similar goals. At the building scale, technological and legislative developments have made on-site electrical generation easier and cleaner, not to mention more efficient and affordable.

Furthermore, cities are slowly shifting their views on their relationship to nature and choosing to see themselves as part of a larger ecological system rather than as separate from—and, in some instances, bulwarks against—the natural world. This has resulted in forays into biophilic design in places such as Oslo, Portland, and, in particular, Singapore.

As more cities shoulder the responsibility of addressing climate change, architects, designers, and urban planners will have an abundance of opportunities to work alongside them in tackling the unprecedented global challenge that we now face. And the array of actionable measures that our industry can take runs the gamut from common-sense design that reduces humanity's environmental impact to the adoption of the most cutting-edge tools, materials, and processes that are currently being brought to market.

For an example of the former, look no further than the return to classic urban planning principles that we've seen in recent years as a means of lessening our collective carbon footprint. Factors such as walkability and mixed uses, combined with a focus on transit-oriented design, make a car-free lifestyle not only attainable but also desirable: a 2016 study by real estate website *redfin.com* found that for every one-point increase in a home's walk score (when that home is compared to similar properties in less-walkable neighborhoods), there is a corresponding increase in home price by nearly one percent. Clearly, there is a demand for mobility options beyond just the automobile.

At the building scale, there are design processes that we can explore to create components that dramatically reduce energy consumption. It's a well-established fact that forty percent of the energy produced in the United States is consumed in residential and commercial buildings. A significant component of a building that heavily influences energy consumption and is under direct control of architects is its façade. However, we now see a need for façades that are capable of adjusting to the moment-to-moment shifts in the natural environment.

One of the challenges in creating high-performance façades lies in utilizing an alternative-rich design process that is

affordable yet easy enough to allow designers of all abilities to use it. That's why our firm, Gensler, initiated a research effort focused on creating a simulation tool that enables the efficient design of more responsive and energy-efficient façades. The research resulted in a new workflow that leverages scripting developed in-house for Autodesk's Revit/ Dynamo platform. Hence, architects of all levels are now able to conduct performance-driven façade design through the rapid generation of geometric models, the running of simulations on them, and the performing of comparative analysis of the results.



Even the very nature of constructing and maintaining our built environment will change dramatically when working conditions won't allow workers to do their jobs.

When such environmentally responsive designs are paired with the latest sustainable materials, the possibilities for impact are multiplied substantially. Recently, we've seen the arrival of a host of new low-carbon materials that offer everything from cement that's 30 percent less carbon intensive than the current standard to plastic that converts carbon into a reinforcing material.

We can now add to that list of sustainable materials modern mass timber products. A recent article titled "Why More Buildings Should be Made of Wood," appearing on the website of *The Economist*, noted that the energy needed to manufacture a laminated wood beam is just one-sixth that of a steel beam of comparable strength. Furthermore, researchers from Yale and the University of Washington found that the use of more wood in building construction could cut global C02 emissions by 14 to 31 percent. Such products provide a glimpse into the kinds of materials the A/E/C industry will need to embrace to make further headway in the face of climate change.

Along with innovative new processes and materials, our industry can look to further explorations into the use of IoT-enabled components to make buildings that much more sustainable, smart, and responsive. The use of sensors and other IoT technologies are quickly infiltrating every phase of the building lifecycle, from design and construction to occupancy and management. With the refinement of these technologies, we'll be able to fine-tune our ability to monitor and predict energy requirements, shut down systems that are not in use, and gather energy data that can be fed into BIM models to inform future sustainable design decisions. Already, such cognitive systems pay tremendous dividends. According to IBM, the use of cognitive building strategies can reduce a building's energy use by 50 percent. As IoT technology advances, that number will only grow.

At this juncture, we need to also refer to the lifecycle operational implications, or at least one example that illustrates the proverbial nail that lost the battle. The curtain wall, in particular, has been noted as a source of operational difficulties—not the sort of armature to meet the challenge of long-term climate shift. We inhabit glass boxes from 10 and 15 years ago where the gasket technology is not only failing and requiring replacement, but is in fact exacerbating other issues as humidity enters the building. Furthermore, increased demand for mechanical systems to offset humidity and heat gain means increased costs at the outset and greater operational expense later. Building a glass box, which tends to have the ubiquitous four-side-same treatment, entails that at different times of the day there will be different challenges, be they from cold or heat, on those zones facing different directions. Throw in the human preference for perimeter offices, and you have a real design challenge for the lifecycle of our buildings in an era of climate unpredictability.

Even the very nature of constructing and maintaining our built environment will change dramatically when working conditions won't allow workers to do their jobs. With climate scientists predicting far more days of excessive heat—and, as we witnessed in parts of the country this winter, a few days of amazing arctic cold—contractors are already viewing normal operations as a thing of the past. With construction challenges

BUILDING WITH WOOD

There is a resurgence today in building with wood. Timber's versatility, beauty and availability are compelling reasons for its use, as are its environmental advantages such as renewability and sustainability. Using wood in place of concrete and steel can lead to a reduction in greenhouse gases. Cement-making creates about 6% of the world's carbon emissions, while steel produces 8%. But when using timber, the carbon absorbed by the trees remains sequestered in the wood–even when it is made into lumber. Forests can be sustainably managed—as trees are harvested, new ones can be planted in their place. Wood is also recyclable and it's a good insulator.

These environmental factors and more will drive growth in the mass timber industry.

Advances in technology and engineering are making wood towers—and even skyscrapers—possible. Innovations in timber products include cross-laminated timbers, mass plywood panels, glue-laminated timber and dowel-laminated timber—all of which will contribute to wood occupying significant space in the design and construction industry in the near future.

ranging from weather impacts on workers to limited materials availability and durability, it all adds up to a shift of both costs and schedule; we may all be building as contractors do in desert regions—at night.



With climate scientists predicting far more days of excessive heat—and, as we witnessed in parts of the country this winter, a few days of amazing arctic cold—contractors are already viewing normal operations as a thing of the past.

Yet we must bear in mind that all of the concerns and actions that we've outlined above—and those of others who, like us, shape the built environment—do not exist in a vacuum. They are part of a larger program—one that has yet to truly get underway. To enact the large-scale change that is needed to ward off the worst of global warming, unprecedented policy changes will have to be enacted by a majority of the world's governments. In a paper titled "Current fossil fuel infrastructure does not yet commit us to 1.5 °C warming," recently

published in the journal *Nature Communications*, researchers found that there is a 64 percent chance of staying below the warming threshold of 1.5°C if we immediately phase out all fossil fuels. Such a measure seems highly unlikely given the staggering effort of political will and economic restructuring that it requires of almost all national governments. But it demonstrates that the math is still, technically, in our favor, and there is still reason to be optimistic—for now. Thus, there is ample incentive for those of us in the A/E/C industry to recommit ourselves to action before it truly becomes too late.

Rives Taylor has more than 30 years' experience in institutional and commercial architecture, with 25 years spent focusing on strategic planning, programming, and sustainable design, scaled from facility operations to campus and city planning. A Texas-practicing architect/educator, Rives directs Gensler's Firmwide Design Resilience Task Force.

Brenden Jackson is a writer and editor based in Gensler's Washington, D.C., office. Though he writes extensively about architecture and interior design, he is especially interested in issues tied to urbanism—from the ways that planning and design shape individual urban experiences to the challenges that cities face on environmental and social issues.

PERSPECTIVES

DFC FIRM HIGHLIGHTS: The New tvsdesign

When I stepped into the role of president of tvsdesign in January 2017, I was only the third person to hold that position since we opened for business in 1968. Having been a leader at tvsdesign as a studio principal, I was already deeply passionate about the firm, and understood the challenges and opportunities I was facing as president that would ensure our long-term success. The residual effects of the market crash had shaken our business in the same way it did so many other companies like ours, and the crawl back to financial stability was a slow one. Changes in the business and new pressures to keep our heads above water impacted morale, and it was clear that since we were still on unsteady footing nearly 10 years after the recession, it was time to do things differently. We developed a strategic plan that led to a refounding, completed in 2018—coinciding with our 50th anniversary—that set us on the road to company health, future growth and leadership in the industry. Here's how we did it.

JANET SIMPSON

THE ROAD TO REFOUNDING

In fall of 2016, before taking the helm, I learned that our revenue levels were not as high as we had earlier projected, and that our operational expenses would need to shift to accommodate the drop in revenue. We also had cultural challenges—morale was low, and although we worked well together on project teams, most people didn't have a broader understanding of where the firm was going or how they were individually contributing to its success. We focused primarily on projects, rather than on firm vision and direction.

One thing I have always loved about tvsdesign is that we are fairly small for the volume and wide variety of work we do globally. Having worked with our people on a daily basis, I already knew how talented and smart they are. If we could link that intelligence together toward a common goal, we could really impact the industry.

From the beginning, it was a priority to get people on board with the leadership transition and vision for success while simultaneously doing a deep dive assessment of the firm. Transparency about where we were financially, culturally and in the marketplace was critical, so I introduced a comprehensive snapshot of what was working and what wasn't, which ultimately led to the firm's two-year Refounding Plan.

The Firm Fitness Plan

The Refounding Plan was designed in two parts. 2017's Firm Fitness Plan was first and had five major goals: 1) break bad habits and replace them with healthy habits; 2) trim expenses; 3) build muscle through increased market share; 4) build accountability into the process to help us achieve our goals, and 5) reward good results.

The spirit of the Firm Fitness Plan was exactly what it sounds like. We needed to control our costs and increase our revenue. I listed daily priorities for leaders that addressed how to tighten up spending. I hired an outside operations consultant to take a deep look at everything from cultural issues to financials. I leaned hard on some outside consultants the firm already had in place. I also started looking for a CFO who could help shape some of those priorities. All of these steps grew out of understanding our cultural issues and our revenue performance.

To the firm-facing side, I spent my days talking to people and gathering information. I established leadership councils with both seasoned veterans of the industry and people with less than 10 years of experience. I also established a brand and culture committee. These groups provided perspectives from all over the firm that could help inform me on issues while we were also working toward a better financial position.

Trimming expenses had a serious impact on the firm. It made people nervous because they knew cuts were on the horizon. In the process of looking at focus areas, we ultimately closed our Chicago and Dubai offices in 2017, within the first six months of the fitness plan. Those were hard but necessary decisions, but when we made the announcement, people understood it within the context of what we were trying to achieve (i.e., firm fitness). Rather than just downsizing, we were pulling back to get to an area of strength so we could come out strong again after refounding.

As we progressed through the Firm Fitness Plan, the first goal—breaking bad habits and replacing with healthy habits—started to pair with #4, building accountability. We knew that people at all levels didn't feel empowered to help advance the firm. Also, there was little accountability for bad behavior, and people weren't rewarded for exceptionally good behavior either. In order to empower leaders and build accountability, we worked on creating absolute role clarity, compensation incentive plans and understanding about what we wanted to do collectively as a firm.

We also worked on building a healthy culture. We knew we needed healthy tension in our Firm Fitness Plan if we were

THE FIRM FITNESS PLAN

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- 2) trim expenses
- 3) build muscle through increased market share
- **4)** build accountability into the process to help us achieve our goals
- 5) reward good results.

THE INTENTIONAL SUCCESS PLAN

The Intentional Success Plan was developed in 2018, also with five major goals:

- 1) magnetic culture
- 2) impactful design
- 3) smart business
- **4)** radical relevance
- 5) irrepressible reach.

going to build muscle, which meant we needed to have the difficult conversations. We needed the right balance between the pull toward client service and the pull toward making a profit on that project. And being okay with a healthy tension allowed us to create a safe environment for people to express frustration and gave us a common language.

In 2017, we made a huge financial turnaround. The Firm Fitness Plan ended with positive financial results and a very good backlog going into 2018. We wanted to take this financial strength that we worked so hard for and get a framework in place to help us grow in the future.

The Intentional Success Plan

The Intentional Success Plan was developed in 2018, also with five major goals: 1) magnetic culture; 2) impactful design; 3) smart business; 4) radical relevance, and 5) irrepressible reach. Along the way, we worked toward some defining objectives and looked at metrics and measures. We knew that when we came out of the refounding, we would have developed a strategic plan for going forward.



Refounding is not for the faint of heart.

We looked at all of our resource areas of support. We asked ourselves, "How would founding a firm today be different from how it would have been founded 50 years ago?"

Needing to bolster our financial reporting and expertise, we hired a CFO for the first time in the firm's history to guide the financial model of the company. Having him on board has helped us understand how to leverage our money to grow the company.

We also looked at marketing. In 1968, you got clients by doing good work and building relationships, but that's not enough in today's digital world. So, we hired a director of marketing, branding, and PR who came from outside the industry and brought with him an entrepreneurial spirit. He has some fresh, new ideas about how we can engage in thought leadership and communication.

Another major growth opportunity was technology, which is key in our industry. However, the firm had not evolved in a way that allowed us to really partner with technology. It was just a tool we used, not a resource that we leveraged strategically. To address this, we hired a consultant, did a complete IT assessment, hired expertise, and founded a digital practice group.

And in January of 2019, we just kicked off our first year under our new Trailblazing plan.

Nothing's Set in Stone

Our new plan, Trailblazing, will allow us to be an evergreen company that is not about me or my name on the door or anyone else's. I feel like I'm the guardian of this smart firm with a framework that knows how to change over time and continue to thrive. It will help tvsdesign secure a greater leadership position in the industry.

During my first address to the firm as incoming president, I made seven commitments to them. I posted them on my wall, and at the end of every day, I would ask myself, "Have I done anything today to advance these commitments?" That helped me stay focused.

I was very transparent during the leadership transition process; I didn't know any other way to do it. I was driven by the deep conviction that we weren't making the most of the opportunities we had to have a greater impact in the industry. I wanted us to meet our full potential, and worked hard to make sure the firm shared this vision with clarity.

Refounding is not for the faint of heart. I wish I had known that if you're making the changes for the right reason, just go bold. It's all about communication, about making your plan for a purpose-driven company known. You just have to do the right thing, and that usually means some sort of change.

Fifty years is a long time to grow and change, and our adaptability and nimbleness is truly behind our longevity. We will have to keep our eye on the horizon and not get stuck on this really great framework that works. We don't ever want to be in a place where everything is set in stone. That's my challenge to myself now—to make sure that we don't get stuck on today's plan at the expense of tomorrow.

Janet Simpson is the president of tvsdesign, a commercial architecture and interiors firm in Atlanta, GA.

The Death of the Architecture Firm

This is the first of a two-part exploration of how today's architecture practices must transform to survive. Part Two focuses on issues related to people and culture.

THOM MCKAY

oday's architecture practices face existential change. Not only is the industry neck-deep in a massive consolidation, spurred largely by mergers and acquisitions,¹ but all the traditional challenges continue to stack up against long-term survival—from the creeping commodification of design services to the onslaught of automation and the unending search for talent and quality clients. Throw in a low-level expectation of an economic recession in 2019, and the next few years are shaping up to be a perfect storm of adversity.

While many practices manage through these tempests—which seem to be happening more frequently and with greater intensity—a few fail to navigate the turbulence, sinking into the oblivion of insolvency.² Some have even been swallowed whole by the lumbering behemoths of engineering conglomerates or global contractors, facing a range of new challenges to remain relevant in a brand-conscious, boutique-obsessed world.³ Is larger better? Is the traditional mid-sized practice slouching toward extinction?

Part of this shift may be the result of regular and predictable business cycles, especially in the United States, where the economy unfurls with the smooth consistency of a sine wave. Postwar America turned out what would become the country's stable of large practices (SOM, HOK, RTKL, etc.), most of which survived more than a few recessions as well as the shifting tectonics of multiple generations and ownership transitions. For the last 75 years, business needed architecture and design, it would seem, so architects and designers became better at business. But is this the case today? Does that smooth sine wave still exist in a world of economic volatility, climate change and shifting demographics?

One clear consequence of the industry's consolidation has been the rise of the *mega-firm*—a multi-disciplinary, diverse practice of 3,000+ professionals, a broad, global portfolio and a traditional leadership hierarchy. It is difficult to describe these companies in anything other than quantitative terms, and the various rankings in the industry trades are devoted to keeping score: revenue, headcount, square footage. These companies are large. They work all over the world. They specialize not in one or two typologies but in large, complex commissions that typically integrate multiple building types. Many also rely on acquisitive over organic growth.

But is this a positive, sustainable trajectory for the industry? Does it advance the practice of architecture in a way that benefits both the practice and the practitioner, or is it a more frictionless path to growth and shareholder enrichment? A convenient way to transition ownership?

These are pressing questions, and the answers are not clear just yet, but what does seem apparent is that a new type of structure needs to emerge—either because of the new demands of today's business or because of the prevalence of consolidations—though it remains to be seen where these new models will come from. Ditto that on the leadership front. Where are the leaders of tomorrow, and what skills will they need to blaze a new trail for the industry? For existing firms or newly integrated practices, it will be much more difficult to have any significant transformation accompanied by a new business model. Thus, it may be much more likely that players and paradigms from outside the A/E/C industry will disrupt the status quo with new business models, new initiatives, and new ideas.

Transformation: Survival or Latest Trend?

Business schools and management circles are abuzz these days with earnest study of transformation and the absolute need to reshape conventional processes and operations. Every week brings new announcements about strategies to go digital or disruptive and capture the next wave of consumers. How much of this is likely and true and how much is B-School rhetoric is yet to be revealed, but there is little doubt that A/E firms are up against some hard choices.

First off, let's define what we mean by transformation with respect to our industry. While breaking into a new market or acquiring a new service is always good business practice, it hardly sets a high bar or heralds a new era of disruption. Tomorrow's practices will need to re-calibrate almost everything about themselves—from their fee structures to their team structures to their business processes—in order to compete against more agile providers. So, at least on this front, transformation seems a righteous tack.



Today's architecture practices face existential change. Not only is the industry neck-deep in a massive consolidation, spurred largely by mergers and acquisitions, but all the traditional challenges continue to stack up against long-term survival.

In any business, there are three core aspects of transformation: financial, operational, and strategic. The financial element comprises the administrative infrastructure and metrics that a company values. The A/E world is largely a fee-for-service game, where clients pay for the hours a professional spends on a project, whether that be repetitive detail work or broadbrush, Big Idea concepting. Sure, there are some variations to this, but fee-for-service has been the status quo for decades and it seems unlikely to change anytime soon. And yet it must.

While most businesses approach financial transformation in quantitative terms—total shareholder results (TSR), EBITA, margin, or profitability—tomorrow's practice must be prepared to consider or at least experiment with new models. While this may mean exploring atypical revenue streams (data, consultancy, allied value-added services), it more likely will involve the replacement of time-based compensation with outcome-based rewards.

Slow to be embraced by architects, results-based fee models are gaining traction in other professional services because they more closely align the consultant's success to the client's success (and thereby mitigate some risk for the client). These models also rely on tangible metrics (a reduction of operating costs, a boost in sales, etc.) and typically drive rewards on the back end (hit these targets and you get a performance bonus).

On the *operational* front, the simple aim is to remove waste and inefficiency from current processes or identify new, more efficient ones. Many practices will trumpet their adoption of technology (BIM, Virtual Reality, and Artificial Intelligence) as proof of their transformative chops, but this is little more than using new tools to solve old problems; there is nothing transformative about it. Scott D. Anthony, an author and consultant who specializes in business transformation, explains: "Sure, costs will be lower, customer satisfaction might go up, but the essence of the company isn't changing in any material way. And, in a quickly changing world playing an old game better is simply insufficient."

Here, it would seem, size is the enemy. While we can debate what the future holds for the industry, it seems indisputable that *agility*—the ability to make strategic decisions quickly, mobilize effortlessly, and collaborate seamlessly—will be the hallmark. Those firms deploying cumbersome bureaucratic structures and matrixed gates of approvals will find themselves gradually left behind.

Which takes us to *Strategic* change, by far the most significant ... and the most difficult to plumb. For there to be lasting, tangible strategic transformation, the shift must be quantum, even alchemical in nature—from lead to gold. A car is a car

until someone suggests that maybe it ought to fly, and then it becomes something altogether different. Of course, the inherent risk tends to be greater, as does the internal resistance, but "executed successfully, strategic transformation reinvigorates a company's growth engine. Poor execution leads naysayers to pounce and complain that a company should have 'stuck to its knitting." 5

While all of this makes perfect sense, it neglects the two components that many architecture practices cherish most of all and typically consider among their core market differentiators—their *people* and their *culture*. How many of us have used the tired cliché that "people are our greatest asset" or tried to lure new talent because "our culture is collaborative and rich"?

Editor's Note: In Part Two, we'll take a closer look at how people and culture are inextricably linked, especially within a creative organization, and how this connection may be the path to tomorrow's successful practice.



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THREE CORE ASPECTS OF TRANSFORMATION

- 1) Financial: comprises the administrative infrastructure and metrics a company values. For professional services, it will likely involve the replacement of time-based compensation with outcome-based rewards.
- 2) Operational: with the simple aim to remove waste and inefficiency from current processes, or identify new, more efficient ones. Agility will be the hallmark.
- **3)** Strategic: the most significant change, but the most difficult to plumb. For lasting transformation, the shift must be quantum, even alchemical in nature.

Thom McKay has more than three decades of experience in the A/E/C industry and served as the Director of Global Marketing and Communications at CallisonRTKL. He currently consults with architecture practices, developing strategies for growth and new markets.

¹ Morrissey Goodale reports that 2018 M&A activity among U.S. A/E/C companies is up 26% and 17% globally.

² Swanke Hayden Connell Architects likely leads the pack but by no means stands alone.

³ Stantec and AECOM, perhaps the two most acquisitive organizations in the industry, have racked up more than 75 acquisitions since 2010, representing some \$7B in capital investment between them.

⁴ "What Do You Really Mean by Business 'Transformation'?" Scott D. Anthony, Harvard Business Review, February 29, 2016. ⁵ Ibid.

"BUT I ABSOLUTELY BELIEVE THAT ARCHITECTURE IS A SOCIAL ACTIVITY THAT HAS TO DO WITH SOME SORT OF COMMUNICATION OR PLACES OF INTERACTION, AND THAT TO CHANGE THE ENVIRONMENT IS TO CHANGE BEHAVIOUR."

Thom Mayne

Celebrating Success: 25 years of the Design Futures Council

Jonas Salk, creator of the polio vaccine and also my friend and collaborator, once said, "I feel that the greatest reward for a job well done is the opportunity to do more." We have taken this to heart with Design Futures Council, and I believe this mindset has been the reason for its success over the past 25 years.

JIM CRAMER

n the early 1990s, after 16 years at the AIA, I felt a desire to start my own firm that was both a publishing company and a management consultancy. I felt there were going to be disruptions in the A/E/C industry, and that architects should be the ones to anticipate and embrace the change. There seemed to be an extraordinary leadership moment for the profession on the horizon, coming from the people who were graduating from traditional architecture and engineering schools. These leaders were interested in providing solutions, not just designs, and some really extraordinary possibilities were about to unfold.



The original mission of the Design Futures
Council was to explore trends, changes
and new opportunities in design, architect,
engineering and building technology; to
conduct research to lead industry focus
groups; and to facilitate conferences on
topics related to value and added innovation,
strategic change and competitive fitness.

I first met Jonas Salk at an awards presentation that was given at the Kennedy Center in Washington, D.C., where he spoke about design, architecture, and the Salk Institute's mission. We came to understand that we were soulmates; we had much in common and we wanted to do many projects together in the future. This led to one of my committees meeting at the Salk Institute, which turned into one of our first think tanks that would ultimately be named the Design Futures Council. Jonas was really interested in improving the human condition, and he believed that design could do that, but he was also interested in technology, sustainability and business management. We believed we could intercept the future, anticipate and embrace change, and provide new solutions.

Even though he wasn't an architect, Jonas Salk was a patron and passionate believer in the mission of the DFC. He said there were better ways to satisfy architects, clients, and people living in cities, and that architecture would be designed for human use. When he talked about human use, he was really talking about an elevated new reality that could exceed expectations. And truly, there would be no Design Futures Council without Jonas Salk (and some others).

Over time, we were able to bring many people together who made vital contributions to the Design Futures Council. I was excited to continue to work directly with architects as kind of a cohort, raising the bar to make performance and speed a new reality. We could see trends that were changing, and we

began to track them with their metrics. We were so passionate about the DFC, its mission and what was happening that we would have done the work for free—in fact, most of our early initiatives were guided by volunteers.

During our fifth year, 3M company became a sponsor of the DFC, and Autodesk and CNA doubled their sponsorships. Steelcase continued to generously fund DFC think tanks, including the first summit on sustainability along with Interface Carpets. Georgia Institute of Technology and the University of Nebraska also joined us during this time as institutional affiliates. The professional partners of the DFC also included The Beck Group, Communication Arts, Frankel & Coleman (a design boutique firm in Chicago), Gensler, Perkins+Will, and Stubbins Associates. There wouldn't even be a Design Futures Council without the Salk Institute, Steelcase, the University of Nebraska, Autodesk, and Construction Market Data Group.

The original mission of the DFC

The original mission of the Design Futures Council—which I don't think we ever drifted away from—was to explore trends, changes and new opportunities in design, architect, engineering and building technology; to conduct research to lead industry focus groups; and to facilitate conferences on topics related to value and added innovation, strategic change and competitive fitness. Incidentally, when we talked about being competitive and competitive fitness, we were not trying to create a different competitive environment within the A/E/C industry; instead, we were trying to create ways that people could collaborate together to reach higher performance to, in turn, raise the bar in A/E/C and be of more value to our industry.

Over the years, when DFC members attended the think tanks, they always appreciated the genuine, sincere sharing among the members with the belief that we could create a new reality and improve performance. We challenged head-on all of the mythology in the profession, such as "architects are not respected by their clients," "architects' fees are not fair," or "architects don't make much money" or "they don't care about sustainability."

DESIGN FUTURES COUNCIL WAS FOUNDED ON SEVEN PRINCIPLES:

- 1) To serve as an authority on trends and forces;
- 2) To provide metrics and data along with opinion, explanation and analysis;
- 3) To publish;
- 4) To hold think tanks;
- 5) To do inclusive research and share it;
- 6) To show inspiring models of strategic plans;
- **7)** To network at world-class levels and be a global organization.

In 1994, the DFC was born of a joint vision of James P. Cramer and Dr. Jonas Salk. Originally focused on architecture's technical and social agenda, the DFC quickly evolved to explore the many ways in which design could improve society and the lives of people, and how design organizations can thrive in a changing landscape. Over time the DFC refined its focus to explore trends, the evolution of the design marketplace, and the business of design. Today, members span the full range of A/E/C, interiors and landscape, product manufacturing and real estate, and more.

It has been very affirming to see so many firms energetically participate in the mission of the Design Futures Council. Jonas Salk would say, "To raise the bar on new success, study the definitions of success today and build on that." We looked at the success models of the day and time in A/E/C, which led to our belief that the firm members and the university members would be top 20 percent caliber organizations, and that they were going to be the new inventors of the profession's



We looked at the success models of the day and time in A/E/C, which led to our belief that the firm members and the university members would be top 20 percent caliber organizations, and that they were going to be the new inventors of the profession's future. Most of the Design Futures Council's goals have been achieved, then reset at a higher level, then achieved, and then reset at a higher level.

future. Most of the Design Futures Council's goals have been achieved, then reset at a higher level, then achieved, and then reset at a higher level.

When I think about the mission of the Design Futures Council and what might lie ahead, I know it will continue to anticipate and embrace change, to bring the thought leadership around technology, sustainability and business management, and to define new ways to prove the value of design—how design can not only make the world a better place, but it can set us free to expand our definitions for what is possible in this human condition.

Jonas Salk believed the Design Futures Council would be relevant for many years to come. I believe that, too.

Editor's Note: 2019 marks the 25th Anniversary of the founding of the Design Futures Council. For 25 years, the DFC has been focused on the future of design and the design professions.

Jim Cramer is the co-founder and chairman emeritus of the Design Futures Council. He is the author of four books, including *Design Plus Enterprise: Seeking a New Reality in Architecture*. He is also the founding editor of *DesignIntelligence* and former CEO of the American Institute of Architects, Washington, D.C. He has retired from active practice, but spends part of his time writing and teaching at Georgia Institute of Technology.

A Vision for the Future

2019 is the 25th Anniversary of DesignIntelligence/Design Futures Council. To celebrate this milestone, we wanted to honor Jim Cramer, the organization's founder, and Dave Gilmore, the organization's president and CEO. In this piece, we're talking with Dave about what drew him to DesignIntelligence, how he got involved, his vision for the future, and some new initiatives.

DesignIntelligence (DI): What drew you to DesignIntelligence and the Design Futures Council?

Dave Gilmore (DG): I had attended several AIA events over the years. I was intrigued by the industry and all that the industry was trying to do, and I wanted more, but I couldn't get it through those events because they're just so big. I wanted something more meaningful.

I was interested in what the design community had to say about some of the world's biggest problems. Not design challenges per se, or even construction challenges, but social and global issues around economics, population, the environment, food scarcity and distribution. It seemed that DesignIntelligence published quite a bit about these things and convened their Design Futures Council as a rallying point for diverse thinkers to gather around ideas, possible solutions, and maybe start creating collaborative relationships, even among competitors.

DI: How did you get involved initially with DesignIntelligence and Design Futures Council?

DG: I began attending DFC leadership summits so that I could get the publications. These were intense events; they lasted a day and a half, and we were not just sitting in a seat

DESIGNINTELLIGENCE WITH DAVE GILMORE

listening to lectures. We were challenged at a table to deal with a problem together, and there was interaction—six or eight people arguing in a positive way through issues to find solutions. They were all C-suite executives—managing partners, chief operating officers, chief financial officers. That was in and of itself intriguing to me, because you usually don't find context where C-suite people roll up their sleeves collaboratively and work through problems. That resonated with me.

DI: How have you seen the organization grow and change over the years since you've been involved?

DG: Jim Cramer had been leading this organization for more than 20 years, and Jim, like me, is a road warrior. He put in thousands upon thousands of miles every year traveling the world for this. And he was looking to pass the baton. So we began to spend more time together, and it made sense.

Three and half years ago I was invited in and made an investment that would allow the organization to continue its work, its mission. I saw DesignIntelligence as a powerful organization, and its power was in its influence. I really felt it was under-optimized, because it was still a smaller voice in a very large industry. I had aspirations to make it a very loud, large voice in a large industry.

I would say that over the last three years, we've dramatically expanded the influence of DesignIntelligence by formalizing our focus. We've done that through creating four distinct yet interdependent entities, and we call them the Design Futures Council, which of course has always been in place. Then we formalized DesignIntelligence Research, DesignIntelligence Media, and DesignIntelligence Strategic Advisors. These four entities are very distinct but interdependent in how they serve the architecture/engineering/construction industry, affectionately referred to as A/E/C.



Our vision is perhaps audacious to some who would be reading this, but it is to become the most trusted source for insight, foresight, and advisory support across the A/E/C industry.

We are making inroads to move Design Futures Council's influence from a smaller elite group to a larger leadership group. We've increased our membership categories and the types of members. We've also expanded the membership categories beyond just architects to engineers and construction professionals, and we are moving into the building owner space and the developer space. In combination, I would say that today across our membership, we now represent more than 450,000 people across the U.S. in A/E/C. That's an exponential growth of representation. We established DesignIntelligence Australia, and it's growing at a rapid pace, and we've spent quite a bit of time in the UK with firms who have become members of the North American Design Futures Council. Canada is also home to several of our most prominent members, and we're honored to have their contributions and exceptional perspectives. So, the Design Futures Council has grown dramatically because we want to magnify the voice and the influence that goes through them. I am honored and humbled to stand on the foundation that Jim Cramer has built through DesignIntelligence and the Design Futures Council.

DI: How have you invested of yourself into the organization?

DG: It really has to do with this idea of significance. There's a book by Bob Buford called *Halftime*. Bob talks about how in the first half of our life, we strive for success, and we do everything we can to achieve whatever we define as success. When you finally achieve that success, you think, "Really? Is that it?" Then you start to look to the other side of life and decide you want your life to count for something. You want all of your effort to leave a legacy that's positive and good in a way that has merit to it.

As I got involved in DesignIntelligence, I found my place of significance. I've been very successful in my career in multiple dimensions. Yet careers come and go, and people can't remember the name of the guy who ran the company or made the great deal. People don't remember any of that "success." What people do remember is, did you change the world? Did you create relationships that were lasting and sustainable? Did you make a mark on God's earth that was really what you were supposed to do in the first place? So, I found that through DesignIntelligence, I now had a platform to make a significant mark on the world that would sustain and would be good for all. That's why I have put a ridiculous amount of time and effort into this. The last two years alone, I've flown more than 200,000 air miles each year, traveling the globe sharing everything that we have in order to raise the bar for the industry.

DI: How do you think DesignIntelligence can change the world?

DG: We gather leaders and people of consequence together at the Design Futures Council. When we're there, we have a collective mind around, "What are the real problems we're trying to solve? What are the authentic challenges that need to be met?" That collective mind is the first domino drop. The second is through our DI Research; we're able to dive into some of those major topics and peel them back to understand even deeper. From that, we apply insight that is life-changing. Through our media, we're able to get that word out and distribute it across a very large audience to make an influence in people's lives. So it's one thing to think about it, but it's another thing to write about it and to get it out to people.

Like almost everything in life, we can know a lot about something, but we don't particularly understand it. That's why we put DesignIntelligence Strategic Advisors in place, to come alongside the firms across the industry and say, "Here's how you apply this. Here's what it means to you, to your clients, and to your community. Here's how you deal with any one topic of this large inventory of problems and solutions." So by combination, those four things create not a pebble in a pond, but a boulder in the pond to splash across the industry of influence.

DI: What is your vision for DesignIntelligence and Design Futures Council moving forward?

DG: Our vision is perhaps audacious to some who would be reading this, but it is to become the most trusted source for insight, foresight, and advisory support across the A/E/C industry. That doesn't mean we have all the answers. But our voice, through those combined and interdependent entities I just described, creates a compelling force of influence. We want to continue to expand our reach of influence so the industry can not only be better in and of itself, but the output of the industry, which is the built and lived-in environment of humanity, can change and be better.

DI: Can you tell us about any upcoming key initiatives?

DG: We have three pretty big initiatives in the process of being developed and released in the coming days. The first is the Design Futures Institute. This is a nonprofit organization that will be funded through the industry and matched by other large foundations to have a bearing on how legislatures and regulators approach and conclude on the direction for the built environment when it comes to environmental responsibility. The Design Futures Institute will take on many different facets, but it is intended to become a cross-organizational, cross-industry vehicle for the passage of environmentally responsible legislation. Measurable legislation can change how we've been dealing with the world's environment without being repressive or oppressive to business.

The second initiative that will roll out this spring is a new application—it's a software app called "Design Schools 4U."

The app is a new way to match students to their best fit architecture and design schools. It is built on an algorithm (like an advanced dating app) that allows a student user to input both the objective factors and the subjective factors—like the emotion that motivates a student around the selection of a school—that are important to him or her. It creates an alignment of those emotions with the cultural and emotional dynamic of the school, along with all of the objective factors, like tuition, class size, and certifications. We're very excited about 4U because we believe it will be the most effective place for candidate students to find the right fit for them optimally.

The third initiative is what we're calling "Catalyst for Reinvention." The A/E/C industry is broken but it doesn't need to remain that way. It can change, and it will require wholesale reinvention—for example, in the way our contracts are put together, the way our teams are assembled and oriented, the way we think about procurement and supply chains, the way we think about the manufacturing and design process, and more. DesignIntelligence is launching into 2019 and 2020 to be a catalyst for reinvention through our thought leadership and influence. We're excited to see what that will yield in the coming years.

The role and vision of DesignIntelligence is to partner with A/E/C, to come alongside firms, universities, organizations, owners—all who are involved in this amazing industry that has so much influence around the globe and frankly, has so much to give. When we are postured with our arms wide and our hands open, we are ready to both give and receive. The posture of DesignIntelligence is to give everything it's got to see and foster a better world. But it's also poised to receive the perspectives and input from others and that allows what we give to be even better. It is the professional structure of our firm—every one of us stands with arms open. We invite other influencers in the industry to talk with us in this open dynamic. Through that, we can literally change the industry ... and the world.

Dave Gilmore is the president & CEO of DesignIntelligence.

GLOBAL INSIGHTS

"Modernise or Die"—A Look at the Future of the Construction Industry, Part 2

David Ronksley—managing director of C2R Consulting (a DFC Australia member firm)—talked with Mark Farmer, founding director and CEO of Cast Consultancy, about the future of construction. This is part two in a two-part series.

DAVID RONKSLEY WITH MARK FARMER

David Ronksley (DR): So, to go back to the offsite construction challenge, what remains the biggest barrier?

Mark Farmer (MF): There are various barriers in my world of residential. You have to bear in mind the difference between doing prefabricated hospitals or schools compared to homes. With homes, the end consumer is the general public, not the government. If they're renting it, then it may be less sensitive, but if they're buying it there is a perception issue. Does a "prefab" equal temporary? Does it equal low quality? Can I get a mortgage? And so on.

I think this is becoming less and less of an issue, as the energy efficiency credentials and general quality improves together with a functioning mortgage market in the UK. The biggest barrier, in my opinion, is within the industry.



It's an important point that we don't just do things differently in isolation—we also need to share with the industry so that people can learn from it.

It's the perceptions and the prejudices. Sometimes there is the baggage of bad experiences for clients who may have used manufactured construction 15 or 20 years ago. It's also an issue to overcome vested interests that do not want to change because they see a threat. There's also an element within the industry about a lack of education. People just don't understand what manufactured construction really means. They default to perhaps images from 1970s or 80s prefabs, and they just don't know what's out there now.

To help overcome those barriers, a few people within the industry need to demonstrate what 21st-century manufacturing looks like. That is beginning to happen, and we're seeing real life jobs with the latest advanced platforms opening up.

It's an important point that we don't just do things differently in isolation—we also need to share with the industry so that people can learn from it. Many people are videoing (and posting to YouTube) how technology is used throughout a whole process. Some manufacturing businesses are videoing the whole onsite install process and are using it as a promotion tool. They're using technology as a means of connecting with a wider audience, and that could be transformative.

DR: Are you experiencing any industrial relations issues in the UK?

MF: We have vested interest trade bodies in the UK, but not powerful unions as such. With the unionization piece, you need to go on a journey, and from what I understand, this has happened in New York. There have been discussions about how this is not about replacing work, it's about reskilling people. Some of the things we do onsite will be different in terms of precision working—for example, working to tighter tolerances, etc. Also, it becomes more palatable when the factory might be close to or even adjacent to the site, so the manufacturing employment is actually in the location where the building is being built and you're not displacing employment to 250 miles away. That has become a bit of an issue where there is devolved or state government. We're moving toward devolution in UK—for example, London has its own elected mayor with his own powers. There has also been an interesting debate as to whether using modular manufactured housing in London seems a threat to London jobs because they might be built in Birmingham, Manchester, Leeds, or Liverpool. But what has actually happened is mature, healthy debate about realizing that London doesn't have enough construction workers to deliver the work anyway.

To deliver our buildings, we need these approaches. It's not going to put people out of work; it's just supporting the process. So, we need the people we already have to continue doing what they're doing traditionally, but we also need these new ways and new skills. It takes a bit of time for that to land as a concept.



If you're weather dependent through building traditionally, it becomes a point of economic significance at a macro country level.

This, again, is the benefits case for offsite construction in that dependency on the weather is removed.

DR: With respect to offsite construction increasing productivity, are there examples where the ability for the weather to adversely impact the construction program has been reduced?

MK: In February (2018) in the UK, we had a very bad spell of weather, the so called "beast of the east." It brought freezing temperatures, blizzards, then torrential rain. Our national statistics for construction output clearly showed the impact of that cold wave. For the whole of the UK there's a big hole in output during that period. This just goes to show that if you're weather dependent through building traditionally, it becomes a point of economic significance at a macro country level. This, again, is the benefits case for offsite construction in that dependency on the weather is removed.

DR: Are there concerns that architectural design creativity is constrained in an offsite solution?

MF: There's an interesting discussion going on in the UK. The current president of the RIBA is the chairman of an architectural practice that does a lot of modular construction, so he's been good at promoting the debate amongst a lot of sceptics. He's trying to say, "Why would we want to keep redesigning the plant rooms or the staircase or the lift shaft or that corridor area? Why aren't we concentrating on what makes buildings beautiful, like facades, the public realm, etc.?" He's absolutely right and that's what platform-based design may be able to do if it is done well. It's fair to say there is still a little bit of a divergence of opinion.

To optimise the effectiveness of this approach, we still have to address the design process. If an architect designs something unique, the modular solution to fit the design has to be reverse engineered. So, it comes down to the application of DfMA (Design for Manufacture & Assembly) which has to start at the outset (not the usual way, in which a developer gives a brief to an architect with a blank canvas to get a planning consent or a permit, and then working out retrospectively how you might apply modular manufacturing).

DR: In NSW, we are seeing a number of government agencies, particularly the Department of Education, embracing new

delivery methodologies and driving the market to respond. Are you seeing similar approaches in the UK?

MF: Yes, it's a real opportunity and government procurement teams are going to have to take responsibility for driving this change. It links to the announcement that was made by the UK Chancellor that the Department for Health, Department for Education, the Ministry of Defence, the Ministry of Justice and the Department for Transport—five of the largest spending government departments in the UK—have been told they will use modern construction delivery methodology by 2019 ... or show why they're not.

The government is making a presumption in favour of modern construction, including offsite. Public procurers will therefore have to abandon any personal prejudices and rethink how they procure. This initiative has to be led by quality, so any concern people have that this will lead to poor quality buildings has to be proven to not be the case. So, the design and manufacturing platforms that come forward in response to this government initiative have to be robust because if they're not, it will just play into the hands of the naysayers.

Productivity and efficiency through a manufacturing process have to go hand in hand with high quality outcomes. This requires long-term investment in building an effective and competitive supply chain rather than simply commodity-procuring modules from competing manufacturers.

DR: This comes back to one of your earlier points. There's a wonderful quote from [a recent] SALUS European Healthcare Design conference where an architect from a development organisation said, "As all of us architects know, Form follows Finance."

It is a signal that this is getting traction when the private sector is doing it and the cash is following it. That's probably the acid test of whether this is a better delivery methodology.

MF: Yes, I think so. That's why I referenced the private equity money because it's a good barometer. There are some very

intelligent people investing their scarce resources into this market approach. I made the point that this is still housingled because it's a fundamentally under-supplied asset class in the UK and in many other countries, and delivering it better and at a lower price is the Holy Grail.



Productivity and efficiency through a manufacturing process have to go hand in hand with high quality outcomes. This requires long-term investment in building an effective and competitive supply chain rather than simply commodity-procuring modules from competing manufacturers.

If funders see manufactured housing as the way forward, then that has to tell us something about the fact that we should follow the money. It's an interesting lead indicator of where the sentiment might be shifting. We still need some of these to launch and to deliver hundreds of homes at a time for people to go and see them, for it to be in the media and in peoples' wider consciousness.

I think we are now in that cycle of doing that in the UK. There are at least two new technology-led ventures in the UK that are capable of completely transforming people's views of what offsite manufactured homes look like. We need them to be out there front and centre. We need them to be on the news. We need them to be in the papers.

Mark Farmer is founding director and CEO of Cast Consultancy and the author/researcher of *Modernise* or Die: The Farmer Review of the UK Construction Labour Model.

David Ronksley is managing director of C2R Consulting.

"WHEN SUSTAINABILITY
IS VIEWED AS BEING A
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Cameron Sinclair

Playing Catch Up

Foreword: In November 2018, one of Australia's leading offsite manufacturers in the residential market, Strongbuild, went into voluntary administration. In response, DFC Australia Managing Director Alexia Lidas shares her thoughts on the status of innovation in the market.

ALEXIA LIDAS

esearching and sharing, listening and learning from colleagues over coffee: that's how I spend a lot of my time as managing director of the Design Futures Council (DFC) Australia. My role is to understand the market position and perception, and to forecast future trends and issues for the benefit of our members in the A/E/C. At times, I'm both excited and distressed by what I'm learning.

As one of the largest sectors in the global economy, our industry could be leading the world in innovation but instead, we just continue with the status quo. Not only have we become one of the slowest to innovate, our sector is also one of the most expensive and least productive when it comes to delivery.

Strangely, in an industry with a currency of risk management, we seem to have forgotten what true risk is: the willingness to step outside of the traditional supply chain and try something new.

Business as usual is not risky. Business as usual is the root cause of our sector's inflated delivery costs, glacial pace, and general lack of innovation.

Last November, I was discussing with DFC Members Fleetwood Australia my impression of the national state of play in offsite manufacturing (OSM) within the construction industry. I said to them, "This is actually an issue of national importance to the economy. There is no question if offsite manufacturing will grow. It is a matter of when and whether our local market will be able to provide a leading-edge response." Then, just two hours later, I received news that Strongbuild had gone into voluntary administration. Voluntary administration is similar to bankruptcy in the United States. An insolvent company is handed over, in this case voluntarily, by its directors to an outside administrator to study all the options and make a recommendation to the creditors about the company's future.

Regardless of the outcome for Strongbuild, the fact that they had to enter into administration at all just proves my point: our industry must step out of the status quo and into innovation. OSM is an excellent place to start but not everyone sees the need or potential in pursuing it.

While our nation has a major housing supply and affordability problem which OSM could effectively address, millions have been poured into propping up the dying automotive industry instead. Of the \$47.5 million Advanced Manufacturing Growth Fund, \$10 million was awarded to the Automotive Innovation Labs program. This award makes no sense, given the costs of labour in Australia and of shipping materials. Even more frustrating is the fact that the skills of most automotive workers are transferable to OSM. It doesn't take long to connect the dots, does it?

While our nation has great homegrown firms in OSM, they require a very large volume of sales to provide the financial backing needed to become internationally competitive and to take their technology to the next level: robotics.

Yet, a significant amount of the total Advanced Manufacturing Growth Fund was given to smaller firms in the form of grants of \$100,000 – \$400,000. For larger firms, the maximum grant available was \$1 million—just a drop in the ocean when we are talking about advanced manufacturing.

Worse, not one of the awarded grants went to advanced manufacturing in construction/OSM. While I believe in opportunities for all and the importance of small firm involvement, I worry whether this funding will have any real impact.

The inadequate funding support seems to indicate a lack of understanding about ...

- the real cost of R&D and the backing needed to truly innovate in advanced manufacturing;
- the current status of the (construction) OSM market in Australia;
- the importance of leveraging partnerships with current players in the market to address a real issue—our national housing supply and affordability crisis.

In addition to inadequate funding for OSM innovation, we have to deal with the fact that our industry works in silos. The benefits of OSM are typically lost in silos, however, where dividends are fully realized within vertically integrated business models that embrace it from end to end (design to manufacture to onsite construction).

The world is rapidly changing and so is OSM. Australia is going to fall behind if our industry does not come on board. To develop our OSM capability and see the technology mature, we need to create projects—in fact, whole communities—that these firms can service. We need to give them the volume of work and funding needed to take OSM innovation to the next level.

In addition, to innovate in this rapidly-changing world, our attitudes around competition have to change. There is more incentive than ever to share the risks and learn collaboratively across our industry. We need multiple players within OSM, all of them supporting and learning from one another. They also

need to educate the marketplace: if clients don't understand something, they won't buy it.

Economics drives manufacturing like most everything else. If a product can be made at a lower cost with higher quality using safe, sustainable methods, it's only a matter of time before it will be. Doesn't our nation want to be part of that?

The A/E/C industry has a long way to go to catch up. Let's speed up the process and work together to better serve our clients, our nation, and our world.

KEY FACTS FROM DFC AUSTRALIA RESEARCH

The Design Futures Council Australia's recent research shows:

60%

of the Australian A/E/C community think that firm leaders are not doing enough to innovate.

62.75%

are not concerned about automation of services

21.57%

are somewhat concerned

15.69%

are concerned

Alexia Lidas is managing director of Design Futures Council Australia. The Design Futures Council (DFC) is a global DesignIntelligence gathering of development, architecture, design, engineering, construction, product, and technology leaders who explore global trends, challenges, and opportunities to advance innovation and shape the future of architecture, engineering, construction (A/E/C) and design.



Methodology

Since 2008, DI Research in conjunction with the Design Futures Council has reached out to leaders in the architecture and design industry to gauge firms' outlook for business as the year ends and thoughts are focused on the future.

The 2019 foresight research project collected data from firms who were invited to participate in the project. The data was collected electronically during a four-week period from December 2018 to January 2019.

Data was self-reported. Firms were asked to report on their top challenges, risks, and opportunities for the coming year, as well as the health of their business overall. They were also asked to identify the market segments in which they operate along with the anticipated health of those segments for 2019. Additionally, they provided business advice for leaders operating firms in architecture and design.

The survey tool used a combination of quantitative and qualitative questions, which allowed a deeper look specifically at the challenges and opportunities facing firms in 2019 and thoughts on business advice for other firms operating in the same space. Qualitative data was classified according to categories agreed upon by the DI Research team.

Only A/E/C firms—or firms operating within the space—with at least 50 employees were included in our research, as firms of this size typically do business in more than one geographic region or market segment, thereby dictating a broader perspective of the overall economic landscape.

A total of 86 U.S. firms met this criterion and qualified for inclusion in this particular study.

For additional benchmarking questions, contact DI research:

Mary Pereboom mpereboom@di.net

Looking Ahead at the Future of Architecture, Engineering and Construction

Since 2008, DI Research has surveyed leaders in the A/E/C industry about their outlook on business as one year closes and the next one begins. The DesignIntelligence 2019 Foresight Survey is both a looking back and a looking forward to the future of the A/E/C world. This context of the perspective of the past from the position of the present can give us insights into the future.

DESIGNINTELLIGENCE

oresight is defined in the dictionary as "the act of looking forward." While we can't know or predict the future, it shouldn't keep us from trying to see around the curve.

Organizations that will be successful in 2019 are those that are open to possibilities. Those who see opportunities within the challenges and risks they face. Those who have their finger on the pulse of the market. Those who lead with foresight. Even in a time of uneasiness such as we are experiencing—What's going to happen in U.S. politics? What's going to happen in the economy? What's going to happen in global or regional market segments?—leaders can still steer their organizations through in order to not just survive, but to thrive.

Many leaders who responded to the survey expressed a wariness about the possibility of a recession in 2019, and many of them are carefully using the time to do all they can to position their firms to weather the storm. They do expect more flux, more uncertainty, more economic and geopolitical shifts. Looking at the hard-won lessons of the past, their caution is understandable.

Even though there is spreading anxiety and uncertainty in the global equity markets, with slowing growth globally (except

for the U.S. economy, which as of this writing is still strong), backlogs appear to be healthy. We asked firm leaders to rate the health of their current backlog compared to last year's backlog (the period from December 2017 – January 2018 compared to December 2018 – January 2019). Sixty-nine percent of respondents indicated that their backlog was either significantly stronger or somewhat stronger over that period.

And yet, when backlogs are compared 2018 vs. 2019, 45 percent of leaders who responded said their backlogs would experience no change by the end of 2019. Twenty-three percent said their backlogs would be either significantly or somewhat stronger.

COMPARING BACKLOGS 2018 VS. 2019

23%

OF LEADERS SAY THEIR BACKLOGS WILL BE STRONGER 45%

OF LEADERS SAY THEIR BACKLOGS WILL HAVE NO CHANGE When we asked leaders about their top three greatest challenges for 2019, unsurprisingly talent was at the top of the list at 87 percent (vs. 82 percent in the 2017 survey). Within the talent category, the responses clustered around: Recruitment & Acquisition (44 percent); Retention (32 percent); Talent Management (11 percent); Growth & Development (10 percent); and Project Staffing (3 percent).

Strategic planning and execution is another top challenge for 48 percent of respondents (compared to 29 percent in the 2017 survey). Some of the comments from firm leaders included: "Reshaping the firm to meet the changing professional landscape"; "Transitioning to the firm's new strategic plan"; and "Driving performance from a change-based to a practice-based model"—all of these and more were listed as concerns under the top challenge of strategic planning and execution.

Firm leaders were asked about top opportunities for their firm in 2019. The top four responses were "Growth/expansion" (79 percent); "Strategy/business development" (41 percent); "Talent/talent development" and "Innovation/technology" (tied at 36 percent). Growth/expansion seems to be on everyone's mind with geographic (i.e., international, regional, state) and market sector expansion indicating the focus of the growth.

The top three risks that firm leaders indicated for 2019 were: "Political/Economic Uncertainty" (91 percent of respondents); "Talent" (67 percent of respondents); and "Strategic Planning/Leadership" (24 percent of respondents). Specifically mentioned in the comments were tariffs, geopolitical/international uncertainty and political uncertainty within the U.S., and recession. Dave Gilmore, writing in *Vantage* (our monthly geopolitical report for A/E/C) says: "geopolitical and geo-economic risks are deepening across the globe," and that the tension between the globalization of the world economy and the growing nationalism of world politics is a deepening risk. Added to that were strained relationships in 2018 between many of the world's powers related to trade and investment, as well as the growing nationalism in many countries. "2019 is the year for Design Futures Council

"Organizations that will be successful in 2019 are those that are open to possibilities. Those who see opportunities within the challenges and risks they face. Those who have their finger on the pulse of the market. Those who lead with foresight."

DFC GRADUATE PRESENTATION PROGRAM

Eighty-seven percent of respondents said talent is the number one challenge for the firm in 2019. In the 2017 survey, 82 percent of respondents indicated talent as their number one challenge. We want you to know that we have heard you. Three years ago, DesignIntelligence, along with the Design Futures Council, initiated a service to colleges and firms that helps bridge the talent gap between graduating students and the design professions: Graduate Presentation Program (GPP). The program helps identify and connect the top graduating students from architecture, landscape architecture, and interior design with hiring managers and leadership at the top 300 firms. The program includes undergraduate and graduate students. This year, we are releasing the DFC GPP Scholars to you in early April in an electronic book called The Book of DFC Scholars. We hope this shortens your path to finding the best of the best of talent.

THE WAR FOR TALENT

As we all know, there is a significant shortage of qualified talent in our industry today. From a dearth of graduates who are even interested in going into the field, to qualified talent not entering the professions, to retention and engagement of current employees and more, there are far more position openings than people to fill them. While the war for talent and the shortage of talent is real and doesn't show many signs of abating, there are steps leaders can take to achieve results. A recent study—"High-Impact Talent Acquisition"—by Robin Erickson, VP of Talent Acquisition at Deloitte, has uncovered how successful companies acquire talent. The first area where employers can take positive action is to treat current employees well. While this may seem like common sense, many companies don't have a plan in place to show their employees that they matter. The second area where employers can take positive action is to create a strong employment brand. Third is to let technology work for you to sharpen the talent acquisition function. And finally, redefine the skills you want in a candidate.

Source: Industry Week; Oct. 10, 2018

member firms to build committed backlog, lose any unnecessary weight, and focus on resilience strategies that ensure sustainability," writes Gilmore.

Our 2019 Foresight Survey rounds out with questions about the geographic regions that look strongest for growth and the health of market segments. We asked firm leaders to rate the anticipated health for each segment in which they do business for 2019.

And finally, we asked firm leaders to share advice with other firm leaders in an organization like theirs. Admittedly, we asked ourselves why a firm leader might be willing to do this. But the collection of advice we received was rich and generous.

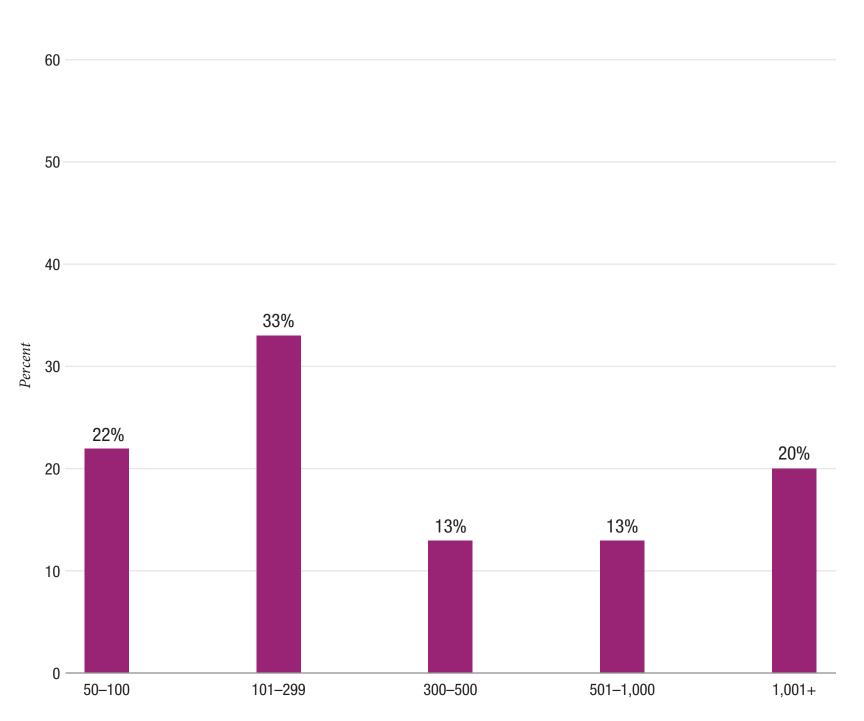
Indeed, a leader is "one who knows the way, goes the way, and shows the way" (John C. Maxwell). And leadership is about seeing things as they are and then looking out to what could be—and then taking the steps and actions to get where you want to go. The challenges, risks and opportunities associated with our rapidly changing industry and our rapidly changing world are common to every professional practice, here and around the globe.

As leaders, we must be forward thinking, big picture visionaries who are both agile and strategic. As we keep an eye on all that is going on around us, let's put in place the actions we need to take to drive the change the world needs.

The DesignIntelligence 2019 Foresight Survey Report is available in its entirety on *di-publications.com*.

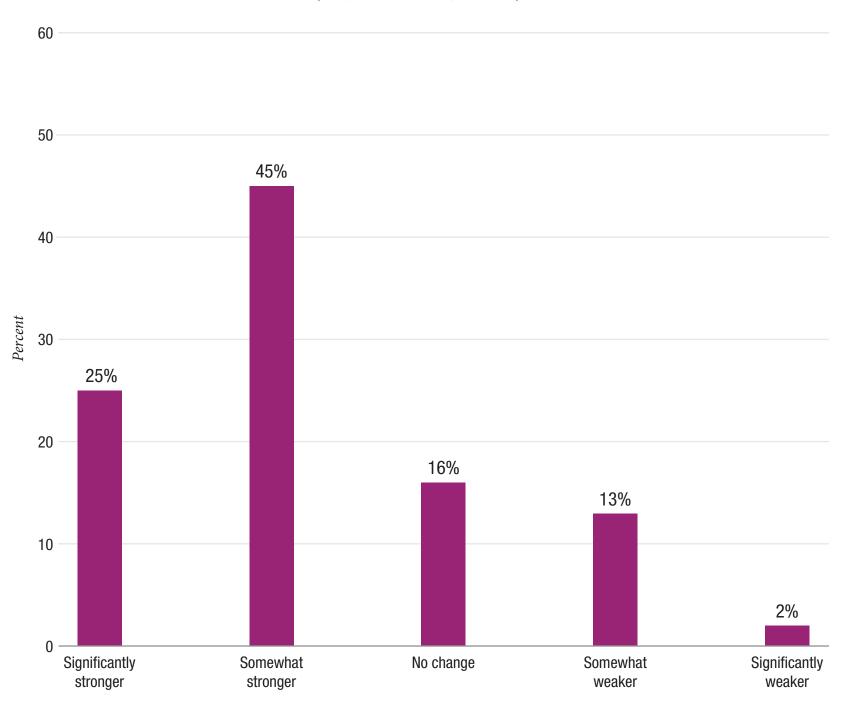
"Even though there is spreading anxiety and uncertainty in the global equity markets, with slowing growth globally (except for the U.S. economy, which as of this writing is still strong), backlogs appear to be healthy."

Firm leaders were asked how many full-time employees are in their firm.

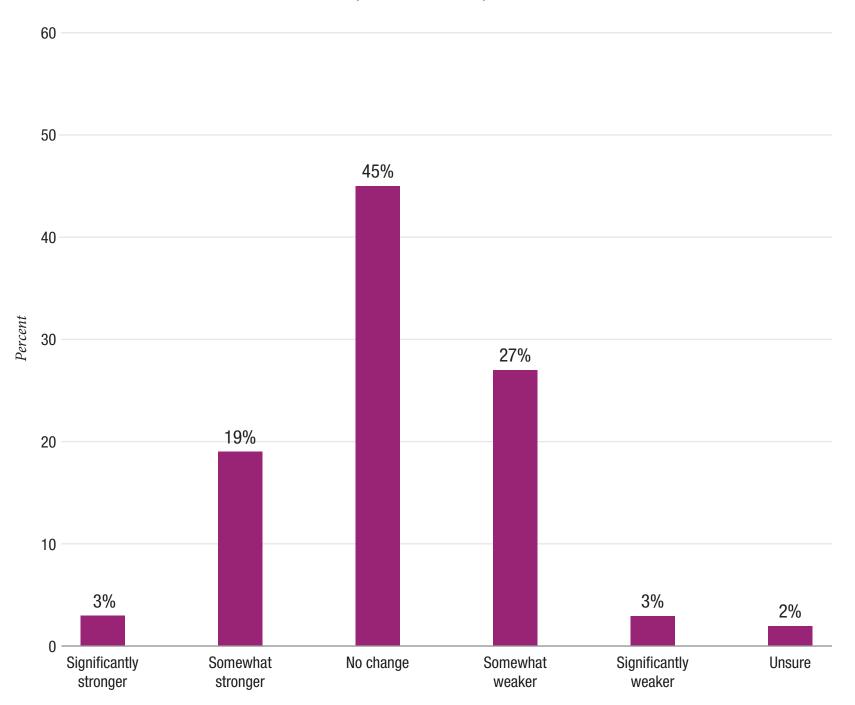


HEALTH OF CURRENT BACKLOG

Firm leaders were asked to rate the health of their firm's current backlog compared to the same time last year (12/2017 – 1/2018).

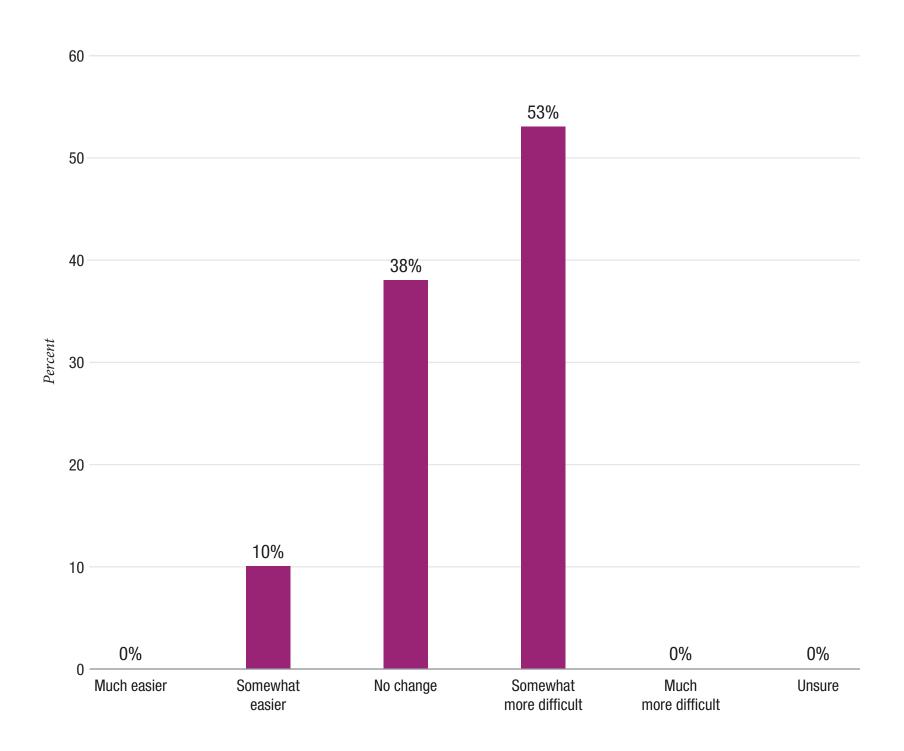


Firm leaders were asked to think ahead to this time next year and estimate the future health of their firm's backlog (end of 2019).



OVERALL BUSINESS ENVIRONMENT

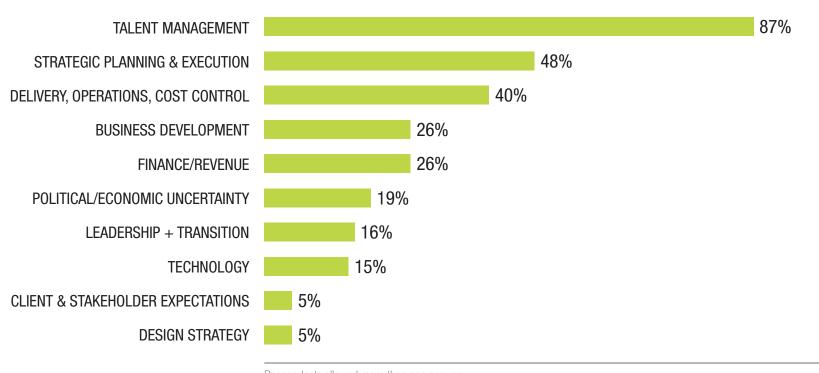
Firm leaders were asked how they think the overall business environment for A/E/C in 2019 will compare to that of 2018.



TOP CHALLENGES FOR A/E/C FIRMS IN 2019

Firm leaders were asked to articulate what they foresaw as the top three challenges for their firm in 2019.

Responses regarding top challenges fell into ten primary themes.



Respondents allowed more than one answer.

DI INSIGHT

Responses regarding top challenges fell into ten primary themes, with these topping the list: talent management; strategic planning and execution; delivery/operations/cost control; business development; and finance/revenue. The fact that 87 percent of respondents indicated one of their top three concerns as talent management cannot be overlooked. Whereas some industries may be slower to recognize that talent management is not just a function of the human resources department,

A/E/C leaders recognize the strategic value of their human capital. The term talent management has a strategic implication that permeates throughout the organization. Developing an organization-wide strategy to determine the current and future core competencies needed is necessary to maintain or grow the business. Such a strategic plan to attract, maintain, develop and retain talent flows out of knowing where your organization is headed and the talent you need to get there.

The Knowledge You Need for the Decisions That Matter

Whether your firm is looking to expand into new geographies, better understand the needs of your clients and markets, establish the right compensation packages to retain key leaders, or understand how to evolve the direction of the enterprise, having information can

make the difference between an effective choice and missing the mark. Since 1994, DesignIntelligence has developed the expertise and extensive network of sources to help you find clarity regarding opportunities, risks and actions.



For more information, contact us at 678.785.3350



Notable Quotes Alvar Aalto

"I do not write, I build."

"God created paper for the purpose of drawing architecture on it. Everything else is, at least for me, an abuse of paper."

"Form must have a content, and that content must be linked with nature."

"Architecture is not merely national but clearly has local ties in that it is rooted in the earth."

"Architecture belongs to culture, not to civilization."

IN THE NEWS

Here, in this space, DesignIntelligence wants to honor our Design Futures Council members—for their accomplishments, their notables, their awards. Send us your good news! Help us to shine a spotlight on all of the good you're doing in the world.



HOK

HOK earned the No. 3 spot on *Fast Company's* 2019 most innovative architecture firms list "for embracing parametric modeling to build the unbuildable, like the Atlanta airport's canopies." For the Hartsfield-Jackson Atlanta International Airport, HOK designed two 900-foot-long, translucent canopies over a terminal to shield passengers from inclement weather. *www.hok.com*





DAN NOBLE/HKS

In March, Dan Noble and HKS, Inc. won *D CEO's* 2019 Commercial Real Estate Award for Excellence in Architecture and Design. *www.dmagazine.com*



MAGNUSSON KLEMENCIC

Structural + Civil Engineers

RON KLEMENCIC/MKA

150 North Riverside in Chicago was recently awarded the 2019 Outstanding Civil Engineering Achievement (OCEA) Award, a top honor presented by the American Society of Civil Engineers (ASCE) at their annual OPAL Gala in Arlington, Virginia. Accepting the award from MKA was Chairman and CEO Ron Klemencic, Rob Chmielowski, and Dave Eckmann—joined by Jim Goettsch from Goettsch Partners and Chris Phares of Clark Construction. Ron Klemencic was also presented with the OPAL Award for Design by ASCE. www.mka.com



SafdieArchitects

MOSHE SAFDIE

The International Wolf Foundation jury committee in architecture has decided unanimously to award the 2019 Wolf Prize in Architecture to the architect Moshe Safdie for a career motivated by the social concerns of architecture and formal experimentation. www.safdiearchitects.com



Image credit: Haaretz-AP



UNIVERSITY OF NEBRASKA-LINCOLN, COLLEGE OF ARCHITECTURE

Professor Jeffrey L. Day, AIA from the University of Nebraska's College of Architecture and his student design team were honored with a citation in the 66th Annual Progressive Architecture Awards from *Architecture Magazine*. Day's FACT design/build studio project titled "The Grocery" was one of 10 selected from over 200 submissions. Annually the magazine selects projects that were fully fleshed-out and developed, but not yet realized in physical form for the P/A Awards in an effort to highlight the up and coming design trends. www.architecture.unl.edu



WALTER P MOORE

WALTER P MOORE

Walter P Moore scores an *Engineering News Record* "Best of the Best" Award for Best Airport/Transit for Orlando International Airport South Automated People Mover (APM) Complex. This is ENR's highest project honor. Walter P Moore served as the structural engineer for the project. www.walterpmoore.com





Council 2019 Leadership Summit Events

Each year the Design Futures Council gathers together around a series of essential themes ruddering the A/E/C industry. The gatherings are always titled as Leadership Summits or Forums. Each gathering is attended by leaders from property development, architecture, design, engineering, construction, finance, banking, building product manufacturing, academia, and more. The overarching goals for these exchanges are:

- relational connectedness among attendees,
- · challenging the status quo of design and delivery,
- presentation of thought-leading content that alters perspectives,
- staging the questions every industry leader should be asking,
- · and more.

The schedule of DFC events for 2019 is:

Leadership Summit on Design Education & Talent Strategies

June 24–25 (University of Cincinnati) - We frequently hear from firms that talent is one of the number one challenges they face. At this DFC Summit, we will discuss past approaches, present trends and future requirements that are facing design educators, all from the perspective of the academy and professional firms.

Leadership Summit on Environmental & Social Responsibility

September 9–10 (Minneapolis, MN) - As the Design Futures Council stands at the intersection of the A/E/C industry and environmental and social responsibility, we bring together great minds to explore and exchange ideas in hopes of breakthroughs that will literally change the world. The Leadership Summit on Environmental & Social Responsibility is a call to action for A/E/C to take the lead to measurable environmental sustainability as well as looking at the economics of it all.

International Leadership Summit on A/E/C Accelerated Convergence

October 15–17 (London, UK) - At the International Leadership Summit on A/E/C Accelerated Convergence, we will look at how the industry and professions are moving toward each other and exhibiting crossover—of skills, of ideas, of processes, and creating greater value for the built environment and the world.

Leadership Summit on the Business of Design

November 11–12 (Boston, MA) - Each year, the Design Futures Council convenes senior executives from across A/E/C to explore essential issues of strategic importance to running a better business.



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AS OF MARCH 2019















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Design Futures Council – 25th Anniversary (1994 – 2019) Founded in 1994 by James P. Cramer and Dr. Jonas Salk Engaging Leaders with One Another and the Future





















Design Futures Council Leadership Summit on Design Education & Talent Strategies

Design Futures Council

a DesignIntelligence initiative

JOIN US: June 24-25, 2019 University of Cincinnati

REGISTER HERE.



 Q_{2019}

Playing Catch Up

DesignIntelligence Quarterly	
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ALEXIA LIDAS

The Way of Authentic Leadership - Part I	DAVE GILMORE
The Influencer Mindset Growing Relevance in the Face of Change, Challenge and Opportunity	BOB FISHER
Increasing Industry Vitality Through Innovation	RAY DADDAZIO
The Evolution and Future of Immersive, Real-Time Technologies	JOEL PENNINGTON
Sustainable Design: A Worthy Investment	JESSE DEVITTE
Searching for Connections-For the Future "of Education/Practice Partnerships	TROY THOMPSON & DAVID FERGUSON
The Transactive Network: Supporting New Building Paradigm	DR. NORA WANG
On Climate Change and Hope: Despite rising carbon dioxide emissions, we can still tackle global warming	RIVES TAYLOR & BRENDEN JACKSON
DFC FIRM HIGHLIGHTS: The New tvsdesign	JANET SIMPSON
The Death of the Architecture Firm	THOM MCKAY
Celebrating Success: 25 years of the Design Futures Council	JIM CRAMER
A Vision for the Future DESIGNII	NTELLIGENCE WITH DAVE GILMORE
"Modernise or Die"-A Look at the Future of theConstruction Industry, Part 2	DAVID RONKSLEY WITH MARK FARMER