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From the Management and Editors

The industry is marked by myriad data points, some possibly relevant and others distinctly not so. We continue to watch A/E/C's obsession with data: big data, AI data, modeling data, and more. The obsession is indicative of an industry segment late to the party, given that most mature industries have been living in and dealing with data for a few decades now. Nevertheless, we are happy to see A/E/C's awakening and the promise such new functional awareness might yield.

As trend trackers, DesignIntelligence is keenly aware of what's driving the industry and what might be coming up that will alter the current trajectory. There's no single thread of trending to track, but many simultaneous ones. Some are more mature than others, but some of the newest trends carry more potential to disrupt industry norms. Still other trends promising positive disruption may in actuality be negatively destructive. The magic in trend-tracking is in discernment that delineates between the two, plus the multiple iterations and expressions each spins off.

One of the macro trends we've given ourselves to over many years is compensation. How firms compensate their professionals has changed and continues to change. How value is defined is radically changing. What new graduates can expect upon entering the professional A/E/C workforce is critical to making the match between the right talent and the right firms. In this edition of the *DesignIntelligence Quarterly*, we give a glimpse into the larger DesignIntelligence Research report on compensation for architects, designers, engineers, management, and executive staff. We hope you will invest in the full report to better understand the drivers of change in this critical area of firmwide management.

The 2Q 2019 edition of *DesignIntelligence Quarterly* provides insights to help you navigate your business. Dave Gilmore continues his series on authentic leadership. We feature the perspectives of technology leaders Heather Wishart-Smith (Jacobs), Roberta Kowalishin (Dialog), Nirva Fereshetian (CBT), and Brooke Grammier (DLR Group), and the perspective of Simon Carter (Morphosis) on data, technology investment, creating a future-ready tech organization, sustainable technology, and more. Hans and Michele Herrmann profile a successful cross-disciplinary architecture and construction education program at Mississippi State University, experts from Pepper Construction offer their perspectives on the future of the building industry, and leaders from HDR and GBBN offer their perspectives on non-U.S. markets. James Frankel, Esq. (Schiff Harden) shares how to conduct the people side of complex negotiations. These are among the other insights available to you in this edition.

As always, DesignIntelligence is committed to optimization and reinvention of the A/E/C industry. We are dedicated to our readership to publish thought-provoking material useful to the profession. Let us hear from you!

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.

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**BUILDING A
BETTER BUSINESS**

The Way of Authentic Leadership—Part 2

A curiosity of sorts is in the natural behavior of people placed into leadership when neither their skillset nor experience warrants the placement. Over the past 5+ years I've been witness to multiple mis-placements into senior leadership roles only to see their organizations swirl into a choreography of confusion and misaligned activities.

DAVE GILMORE

The leader (by title) assumes the role and it's at this moment that we discover their authenticity or lack thereof. The effective leader will:

- admit to themselves that they don't know all they need to know to perform to expectations.
- seek out trusted advisors, internally and externally, to support and reinforce them.
- ask more questions than offer responses.
- operate from a posture of humility and openness.
- exercise active listening in every interaction, seeking first to understand and engage before being understood.
- put the organization's interests before their own.
- be slow to judge, measuring thrice and cutting once.

An "imposter" is one who assumes a title and role to which they are not qualified and cannot genuinely perform. Far too many imposters are sitting in seats better filled by authentic leaders.

Upon assuming a leadership role, an imposter will:

- adopt an authoritative demeanor and when pushed, will remind all within earshot that they're in charge. After all, they hold the title and we all know the title makes them real.
- grow increasingly agitated when pressed for decisions and directions. They will often knee jerk and toss out a statement or two that may or may not be interpreted accurately, leaving the hearer in a bind to either go with it or risk further ire by pressing for clarification.

- over-commit their calendar in an attempt to be all things to all, assuming they have the answers to whatever might be posed.
- avoid face-to-face meetings with those they believe don't support their placement, question their direction, or somehow threaten their sense of authority. When such meetings do occur, the tension rises, and power-posturing occurs to send the message of who's in charge.
- swing to ever-increasing opposites in emotional expression. One day they may be happy-go-lucky, the next day dark and brooding. This see-saw behavior sends increasing uncertainty, doubt, and frustration to those in a direct reporting relationship with the imposter. This Jekyll & Hyde syndrome is rarely an outcome of neurosis or chemical imbalance, but rather the inner turmoil of pretense desiring balance which is not possible save for the pathologic.

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When we know our shortcomings, acknowledge our gaps, and seek trusted input from others to grow and become increasingly effective, we enter into the space of authentic leadership.

This of course isn't an exhaustive list of imposter ways and means, but the point is made that marks the imposter as fundamentally "un." Unpredictable, unsure, unstable, unapproachable ... "un." But there is a better way.

Frankly, no one is perfect for every aspect of a given role. All have gaps, all have areas of weakness and deficiency. The gaps, weaknesses, and deficiencies aren't the point ... what a leader does in spite of them is. The authentic leader more often than not possesses an observable degree of emotional maturity.



Each of us has a choice to make as leaders.
Either we own our weaknesses and gaps,
determined to better them through
collaborative input and discipline, or we
play the imposter and hope no one notices.

We define emotional maturity as being self-aware but focused on the betterment of others. The opposite is true of the emotionally immature. They are marked as being self-focused and unaware of others.

When we know our shortcomings, acknowledge our gaps, and seek trusted input from others to grow and become increasingly effective, we enter into the space of authentic leadership. When we focus our attention on bettering others through the context of our self-awareness, we display the best that leadership has to offer.

One of the discoveries I've made along the way is that for almost everything good and true and right, there's a counterfeit. Counterfeits are "near-genuine." They appear genuine but when tested by time and the measure of consistency, they usually reveal their inauthentic nature.

Mike was placed in the C-suite of a national firm overseeing operations across six locations involving a few hundred people. He was amiable, smiled often, and was readily

approachable. The problem was that Mike didn't understand business operations, process, resource management, or how technology could be best employed to drive better efficiencies and design quality. Nonetheless, Mike was now placed over operations. It didn't take long for his new direct-reports to figure out that Mike was an imposter, and soon after the proverbial bloom was off the rose.

Mike's office bookshelf was lined with self-help books, design management tomes, and even a volume entitled, "Condensed MBA in 15 Chapters." It appeared he was doing all he could to teach himself, but upon perusing the noted library I discovered none of the volumes had ever been opened. The crack of a new book is something I enjoy. An Amazon.com receipt was behind the row I was inspecting and listed each of the volumes on that shelf, all ordered several months earlier.

Mike maintained an amenable demeanor to those outside his organization but grew increasingly hostile, argumentative, and antagonistic towards his direct-reports and those he deemed disrespectful of his position. In one conversation I had with him he confessed his dislike of the team he'd adopted and stated, "Don't they realize who I am? The board of directors appointed me to this position, and they owe me their respect!"

Mike didn't get it. Several years later he still doesn't, even after being removed from the role when a new CEO came into the firm. Mike operated as an imposter. He seemed the right fit for those not in his closest circle. He looked the part, spoke like he should, and took the limelight at times to validate himself. But time and inconsistencies caught up with Mike.

Each of us has a choice to make as leaders. Either we own our weaknesses and gaps, determined to better them through collaborative input and discipline, or we play the imposter and hope no one notices.

Dave Gilmore is the president & CEO of DesignIntelligence.

The Not-So-Common Sense of Leadership Communication

Nothing could be simpler, more commonsensical: spend less than you earn and save for when you need it. Few would argue against such sound practices. Yet according to the U.S. Federal Reserve, in 2018 American consumer debt rose to just over \$4 trillion, up from \$3.3 trillion in 2014. And according to the 2018 Northwestern Mutual Planning & Progress Study, one in three Americans have less than \$5,000 in retirement savings.

A similar claim can be made for good leadership communication. Many preach its virtues, and guidance from published experts is straightforward and sensible: tell the truth. Be authentic. Use stories. Listen more. Know of what you speak. Yet in my work with executive teams and boards of directors in architecture, engineering, and construction (A/E/C) firms, I see far too few who effectively act upon the advice.

BOB FISHER

In the 2017 Forbes article “The True Cost of Poor Communication,” Dean Brenner blamed bad communication practices for five pernicious ills in organizations: lack of focus, failure of purpose, lack of innovation, drop in morale, and loss of credibility. One can easily imagine replacing “leadership” for “communication” in the sentence, which is a testament to the inextricable nature of the two.

Communication—and the connection it creates with those who follow—is one of the fundamental tools of leadership. Natural leaders are uncommonly good communicators. Their use of conversation and presentation come easily enough that they are exemplars without being fully conscious of their skill. Most of us, even those who have been in positions of leadership for some time, are not so blessed. And worse yet, many of us overestimate our abilities and effectiveness.

A short time ago, I had the good fortune to be at a pre-meeting breakfast with two exemplary leaders from different parts of A/E/C who have recently joined DesignIntelligence: Ken Sanders, a former managing principal with Gensler, and Glen Morrison, the former global CEO of the French flooring company Tarkett. The topic soon turned to the relationship between leadership and communication. “Communication is a huge part of being a leader,” said Morrison. “Leaders set the tone and tenor. They cannot be effective in the long term without strong communication.”

What followed was the sharing of stories and ideas about communication that were formed over decades of shaping purpose-based organizational cultures, aligning large groups of people to common goals, and motivating them to share the best of their talents. The picture that emerged was the antithesis

of missteps I had seen in the field. Recognizing the spontaneous formation of a practical guide to leadership communication in A/E/C, I initiated a series of follow-up conversations with Ken and Glen on their experiences and perspectives.

At the beginning of our second conversation, Sanders warned of a natural dynamic that highlights the importance of communication in leadership. “Nature fills a vacuum,” he said. “When they’re not fully informed, you start to see people making guesses and speculating.” In such situations, people tend toward the most negative interpretation, creating a host of potential issues that could have been avoided.

The antidote is deceptively straightforward: ensure that everyone in the firm understands the true story and remains engaged. A simple idea, yes. Easy? Not so much.

In order to be successful, leaders need to understand the interplay of context, messages, means of communication, and, most complex of all, human nature.

According to Glen Morrison, effective messages must have three components: consistency, relevance, and authenticity. Messages and the leaders who deliver them must set context, laying the groundwork for an audience to achieve understanding. Like so much in leadership communication, setting context is not a one-and-done exercise. “Someone needs to be contextualizing all the time,” said Morrison. “Context has several layers of meaning,” he continued, “such as how people in the organization matter in the bigger picture, and how a company can proactively communicate with the marketplace and internal audiences to set the right environment and build trust.”

Consistency is important because of the way in which people form their perceptions. Employees build their understanding of stories from multiple sources, and they need to hear the same fundamental message from all members of leadership. When they do, they can be confident that leadership is aligned and unified. When what they hear from leadership corroborates what they hear from peers and other sources, they have more reason to trust the message.

Relevance also has several layers of meaning, according to Morrison: “It explains things in terms that matter to the audience by making the issues relatable and concrete.” Understanding the audience’s perspective and what they care about within the larger picture helps a leader use context to achieve relevance, he says.

When you’re talking about communication on the plant level, it pays to go up about three levels in the company structure to provide appropriate context. Any higher than that becomes too much of an abstraction and not directly applicable to the audience. It pays to [frame broader] issues such as safety, environment, quality, operational metrics, and finances [by tying] them indirectly to the work of the plant.



Glen Morrison articulated the final and most important axiom for leaders: “Actions are the most powerful form of communication.”

Like being consistent and setting context appropriately, authenticity contributes to credibility. “If you communicate authentically, you build a credit bank,” said Morrison, looking ahead to an occasion when leaders may have to draw down the account. “When you have difficult messages to communicate in the future, people will listen.”

Perhaps the most important ingredient of authenticity is transparency. In order to trust the message and leaders who deliver it, people need to feel nothing is being kept from them. Max DePree, the former CEO of Herman Miller, captured the essential rationale for transparency in his book “Leadership as an Art,” when he said: “The right to know is basic. Moreover, it is better to err on the side of sharing too much than risk leaving someone in the dark. Information is power, but it is pointless power if hoarded. Power must be shared for an organization or relationship to work.”

Sanders echoed DePree's assessment. "Tight control of information is not a virtue of leadership," he said. "People in my experience are more energetic, productive, and create more value when they not only are fully informed, but also feel fully informed."

Transparency, perhaps more than other aspects of communication from leaders, requires a nuanced understanding of limitations, circumstances, and what best serves the people with whom the leader is communicating.

When Sanders accepted his first major leadership position as the newest partner of a firm, he learned that the position required him to change his approach to communication.

I would be out in the studio, talking to people individually, and even joking around. But I quickly became aware of the fact that more people were listening in and overhearing the conversations in a way they never did before. I didn't expect that. I had to be much more aware of that extended audience. I also learned that while I could still joke around with people, the risk was higher that someone might take something the wrong way. So, although I didn't want to change my communication style to the point of sacrificing authenticity, I did have to recalibrate.

Glen Morrison experienced a related leader-employee divide and developed an approach to quickly overcome it. "When a CEO shows up on the shop floor," he said, "people see the suit, or position, and not the person behind it. The CEO needs to get to the person behind the position quickly; it is the CEO's job to break through. The CEO can break through using something of common interest that is relevant and real. What breaks through differs based on geography and local culture, but it only works if you have a genuine interest in people."

The importance of listening, which could rightly have led this article, is the crucial first principle of connection. "Attentive listening is essential," said Sanders. "I think many new and emerging leaders feel that leadership is more about telling, and sometimes it is. You have to communicate a strategy, you have to make decisions, you have to tell people what's going on, all of that is true. But listening is equally if not more important. Two ears, one mouth: use them in those proportions."

The benefits of listening well reach beyond creating a genuine connection between leaders and employees. According to Sanders, open lines of communication help leaders in other practical ways.

When you build relationships, people come to you with problems rather than wait for you to come to them, which is what you want. Over the years, I've seen people do it really well and I've seen people do it really badly. If leaders get angry, they point fingers, and all that does is dramatically lower the probability that people are going to bring bad news to them in a timely way. They'll either try to hide it or cover it up. Even if you're disappointed or angry with them, how you respond is so important. If there's a problem, do they feel you are there to attack them or help them? If they get you are there to help them, that's a game changer. If they think your response will be to attack them, that will throw a wet blanket on communications.

Glen Morrison articulated the final and most important axiom for leaders: "Actions are the most powerful form of communication." Without integrity between words and actions, a leader cannot build the authentic connections that are the foundation of trust. Writing in "Leadership as an Art," Max DePree concurred: "The best way to communicate the basis of a corporation's or institution's common bonds and values is through behavior."

Leadership needs good communication in all its forms, and it is incumbent on leaders to master the complexities of connecting with those they lead and others they wish to influence. To fail in that effort is to be ineffective. Sir Winston Churchill once said, "The difference between mere management and leadership is communication." As he also demonstrated, leadership empowered by communication can lead to extraordinary accomplishments.

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

DFC FIRM HIGHLIGHTS

Taking Cues from the Design Process, Organizational Structure Is Key to a Firm's Creativity and Success

As a network of creative professionals, we have the privilege to see the design process and its outcomes generate powerful change in the lives of our clients—from inspiring the next evolution of health outcomes to encouraging a greater sense of well-being and productivity at work.

JULI COOK

Our fundamental belief that physical buildings drive behavior and human experience has been a hallmark of NBBJ since its inception in 1943. In the generations since, our focus has also expanded to encompass the importance of immaterial structures, such as the organization of our firm, to support the success of our people and work.

Today, as the industry faces competition from unexpected places and the demand for increased value is high, we believe it is critical to invest in our internal structures and alignment to allow us to better serve our clients and our talent. Here's a look at three ways NBBJ's structure is driving these outcomes:

Culture: The formation of NBBJ took place during the Second World War when the U.S. government asked four disparate architects to collaborate to solve critical design and infrastructure challenges. Fast forward several generations

later: NBBJ continues to retool itself to ensure that teamwork, distinct viewpoints and unique partnerships remain at the core of how we organize ourselves. Our firm is a creative hub without hierarchy, a collective where “psychological ownership” in all roles encourages and inspires staff to think and lead outside the box. We live by the belief that the best ideas win, and everyone is invited to the table to contribute and deliver impact. For example, while the firm is guided at a high level by a four-person senior leadership team and with the support and oversight of a board, each individual studio across the firm has the autonomy and finances necessary to lead in a dynamic business environment. Each studio is empowered and supported, as the needs of clients and employees change quickly and design must keep up in order to ensure its relevance.

Leadership: The growth of our company and the impact it has on the world is the direct result of leadership. While leadership ultimately comes from our people, it is the structure of our firm that allows it to deepen and expand. To that end, the people of NBBJ are given permission to test new ideas, switch roles and even create new business opportunities, while growing their leadership in the process. As a result, we organize our firm and live out this approach through a variety of custom programs, including: Leading Change, a year-long development intensive that pairs emerging leaders



We live by the belief that the best ideas win, and everyone is invited to the table to contribute and deliver impact.

with seasoned mentors who work together on a common project with high impact; Oregano, a traveling fellowship program which brings together people from across our firm to see the world and design through a new, multi-cultural lens; our firm-wide career development program, which ensures each employee is designated an advocate with whom he or she can pursue personal and professional growth; and a series of informal and formal leadership gatherings throughout the year in multiple cities that allow us to step back, develop strong relationships and think about what's next.



Relevance comes by looking outward to understand the challenges our clients face and inward to see how we can make our firm better.

Design: Design is how we bring value to the world. It's the reason we wake up in the morning and the driving force behind our work. Every aspect of the organizational structure of NBBJ is set up so new design ideas can emerge, develop and succeed. One of the ways we go about ensuring strong

design is by creating a structure where resources and tools are constantly available to make us better. For example, NBBJ hosts internal design competitions, outside critiques and project awards; we create a framework for new tools, such as the NBBJ-incubated virtual reality startup Visual Vocal; and we form unique partnerships with outside experts to integrate research in neuroscience, social health, biophilia and materials science into our work. Combined, these outcomes of our structure lead to better design.

Ultimately, the key to our future success is relevance. Relevance comes by looking outward to understand the challenges our clients face and inward to see how we can make our firm better. When only one is emphasized, or done independently of each other, we can fail or at the very least, we don't reach our full potential. A structure that enables relevancy from the inside out creates lasting value for our clients as well as staff and ensures our industry thrives with the world around it.

Juli Cook is NBBJ's chief operating officer, managing the firm's administrative, financial, legal, information technology and human resources functions. Prior to joining NBBJ, she served as executive vice president of Corbis Images and as its senior vice president of media products & global operations.

TECHNOLOGY

A Strategy to Turn Digital Disruptions into Opportunities

A recognized leader in design, engineering and technical services, Jacobs has transformed its portfolio to focus on technology-driven innovations, helping its business and government clients overcome disruptive challenges such as resource scarcity, security and resilience threats.

HEATHER L. WISHART-SMITH

We spoke with Heather L. Wishart-Smith, senior vice president leading Jacobs' Connected Enterprise strategy for the firm's Buildings, Infrastructure and Advanced Facilities business to learn how Jacobs is leveraging artificial intelligence, big data analytics and automation to advance critical infrastructure and operations for its clients around the world.

DesignIntelligence (DI): How does cybersecurity fit into today's digital disruption strategies?

Heather L. Wishart-Smith (HLWS): Cybersecurity is a necessary measure as we move into a new world of connected and autonomous vehicles, buildings and smart cities. These new opportunities for technology and data can be very exciting, and it can be tempting to jump into development at the exclusion of some important guiding principles. It is vital to keep your data and systems protected as well as to implement a true IoT [internet of things] and technology plan for data collection.

Jacobs' Connected Enterprise is a strategy for contending with digital disruption. It was initiated in 2016 following the acquisition of Van Dyke (a 500-person cyber security firm). Our goal is to take advantage of the movement in this industry toward digital disruption and the need for more fully integrated solutions. Jacobs is uniquely positioned to provide both the digital capability as well as the deep domain expertise, which then allows us to help our clients make better business decisions.

DI: What is your organization's focus?

HLWS: We are focused on four different solution areas: connected mobility, connected places, connected assets and connected delivery. These solution areas are supported by five innovation hubs—cybersecurity, internet of things, predictive analytics, applied geospatial science, and automated design. We are currently accelerating the existing innovation in those five different areas through a wide range of initiatives and client engagements, as well as through a robust internal program to accelerate a culture of innovation among our employee community.

For some clients, we help them create a technology strategy or digital master plan that is ideally a full-lifecycle strategy for their operations. For others, we're helping them focus on a single asset (such as a building), as it is important to make the best decisions from the perspective of the lifecycle of a building as opposed to just the initial capital cost.

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Our goal is to take advantage of the movement in this industry toward digital disruption and the need for more fully integrated solutions.

“What if ...” Solving the World’s Greatest Challenges with Intelligent Solutions

One City Is Getting Smart to Confront Urbanization

India is experiencing an astonishingly rapid shift in the movement of people from rural to urban centers. What if we showed you how Jacobs and Aurangabad Industrial Township Limited are promising India’s residents new pathways to economic vitality and vibrant urban living with creative reconnection to its golden past?

A Picture Is Truly Worth 1,000 Words in Disaster Response

When disaster strikes, providing aid and returning to normalcy is crucial. What if we showed you how Jacobs, in support of NASA’s International Space Station team, is leveraging remote-sensed data and high-definition imagery captured from 240 miles above in space to aid disaster response efforts?

Online Water Quality Monitoring Provides Better Detection and Protection

The number of reported illnesses caused by water-borne Legionella bacteria have increased by nearly four and a half times in the U.S. since 2000. What if we showed you how Jacobs, alongside Cisco, designed a powerful online monitoring system to monitor water quality and protect public health?

Source: jacobs.com/what-if

DI: How do you think IoT and digital disruption will change the A/E/C industry?

HLWS: Professional practice in A/E/C is going to be changed by IoT and digital disruption in many ways. The first way professional practice is changing is integration of solutions to include technology. There are so many different opportunities now with data, sensors, digital twins and more. In the past, Operational Technology was not really a factor, and Information Technology was considered separate from the built environment. But as the built environment becomes more integrated, it often needs to be supported by enabling capabilities like cybersecurity, data analytics and geospatial. Back in 2015, Jacobs had separate lines of business for buildings and infrastructure. They were different performance units with different management structures, and then the decision was made to bring them together. At the time, this was revolutionary and there was some pushback. People thought their DOT clients weren’t really interested in buildings, and their buildings clients weren’t really interested in transportation. It was a forward-thinking step because we have seen the industry moving toward integrated solutions.

The second way professional practice is changing is in automation, particularly of design, construction, operations and maintenance. There are also other automation factors in terms of the supporting environment, such as HR and accounting. Some in A/E/C may feel threatened by this, but it is important to view this as an opportunity to reserve high-level human input and direction for the most critical needs. This provides better solutions for our clients because automation can offer rapid optioneering. It also helps to address STEM and trade deficits; as a country, we will suffer in the near future because we’re not graduating enough STEM professionals or trades for construction, operations and maintenance.

The third way the professional practice has already changed and will continue to change is that old hierarchies are no longer as relevant or as important as they once were. Four-year college degrees are no longer sufficient. By the time a graduate leaves college, much of what they’ve learned in their first couple of years has become outdated. In light of this, we all need to have

an innovation mindset and a commitment to lifelong learning in order to stay relevant. Another example is that start-ups are innovating, and they're advancing ahead of many organizations that have been in business for much longer periods of time, so duration is no longer as relevant. Those in the industry who cling to old ways of doing business and don't innovate are likely to be left behind—and quite possibly they may also not survive.

DI: What opportunities do you see technology creating for A/E/C firms?

HLWS: One is closing socioeconomic imbalances; that divide has been significant and continues to widen, particularly in our country. We view this as an opportunity to try to address some of those imbalances and help to level the playing field. We feel that certain opportunities like smart cities create an opportunity for our clients to close that gap with education by providing more access to wireless services and technology. Some developing countries have gone directly to wireless in a way that is a lot less infrastructure-intensive. Certainly, there are also concerns about technology creating more of an imbalance, particularly as automation can take over some of the more manual or repetitive labor, but that's why we have to be very focused on education and the important role it plays.

Another opportunity relates to environmental protection. There are so many avenues to address environmental issues like decreasing traffic congestion, improving air quality, and improving water quality through data-driven change. There are case studies in places like Cincinnati where we've used IoT to help them decrease the amount of untreated or partially treated sewage that is released as a result of their combined sewer overflow by half a billion gallons a year, while saving hundreds of millions of dollars from using their existing infrastructure more wisely rather than adding capacity.

Safety is an area with many different opportunities for digital solutions to assist. They include everything from laser scanning technology that prevents people from having to go up at height or into heavily trafficked areas, to highway staff using virtual and augmented reality so they can learn more about a construction zone on a roadway without having to be put in harm's way



We are focused on four different solution areas: connected mobility, connected places, connected assets and connected delivery. These solution areas are supported by five innovation hubs—cybersecurity, internet of things, predictive analytics, applied geospatial science, and automated design.

to start. Another is the use of drones to do an inspection or to help with things like hurricane response. Approximately 95% of traffic accidents are caused by human error, so removing that component creates an opportunity to help improve safety. We also need to be careful from a safety perspective with challenges. Jeep had to recall a number of their vehicles because it was proven that hackers could take them over, and there was also the highly publicized situation with Uber where one of their vehicles killed a pedestrian. Unfortunately, cybersecurity is an afterthought in many cases. Many people aren't aware that the Target identity theft breach where so many credit cards were stolen occurred through a hack related to the HVAC system.

DI: What are some of your organization's data-driven connectivity initiatives?

HLWS: Regarding connected places, "smart cities" is a popular term, but we view them as places that can also include areas like military bases, airports and stadiums. In India and Georgia, we have created apps to help with the connectivity between the citizens and the city services. Connected mobility is very related to connected places, with one example being our Project EDMOND project. We've taken the data from 400 million multimodal journeys, and we're using it to gain previously unattainable insight into crowd behavior and how people travel around London.

On the connected-asset side, we have a case study with NASA at their Langley site in Hampton Roads. We have installed and now monitor 120,000 sensors that are used to measure and detect changes in everything from acceleration to temperature to vibration that will allow more of a predictive maintenance model rather than just a preventive maintenance model. We didn't start out with 120,000 sensors, however; we started with a proposal to do a few hundred, and we built from there over the last four years.

Thinking big, starting small, and scaling fast allowed us to develop a proof of concept to make sure it made sense, because sometimes you will fail. When it comes to failures,

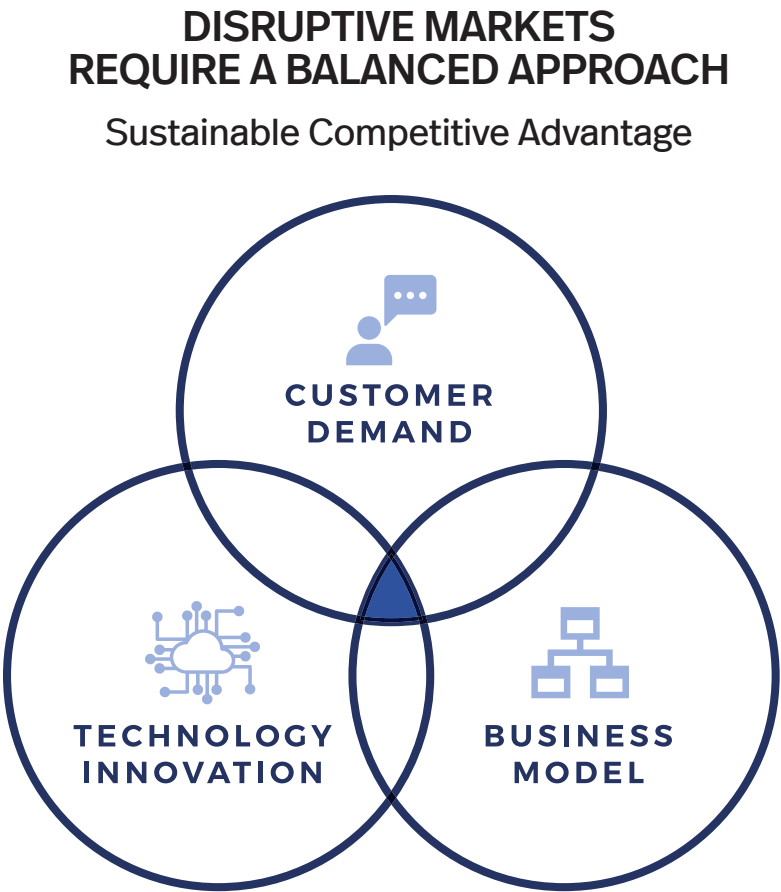
you always want to do so quickly and on a small scale to ensure you don't end up wasting time and resources. In talking with our clients, sometimes they ask us to start with something small like their digital roadmap for one plant, and then eventually we expand it as a prototype for others.

DI: With so much technology available, how does an organization decide which tools will best serve them?

HLWS: There are so many great ideas out there, but unfortunately they can't all be done. It becomes a matter of prioritization. The pictured Venn diagram was created by my colleague Vincent Mihalik to communicate the fact that a balanced approach is necessary to realize a sustainable competitive advantage. Many people focus on technology innovation, because it's fun, exciting and new. But if you're focusing on technology for technology's sake, it will not be sustainable. The other two components of the Venn diagram are the business model and customer demand. We have to ensure that a solution makes sense for our clients, that it makes sense for our organization, and that it's going to be profitable and scalable; we don't want to invest a whole lot in a niche product or solution that's not going to be scalable or profitable.

We are transforming our culture to change the way we think about our role in helping clients improve their performance. In today's world, market leaders who ignore the digital revolution will become irrelevant—even disrupted themselves—and pushed out of the marketplace. Our goal is to help our clients harness the power of digital technologies and become a disrupter in their own industry.

Heather Wishart-Smith is the senior vice president leading innovation and strategy and growth of Jacobs' Connected Enterprise (JCE) for Jacobs' global Buildings & Infrastructure line.



Designing the Future: Priorities in Technology Investment

Our clients hire us for creativity and ideas that improve the way people work, live, and interact. Design decisions affect every component of the environments we invent through the creative process, whether it's the massing of a building, the façade, the landscape, the interior, the overall structure the mechanical or electrical energy efficiency, air quality, or people's happiness and well-being. But where and how much investment in technology is needed in a world where disruption and innovation are dramatically impacting the built environment? DIALOG has a high-level framework that helps us categorize our technology investments and evaluate where and when to invest as an integrated design practice.

ROBERTA KOWALISHIN

At DIALOG, we've created a framework for defining technology value and innovation that helps us evaluate and drive innovation across what we call "plumbing," "process," and "product." By plumbing, or what is sometimes called the 4th utility, we mean core infrastructure—compute, store and network hardware. Process describes the software and programs like computation, collaboration and computer-based, data-rich solutions for design. And lastly is the product, or the technologies and data we embed in the built environments we create. Great technology plumbing is table stakes to innovate at the leading edge. I believe what's more important now is to make sure our technology resources and priorities are focused on our design processes and our built product. Through innovation in our own firm's technology plumbing, especially moving technology infrastructure to the cloud, we are freeing up resources to focus on design processes and the technology that's needed for our clients' built products.

With this framework in mind, we consider the current needs of our designers, engineers, business developers and clients. For example:

- As a designer, I need to be able to perform rapid analysis on my design at an early stage so I can better understand the environmental and performance factors influencing the project.
- As a business developer, I need to be able to show and have my client's experience our designs through visuals that demonstrate our ability and expertise to deliver high-performance buildings.
- As a client and owner, I want to equip my designers with my latest facility data, so they can design with knowledge and insight into the performance metrics affecting operations.

Like most of the industry, we are heavily invested in the design **process** and technologies from basic BIM content, templates, objects and scripting to computational and generative research, design and collaborative workflows. Together, these tools allow us to rapidly generate and evaluate building performance throughout our designs.

At the same time, immersive 3D visualization allows us to engage our customers in new ways where we can be creative,

playful and fun with technologies the same way we do with paper and pen. It's not hard to see the huge possibilities for creativity and imagination in design that is orders of magnitude cheaper than building something and then figuring out it doesn't work. While the potential of immersive 3D visualization is huge, a caution to consider is that the technology itself is still evolving and less mature than many other technologies already disrupting the design and construction industry. We are currently building capacity at DIALOG but are being thoughtful to ensure we make the right level of investment in immersive technologies in our workflows.



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There is a natural tension between efficiency and design in our *process*. We must remember we're designers first; once we decide on a direction, getting the design into production naturally requires more focus and more efficiency. Digital project delivery is very important to make us and our industry more efficient, but it is also commoditizing our workflow. As designers, becoming more efficient gives us back time to focus on answering big design questions. It's important to remember that tools that build walls and doors faster bring overall efficiency to our clients and projects

but may not make us more strategic or better designers. We focus on a balance of investments across tools for efficiency and tools that transform design processes. This is an important conversation related to technology investment that each firm needs to engage in.

Data is being generated everywhere across process and built product technologies. In our design processes, we start by asking the question: What data can and should be measured across the lifecycle of our work in the design, construct, operate, and experience phases? What data do we have or want to get so that we can measure what will feed the design process? As designers, we can better focus on designing for optimal experiences when we set goals for a specific project at the outset. Whether it's sustainability or occupant well-being for example, how can we measure the experience in terms of wellness? How can we measure accessibility? How can we measure density, tranquility, lingering, mobility and any other goals for a place or space? What options do we have in building performance? How can landscape architects, interior designers, and mechanical or structural engineers push out an optimized design that simultaneously captures data to support a carbon-neutral goal? Can we also help the team better understand construction trade-offs that may need to be made in materials selection? Can we use this information to discover how it could be modified to fulfill the goal (or a future goal) in a different way? We believe we can.

We're defining key data elements and building a foundational database that will help us on the front-end as we ask the big questions. We want to be able to benchmark our early designs against generic and specific data from the goals of the environment. Establishing upfront data goals will provide direction for our collaborators both upstream and downstream. As our foundational database grows, we expect machine learning and artificial intelligence to play an important role. Many tech solutions for building performance, energy modeling, and carbon-neutral applications are available today, though most are still standalone or only partially integrated into our workflows. We've got a roadmap to integrate and build custom design solutions into our cross-disciplinary workflows and feed design data into our foundational database.

While we innovate across the design process, our industry is facing incredible hype around “smart” buildings, communities, and cities and implementing technology in our built *product*. Today, there’s a big gap between the “smart” vision and the reality of designing and implementing an intelligent, safe, secure and ethical smart space. Owners, facility managers and construction companies are working in parallel or even ahead of designers as they implement sensors, internet of things (IoT) and technology platforms to measure the built environment. As designers, our work now includes technology design discussions earlier in the process, so that we define “smart” technologies and guiding principles that consider technology’s role as we design a built space before it’s being constructed. As designers, we help our clients turn goals for buildings, campuses or cities into data that can be measured across the lifecycle of a project, before technology platforms are even considered. Platforms designed to collect data at the building, community and city level then provide real-time feedback on our designs. Today, we see this as the third, longer-term priority for technological investment and an important new skillset that is brought in early in our design work.

Finally, as technologists in a design practice, we have a few additional key questions and principles that guide technology investment decisions.

Should we buy vs. build technology? I think this industry is still at a point where we’re trying to decide what to buy versus build. Technology that can impact the beginning of the design process is the area that I would advocate early investment in—we use an agile approach and do short projects with rapid visible progress. It’s very expensive to build your own tools, and strategically, we aim to buy (versus build) anything that helps us with digital project delivery and managing the contract and constructions phases of work.

We’re a design practice. To navigate the technology investment priorities, it is important to stay loyal to our goals and core competencies. First and foremost, DIALOG is a design practice. We leverage technology as an enabler to our cross-disciplinary design process. Technology that helps our design come to life in a more integrated, creative, effective and efficient way for our clients and end-users is the priority.



Owners, facility managers and construction companies are working in parallel or even ahead of designers as they implement sensors, internet of things (IoT) and technology platforms to measure the built environment.

Are we leading or bleeding edge? It’s critical that DIALOG stay connected with university research and venture funded startups driving technology innovation in design and our industry. We want to benefit from innovation as quickly as possible. However, for our size of practice and the type of work we do, we need to carefully consider how and where we get involved in research and focus on finding and applying innovation to our project work versus a pure research agenda. Great recruiting and co-op programs are also critical to bring talent, new ideas and technology to DIALOG.

Responsible innovation in a time of disruption. As technology continues to permeate our design process and built products, other industries, investors and companies, especially big technology, are jumping in. From my perspective, this means there is a learning set that’s outside what a traditional designer might do, and designers and technologists have much to learn from each other to enhance the design process. Many designers bring experience, perspective and education that considers history, art and impact to community well-being. Innovators like Sidewalk Labs and WeWork have new design approaches to built technology and our traditional work. But as Facebook and big tech-building communities online have demonstrated, technology can bring many unintended consequences. Designers have a critical role in setting goals for technology in our built environments.

Responsible technology innovation understands that cities are our future; that carbon-neutrality and environmental

sustainability are paramount for the future. Our industry and designers especially are responsible for the big questions that create design for technology in built environments. For many, technology is a new world. But if we stand by, will the tech world create platforms aligned with the goals for the built environment, public and private space and community that we imagine? We need to place our bets on technology that will not only keep our own design practice healthy, but also advance what architects and designers can do globally. We believe with the right technology investment, great design can change the world.

Roberta leads DIALOG Technology and brings a breadth of strategic technology leadership and innovation to DIALOG's changing design-build work. From information technology (the IT plumbing of our business), to design technology (our processes and automation of DIALOG's design-build work), to seamless integration of technology into DIALOG built-environment products and communities, Roberta's broad technology experience allows DIALOG to look sideways from industries that are being

disrupted by technology: consumer news media (CIO at NY-based Hearst Newspapers), cybersecurity and records management (Director in PwC's privacy and forensics practices), and venture backed satellite network services (VP, Technology at Harris CapRock Communications). Her experience, passion for community well-being, and her desire to challenge people and companies to re-invent how technology interacts with their environments and work helps DIALOG, as a design firm, simplify and create trusted solutions and new models of practice, design and customer service with collaboration across geographies, disciplines and project teams.

Roberta holds an MBA from MIT, a BCom Economics from McGill, Harvard's Graduate Cybersecurity Certificate and the CISSP (Certified Information Systems Security Professional) certification. She has been cited as a next generation CIO in the Wall Street Journal and been quoted Business Week, Wall Street and Technology and Information Week.

Digital Transformation: How Integrating Technology Can Change Design Culture

Technology plays a critical role in what a firm can accomplish today. It is now the framework to distinguish firms and their value propositions of enhancing processes to deliver more insightful services in shorter time frames. It has an impact across the board, including on how we do business development and recruiting. It changes how we think about providing the best experience to both our employees and our clients, old and new. Ultimately, it needs to enhance the experience of users in the spaces and environments we create.

NIRVA FERESHETIAN

In my tenure as a chief information officer, changes in technology have been constant. From my college days to my first internship to my current role, there has been explosive growth and advances in technology.

After receiving an undergraduate degree in architecture, I attended UCLA for a master's degree in architecture with a specialty in design technology; at the time, programs offering this specialty were limited, but UCLA had a faculty with pioneers in Computational Design like Bill Mitchel (who later went on to found the MIT Media Lab), Charles Eastman, George Stiny, and Terry Knight.

In the summer of my first year, I worked as an intern in Skidmore Owings & Merrill's (SOM) Los Angeles office. SOM had formed a collaborative partnership with IBM to develop a software called Draft. A familiar practice now, this type of partnership—design companies incubating technology concepts/startups and/or collaborating with technology companies—was a unique and fairly new concept then. That summer was eye-opening. SOM was using technologies that no other architecture firm was using, including color

plotters and tape backups. I was working as part of their technology group, a department rarely seen in an architecture firm.

This enforced my desire to combine technology with a creative architectural design career. After graduation, I worked for a few different firms—disappointingly, very different from my experience at SOM. Shortly thereafter, I moved to Boston and responded to a position at CBT, a company that was interested in my technology background. My role initially focused largely on CAD management, but extended deeper into incorporation of other technology tools as CBT adopted early business technologies.

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The fact that our small cell phones have more power now than computers had decades ago demonstrates the rapid change of technology across every industry and firm.

The design/construction industry seemed to lag in embracing digital thinking compared to other industries. The first shift was moving from analog to digital: we digitized and converted the analog drawing with pen and pencil to actually drawing in AutoCAD. But unlike other industries, the thought process, culture—even the deliverables—did not change.

The personalization, democratization, and availability of technology was in the background of every industry, not just architecture. The fact that our small cell phones have more power now than computers had decades ago demonstrates the rapid change of technology across every industry and firm.



Even though the term “digital transformation” suggests an emphasis on technology, the movement is less about the digital and more about the people and cultural transformation behind it.

For us, what began as the digitalization of the analog process of drawing eventually spread to other non-design-related technologies. Beyond introducing and understanding AutoCAD, the industry turned to expand capabilities of 3D modeling and rendering/digital presentation tools, to re-vamping email systems, archiving systems, disaster recovery, unified communication systems and cyber security. BIM, Data, Cloud Migration, and Digital Transformation have revolutionized the responsibilities of my role. From a back-office support responsibility, my position as CIO has evolved to full-on integration with business, client, and employee experiences.

As technology has changed and grown, we have had to change and grow with it. One way we’ve moved forward in this position is by exploring how to promote our tools and ways of thinking, both internally and externally. Creating a culture has

become an important part of the discussion. Making sure that we are well-informed internally and externally and focused on sharing the story behind of what we’re doing and how we’re delivering. Our goals are less about actual technology execution and more about research and understanding how we can change the culture internally to make all of this happen.

Integrating technology into an organization’s culture should stem from a connected vision. It’s important to look internally and see who can be part of this change. Change management alone is a difficult task, and adding a digital element can make it even more challenging. The top priority needs to be buy-in from management, affirming that this integrated vision is really something they want to pursue.

Once management has bought in, the next step is to expand the understanding and aptitude of those tools to the next organizational level of the company. Failure is a certainty in this process, and human nature can often cause us to fall back and use what we know. Deadlines and project delivery processes are not very conducive to experimentation and research. This incites a cultural change: to understand how to fail fast, move on and properly manage expectations all around. This means shifting the focus from the tools to the practice of collaborating and joining forces in the industry. What we want to deliver is a highly collaborative effort and we need to work with those who have the aptitude in technology.

Consequently, profound changes are happening in the way the firm is managed, and the way we hire, with a primary goal of developing a culture that sustains this overall effort. It’s important to focus on the overall messaging, while at the same time delivering evidence that this is a better way of thinking and working. The transformation has to show ROI that’s beyond financial profit.

Beyond basic knowledge of software tools, we need digital savviness. We need a workforce of super integrators: technology with content and problem-solving skills, elevating the capabilities of our employees and situationally understanding the necessity to expand our collaboration efforts outside of our walls into the gig economy.



Work flow is ripe for change, and technologies are maturing at an accelerated rate, but the rest of our contractual and business processes need to catch up.

Even though the term “digital transformation” suggests an emphasis on technology, the movement is less about the digital and more about the people and cultural transformation behind it. Internal integrators, who understand the general vision, are necessary to the success of the initiative. Unlimited options of tools or processes make it apparent that collaboration with the right partners on the road map is required in order to transform. No longer just an internal functionality and understanding of technology, digital practice extends outside to different parties and thought leaders who are really pushing forward in this field.

This is an exciting time for the industry. Where demands can vary at different times, digital integration is very much client-centric and client driven, and firms must decide for themselves whether upcoming technologies will effectively make a difference in delivery, or possibly develop new service deliveries. Opportunities that were not available to smaller firms previously are now accessible because of the democratization of these tools, concepts and processes; historically larger firms had a much greater advantage. The competition landscape is changing, and the new paradigm for innovation exists on all scales now—not just your own size and type of firm—and extends beyond industry boundaries to new innovators like WeWork and Kattera.

For a long time, technology was considered only a tool, and was left out of business conversations—it is certainly part of the discussion now. Still, this is very much the result of technologists’ efforts to reach out and ask to be part of these conversations. Lack of awareness in business decisions and practice road maps can often negatively affect execution of a firm’s digital evolution. The balancing act has many pillar

needs—a vision, a culture that follows that vision, development of a digital culture, development of a change culture, and consistent communication.

There are many possibilities on the horizon for this industry’s integration of technology into our systems. The promise of AI and machine learning will completely change the landscape for designers. Our goal is to deliver thoughtful design and data for process improvements in the construction phase, when owners take over the building, and the building’s entire life cycle. We are interested in post-occupancy analysis, and bringing that data back to our design phases to learn from it. Design firms are now involved in a much larger ecosystem than before. We’re now using technology to work in common cloud platforms with all collaborating parties. Work flow is ripe for change, and technologies are maturing at an accelerated rate, but the rest of our contractual and business processes need to catch up.



Integrating technology into an organization’s culture should stem from a connected vision.

Collectively as an industry, we have to make drastic changes; the onus is not on one firm at a time. We are seeing some sharing within the technology arena, such as computational approaches. That is fundamentally the right direction; while we don’t necessarily compete on what technology we use, we all agree on establishing tools and connected platforms to better product delivery and overall industry efficiency. We need technology tools/platforms that are interconnected and provide smooth transition at different phases of a project and data flow through design, build and operate lifecycle, avoiding duplication of efforts all along.

Together we can open our work up to realities that were not possible before.

Nirva Fereshetian is an associate principal and the chief information officer of Boston-based design firm CBT, where she leads the Digital Design Practice Group and is responsible for aligning business technology strategy to meet primary business objectives. Nirva is experienced in managing projects and people with an interdisciplinary background in architecture/construction/technology and a capacity to bridge that knowledge to enable informed business decisions and increased productivity. She is a board member of WITI (Women in Technology International) Boston Chapter and a member of SIM (Society for Information Management).

About CBT

CBT is an award-winning, Boston-based design firm working nationally and internationally on projects at all scales, from multi-family residential, workplace,

building repositioning, academic, hospitality and civic projects to large-scale mixed use developments and urban district master plans. Over 250 awards recognize excellence and creativity in the firm's design and planning work. Clients come to the firm for its recognized ability to provide strategic design services in a broad range of project types and styles; its proven real estate acumen; and its skill in blending high-quality planning and architecture with practical goals of building performance, budget, and schedule. The core values of the practice are innovation in every design commission, social responsiveness in the community, and the continued advancement of research and discovery in all that the firm undertakes.

In the Mix: Integrating Technology into Business

When I first entered this industry, technology took a backseat to everything else. People were using computers to assist them in doing their jobs, but technology was not driving their daily tasks. Technologists were largely support, acting in a reactive state handling upgrades and repairs. We as technologists were not part of the business discussion; with the technologies that were in existence back then, it didn't make sense for us to be included. Throughout my career, the evolution of technology has completely changed this landscape. Our role supporting the backend infrastructure has simplified with the addition of cloud-hosted systems, virtualization, and automation. However, our role as a trusted business partner has grown exponentially.

BROOKE GRAMMIER

At the same time, the number of additional technologies that are now in existence has complicated this environment. I've spent the last ten years of my career finding ways to better align technology with our business to better support and implement those innovations. It has gotten to the point where technology is now a large part of the business; it is driving the business forward into the future. My focus has shifted away from the actual technologies to the value they can bring to the table. This is a necessary approach, because there is so much out there that it is easy to lose focus on what can truly bring value versus what is just a shiny, new object.

Now, technologists are becoming integrated into project and design teams. Part of my job is to help coach their leaders because they are unfamiliar with how job roles such as software developers integrate and operate. I need to keep my mind around all of it and understand how the ecosystem works to help guide those project teams and managers on how to manage that type of role. It's becoming less about *aligning* with the business and more about *integrating* with the business. Our design staff, especially the younger generation,

are taking on more technology-related skillsets combined with their design skillsets, and it is becoming a major shift in our workforce.

Since I joined DLR Group, we have had big changes to our technology team structure. When I joined, everything was flat; we had IT managers, BIM leaders, and design technology staff all over the company doing wonderful things in silos. For us to be a technology leader in our industry, it was important to lay out the foundation of a technology structure to build upon. We have been able to restructure IT and BIM fairly quickly and are now building out our design technology structure. This has allowed us to focus on priority initiatives and get resources properly aligned behind them in order to move more rapidly. The pace of change, due in large part to technology, is only going to increase, and we are positioning to more easily keep up with it.

One priority initiative was the rollout of virtual reality to every office, which we were able to accomplish within six weeks. Identifying champions for any new technology is key

so that it is not just the technology group trying to push it out and train the users. We ended up with more than 120 VR champions across the 30 offices, which helped us to quickly get people excited, on board, and trained. With the pace of change happening in our industry, this was a critical approach for our firm and one we will continue to repeat with many other technologies.

Building influence is one of the most critical skills for my role. Because technology changes so fast and since it is woven into the teams now, I can't possibly own it all. But if we can make technology exciting for them, if they are getting something out of it, and if they really enjoy what they are doing, then the rest of it takes care of itself. The hardest part was identifying those people to be technology champions. Being new to the firm, I traveled to almost every office, and I essentially asked people to raise their hands and let me know what they were interested in being a part of. I probably identified half of those people just from that exercise and the other half from them talking to their friends in the office about the initiatives. One of the great things about our company culture is we have a lot of people who are willing and excited to raise their hand for things that aren't necessarily inside the scope of their daily job, which has been encouraged by leadership at DLR Group. Our entrepreneurial spirit really drives us and is key to our future.

A value-based approach can be difficult because it's not black and white, it's feedback-based. Are we doing things faster? Are we doing things smarter? Are our designs getting better? Those are all very soft returns that are difficult to measure,



Technology is now a large part of the business; it is driving the business forward into the future. My focus has shifted away from the actual technologies to the value they can bring to the table.

but we do look at them. Then there are the hard ROIs—are we saving? Are we reducing our costs in printing because we moved to managed print services? Is the time it takes to collaborate with another office reduced because we consolidated our data into a cloud-hosted solution? Is the design decision-making process shortened because we are now using tools such as virtual reality? These are some obvious items that will have a sizable return on investment. These items will pay off financially in no time and reduce the amount of work we, as technologists, have to do so that we can focus our time and effort on further integration with the business.

As we move into the future, technology teams must adopt new skillsets. Those that are used to handling the hardware and backend infrastructure will need to learn how to manage applications and cloud providers, and move more to the front end. Skills in automating through scripts and software development are going to be more prevalent than they ever have been. I've suggested to my whole team that they should learn PowerShell at some level to understand how to write and understand scripting. Automation and the use of data is already a large part of what we do, and we will only see an increase in the demand for these skillsets.

Technologists need to understand leadership, people and empathy because in today's world, "technical" doesn't mean what it used to. I spend a lot of time talking to people and asking them about what they do every day and how it interacts with what everybody else does. In this way, I have a better understanding of how it all ties together—not just how servers, networks and desktops tie together, but how all the different technologies tie into how we do design and how it can improve design.

Above anything else, it is critical for people in technology leadership roles to understand empathy and emotional intelligence. Many leaders just don't understand these topics. But these are critical skillsets for current and future technologists. I would go as far as to say they are critical skillsets for all professionals in just about any role. The days of hiding behind a computer or server are long past, and we are now much more integrated with the business.



Technologists need to understand leadership, people and empathy because in today's world, "technical" doesn't mean what it used to.

A part of that development will be managing concerns around technology replacing current job roles. They may replace parts of a job, but they won't eliminate it because computers, at least today, don't have the ability to feel and understand empathy.

We can put in parameters and it can give us options, but someone still has to look at those options and choose the one that meets the emotional need we have. For example, when we walk into a building, it evokes emotion, and that is something computers don't quite understand today. Technology will speed up the design process, make it more technically accurate, and help us get make decisions much faster.

At some point, if we are not willing to learn new technologies, then we will become irrelevant and we will be replaced by those that do know how to use them. If we are continually learning and adopting technologies at a rapid pace and understanding how they fit in, we will be fine. It will be a long time before we see technology even begin to threaten the need for humans in design.

As we look to the future, we at DLR Group are openly talking about how to switch from being hours-focused to being more value-focused as a cost model. If we have a design that typically took 12 months and we can do it in three, we certainly do not want to lower our fees. So how do we focus on providing a high value design versus the number of hours it takes to do it? It's a mindset shift, and it will take trying it with a few clients, seeing how it works, and growing from there. We could be providing much more valuable products to our clients because we have been allowed to spend more time being creative or training on new technologies that allow us to do things faster and better. That is where the shift will begin to happen.

This is a pivotal time for DLR Group and the A/E/C industry. As we begin planning for our 2025 Vision, I am excited for how technology will impact a much more efficient and creative future as we continue to "Elevate the Human Experience Through Design."

Brooke Grammier is DLR Group's chief information officer. She is a member of DLR Group's executive leadership team and works globally across the enterprise from the Houston office. In this strategic role, she collaborates with leaders of the firm's design, operational, practice, and technology teams to formulate a strategic vision for technology at DLR Group.

TALENT

More Than Just a Deal

Jamie Frankel's career within the built environment continues to serve owner, architect, engineering and construction clients. We talked with Jamie about the sides of doing business that are not often addressed:

1. Leading high-stakes negotiations and similar discussions.
2. Dealing with powerful people with strong, sometimes divergent interests in business negotiations.
3. Managing conflict.
4. Navigating situations with politics at play.
5. Handling yourself in high-stakes situations.
6. Growing over the long-haul.

DESIGNINTELLIGENCE WITH JAMES FRANKEL, ESQ.

DesignIntelligence (DI): As a lawyer, for many years you've worked with very powerful people in New York real estate on complex and sometimes difficult negotiations and business decisions. What have you learned about navigating the people side of those interactions?

Jamie Frankel (JF): It's important for me to start any relationship or negotiation by initially learning about what's important to the person or people in the "room" in order for me to achieve the business goals of my clients.

To develop that level of knowledge I use a question—"The Relationship Question"—which was taught to me by a mentor many years ago, and it has served me quite well over time.

The answer(s) to that question, along with three other related questions, allows me to know what the counterparty values that day (be it one person or a "committee"), whether or not it relates to the transaction or dispute. I call these "The Four Questions."

I drive my negotiations around what the counterparty tells me that day in response to the Relationship Question and the three other questions.

I've found that no amount of off-site research can provide the answer(s) to the Relationship Question as surely as asking that question at the beginning of that day's negotiation, whether it's a face-to-face or electronic meeting.



Failure, to me, in this context, is defined as being engaged in multiple disputes rather than being inside of a solution.

Jamie mentioned his process for determining what is important to the people he's working with in complex, high-stakes interactions. His process involves four questions he asks at the beginning of each meeting. The first question is, *"If we were sitting in this room a year from now, or three years from now, what has to have happened, both professionally and personally, for you to feel good about your growth, both personally and professionally?"*

Without first focusing on the personal concerns of the counterparty and its future, the road to success will be more difficult. Jamie says, "You can't get your needs met until you satisfy the needs of your counterparty. We need to learn to see through the eyes of the counter party." And because the needs of "the room" change day-to-day professional service providers need to engage in some effective way to discover those needs.

Many people conduct research on someone they are going to meet with. This can lead to a large quantity of irrelevant background information or even commoditized information that can be of little practical value in negotiation and relationship building. In addition, because the needs of the counterparty change daily, background information can often be outdated. We need to build authentic relationships, and we need to be able to have real conversations and create real value every day and that calls for efficient and reliable fact-finding.

The answer to that question calls for concentration and on-the-spot analysis. The counterparty usually takes time to consider their response because the question is invasive and personal. Fortunately for me and my clients, the question invariably draws out an answer or response which allows me to, at that time or soon thereafter, create value for the counterparty as I work toward achieving my client's goals.

Over the years, I've learned that by first creating value for the counterparty, I can then focus on what's important to the transaction and to my client.

I've been able to work my way through failure and success in negotiating high-stakes matters by using this process domestically as well as internationally.

DI: What are those four questions?

JF: I developed this process by integrating what I've learned from my mentors. To the uninitiated, this process can appear difficult, but in actuality the process and four questions are quite simple.

The opening question is designed to find out what's important to the counterparty, either inside or outside the transaction, on that day. The Relationship Question is centered around how the counterparty defines personal and professional success in their future.

The first question: *"If we were sitting in this room a year from now, or three years from now, what has to have happened, both professionally and personally, for you to feel good about your growth, both personally and professionally?"*

When I secure the answer to that question, I know I'm going to be able to develop a relationship with the counterparty or the room and have a more efficient and rewarding negotiation for my client. The question is used in multiple forums and geographic arenas, whether domestic or international.

I've found that wherever I'm working, the *human condition* is paramount and is driven by what the counterparty

values. The Four Questions are designed to get to that point early on in each day's relationship. The questions are focused on the obstacles which the counterparty encounters in moving forward to their definition of personal and professional success.

DI: What you're looking for is openness?

JF: I'm looking for the counterparty to recognize that I'm addressing them within the context of the transaction in a way that does not directly relate to the project or dispute at hand.

Their answer tells me what I need to know to be successful in behalf of my client. I ask the question daily in different ways because what's important to the counterparty can change daily and often does.

Learning what the counterparty defines as important to them that day—at that time—allows me to navigate the conversation around the negotiation so that I can create a win for the counterparty and then for my client.

The process works quite well whether the counterparty is one person or a committee (whatever that might be).

DI: Do people ever give you personal answers?

JF: Most often they do; it's rare if they don't.

People know what they want and what's disturbing them because they think about it throughout the day and night, when they wake up, before they go to sleep.

We all have pressing issues that may be centered on what we do in our professional or personal lives, and those issues stay paramount throughout the course of the day, the month, the year or the project.

When they see that I'm focused on what's important to them and how they define success, by way of the Four Questions, they begin to experience something different from what's usual within the traditional negotiating setting.

I'm asking them about themselves, and that's unusual and quite out of place. Most often the answer I get starts out with the counterparty making a statement such as, *"That's an interesting question,"* or, *"No one's ever asked me that."*

With an answer in hand, I know that a different kind of relationship has been initiated and they know that as well. I can then begin to focus on what's important to my client with the expectation of more efficiently achieving those goals.

I've never had anyone not respond to the Relationship Question. I've realized that an important part of the process is the delivery and context within which I ask the question. I've worked hard during these many years to be able to enter into an early stage relationship with the room or the counterparty in a sincere way. The questions and related answers provide the key that most often unlocks the door to a successful negotiation, as my clients define success.

DI: Where do you go from there? What is the second of the Four Questions?



For all sides to be working efficiently,
the parties can't function well or at their
highest level if they're coming from a place
of fear or stress.

JF: The remaining three questions focus on what may be preventing the counterparty from achieving personal and/or professional success.

Having provided professional services all these years, I feel that I can address the answers to the Four Questions in a unique way that opens doors and allows the counterparty to receive something of value from me that they hadn't considered or didn't have access to in their world.

I'm addressing their vision of their future without having spoken a word about the project/negotiation at hand or about me. It's not off-putting, rather it's engaging on a quite different level.

I make sure that during this initial part of the conversation I avoid talking about myself, my firm or my client. I'm just focused on the counterparty and the obstacles they've encountered to achieving their vision of personal and professional success.

DI: When you're asking them the Four Questions, at what point does the conversation shift from being focused on the needs of the counterparty to the goals of your client?

JF: In addressing the obstacles that the counterparty is experiencing, I'll eventually and efficiently begin to refer to the project at hand.

The fact that I first focused on them sets me apart in such a way that I can begin to focus on how we might work together to achieve their goals, as I begin to do the same for my client.

DI: So, you communicate the value your firm delivers by telling your story framed within their story.

JF: Exactly. That's a great way of putting it.

DI: When you're in a room with people who don't know your capabilities, where you aren't pre-qualified, how do you start that conversation?

JF: I look for a fertile point in which to initiate my process. If one is not forthcoming within the first 15 minutes, I'll create that point.

If I haven't been pre-qualified, my job is to get pre-qualified during the beginning of that meeting. If the counterparty knows nothing about me or my law firm, I weave my experience and relationships into the conversation.

DI: How do you navigate a situation where strong politics are part of the dynamic of a multiparty relationship?

Jamie's "Three C's to Relationship Building and Credibility" for professional service providers:

- 1)** Confidence—Create and maintain the confidence of the counterparty and your client.
- 2)** Creativity—Focus on providing recurring creativity to address issues and opportunities as they develop within the conversation with the counterparty.
- 3)** Capability—Develop a plan for continuous growth of substantive skillsets in relationship-building.

JF: If I'm going into a room filled with certain people with strong political interests, I'll do my research beforehand. I use strong eye contact, the "power of the pause," and I address them by first name. My job is to provide efficient solutions using the law, the facts and what's important to the counterparty in order to address the needs of my client.

DI: Suppose you have an open conflict. Something quite serious has happened and you're trying to negotiate on behalf of your client to settle a major conflict. There's a lot of money on the line. How do you deal with managing conflicts and bringing groups of people to resolution?

JF: I'll not usually go into such a meeting alone. There's great value in having an experienced colleague with me. That's true whether the room contains two people or 20.

My colleague and I need to efficiently and quickly understand the dynamics, the people and the mood. Multiple "side-bar conversations" are difficult to grasp if I'm alone. I need to be able to retrieve and note the issues early on so I can start

addressing the key issues that need to be handled first, which are those that belong to the counterparties.

I work to avoid failure. Failure, to me, in this context, is defined as being engaged in multiple disputes rather than being inside of a solution. Failure is having multiple unnecessary meetings rather than one or two meetings in which to achieve “*success*.”

DI: In high-stakes negotiations, there’s a lot going on both intellectually and emotionally. How can we master ourselves to navigate successfully?

JF: Relieve the stress. For all sides to be working efficiently, the parties can’t function well or at their highest level if they’re coming from a place of fear or stress.

My priority is to identify those points and to get them off the table. My process is designed to do that. (Of course, there may be exceptions to this approach, in which case I’ll conduct myself accordingly.)

DI: Jamie, you’ve given us the benefit of decades of your wisdom and knowledge in the way you practice, the way you look at the world, and the way you look at these complex, high-stakes situations. Is there anything else you’d like to add?

JF: If there’s a legacy to leave on this subject, it is to provide insight to others.

I believe three concepts are important to mention in response to your question:

- a. Stay relevant and continuously build new substantive skillsets.
- b. When you start your career, there’s a steep learning curve of professional growth, but over the years, professionals begin to “flat line” and that should be frightening and avoided.
- c. The learning curve never stops and it’s most often very steep. Getting off that learning curve takes the professional into the world of those that can be easily intermediated.

Jamie Frankel is a senior partner in the Construction Law Group of the national firm of Schiff Hardin, LLP. He focuses his practice on providing creative business solutions to front-end project structuring, transactional documentation and contentious dispute issues as he serves the owner, architect, engineering and construction communities.

In addition, Jamie provides intermediary services within his M&A practice which has been an ongoing part of his practice for more than 30 years. His practice also includes his work in renewable energy.

Jamie is the creator of Schiff’s Curtainwall Risk Management Program in which he and his team address the containment of risk related to this building element including addressing related dispute-resolution issues.



Designing Collaborative Education

In today's A/E/C industry, collaboration between designers, builders, engineers and constructors has become increasingly more important. Buildings are more complex. Clients demand better performance. Climate change is placing demands on how we build for the future in a sustainable way. Costs, efficiency, liability issues and more—all are impacting the outcomes of design and construction. Strategic collaboration, while not a new concept, is shifting the way that A/E/C professionals work together to build a better world. Mississippi State University's (MSU) School of Architecture and Building Construction Science program recognized the changing trends in delivery methods as well as the importance of teaching their students how to be industry leaders.

DESIGNINTELLIGENCE WITH HANS & MICHELE HERRMANN

Recently, DesignIntelligence talked with Mississippi State University's Hans Herrmann and Michele Herrmann about the College of Architecture, Art and Design's cross-disciplinary program for architecture/design/construction management students and how they went about resourcing faculty to be more effective in teaching IPD content.

DesignIntelligence (DI): Tell us what inspired you to develop the cross-disciplinary education program as well as the context in which you began your work.

Michele Herrmann (MH): From the Building Construction Science (BCS) side, it started when Jim West, former dean of the college, was approached by construction industry professionals who saw a need for a different type of construction management professional, someone with a collaborative skillset, more soft skills. Those involved in creating the BCS program saw a unique opportunity to create a program within the College of Architecture, Art and Design that would facilitate this type of collaboration by strategically modeling the pedagogy of the BCS Program to be studio-based, which

is common in architecture and other design disciplines but unheard of in construction education.

The School of Architecture was already well established, but the BCS program was a clean slate—a tremendous opportunity but overwhelming at first. There was always a goal to eventually have collaborative studios between architecture and construction, but the initial idea was to build toward that in incremental steps. It began with cross-disciplinary lecture courses—such as structures, active and passive building systems—that were required for both disciplines. The students took them together so they could start to collaborate and interact with each other.

The first studio-based collaboration began in 2011 when Brasfield & Gorrie General Contractors approached the college about sponsoring a two-week interdisciplinary student competition. They recognized the industry's need for emerging professionals who were knowledgeable in collaborative project-delivery methods. For that competition, we gathered fourth-year students from architecture, construction and

interior design. We still do that competition every fall and have since included graphic design. In addition to the competition, all architecture and building construction science students now take part in two semesters of collaborative studios—first in fall of their second year and again in spring of their third year.

DI: Initially, you looked for overlaps in the curriculum between construction and architecture. Would you recommend that to others or would you start with a different approach?

Despite the introduction of, and increase in, collaborative project delivery methods in recent years, the academy is still ill-equipped to prepare students for collaborative practice. Approximately 70% of faculty members surveyed who identified as teaching collaborative project-delivery methods, such as Design-Build and Integrated Project Delivery, also acknowledge a lack of firsthand industry experience with the project-delivery method. In an effort to improve the teaching of collaborative skills, as a foreground for collaborative practice, the authors conducted a two-day interactive symposium—“Integrated Project Delivery Theater”—for nearly 80 third and fourth year level bachelor of architecture and building construction science students in which the students actively engaged in exercises exploring the six topics central to IPD as outlined in the American Institute of Architects’ Integrated Project Delivery Guide. These topics included: process, team formation, communication, compensation, risk, and agreements.

Source: Mississippi State University School of Architecture and Building Construction Science Program; IPD Theater Presentation 2017.

MH: From BCS’s point of view, as a clean slate, we had tremendous opportunity and freedom to define what we wanted to be from the beginning. Because the School of Architecture was already well established, they had important decisions to make in terms of identity.

Hans Herrmann (HH): Yes, I would recommend beginning where curricula overlap. In our case, we asked some questions of ourselves: who will we be teaching to, what will the faculty be capable of, what will students be capable of, and how could we implement this new approach at the undergraduate level? Since we didn’t have graduate students with which this content might more readily resonate, what would be the common ground on which we operate such that undergraduates might find traction and value?

That’s how we wrote the construction, materials, methods, and technology courses, which needed to be taught jointly with BCS faculty. We felt that if the students were going to partner with each other, they should all learn the same content simultaneously. We didn’t want a hierarchy to exist that would give one group an advantage or engender an academic disparity.

The School of Architecture has historically been focused on technology and design rooted in craft and materiality, so we held to that context and introduced that as the ground for collaborative learning. Because building technology is fairly objective, we felt students could get a solid footing with something relatively straightforward to understand and later deploy within more advanced collaborative-design thinking.

DI: Ultimately your effort focused on 1) developing interdisciplinary courses for students and 2) studying the state of interdisciplinary education in architecture and construction programs. Why include both directions?

MH: Hans and I, along with former colleague Emily McGlohn, saw the industry shift toward collaborative IPD (Integrated Project Delivery). The longer we’re in academia, the further away we get from firsthand experience with emerging project-delivery methods, so we needed to do some homework ourselves. We found in other programs that they were just

figuring it out as they went. So, we developed the Integrated Practice Theater with funding from the Architecture and Construction Alliance. We explored and developed ways to make our teaching of IPD principles as effective as possible, not only for our students but also so we could share our findings with colleagues in other programs.

DI: When you looked at other institutions, what positive examples did you find?

MH: As educators, we struggled to find examples that gave us enough substance and detail to use in our teaching. Case studies that are a synopsis of an IPD project don't help you understand how and why those projects were successful from an interdisciplinary perspective. We did learn that the more the different disciplines respect, understand, and work with each other, the more effective collaboration is.

HH: We knew that Auburn University had, for a brief time, a graduate program that focused on integrated practice and other institutions such as Cal Poly San Luis Obispo [California Polytechnic State University at San Luis Obispo, California] had been experimenting in limited ways and those served as models for us. Other schools offer collaborative experiences as electives, but students who want those experiences aren't guaranteed to get them. That helped us commit to the idea that this would be a curriculum-wide requirement for graduation. With that, we set about developing institutionalized ways of working.

DI: You were breaking new ground in that sense.

MH: In terms of it being a requirement for every student in these programs, yes.

HH: That helped get the faculty on board. This wasn't going away, so they began to take it seriously.

Because we don't have graduate students and our teaching load is high, everyone involved needed to get some benefit out of this effort with regard to scholarship and publications for promotion and tenure. We had to make a strong case for why it was necessary, how to implement it, and substantiate that work with peer-re-

viewed research. Sole authorship, as you know, is a cornerstone of academic performance so working this hard to only have co-authored research was a big request. People needed to know their joint efforts would be acknowledged and rewarded accordingly.

We established a sincere and rigorous approach. The dean and department heads were very supportive and paid faculty during the summer to record and study our efforts. We did significant documentation of successes and failures of exercises as well as developed and evolved learning modules so we could build on them and share it with the faculty. It legitimized the effort in their eyes, to see that the administration wanted us to succeed and was trying to figure out how to do it in a meaningful way.

DI: What were some challenges?

HH: We decided to work with young, inexperienced students because we felt they may not have developed preconceptions about their discipline or the other yet. Consequently, their understanding of the most basic design/bid/build formats for project delivery are limited. It was difficult for them to grasp and hard for us to model the nuances within various types of project delivery. Plus, there's very little collaborative industry work in our immediate area so it's difficult for students to find internships or co-ops to build on that education.

Another challenge is getting our colleagues to understand that the artifacts of this work won't be the same as in traditional education. If an architecture student is presenting a flowchart, estimate or spec sheet, we need to be open minded about why they're doing it and how it's a manifestation of their skill in cross-disciplinary or collaborative-design work.

70%

FACULTY ACKNOWLEDGING LACK OF
FIRSTHAND INDUSTRY EXPERIENCE WITH
PROJECT-DELIVERY METHODS

DI: It seems like your students need both hard and soft skills for a collaborative, IPD practice environment. What would that ideal student look like?

MH: Someone open-minded, willing to listen, who understands that others have valid contributions. Someone who doesn't think education stops when they graduate but will continue to learn and adapt.

On the construction end, our graduates get jobs with regional and national companies. Industry professionals appreciate our students' collaborative experience because they have to talk with other disciplines every day. And even design/bid/build projects benefit from professional understanding, mutual respect, and effective communication on any project.

When I ask industry professionals for advice for students, they always recommend a psychology course. If you can't work with others, it doesn't matter how smart you are, how much you know, or what you can do individually.

DI: Are the hard skills different when you're teaching architecture and construction students a collaborative approach?

MH: They may be different but still related. We have to make sure the individual disciplines are fulfilling their objectives for each course. We still have to fulfill our accreditation requirements.

DI: What goals did you set to guide and measure your progress on the effort?

MH: It's hard to measure in a truly objective way. The output of the fourth-year student competition has changed drastically. We didn't have collaborative studios in 2011, but now the students taking part in the competition are used to working with each other, so they hit the ground running. When we talk about our efforts, the process is equally as important as final output, but the process is hard to measure.

HH: In the big picture, one obvious metric is graduates taking positions with firms that focus on this kind of work. But that's also a challenge because those firms operate largely in the

Pacific Northwest, and many of our students don't want to move far away from home, especially without having had an internship, co-op or some form of professional experience in this area. Another metric is feedback from our advisory boards and hearing what firms think of our graduates and whether they're supportive of this. This information we do get steady access to, and it has been overwhelmingly positive.

On metrics specifically for each student, we have every student in both programs participate in building something full scale. Graduates can then show that work in their portfolio or resume. Within that project, we've developed other goals, such as whether it's done on time and on budget. It gives students a sense of accomplishment and understanding that this approach allows you to make guarantees to your client.

On the research side the faculty made a pact that what we do in the classroom (i.e. the scholarship of teaching) will whenever possible be shared such that it may be acknowledged by our colleagues through organizations such as the ACSA, BTES or AIA, whether with awards or recognition through publication. That external assessment then feeds back into the students' portfolios, benefiting both students and faculty.

DI: What advice would you offer other educators who want to build similar programs?

MH: Start small with a project of limited scope and duration and set realistic expectations. The amount of coordination that's required can be overwhelming at first. You have to have buy-in from the faculty as well as the administration, which we've been fortunate to have here. Also, as faculty, you have to model the behavior you're trying to teach students. It's a lot of collaboration and time on the faculty's part.

HH: In shared work, like shared scholarship, you want to avoid territorial behavior. Sit down at the beginning with administration and faculty and develop a collaborative-teaching-culture document that establishes guidelines for behavior on how you're going to publish, share, and talk about the work. That way, everybody is clear. Practicing this

The ability to work effectively in teams has become increasingly important because of the complexity of projects requiring expertise from a variety of specialties and demands from clients for better building performance. Collaboration is a meaningful response to the ongoing marketplace mandate for buildings that are faster to design and construct and at a lower cost than those built in the past. And, perhaps most important, it could be argued that the final outcome—the design work—is actually better.

Source: Andrew Pressman, Designing

Relationships: The Art of Collaboration in Architecture.
New York: Routledge, 2014.

same form of directness and transparency is similarly useful in defining the pedagogy, right down to the day-to-day assignments and exercises.

DI: What do you see as the future of interdisciplinary education in architecture and construction?

HH: I see architecture moving away from risks related to the execution and administration of a project, choosing more and more to engage only the schematic design phases. Our definition of a good architecture student is still linked with their ability to make beautiful compositions, but I have witnessed that not every student is good at that. Plenty of students excel in technology, history or theory courses, as well as communication, organization, and systems-thinking,

which are required to work in integrated practice. We need to find a place for students with those skills in the architectural profession instead of dismissing them because they can't make a beautiful figure on a piece of paper. I believe that schools need to think about the future and open up the field to some expanded definitions of accomplishment and skill in design-thinking and design-making if we hope to remain relevant within both the academy and the A/E/C industry.

MH: On the construction side, the labor shortage will eventually affect how clients demand projects be delivered, whether it's fast scheduling, integrated practice, or public-private partnership. A different type of professional is needed to facilitate those projects. Students like ours with an interdisciplinary education will be in higher demand.

Hans Herrmann is associate professor of architecture at Mississippi State University focusing on foundational design, comprehensive/integrative design, and building technology. With degrees in architecture and landscape architecture, both his professional work and teaching have received numerous national awards and recognitions from organizations such as the Cooper Hewitt Smithsonian Design Museum, American Institute of Architects National and State level, Association of Collegiate Schools of Architecture, American Society of Landscape Architects National and State level, and Architecture + Construction Alliance.

Michele Herrmann is associate professor with the Building Construction Science Program at Mississippi State University focusing on construction law. She earned her bachelor of science in design from Clemson University and her Juris Doctor from New York Law School, where she worked at the Center for New York City Law. She is a member of the New York State Bar.

THE FUTURE OF ENVIRONMENTAL RESPONSIBILITY

Technology, Sustainability, and the Construction Industry— a Case for Change

There are many trends and changes that are impacting the construction industry. From innovations in technology to sustainable construction, from a labor shortage to increased prefab projects, from increased material costs to green technology, companies must stay up to date in order to compete in the future. DesignIntelligence talked with Susan Heinking and Jake Pepper of Pepper Construction about new technologies, new ways of thinking, “coopetition” and how the construction industry can change the way it operates.

DESIGNINTELLIGENCE WITH PEPPER CONSTRUCTION

DesignIntelligence (DI): What are the top drivers of change in the business and practice of construction and A/E/C?

Susan Heinking (SH): Technology will be the biggest driver of change within the construction industry, but in addition to that, the increase of renewable energy sources in the market is going to be another big driver of change. Climate change, extreme weather events, and our focus on health and wellness

with people spending 90% of their time indoors will also impact the industry’s future. All of these things are interconnected one way or another, which will force our hand to design and construct buildings differently. We will have to build differently because buildings will have to be operated differently, and the common denominator will be technology that instantly gives us information. Robotics are coming online more frequently in the construction industry, which will also change how we build.

DI: What are some challenges and opportunities that you see for construction firms in the future?

Jake Pepper (JP): Higher-performing buildings create huge challenges and incredible opportunities at the same time. We spend as much time in our work environment as we do in our homes. Because of this, building occupants are beginning to demand healthy working environments. This is only possible if buildings are designed and built to be smart, connected and to generate as much, if not more energy than they are consuming. Right now, a high-performing building costs a premium, and that premium is justified by energy savings or increased

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We as an industry are being naïve if we don’t believe there are massive changes coming to our industry. The best way for us to remain relevant is to be ready for those changes when they’re actually here and help shape them as they develop.

productivity of workers. At some point, high performing buildings will be standard, which is our big opportunity. Our challenge is figuring out how to build those high-performing buildings as fast and cost-efficiently as a typical building.

SH: Our buildings are going to be a little leaner—higher performing and more efficient. But they're also going to have to be stronger and more resilient. If an extreme weather event happens, it's important that everybody stays safe, but how do we also bounce back quickly? How are we not only making our buildings more resilient, but also making our job sites more resilient as we're building?

DI: How is technology both a challenge and an opportunity for construction firms?



When sustainability becomes important to the occupants of the building, which are really the employees of the companies that are leasing space in the buildings, that will cause change. Those companies are going to be dedicated to providing their employees healthy working environments within high-performing buildings.

JP: There are a couple of indexes that look at different industries' adoption of technology relative to other industries. The financial world is at the top of that list because they've embraced technology. Construction and the built environment is second from the bottom only above hunting and agriculture—and if you're looking at Big Ag, you can argue they're much more advanced technologically than we are. Our biggest challenge is trying to find solutions that work across the four to five generations that exist in the workforce right now. Once you find that technological solution, you have to get all the different users to

As in industry, our productivity hasn't increased since 1960. We're building buildings the exact same way we were 50–60 years ago. Technology, especially robotics, is increasingly playing a role in the forward-looking changes that we're seeing in the industry. We have to get creative about the process of designing and constructing a building in order to build them faster, cheaper, and to be more resilient without sacrificing quality.

believe it's going to make their job easier and better rather than harder because they have to learn something new. Every new piece of technology and software, no matter how great, is in itself a challenge to implement in an organization.

DI: What do you think are the most effective ways to get a very traditional industry to embrace change in the way you're describing?

JP: Whether it's grassroots or not, you have to come up with solutions that are perceived as grassroots and organic. You have to prove out technology by building a case study around it and getting a team on board. Hopefully that team involves someone who is cynical at first, but who can then testify to the technology's benefits in the end. We've done that by going from paper drawings to electronic and using an iPad in the field. Once we sit down with those who are resistant and work through it with them, they are able to see how easily connected and accessible their data and information is. They then embrace it and tell their peers they need to start doing it. If you just command and control from the top, it's never going to work.

DI: How do you see the construction firms' fundamental business model evolving to meet these changes to thrive in this new kind of environment?

JP: We're going to have to get comfortable cooperating with our competition, and so a lot of people in the industry have started talking about this term "coopetition." Who are you competing with that you are willing to cooperate with in order to progress the industry and really push it in the direction it needs to go? If we're comfortable doing that, we can start to pull away from that broader pack and be the leaders of this new business model.

DI: How can construction firms help promote more sustainable strategies for their clients, and how do you promote that?

JP: We developed a software program called the Pepper Building Performance Tool that can take basic inputs on projects and run quick energy models for various design options. We couple these energy models with the upfront construction cost of the different options and the owner starts very quickly understanding their payback scenarios associated with the different designs. Before we built that tool, it would have taken us two weeks to project that data, where now it only takes us 15 to 20 minutes. To put that in the context of "coopetition," we've had good feedback on that product, so we're looking at bringing on a partner to help us turn it into a more robust program that potentially gives licenses to architects, engineers, property managers and even our competition. If we turn it into a product that people pay a monthly fee to use, it really shouldn't have any contingencies on who is or isn't allowed to use it. It will make for better projects throughout the industry, and that's a new mindset relative to the traditional business model.

DI: What is the bigger picture for building the business case for sustainable design and construction?

90%

AMOUNT OF TIME HUMANS
SPEND INDOORS

COOPETITION

Who you're competing with but that you're also willing to cooperate with to progress the industry and push it in the direction it needs to go. In this way, by opening up and collaborating, the industry will grow and there are potential benefits to everyone. Collaboration across engineers, designers, owners and contractors from day one helps projects come in under budget, on time, and more efficiently.

SH: We're trying to raise awareness and bring attention to certain environmental topics. Solar photovoltaic is a great example. For every new project that comes in with a site or roof that lends itself to solar photovoltaic arrays, we will soon have a standard in place that will provide a calculation for that feature, whether it's asked for or not. Just because they didn't ask for it doesn't mean that they don't want it. It kick-starts a conversation, and if they say they're interested, then we're one step closer to a higher-performing building.

In the beginning we had very lofty goals with our Building Performance Tool, and we wanted to tackle all of the strategies that make a high-performing building high-performing. We wanted to look at energy, water saving, indoor air quality, overall environmental quality, and the health of the materials we were installing in the building. We wanted this tool to show construction cost and the return on investment calculation—not as straightforward as ROI for energy, but to do it with water and environmental quality for increased productivity or rental value. When we started to get into it, however, it was a lot, so we decided to tackle one topic at a time and since energy is something everyone can understand, we started with that. But we plan to grow it.

DI: Are there barriers we can identify and try to work around that could really open things up and have them scale quickly in sustainable design and construction?

JP: I think a lot of the barriers are economic, and breaking those down comes from the end user. When sustainability becomes important to the occupants of the building, which are really the employees of the companies that are leasing space in the buildings, that will cause change. Those companies are going to be dedicated to providing their employees healthy working environments within high-performing buildings, and they will be willing to pay a premium to do that. That in turn will push the real estate industry to create those buildings, and that's all happening right now with the big guys like Facebook, Apple and Google. The mom-and-pop shop down the street that might be renting 10 desks isn't there yet. At the same time, hopefully these high-performing options and materials become more cost-competitive.

DI: Assuming construction firms are going to continually improve at building high-performing buildings more sustainably, how do you see Pepper remaining at the front of that competitive wave?

JP: Our perfect example is the creation of the Building Performance Tool. It's a proprietary software that helps us stay in

front of our competition and be forward-thinking. We've also created a net zero construction trailer to provide a better working environment for our field teams, because they might occupy that trailer for up to four years depending on the length of a project. We wanted to create an environment that will enhance productivity, and in that way, we're being a better steward for our employees. Our clients might pay a premium to have a high-performing trailer on their job site, but they will get a better product and service at the end of the day because of it. We are going to continue to innovate and try to capture first-mover advantage.

DI: How does staying highly attuned to changes in the marketplace and having strong foresight play into your overall business strategy?

JP: I think we as an industry are being naïve if we don't believe there are massive changes coming to our industry. The best way for us to remain relevant is to be ready for those changes when they're actually here, and help shape them as they develop. There are many ways to try to figure out what those changes are going to be. We're associated with a venture capital building fund called Building Ventures, and that team gives us a foot on the ground on the tech scene. They know every software company out there focused on our industry, so we can use them as a sounding board. We know how to be a general contractor, we know how to build buildings, and as that process evolves, we will make sure we're the most educated on those new processes.

Susan Heinking, AIA, LEED Fellow, is vice president of high performance and sustainable construction at Pepper Construction.

Jake Pepper, LEED AP, is vice president of Pepper Construction, leading strategic IT initiatives.

BIG DRIVERS OF CHANGE IN THE CONSTRUCTION INDUSTRY

- 1)** Technology—robotics, drones, VR, AR
- 2)** Increase of renewable energy sources
- 3)** Climate change and devastating weather events
- 4)** Human health and wellness in the built environment

PERSPECTIVES

Convention Meets Invention: Change, Technology, and the A/E/C Industries

Change does not come easy to the A/E/C industries, but that doesn't mean we shouldn't challenge our thinking about the best ways to do business. The needs of the present (and the future) are unlike any we have previously faced.

JULIAN ANDERSON

But it's not so much that we should be doing *different* things when designing and building buildings but that we should be doing the *important* things better. Innovation without insight is wasted effort. The popular term "disruption" is a dramatic misnomer that I suspect serves more as marketing bait for venture capitalists; what's actually happening is the antithesis of disruption. In the A/E/C world, technology is not interrupting the workflow; it is making workflow seamless.

Underlying all the technological advances we're seeing in software, hardware, and equipment, these changes boil down to making connections: between the designers, the engineers and the jobsite supervisors, labor, and the owners. It's enhanced communication that can make project planning, project management, and project execution less susceptible to interruption.

God Is (in) the Data

To be clear, that communication is not verbal in nature; it is digital. And the main participants in the conversation are the tech titans. Information collected from our homes, workplaces, and public spaces via a host of devices is converted into algorithms focused on efficiencies, a driving concern of the A/E/C world.

In the residential sector, Amazon has a deal with Lenar, one of the country's largest homebuilders, to equip its new housing stock with an array of Alexa-controlled products, including built-in WiFi, smart locks and doorbells, thermostats, and

lights. To analyze uses and patterns in the office, WeWork has instituted extensive monitoring programs. An example of the granularity of its studies: To ascertain the occupancy rate of meeting rooms, battery-powered thermal sensors were placed under conference room tables to measure how many pairs of legs were present and for how long. Crunching the resultant numbers, the company concluded that conference rooms should be smaller in size since they're rarely full.



In the A/E/C world, technology is not interrupting the workflow; it is making workflow seamless.

Going outside, we're about to get a ground-up look at how this kind of approach plays out at scale. Sidewalk Labs (which is owned by Alphabet, the parent company of Google) is a consortium of urban designers and technologists who are dedicated to exploring how new technologies can solve big urban challenges and improve the quality of life in cities. In 2017, it became a partner in a major development in Toronto called Quayside, which seeks to revitalize 800 acres of underutilized waterfront land with a slew of fresh thinking about affordable housing, resiliency and flood protection, retail, and transportation systems.

In Toronto, Sidewalk Labs is planning to contribute innovations that are overtly oriented to the built environment, such as canopies that automatically retract in advance of severe weather. But as the architect of the data infrastructure, the applications—and the implications—of Quayside’s digital domain will be significant beyond the immediate community. As with all R & D, it will take time to evaluate its success.

Spreading the Digital Word

A fundamental factor in transmitting this information is the telecommunications system. The advent of the 5G wireless network (rolling out in 30 U.S. cities by the end of 2019) will open up new bandwidth spectrum for IoT use and small-cell deployment in urban areas, both of which are central to construction applications. The faster rate of data transfer—upon its release, 5G downloads are initially estimated to be about 20 times as fast as the current 4G capability, and will accelerate to more than 100 times as fast—will support the reception and streaming of videos captured by drones, as well as enhance virtual-, augmented-, or mixed-reality tools.

Based in Realities

Those reality visualization programs are significantly growing in usage. Worldwide spending on augmented reality and virtual reality is expected to reach nearly \$20.4 billion this year, according to market intelligence firm International Data Corp. That’s up from an estimated \$12.1 billion in 2018.

On the construction site, the rise of reality-capture technology has opened the door to true, real-time analysis of projects. Drones, rovers, laser scanners, and 360-degree cameras can more effectively track progress and productivity as well as identify risks for potential delays. Drone-based visual

\$20.4B

WORLDWIDE SPENDING
ON AR AND VR IN 2019

inspections not only provide up-close, accurate images but can easily produce pictures from vantage points that were previously inaccessible to human photographers, such as inside wall cavities or over bridges. All this can help streamline the design process (and timeline) by eliminating unnecessary design iterations.

Trimble recently introduced a viewing device that clips to standard hardhats and enables workers to access holographic information directly from the jobsite. Featuring a wider field-of-view than earlier generations of the hardware and a flip-up viewscreen, the XR10 with Microsoft HoloLens 2 combines state-of-the-art mixed reality and safe operation in restricted-access work areas. Unlike immersive headsets, whose opaque displays conceal the physical environment and replace it with a fully digital experience, this transparent display allows users to see the physical world while digital content is superimposed into the view in real-time.

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Historically, the construction industry is slow to change and risk-averse, for obvious reasons. Until a process is tried and true, developers will not embrace it.

From the Ground Up

There’s been lots of discussion about the viability of 3D printing as a construction method. Historically, the construction industry is slow to change and risk-averse, for obvious reasons. Until a process is tried and true, developers will not embrace it. The large printers that are required for additive manufacturing—for onsite concrete pours, for example—rely significantly on the reliability of the print head. If a problem develops there, the entire process can grind to a halt. The enormous size of these printers makes them expensive and difficult to transport as well.

The future of modular construction, where building components are manufactured in a factory-controlled environment instead of on a construction site, looks more promising. Big Data is ever-deeper involved in this facet of the industry. Through its Alexa Fund, Amazon has invested millions in Plant Prefab, a Rialto, California-based company that builds prefabricated, custom single-family and multifamily residences using sustainable materials and processes. For its modular



Disruption has its place; without it, there could be no progress, and we'd be stuck in an endless status quo. By the same token, continuity is critical; we can't go back to square one every time an innovative step is taken.

homes, Plant Prefab has developed a proprietary technology which the company claims can reduce time by 50% while also achieving a savings in overall costs of between 10% and 25%, depending on the geographic market.

Future Perfect?

Disruption has its place; without it, there could be no progress, and we'd be stuck in an endless status quo. By the same token, continuity is critical; we can't go back to square one every time an innovative step is taken. It's worth bearing in mind that the A/E/C fields are composed of both creative forces and conservative thinkers, and their needs are sometimes divergent. By applying these new technologies to the design and construction process, we are reducing risk, cost and time and enhancing the process, which then empowers the parties to use it and adds value across the board.

Julian Anderson is president and a founding shareholder of the Rider Levett Bucknall's North American region where he is responsible for overall management of the practice. He is also chairman of RLB global board of directors.

DFC FIRM HIGHLIGHTS

Advocacy: The Impact of Architects

The need for great architecture has never been more urgent, the challenge to creating it never more complex. At SHP we believe our mission is informed by three things: design, research and advocacy. For most of us, the value of design is where we were born. Research underpins the way we solve problems. Advocacy is the new kid on the block. Like good design, advocacy requires a commitment to a belief and mission that adds deeper value to the solutions we provide, not just to our clients but to a larger context, one that embraces empathy around differing points of view that learn from the past and embrace constant change and improvement.

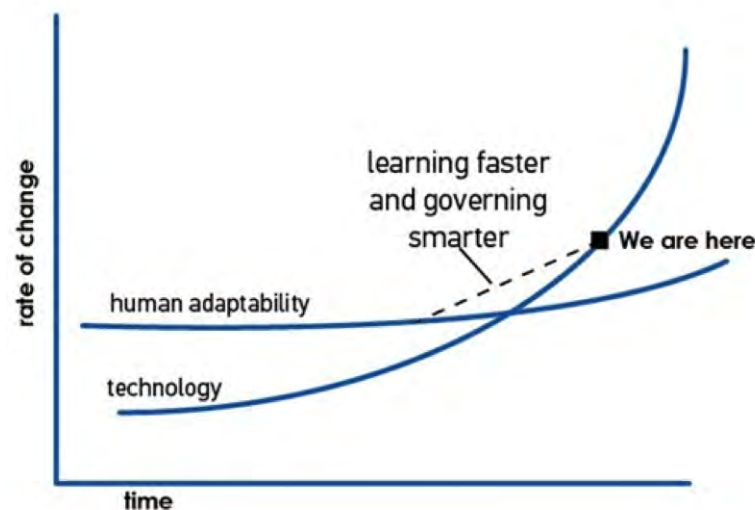
DICK THOMAS

A number of things shaped this article. The first was a workshop sponsored by Autodesk in 2015 under the moniker of “IDEAS: The Innovation + Design Series.” The specific session centered on the following question: How can we foster a design mindset in education to help more people to cultivate 21st century skills? Out of this experience, I asked myself if I had been designing educational facilities to an outdated and inadequate paradigm. It caused me to completely re-think how I apply the skills I’ve learned as an architect to the challenges, large and small, of the world today.

The second was a Futurecasting event that SHP executed that informed the future mission and vision of the firm, as well as underpinned the co-authoring of a book called “9 Billion Schools: Why the World Needs Lifelong Personalized Learning for All.”

Another was reading Tom Friedman’s book titled “Thank You for Being Late,”¹ in which he discusses the “AstroTeller Curve”—a unique perspective on the pace of change in our world today (see right).

As a firm that has spent a good bit of the last 75 to 80 years of its almost 120-year history serving the needs for the education marketplace, the three events just described can’t be ignored. Continuing to shape, inform and influence our work through the lens of lifelong learning requires us to dig deeper into how learning can add value to what we do.



Source: “Thank You for Being Late” by Tom Friedman

Just as the maturation of the value of the “I” (Information) in Building Information Modeling (BIM) is rapidly changing how we document the buildings we design by adding value up front in the form of data, so too must we integrate higher value into the decisions that go into “what” we design. We need to advocate for deeper, more meaningful solutions to the “wicked” challenges we face. Repeating past mistakes of paradigm serves no one in the long-run. Becoming part of the hard work of changing mindsets and informing the future versus reacting to it is difficult and doesn’t happen by flipping a switch. It requires a decision to devote time, resources and energy to learning constantly about the issues, researching possibilities, and broadening our reach and influence. It requires a kind of advocacy for both the higher level mission (lifelong learning) we serve and our role in advancing it.

Architects have great power to impact the multitude of issues facing our society and culture today. By leveraging our innate skills in applying design thinking and design skills to the problems in our world, we can lead in building a better world. In the simplest of terms, our focus needs to expand from simply responding to a program defined by others, to helping define the program to which others must adapt. In short, we must advocate for change to the basic ways we have been conditioned to respond by taking on problems at the source of the question, rather than the arguably predetermined answer as reflected by the POR (Program of Requirements). This is an enormous, scary and perhaps risky challenge, to which I believe we are called ... or should be.

SHP has responded to the call for advocacy over the past twenty-five years in several ways.

One way is in recognizing that architecture, as Dana Cuff would argue, is a “social construct.” In the early 1980s, SHP adopted a process centered on the power of the voice of the customer and it was called the “Schoolhouse of Quality.” The process advocated for and interjected the voice of all those influenced and/or affected by the buildings we designed directly into the design process. It was influenced by and derived from the work of W. Edwards Demming and the application of TQM (Total Quality Management) methodologies into the

THE 9 BILLION SCHOOLS INSTITUTE

By 2050, there will be at least nine billion people on our planet. The 9 Billion Schools Institute’s bold vision is that for a healthy, productive and rewarding existence in 2050, lifelong, personalized learning will be a must. Given the rapidly increasing pace of change we are all working hard to manage, it is becoming more and more evident that everyone will soon have to become a school unto him- or herself, a place, so to speak, of near-constant learning for his or her entire life.

As columnist and bestselling author Thomas Friedman puts it in “Thank You for Being Late: An Optimist’s Guide to Thriving in the Age of Acceleration”: “We go to school for twelve or more years during our childhood and early adulthoods and then we’re done. But when the pace of change gets this fast, the only way to retain a lifelong working capacity is to engage in lifelong learning.”

Though the Institute’s vision is lofty, we believe it is achievable by focusing our immediate work on bringing definition and clarity to real-world solutions that deliver on the promise of personalized learning in our daily lives. We do this through active research, consulting with real world learners, advocating through books and publications, and connecting like minds with the mission and vision of lifelong, personalized learning for all.

The Institute is committed to the infusion of personalized learning skills and opportunities that are tangible, effective and supportive of a lifelong, life-wide and life-deep experience in all areas of our daily lives.

The Institute is actively engaged with the School for Innovation in Society and the Mary Lou Fulton Teachers College at Arizona State University in the pursuit of the above-referenced activities. It is seeking additional partners and research and development opportunities in the pursuit of mutual goals related to education for all and the pursuit of lifelong, personalized learning as a means to flourishing in the future. To learn more, please see the book “9 Billion Schools: Why the World Needs Lifelong Personalized Learning for All,” which is available at www.9BillionSchools.org.

auto industry. Our advocating for better ideas by all those closest to the issues was celebrated. It was a critical success factor in moving SHP from a local design voice to a regional power house—setting the firm up to elevate its design work and status in the conversation about education.

John Tocci, of Tocci Construction and co-founder of the BIM Forum, is famous for introducing many BIM Forum events with statistics that indicate our trillion-dollar industry regularly operates on a 30% to 50% inefficiency ratio, wasting between \$300 billion and \$500 billion a year! The numbers are staggering and embarrassing even at the lowest percentages. How this happens belongs to everyone that participates in the business, and I include myself in that. To combat the issue and to advocate for the efficacy of a better way, SHP led an effort to redefine the process of design and construction some 10 years prior to the first conversation about Integrated Project Delivery (IPD).

In 2000, SHP and a leading major construction company joined forces to implement the concept of Integrated Project Delivery (IPD) as means to deliver better-designed, higher-quality facilities with lower risk for all involved. SHP and the construction company shared total project value risk equally (to the penny!) across the board, and developed performance compensation incentives and processes that were highly

collaborative from start to finish. We blew apart standard delivery methodologies, employing state-of-the-art pull planning and last-planner strategies when such process models were in their infancy. We pushed the early adoption of Revit technologies and the application of the power of BIM and led the firm's transition to the potential ability to leverage the data we were producing well into the future.

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Stepping out of our limited view of the profession, to embrace our natural ability to solve problems at a much higher and more influential level than before is our responsibility.

Advocacy can take many forms and it would be undeniably wrong for me to suggest that the profession has been devoid of the concept of advocacy. We advocate for “DESIGN” and its power to make lives better. Good design is a powerful positive influence anywhere it is applied. I would be equally wrong to suggest that the profession has failed to make lives better through design. It has done so in spades, and I am proud to be an architect and a member of such a noble endeavor. I am not arguing the we as a profession have failed per se, but that we are selling ourselves short and can do (must do?) more if we are to continue to even hope we'll be in any position to control our own destiny. I am not alone in that belief and am inspired by others that have come to the same conclusions and have developed ways to spread the message and include others in leveraging our skills toward a better future.

Several examples come to mind. The first is HMC Architects, who in 2008, formed a non-profit called the Designing Futures Foundation. Their mission is to give back to the communities the firm serves. Another example is InScapePublico, a non-profit architecture firm whose mission is to provide affordable

OUR TRILLION-DOLLAR INDUSTRY

30%–50%

INEFFICIENCY RATIO

\$300B–\$500B

WASTED PER YEAR

Source: BIM Forum

professional architecture services to other nonprofits and the people they serve. A third example is the Open Hand Studio of Cannon Design that works as an incubator for public-interest design projects within the firm with a two-pronged approach to giving back.

Each of these examples speak to outreach and either support them through access to funds, or reduced cost via pro-bono services or reduced fees that create a more fertile environment for problem-solving in a related context to the value of design. They are to be applauded for their work. There are numerous other firms and organization that take on advocacy in ways that support their role in the community and their positions on particular social issues.

The way we, as professionals, were taught to solve problems has enormous value in addressing the challenges of the future. When in school we were taught that the first step in design was to understand as much as possible, what was there to know about “who was asking?” Today’s favorite descriptor is the term “empathy”—to ask not just “what was the program?” but to explore much more deeply what the issues were that generated the program. As a profession, I think we’ve lost a good bit of that. We default too frequently to simply accepting that beloved POR.



Our designs need to be accountable to the performance goals necessary to enhance our communities and the places in which we live.

As important as that first step (empathy) was/is—we believe a greater sense of empathy based on research is necessary to be of highest value to the needs of the future. This is no longer about waiting to be told what to do. Rather, it is about researching, defining and getting ahead of the issues of importance so we can shape the programs and solutions being created.

Stepping out of our limited view of the profession, to embrace our natural ability to solve problems at a much higher and more influential level than before is our responsibility. Given the complexity of the global issues we face, we need to recognize just how much we need to step up and stop living under past paradigms.

To that end, in support of the firm’s mission and commitment to lifelong learning for all, and to advocate for so many things that are critical to the future, particularly in education, we formed a non-profit research/consulting organization called the 9 Billion Schools Institute. Through the work of the Institute, topics around the future of how we teach and learn, how facilities need to respond to change, the role of design in enhancing productivity in the corporate world, etc., are being explored to help us shape and implement the future so others can thrive in it. In doing so we believe we add substantive value to what we provide our customers through design and execution, and we enhance the idea of what architecture can provide to society today.

We are doing this because we believe it is key to our ability to thrive in an ever more complex culture and profession. We are doing this because it is no longer good enough to design it, build it, and then just walk away. We have an obligation to understand more about what we do and its impact on the complex fabric of our world. Our designs need to be accountable to the performance goals necessary to enhance our communities and the places in which we live. To be responsible/accountable we need to know more, to understand more, and to analyze more so that we can promote the value with the proof that what we do is better for us all.

¹ Friedman, Thomas L. *Thank You for Being Late: An Optimist’s Guide to Thriving in the Age of Accelerations*. New York: Farrar, Straus and Giroux, 2016.

Dick Thomas, vice president at SHP, has a broad background of experience gained over his 40 years of diverse practice in the public and private institutional and commercial business markets.

The Death of the Architecture Firm—Part 2

This is the second of a two-part exploration of how today's architecture practices must transform to survive. Part One (in the 1Q 2019 issue of *DesignIntelligence Quarterly*) touched on many of the external factors impacting the industry and the need for developing new organizational models.

Most companies today have discovered the importance of striking an equitable work-life integration, but many are still baffled on how to create a coherent, compelling culture when many employees work from home most days of the week. The traditional 9-to-5 workday shattered years ago and new, more dynamic models have begun to take root, some with more success than others. Saddled with crippling student loans, today's graduates entering the work force no longer expect (or seem to want) a "job for life," and they have little to no allegiance to organizations; they are wed to their craft. And, thanks to technology, they can practice that craft almost anywhere. It's no wonder that telecommuting, hoteling and WeWork-type environments have proliferated over the last decade, redefining what we mean by "corporate culture."



Saddled with crippling student loans, today's graduates entering the work force no longer expect (or seem to want) a "job for life," and they have little to no allegiance to organizations; they are wed to their craft. And, thanks to technology, they can practice that craft almost anywhere.

Mega-firms have made significant strides in breaking down traditional paradigms, though they need to push further to strengthen the profession's attractiveness and relevance to the next generation, and that presents very real opportunities for the profession. Indeed, whether we point to the creeping malaise of our polarized political climate, the confusing codes of a multi-generational workplace or just the yawning disillusionment of debt-laden graduates entering the profession, employee engagement is at an all-time low, suggesting that employers are not doing what it takes to attract, engage and retain talent in today's market.

The picture does not improve. "The rise in populist movements like those in the U.S., the U.K. and other regions is creating angst within organizations as they anticipate the potential for a decrease in free labor flow," explains Ken Oehler, who ran the survey for Aon Hewitt. "Along with rapid advances in technology that are increasingly threatening job security, fewer employees are engaged and we expect this trend to continue."¹

Let's not forget the issue of diversity, looming large over the industry and, thanks to recent media attention, finally getting the air time it deserves. The last two years have seen a clear-eyed examination of architecture's male dominance and how fundamentally the industry needs to change. Yes, progress is being made but not fast enough and not in all the right places. Alison Arieff describes the issue perfectly in a recent article in the New York Times:

Two recent surveys paint a sobering portrait, and, while the data apply to the workforce generally, they cast a relevant light on architects:

- While job satisfaction in the U.S. has rebounded since the depths of the 2008–09 recession, just 50% of workers report being satisfied with their jobs today. And a staggering 85% of employees say they are either not engaged or actively disengaged with their jobs, at a cost to the global economy of \$7 trillion in lost productivity.²
- Aon Hewitt surveyed more than five million employees at more than 1,000 organizations around the world and found that less than one quarter (24%) of employees are highly engaged and 39% are moderately engaged.³

Women are underrepresented in architecture not just at the top of the field but at all levels of practice. In 2015 and 2016, only 31% of full- or part-time faculty members in architecture [schools] were women. Even as women have been gradually increasing their numbers, they've mostly done so at lower rungs of both academia and the profession. Not surprisingly, then, the percentage of women in architecture radically decreases as one moves up the ladder toward more senior positions and prestigious honors. Female mentors and role models are in scarce supply.⁴

If ever there is an opportunity for mega-firms to lead, surely diversity (gender, ethnicity, culture) and inclusivity is it, though this will likely take a systemic reshuffle of the industry and the entrenched hierarchy on which it relies. But, why is that so preposterous? What if we defined a practice not in terms of traditional hierarchies but as a dynamic organization whose leadership and practitioners reflect the communities in which they work; a collective of like-minded professionals working

toward a shared goal; a flexible eco-system of talents focused on solving the world's big, audacious challenges? Or even the small audacious challenges? To be sure, tomorrow's employer of choice will need to embrace fluid organizational models that allow talent to move in and out of their orbits, driving the need for bendable structures, diverse but harmonized voices, and personalized, agile and holistic compensation schemes.

One significant hurdle to this is the trend that young designers are leaving the profession, or simply choosing not to enter the field of architecture. The data go up and down but the warning signs are there. The National Council of Architectural Registration Boards (NCARB) reports that accredited U.S. schools have graduated an average of 6,152 students per year since 2009, but the number of graduates securing licensure is only 3,560. And the National Architectural Accrediting Board (NAAB) reports that while the pool of new enrollments during the 2015–2016 school year grew by 4%, the number of graduates declined by 5%.⁵ This does not bode well.

Taking this idea to the next logical stage, tomorrow's practice will also need a broader, more diverse talent base—not just Maslow's Hammer of conventionally trained architects at different rungs of the experience ladder cranking out lines on a page. Already we see how data/analytics, industrial

6,152

GRADUATES EACH YEAR SINCE 2009

3,560

OF THOSE SECURED LICENSURE

Source: NCARB



If we consider the issues discussed above (diversity, employee engagement) and a few we have omitted in the interests of space (resiliency, climate change), the value of articulating a clear and compelling company mission—a *social purpose*—is essential.

and organizational psychology, consumer behaviors, and demo- and psychographic research all contribute to the design process. Why are firms not teeming with these diverse pools of talent, working across disciplines, geographies and cultures?

Finally, no discussion of talent is complete without considering leadership, and this may be the most critical element for how the industry's next generation of firms defines themselves. Running a large practice takes a certain type of professional, one with the acumen of a seasoned CEO but also one who deeply understands the industry and the quirks of the profession. While architecture has its share of luminaries and highly successful leaders, it is not quite an incubator of business genius. Indeed, the profession's most visible names—its giants—tend to have attained their lofty status because of creative talent rather than their financial acumen (though the two traits are far from mutually exclusive).

Nonetheless, if we advocate for a new generation of architecture practice, we must also advocate for a new generation of leaders. Will that next wave come from within the industry, a hybrid of architecture and business, or will we manage to attract leaders from allied professions who can spark deeper change or a new direction? And, perhaps more importantly, is academia and the industry preparing them—either in

education or practical experience—for the slings and arrows of an outrageous future?

How a leader drives, anticipates and manages change will likely be the currency of the profession's future, and any CEO worth his or her salary will need to do more than win the hearts and minds of employees. It will take a passionate belief in the architect's role in society, a vision of what the industry can do to improve or enrich that society, and an understanding of what it will take to get there.

We see this shift in other businesses. Organizations are no longer assessed solely on traditional metrics such as financial performance, or even the quality of their products or services. Rather, organizations are judged increasingly on the basis of their relationships with their employees, their customers and their communities, as well as their impact on society at large—transforming them from business enterprises into *social enterprises*.⁶

In his annual letter to CEOs, BlackRock chief executive Laurence Fink notes that people are increasingly “turning to the private sector and asking that companies respond to broader societal challenges” and demanding that organizations “serve a social purpose.”⁷ Fink goes on to state that shareholders, including BlackRock itself, now evaluate companies based on this broader standard. Offering context, Andrew Ross Sorkin suggests in the New York Times that Fink's letter could be a “watershed moment on Wall Street” that raises questions about “the very nature of capitalism”⁸ and the role businesses must play in society.

If we consider the issues discussed above (diversity, employee engagement) and a few we have omitted in the interests of space (resiliency, climate change), the value of articulating a clear and compelling company mission—a *social purpose*—is essential. Corporate change takes more than a few work-sessions, company retreats and management-speak tropes. Rather it relies on a clear and demonstrable commitment to a shared purpose along with a self-awareness of a company's aspirations and role in society. Anything less likely leads to failure.

“Rumors of my death ...”

Architecture, and by extension architects, are not going away, but the profession is up against a series of cataclysmic forces that will drive deep and fundamental reprogramming in the years ahead. Indeed, demand is only rising, especially when it comes to the global need for improved infrastructure, the battle against climate change and the shifting goalposts of our social playing field. The challenge is to ensure that the profession (and its practitioners) positions itself to capitalize on the opportunities ahead. And that will take no small measure of change.



Architecture, and by extension architects, are not going away, but the profession is up against a series of cataclysmic forces that will drive deep and fundamental reprogramming in the years ahead. Indeed, demand is only rising, especially when it comes to the global need for improved infrastructure, the battle against climate change and the shifting goalposts of our social playing field.

¹ *State of the Global Workplace*, Gallup, Inc., 2017

² “How Is Global Uncertainty Impacting Employee Engagement Levels?” Aon Hewitt, 2017

³ Aon Hewitt, “Global Uncertainty”

⁴ Arieff, Allison, “Where are all the Female Architects?” *The New York Times*, December 15, 2018.

⁵ National Council of Architectural Registration Board, 2018 *Annual Report, Education*, available online at www.ncarb.org

⁶ “The Rise of the Social Enterprise,” *Deloitte Global Human Capital Trends*, January 2018

⁷ Fink, Laurence, “Larry Fink’s annual letter to CEOs: A sense of purpose,” *BlackRock*, January 2018

⁸ Sorkin, Andrew Ross, “BlackRock’s message: Contribute to society, or risk losing our support,” *New York Times*, January 15, 2018.

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.

GLOBAL INSIGHTS

Crossing the Threshold: Moving Toward a Sustainably Digitalised Future

DesignIntelligence talked to Simon Carter, founder of corporate sustainability strategy practice Morphosis about sustainable digitalisation and his recent report, “Crossing the Threshold—A Primer for Sustainable Digitalisation in Real Estate and Cities.”

DESIGNINTELLIGENCE WITH SIMON CARTER

DesignIntelligence (DI): Tell us about how “Crossing the Threshold” came to be.

Simon Carter (SC): In 2014, a client asked me to map the digital space—from AI and augmented reality to autonomous vehicles, big data, etc.—for cities, real estate and their global property business. On laying out this enormous jigsaw puzzle, I realized that I had not appreciated the extent of the impact of digitalisation, nor was I seeing industry, government or society doing so. It clearly had serious implications for sustainability—taking a broad definition beyond just environmental sustainability—and this was getting very little attention.

In 2016, I commenced a self-funded project to put an environmental, social and governance (ESG) lens on digitalisation in real estate in cities. After two years of research it boiled down to 24 digitalisation-driven ESG issues for built environment stakeholders, both opportunities and risks.

In 2018, I published “Crossing the Threshold” with the Royal Institute of Chartered Surveyors (RICS), with the endorsement of key industry bodies; the Property Council of Australia (PCA), Green Building Council of Australia (GBCA), Infrastructure Sustainability Council of Australia (ISCA) and the Global Real Estate Sustainability Benchmark (GRESB). I coined the term *sustainable digitalisation*: “sustainable” because it’s ultimately about long-term prosperity and

“digitalisation,” referring to the application of digital technologies. The longer version is responsible, ethical and sustainable digitalisation.

DI: What are the errors you see in our current path to digitalisation?

SC: Digitalisation is a mega-trend, alongside globalization, urbanization, climate change and others that is re-shaping our world. Day-to-day, we focus on microcosms of this, such as proptech, smart cities, digital disruption, or cyber security, but we are missing the big picture. There is a structural change occurring for humankind that needs to be carefully navigated.

Our species has evolved for one world. Let’s call it the real world, although Buddhists and quantum physicists may well debate this. Suddenly, we’re creating a second world, an unreal world, a digital world; augmented, virtual. We’re effectively conducting a very radical experiment on ourselves. In a minute moment in our history, we are throwing ourselves into this new digital world and it is very unclear how our species will be able to straddle the two, particularly with regards to mental well-being. Will we be able to tell the difference between the real and the digital?

And we’re addicted to it. We are so consumed within digitalisation that it is hard for us to have visibility of the cumulative affect it is having. Technology should be our tool, and

shouldn't be deployed for technology's sake, which is how it's likely to be used when we don't have sufficient strategic oversight or mindfulness.

I see a lot of flipped-ness around the use of technology and the risks this presents. For example, people assume we've given our privacy away. But this is false. While we have forfeited a lot, we still have plenty of agency over much of it. It's just a conversation the community is yet to have in a meaningful way. But it's coming to a boil, such as we have been seeing recently around Facebook and social media.

Security is another big concern. We deploy IoT technology in our buildings to make them more environmentally efficient, healthier, or to provide better amenity to users, but the flip-side of this can be increased security risk. One European hotel I read about was held for ransom by cyber criminals who locked all the room doors so people couldn't leave or enter. The cyber-world leaks like a sieve and our exposure to this in the built environment is growing rapidly as more technology is deployed.



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Digitalisation is ultimately a double-edged sword, with both opportunities, but also serious risks. Sustainable digitalisation means leveraging opportunities for social, environmental and governance benefits, while also mitigating the risks presented, which is currently not happening well.

Importantly, this is not a conversation about whether we digitalise or not. We must do so for many reasons—from health and science to environmental sustainability—and it is in our very nature as *Homo sapiens* to embrace technology. It is a question of how we go about it, and this must be done much more wisely. It must be responsible, ethical and sustainable.

DI: Do we need an agreed-upon philosophy for how humans engage with technology?

SC: Absolutely. We need regulation and standards, but underpinning that, we need a real philosophy, an ethical basis grounded on shared values. Of course, the values in Australia might be different from those in America or China, so that's an interesting challenge.

Digital technologies employ billions of algorithms, and every algorithm inherently has an ethical framework based on certain values and purposes—often developed by people not trained in ethics. We need to better design them to ensure that the technology operates ethically and responsibly.

DI: Let's talk about cities now. As the world population urbanizes at an unprecedented rate, how is digitalisation likely to shape our cities?

SC: There's no end of opportunities for improving our cities, as we are seeing emerging in the smart cities space. For example, in Australia, and other parts of the world, city administrations are using technology to become much better service-based organization—more transparent, accessible, and responsive to their constituents.

Technologies like the internet of things, big data, etc., can be deployed across the city for environmental improvements in areas like transportation, waste and safety. With autonomous

vehicles, we could begin to correct the deep problems of the 20th-century automobile-driven city, or, if they are not used responsibly, we could make it much worse. If we deploy new transportation models based on privately-owned autonomous vehicles, we could see more vehicles on the roads, greater congestion and increased pollution, and miss out on the opportunity to make our cities much more livable, equitable, healthy and environmentally sustainable.

The preferred solution using autonomous vehicles is a “diverse mobility system” where app-based platforms wrap up mobility as a service (MAAS). It connects modes of transport to get us where we need to go as effectively as possible: public transport, autonomous taxis, shared vehicles, bikes, walking and more. We’ll get more value out of public transport infrastructure and free up space used by cars, such as on the roads or parking. The quality of our streets will greatly improve, with many potential commercial benefits such as real estate uplift.

Now’s the time to decide between two very interesting paths, as the policies and planning and legal frameworks are developed for AVs and our future mobility systems. We won’t see enormous amounts of AVs in the next 10 years, but it’ll be ramping up.

DI: For those in A/E/C, how will their responsibilities change as digitalisation progresses?

SC: In many ways. They’ll have increasing responsibility and also a lot of new design and construction possibilities. Design and construction is no longer just about the physical building. We’re moving toward digital twins, so every property or piece of infrastructure in the real world will eventually also exist in the virtual world. That brings up some interesting questions about ownership. Another example, as architects, we deliver workplaces and then we walk away. With sensor technologies and analytics, we have extended responsibility now, because we can see how a building is performing. Another responsibility is improving health, comfort and safety in the built environment, using available technologies such as sensoring.

DI: In your report, in a section called “Framework for Action,” you have some recommendations for organizations to embrace sustainable digitalisation. Can you tell us about them?

SC: Yes. It’s a simple framework to help organizations make a start. The first five actions are for any organization.

- 1) **Digital literacy.** Understanding the technologies, both the benefits and risks, all across the organization, including the board.
- 2) **Strategy.** Expanding sustainability, corporate responsibility or other such strategy to address the types of ESG issues in the report, from personal privacy to electronic waste, health and more.
- 3) **Ethics.** The heart of the matter given the double-edge sword nature of digitalisation and need to work with difficult trade-offs. Develop a culture of ethical decision-making and be prepared to disclose how decisions are made.
- 4) **Trustworthiness.** We need the deep trust of our communities and other stakeholders for initiatives such as smart developments, but also as ESG issues associated with our organizations are exposed in an increasingly transparent business environment.
- 5) **Prioritize mindfulness.** An antidote to digitalisation, allowing us to get better visibility on it. If we can do this, these technologies will become the tools in our hands as they should be. It is also critical for mental well-being.



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The last three are for organizations who want to provide leadership:

- 1) **Champion sustainable digitalisation.** Being a voice and demanding that the use of digital technologies is responsible, ethical and sustainable, and supporting a mature and inclusive discussion on this.
- 2) **Shared vision.** Having a vision for our society to which we put technology to service. Technology must be a tool for the betterment of our lives.
- 3) **Policy.** Setting the right policies and legal and planning frameworks now, to best set us up for a sustainable future with digitalisation.

DI: This is so complex, yet these issues of our digitalised future seem urgent.

SC: Absolutely. We're crossing the threshold into a digitalised future right now. The technologies have reached a critical point of maturity and are integrating. There is an enormous amount of acceptance, I often think complacency, and money is flooding into the space. There are very strong drivers pushing technology forward. Now is the time to make big choices about our digitalised future as we are unlikely to get the chance to do it right later on.

In Australia, we're convening roundtables of people who get the nexus between sustainability and digitalisation to help plot a path for the real estate and infrastructure sectors with sustainable digitalisation: technologists, sustainability leaders, designers, landlords, developers, ethicists etc. Ultimately it must be a big discussion point for the community as it is their future that is being shaped, currently with little voice from them.



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What gives me hope is the journey we have had with climate change. Although it is by no means solved and we are already exposed to a lot of climate-induced damage, we have gone through the process with a highly complex global issue and learnt a lot about how to navigate that, especially where there are powerful interests vested in avoiding change.

Another thing that gives me hope is that people are already connecting the dots in their personal lives. They're beginning to consider what it means to have smart listening devices in their homes, discussing ethical dilemmas such as whether the autonomous vehicle should kill the pedestrian or the passenger, or observing what is happening with the likes of Facebook. Technology is more personal than climate change, so it'll be easier to bring it home to the individual.

So yes. It's a big, exciting, and sometimes frightening challenge.

Simon Carter, founder of sustainability strategy practice Morphosis is a corporate sustainability and responsible investment consultant based in Sydney, Australia, and working internationally. He is the author of "Crossing the Threshold: A Primer for Sustainable Digitalisation in Real Estate and Cities," available for free from www.morphosis.com.au

Industry Interrupted: Build-to-Rent Embracing Market Disruptions

In 2013, HDR acquired TMK Architekten • Ingenieure, a German healthcare architecture firm. We talked with Doug Wignall and Johannes Kresimon about what they've learned in the years since the merger, as well as the health of the market, the state of talent and the biggest risks to the German market.

DESIGNINTELLIGENCE WITH JOHANNES KRESIMON & DOUG WIGNALL

DesignIntelligence (DI): What makes Germany an attractive market to a global firm like HDR?

Doug Wignall (DW): It is clearly the strongest economy in Europe. Its GDP growth has been at least as good as the U.S., or very close to it, for a sustained period of time. It also has a very strong banking system; our experience proves that you can almost predict your ability to get paid in a timely manner on the strength of a country's banking system. Last but not least, Germany also has a long history of doing business ethically.

DI: What are the drivers of growth in the German market?

Johannes Kresimon (JK): Europe has a strong economy, and we are benefiting from being part of the European Union. The German public finance system is balanced, which is very unusual for most countries in the world, and the country is able to invest significantly in infrastructure and innovation. One major driver of growth stems from Germany's decision in 2011 to close all nuclear power plants by 2022. A big portion of German power comes from nuclear power. Additionally, Germany made a decision to also shut down all coal-fired power plants by 2038. Together, these decisions have become a major driver for investments and innovations into alternative power sources. The state said they would invest 50 billion euro in carbon-dependent regions over the next few years,

and we expect that private industries would also invest a lot of money to stay at the forefront of innovation leadership. The growth of GDP this year will be lower than expected—only 0.5% instead of the previous 1.9%—but we're confident this is only a short-term shortfall, and that growth will rebound and continue to improve next year.

DI: What do you consider the biggest risks to the health of the German market today?

JK: The biggest risk comes from outside Germany. While the German economy itself is very stable, each political change in the European Union that impacts free trade between countries subsequently impacts Germany significantly—we're very dependent on the possibility of free trade with all the countries around us. Also, for architecture firms like ours, it's very difficult to find talented and qualified staff, which can be a problem, but can also be a driver for innovation.

DI: Can you tell us more about the state of architecture, design and engineering talent in Germany?

JK: With some obvious exceptions, Germany is not necessarily known for its high-design profile. We do have some very solid architecture firms, and I believe HDR is one of them. However, the design reputation of firms in nearby countries like Switzerland and Denmark is stronger. So when we talk

about German architecture competition, we are not just focused on the German market; we are also looking at architects like BIG in Denmark or Herzog & de Meuron in Switzerland. Prices are increasing significantly, and this year we experienced an escalation rate of more than 5%. This is a problem for many clients, and it is greatly impacting the market. At the same time, it's difficult to find and recruit the right professionals in architecture and especially engineering. Some clients are challenged to find building engineering companies to perform design work because the market is so tight, and the resulting quality is low because the labor force is under high pressure. There is not enough good, intelligent staff to hire to work on the large number of projects available. However, we are benefiting from being a global company, with access to the top-quality talent and skill that resides in our sister offices in other countries. We are also benefiting from an expanded talent pool as the result of many refugees who have come to Germany over the last few years—these are skilled professionals that are now available to us to work on our projects.

DI: Would you say that the architecture, design and engineering educational system at the university level is developed enough to meet your needs?

JK: The big difference between now and 20 years ago is that there is less flexibility for students to work while they study. When I studied, I could work three days a week and go to university two days a week. That provided me with a lot of professional experience that a student today does not get. Instead, today's students are going as fast as possible through university and don't get exposed to real world experience in architecture or engineering. We basically have to train them starting from zero when they join us.

DI: What might the future of the German market look like in the next 10 years?

JK: I think a trend that has started and will continue is that the number of smaller architectural and engineering firms will diminish as larger firms from outside Germany will try to merge with German firms. This has been done not only by HDR, but

also by the Scandinavian firm Sweco, which has purchased one of our competitors. The decision by TMK to merge with HDR seven years ago was a strategic one, made to ensure the firm could survive a changing market. Another industry trend I believe will increase is the ability to expand and work in more than one country. We don't talk in generalities about a "European market" for architecture because it is actually composed of a number of different countries, each with specific market conditions. It will be an ongoing challenge for bigger companies like us to identify opportunities to expand into these other countries and adapt to their market conditions. Lastly, I expect the German market to continue to be stable for the long-term.

DI: What were the qualities that HDR and TMK shared that drew them together?

DW: What we were looking for specific to Germany was a firm with expertise that aligned very closely with ours, which meant it had to have a well-respected health practice to leverage our global health footprint throughout Europe. From a financial standpoint, we also believed it was a good time to capitalize on the German market. And finally, our experience has proven time and again that it's critical when two firms come together that they have an "emotional" fit. Two firms will never be perfectly aligned, but it's pretty evident during the many conversations that lead to an acquisition whether a culture fit is possible. With TMK, all of those boxes were checked, and it has since progressed into a very successful



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acquisition, growing by 50% or so since the onset. And while our German offices aren't located in some of the larger metropolitan cities in Germany, we've worked together to grow respectably throughout the country.



Companies like HDR that create a global network and are willing to work together with people all over the world make the world a better place.

JK: TMK was the first architecture company in the health industry to take the big step of merging with an international practice. I think our competitors are happy that this has worked—we have good relationships with them and there is enough work for all of us in Germany—but I believe they were surprised this merger has worked out so well.

DI: Since the two firms have come together, in what ways has HDR, the global firm, and TMK, the local German firm, influenced the way that each other works?

DW: We had been doing business globally for quite some time, including in Germany, and we thought we had a solid understanding of the cultural differences between countries. But when you merge two cultures across all aspects of daily business, it did present some challenges that we needed to work through, from recruitment processes to employment practices to accounting procedures and career development. And of course, the language issue added a whole separate layer of complexity. We thought we were prepared for the language issue, and I actually think that we've done really well, but when you consider how many different forms of communication exist within a large company that need to be translated—it can seem overwhelming. In the end, though, when you work through those issues, it's an amazing feat and I think all of our employees are better off for it—I know that I, personally, have a much deeper understanding and appreciation for each country's culture.

JK: We received a lot of support from HDR and learned much from them, especially about data-driven design technology. This was completely new for us, and we were so lucky to have a group of employees in our German offices who immediately understood that this technology could be a game-changer for HDR here. So, we worked with our colleagues in the U.S. to adapt all the tools to Germany, and now our German team has continued to develop the tools so we can give back to the U.S. colleagues who first introduced us to the concept a few years ago. I also think HDR in Germany did help the organization become a truly global company. At the beginning, HDR was a U.S.-driven firm with some business outside its borders. This is vastly different from the global firm that HDR is today. It's been a change of mindset for everyone in the company.

DI: Do you have any other advice to share on the process of bringing firms together?

JK: Companies like HDR that create a global network and are willing to work together with people all over the world make the world a better place. I believe that, from a long-term perspective, global companies that work in different countries will help ensure that there are less conflicts in the world because, to work successfully, we must learn to understand and appreciate each other's different cultures. We begin to depend on each other. And once that happens, I believe it breaks down the kind of thinking that leads to serious conflict and war. I hope the fact that we have more global companies in the world means the world becomes a better place.

Doug Wignall is president of HDR's architecture practice, which operates 42 design studios in six countries; eight of those offices are located in Germany.

Johannes Kresimon is managing director of the German HDR GmbH and senior vice president of HDR.

Architecture Abroad: Chinese Design Becoming a Global Force

GBBN's Jervy Zhu talked with DesignIntelligence about the current architecture and construction market in China as well as the state of design education and talent there.

DESIGNINTELLIGENCE WITH JERVY ZHU

DesignIntelligence (DI): Describe the current Chinese architecture and construction market compared to when you began the Beijing office.

Jervy Zhu (JZ): China is becoming the world's largest economic power. They have seen high GDP growth in the past 28 years. Interestingly, just last year they hit rock bottom with the lowest GDP growth rate at 6.2%. This year, the government issued a stimulus package with massive cuts in taxes and fees focused on private sectors. Now the projection for 2019 is a good, self-sustaining recovery. Architecture firms still have a lot of roadblocks and constraints working in China, most notably in the need to rely on local design institutions to execute the project design. The government has tight control in terms of how the land is bid on in the open market, particularly in large cities like Beijing. There is also a need for upgrading currently out-of-date facilities for adaptive reuse particularly in the major cities, for commercial, office and residential uses instead—this is becoming a major trend. For example, there are many Olympic-related facilities from 2008 in Beijing that question how we can turn these very beautiful buildings into something relevant to current economic

conditions, perhaps by giving them new retail or culturally significant components. There are also many old office towers and commercial buildings that are not up to current standards, yet many high growth technology firms need that space. To build a brand-new office space is almost impossible in a city like Beijing, so turning an existing building into something that fits this need is very appropriate.

DI: What is the rationale for limiting the construction of new buildings in Beijing?

JZ: From a planning and zoning standpoint, Beijing is very unique. It actually consists of two aspects. One is being the capital of China, which is like Washington, D.C.; it's the central government with many of its governing branches. The other is being the city of Beijing, which is like New York City with a concentrated abundance of resources such as healthcare, finance and educational institutions. The Beijing government is trying to separate these two functions. In a city of 28 million people, how do you regulate the construction of new buildings in addition to the renovation of old buildings? They have essentially set clear borders that indicate, within this area, there will be no new construction at all, such that 98% of opportunities within the city will be renovations only.

DI: In the time you've been back in China, what are your observations of architecture and design talent in terms of availability, quality and how well-prepared they are for practice?

JZ: There is an increasing amount of rising, locally trained and educated architectural talent, and many of them are able

98%

OPPORTUNITIES WITHIN THE CITY
WILL BE RENOVATIONS ONLY

to get some sort of U.S. education along the way. Could these numbers in talent be a little better? Absolutely. But it is definitely more than what I saw 10 to 15 years ago. There is also a pool of talent consisting of all foreigners. As major cities like Beijing and Shanghai progress and evolve, it creates many interesting living opportunities for younger-generation designers coming from mostly Europe and some Asian countries. They have a very well-rounded education background, but there's still a shortfall of talent from the local colleges and universities. I've also seen an increasing amount of smaller design firms that are becoming very competitive with high design standards aimed at the understanding of a building and its context. Large institutions are also getting better, but they're playing by a completely different set of rules. They are definitely much more advantaged in this market, because we, as a foreign company, are still not able to do many different things. They are self-protected, and the current architect registration system is really giving them a monopoly in areas like airports and major high-rise buildings.



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DI: What is the state of Chinese architecture and design education?

JZ: It's very worrisome. I'm an adjunct professor at one of the institutions here, Beijing University of Technology. I teach and help students with their graduate projects, and GBBN hires some of them as interns. In my opinion, there are very few Chinese universities and colleges with architectural programs that truly offer training in architecture as a profession—maybe five out of 100. There are quality programs out there, but very few. The top 10 programs in the country are only able

to produce about 2,000 out of the 100,000 graduates that are supposed to go into this profession every year. The majority of those 2,000 graduates leave China to pursue further education in architecture or in other areas in North America and Europe. If you ask 10 Chinese architecture students what they plan on doing after graduation, five would say they will not continue architecture, because they feel it is not a sustainable profession for cost of living in a major city.

Architecture design firms in China fall into two categories. One group is focused on service and production. When you go into those large institutions, it's very commodity based; employees work 12- and 15-hour days, there's a lot of staff turnover, and so they can only churn out mediocre work. The other group is really pursuing excellence in design, and they're trying to understand client needs to generate great architecture. They are looking for people that engage in highly competitive architecture programs with a very good educational background. Those employees will make very good money, but some students may be confused with the overwhelming quantity of architecture professions in the major cities where they live and work, and just can't see their future.

DI: So how do foreign firms need to change in order to thrive within China?

JZ: There is a new aesthetic that requires a deeper understanding of Chinese history and culture by embracing these elements in architecture, so that is something foreign firms need to learn about and be able to implement. Many foreign firms believe the way they do projects in their own country is exactly the same way they need to do it here, but here, no one cares about whether you are from San Francisco, Sydney, Beijing or Shanghai. All they care about is your portfolio, what you can offer, and your relevant project experience. I would tell any foreign firm coming here to approach this opportunity by showing what you can bring, what you can do differently, and managing your project cost. Also, in order to get your foot in the door of some nice projects, a fundamental prerequisite is relevant experience in pursued building type, function and process.

DI: What trends are you observing in different geographic regions within China?

JZ: Over the past five years, I've seen our projects mostly concentrated in the northern region of China, and in the last two years most of them have been in Beijing. Beijing itself is well developed, but there's a high demand for more urban development across many different tiers of cities across China. Our local connections allow us to better understand these locations, control our projects, and enhance our clients' experience. As a result, our buildings are improving. We are gaining a type of maturity. Previously, that was not how we operated. We could just stay in Beijing, and reach all the way to southern cities like Shenzhen or western cities like Chengdu. We could go everywhere, launch out, and still be able to survive. That doesn't work anymore because the expectations in the marketplace have matured and there is a greater expectation of quality. I have to think about how our Beijing office can be rooted in Beijing and do more work locally to produce high-quality architecture through each step of each project. That's the only way you're able to stay competitive. In my opinion, you must have offices in the markets where you want to build your work.



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DI: What changes have you seen in market sectors?

JZ: China's economic growth still relies on real estate, so developers' activities are a dominant force. The developers are not the same developers from 15 years ago, however. You really have to break the developers down in terms of their architecture needs in many different areas. Sometimes the developer is purely focusing on residential work, other times

they're operators for offices, or operators for hotels, or operators for senior facilities or for retail. So as the needs arise, we as the service provider are able to cherry-pick which one fits our goals better. If we do less residential work for a developer, what can we do more of on the operational side of work? Since we have a very reputable brand in design excellence, now we are able to decide what we would like to work on rather than be assigned, which is something we're very pleased with.

DI: Opportunity never exists without risks. What are some of the unique risks in the Chinese market right now?

JZ: Since we are a U.S. firm, a high risk lies in our countries' relationship—if anything negative happens between the U.S. and China, we will suffer. Of course, if the relationship has positive momentum, we will also reap those benefits. Another big risk is how we conform to local regulations and taxation law. We hope to stay within the limits and be good citizens for doing business in China without getting into trouble, and we have to be watchful for that. Even though there are other potential issues and risks we have to be prepared for, I feel they are manageable. It is an exciting time to be in this profession in China.

Jervy Zhu is principal/managing director China for GBBN. Jervy oversees GBBN's Beijing office and helps guide projects of all types and scales to completion, including Crane Pavilion, Purple Jade Resort, and Suzhou Science & Technology Hospital. Jervy supports a team culture by leading and mentoring staff on design, project management, innovation, and industry trends.

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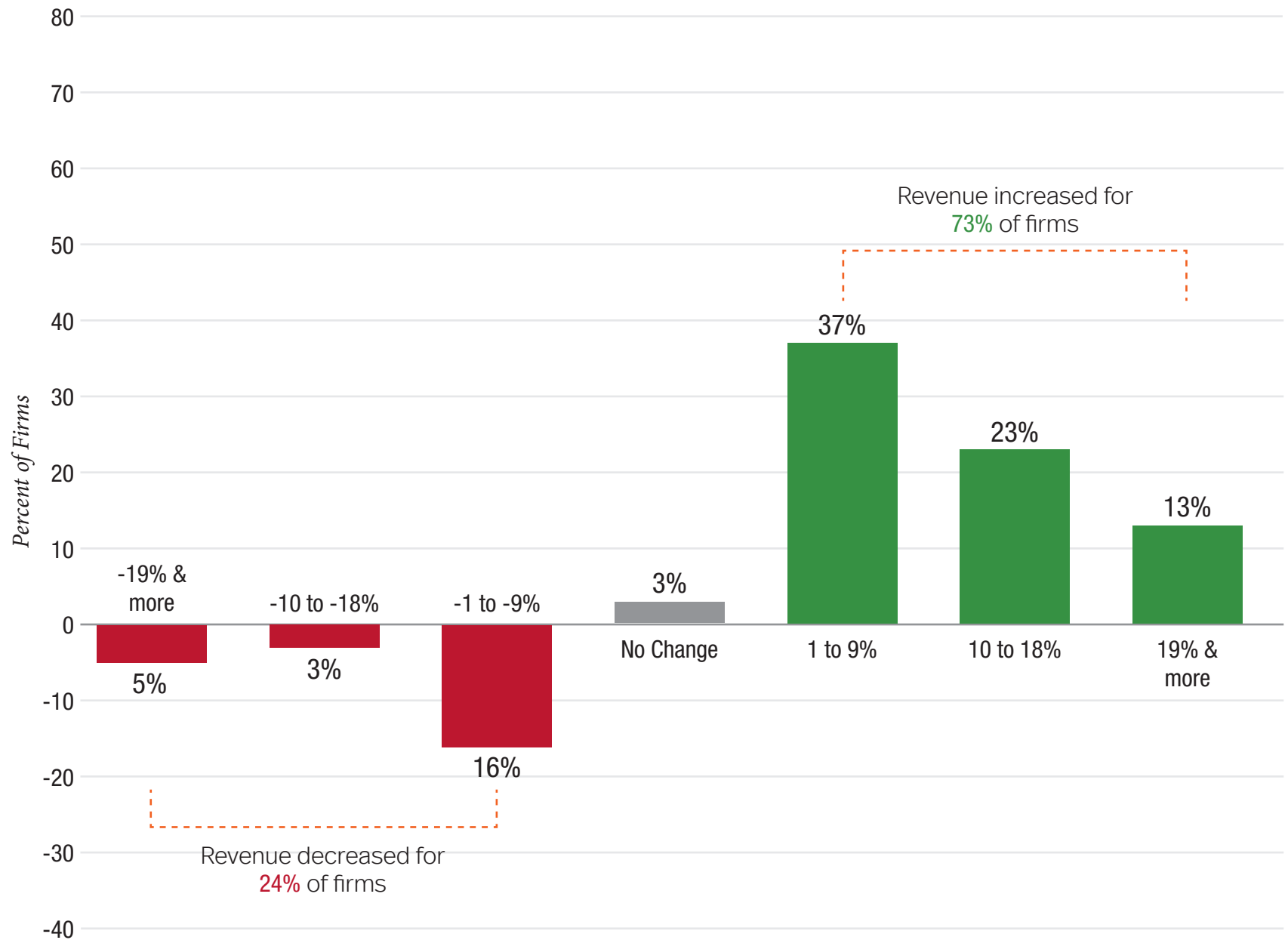
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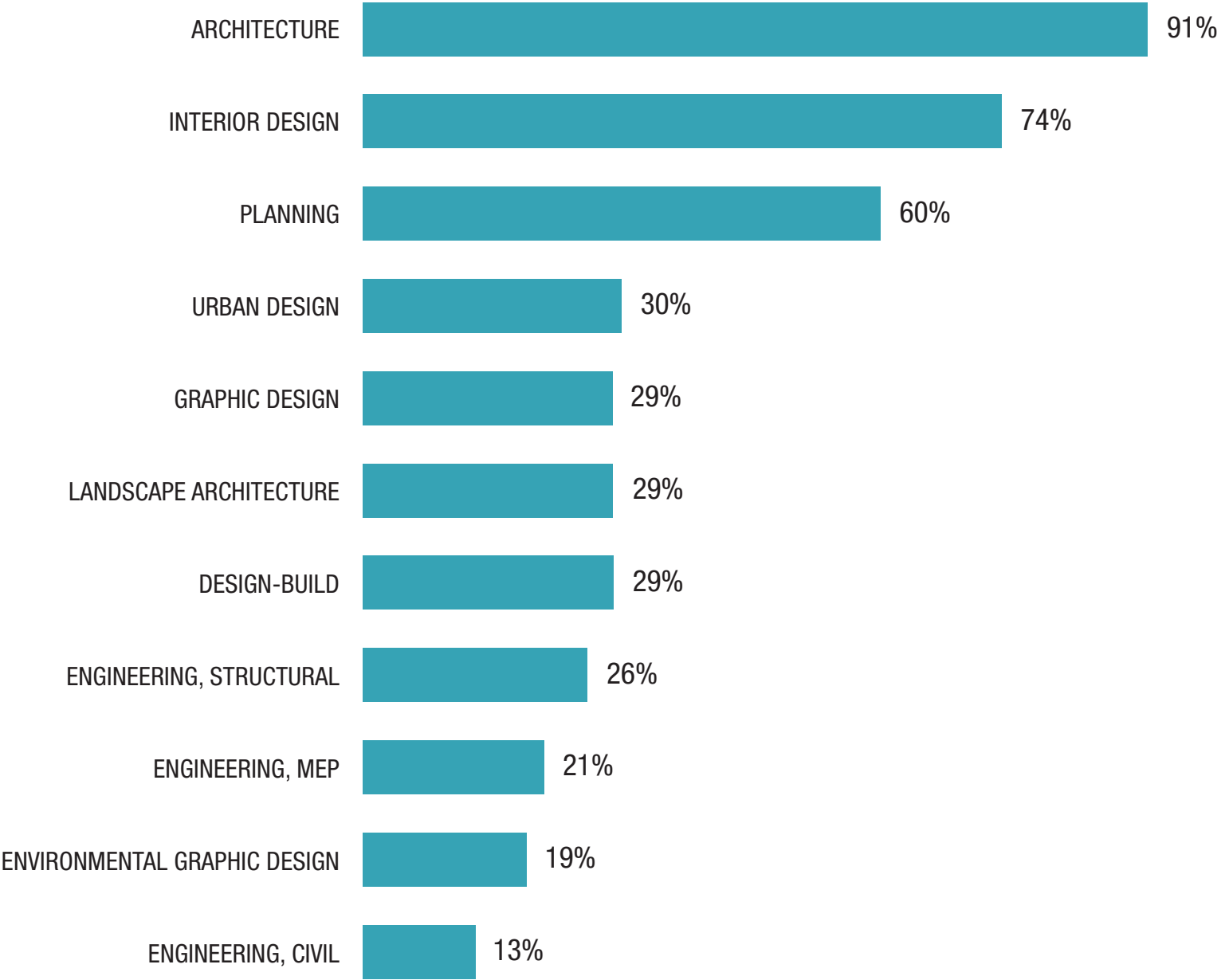
Projected Organization-Wide
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GENERAL INFORMATION



Services Offered by Survey Respondents

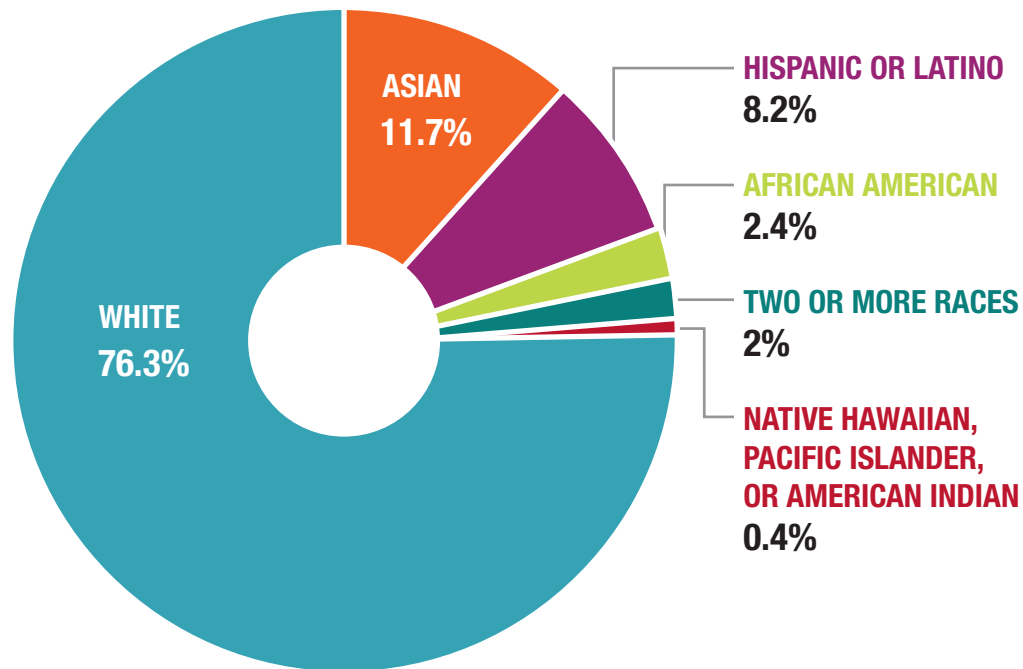
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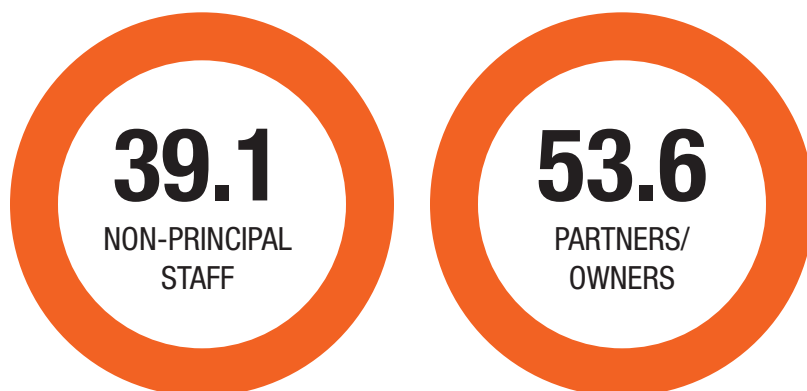
Percentage of Firms Responding

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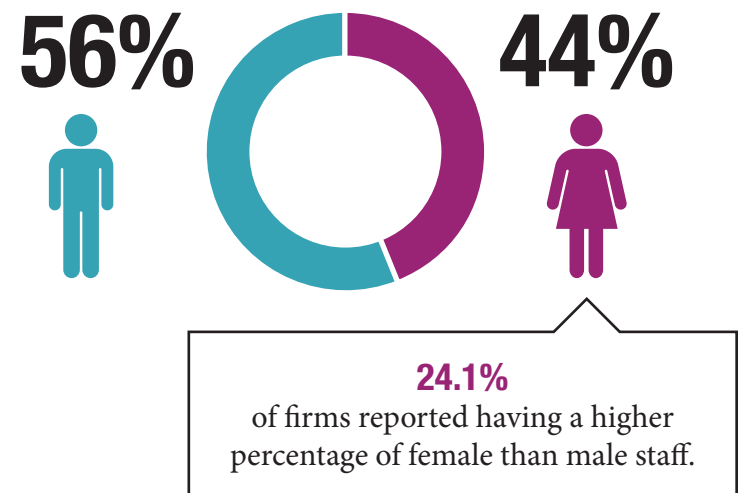
Race/Ethnicity of Staff



Median Age of Staff



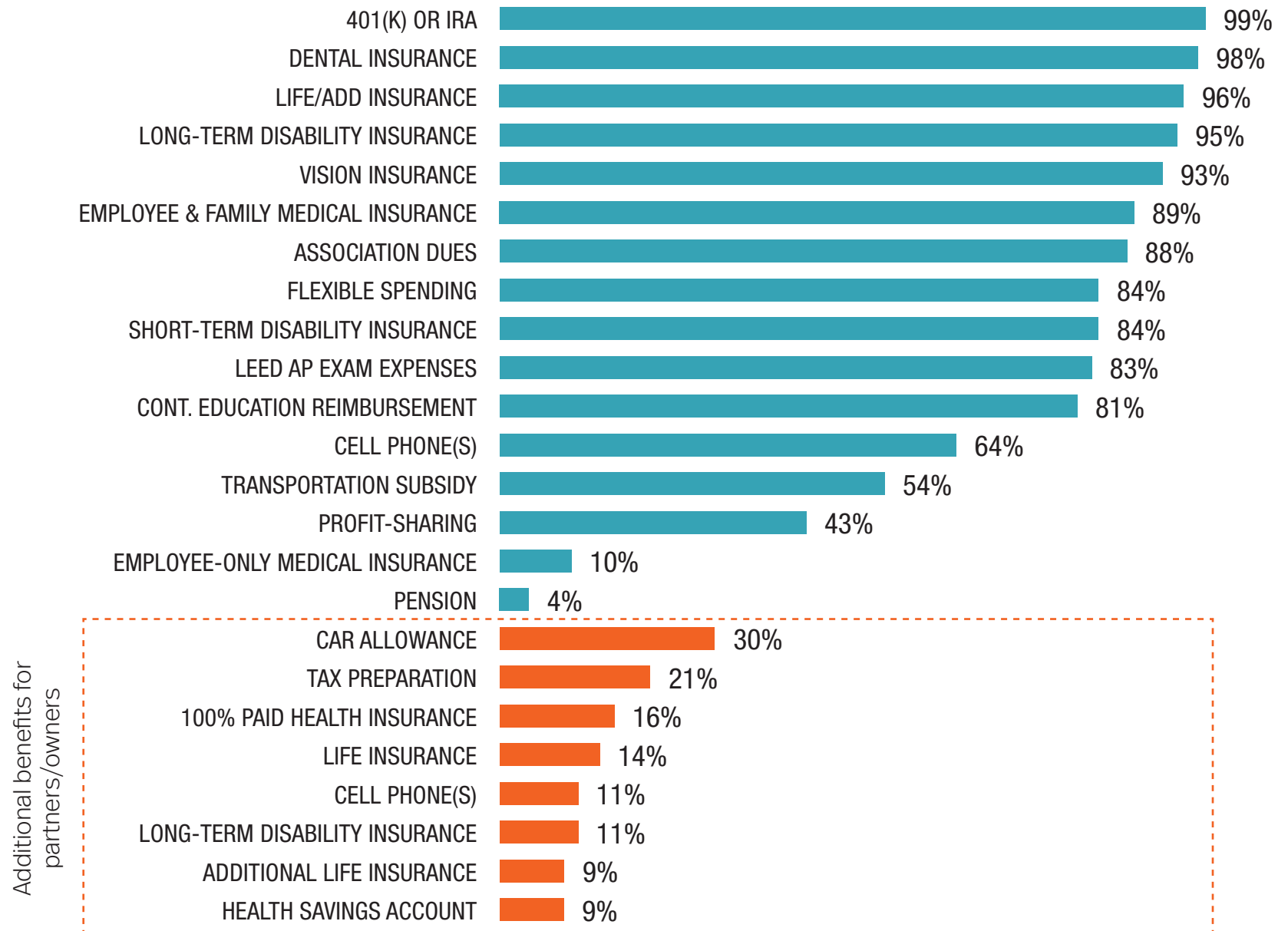
Median Ratio of Male/Female Staff



Benefits

BENEFITS

Benefits for Staff and Partners/Owners

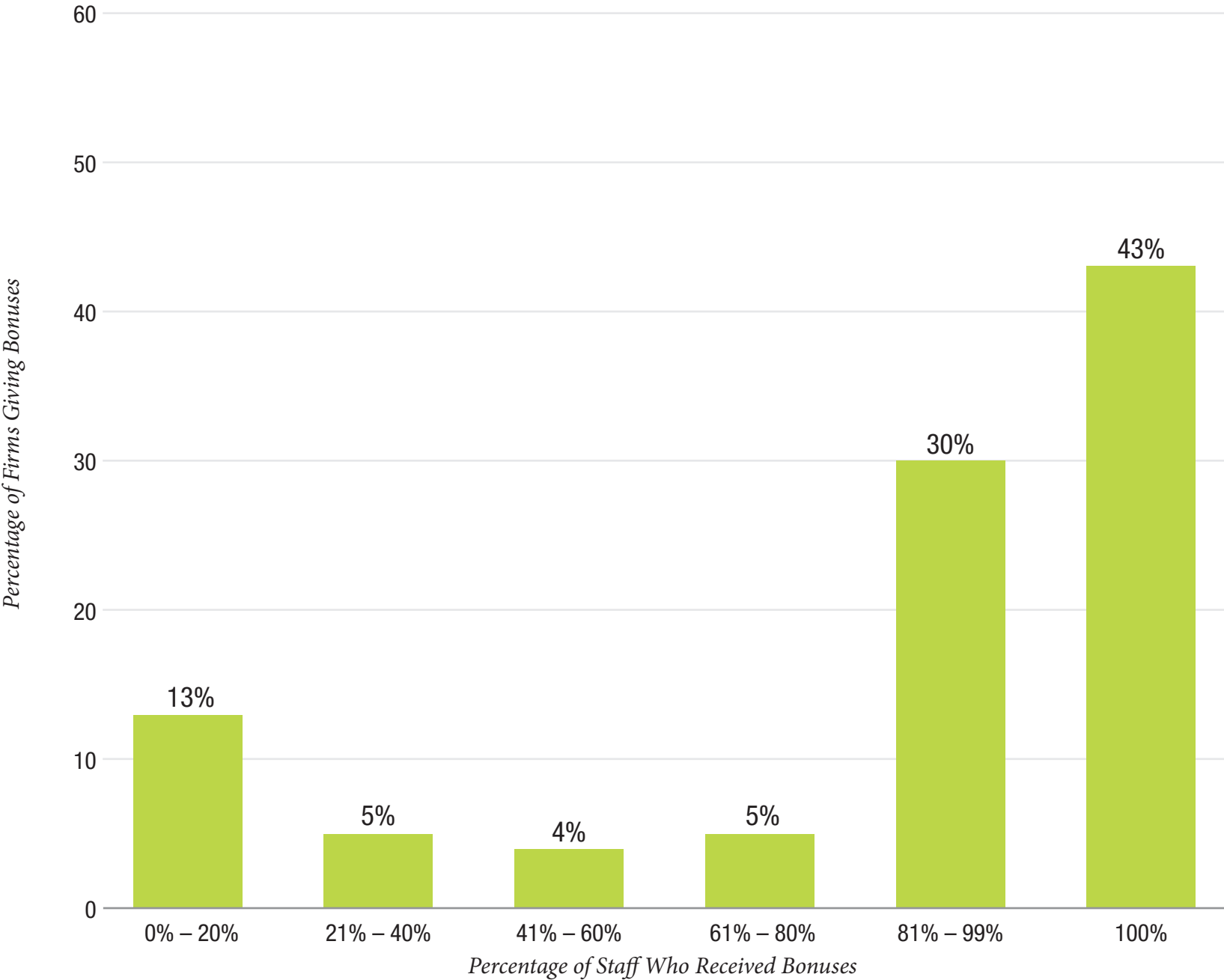


Percentage of Firms Responding

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Facts & Figures
Across Disciplines**

CASH BONUS FACTS & FIGURES ACROSS DISCIPLINES

Percentage of Staff Who Received Performance Bonuses

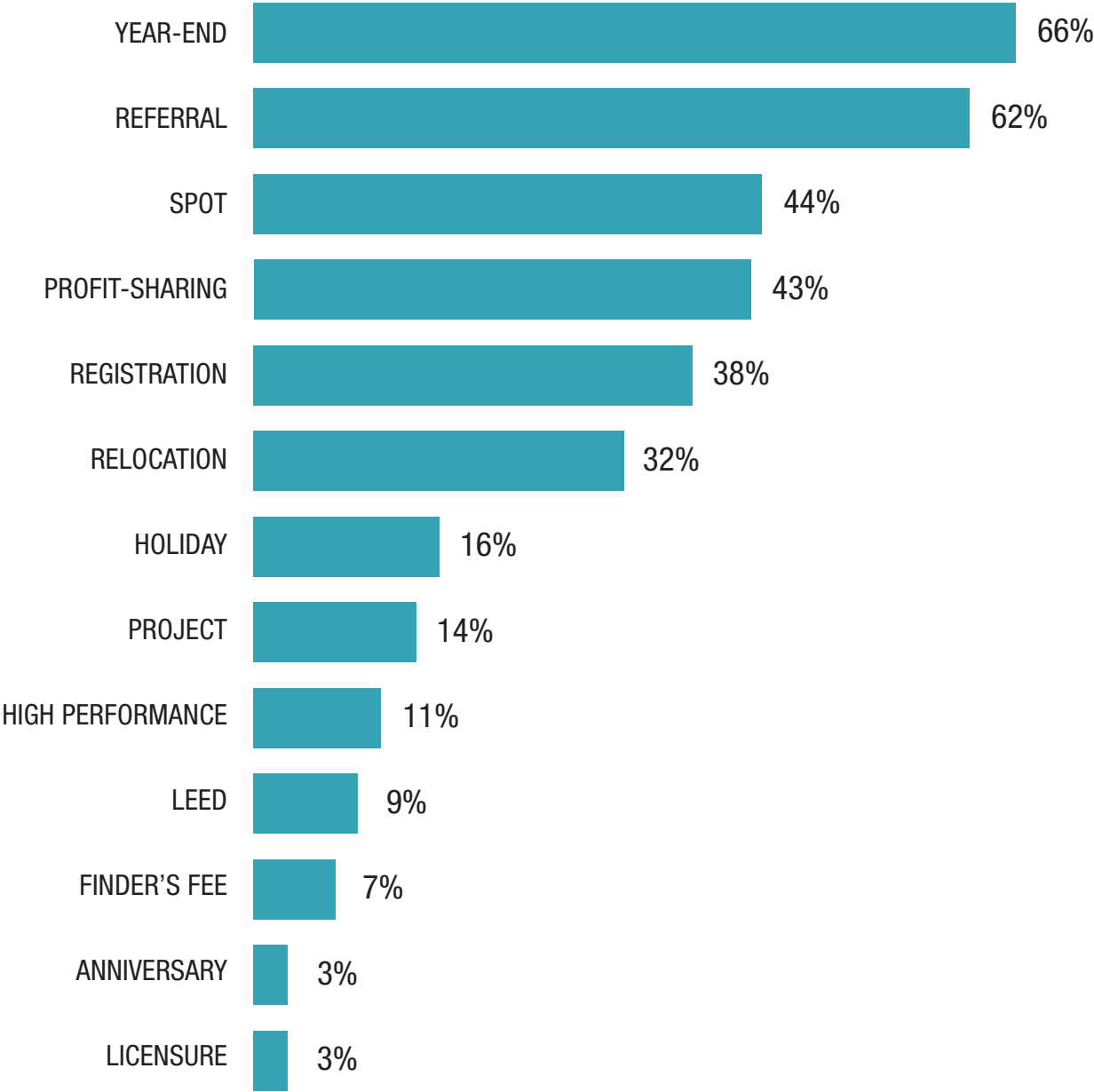


CASH BONUS FACTS & FIGURES ACROSS DISCIPLINES



What other kinds of bonuses does your organization offer?

Bonuses Offered by Survey Respondents



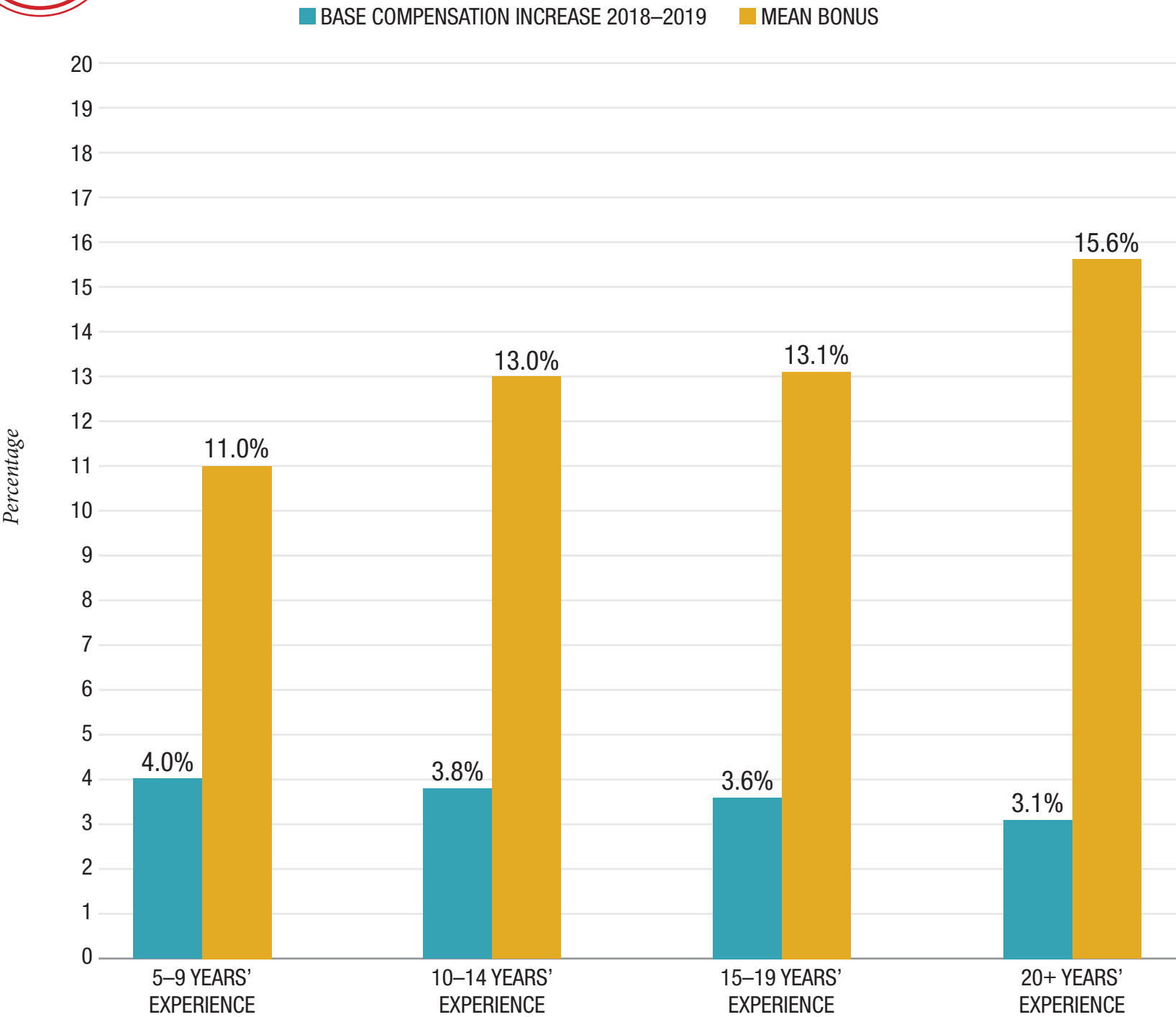
Percentage of Firms Responding

**Base Cash
Compensation
by Discipline & Role**

BASE CASH COMPENSATION BY DISCIPLINE & ROLE



Base Compensation: Licensed Architects

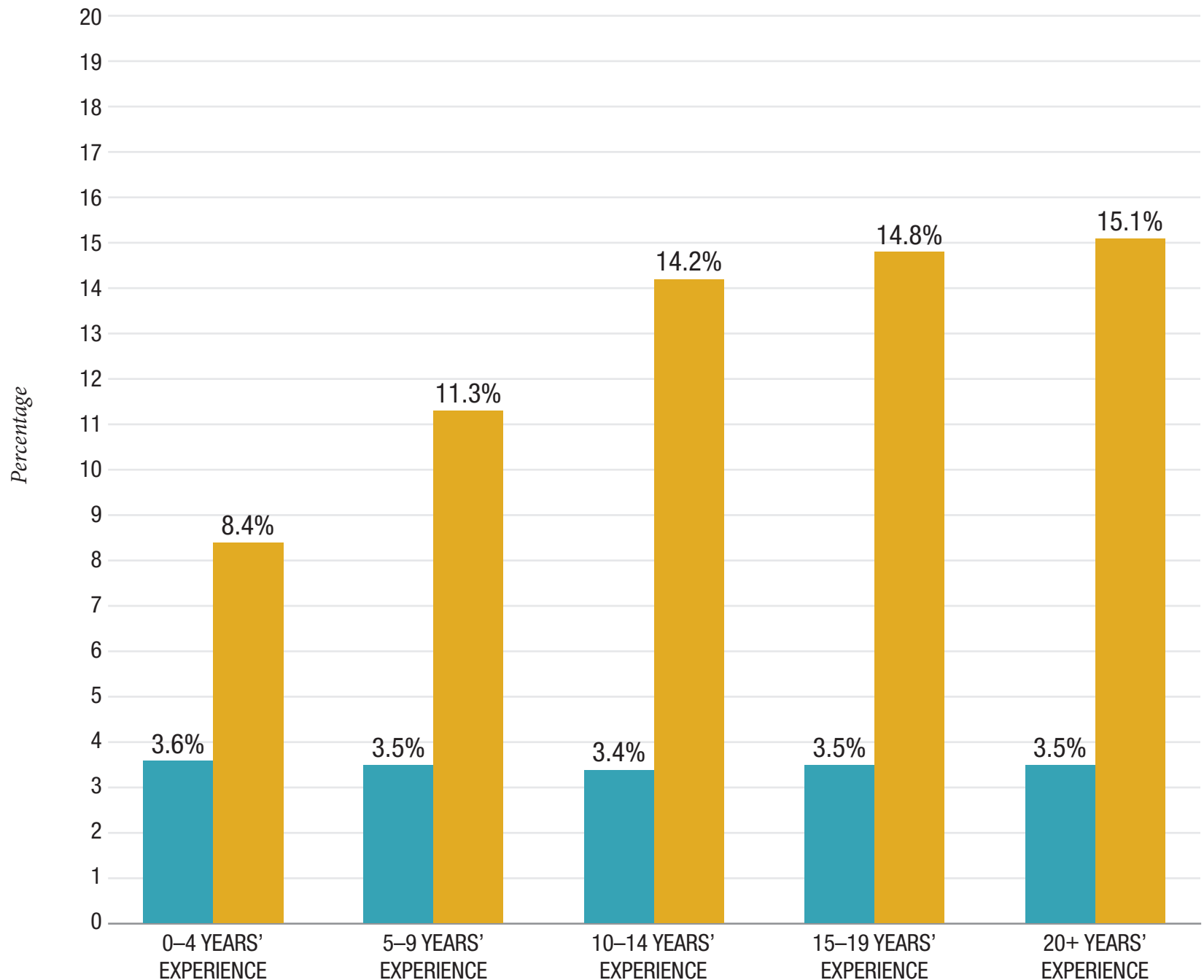


BASE CASH COMPENSATION BY DISCIPLINE & ROLE

Base Compensation: Interior Designers



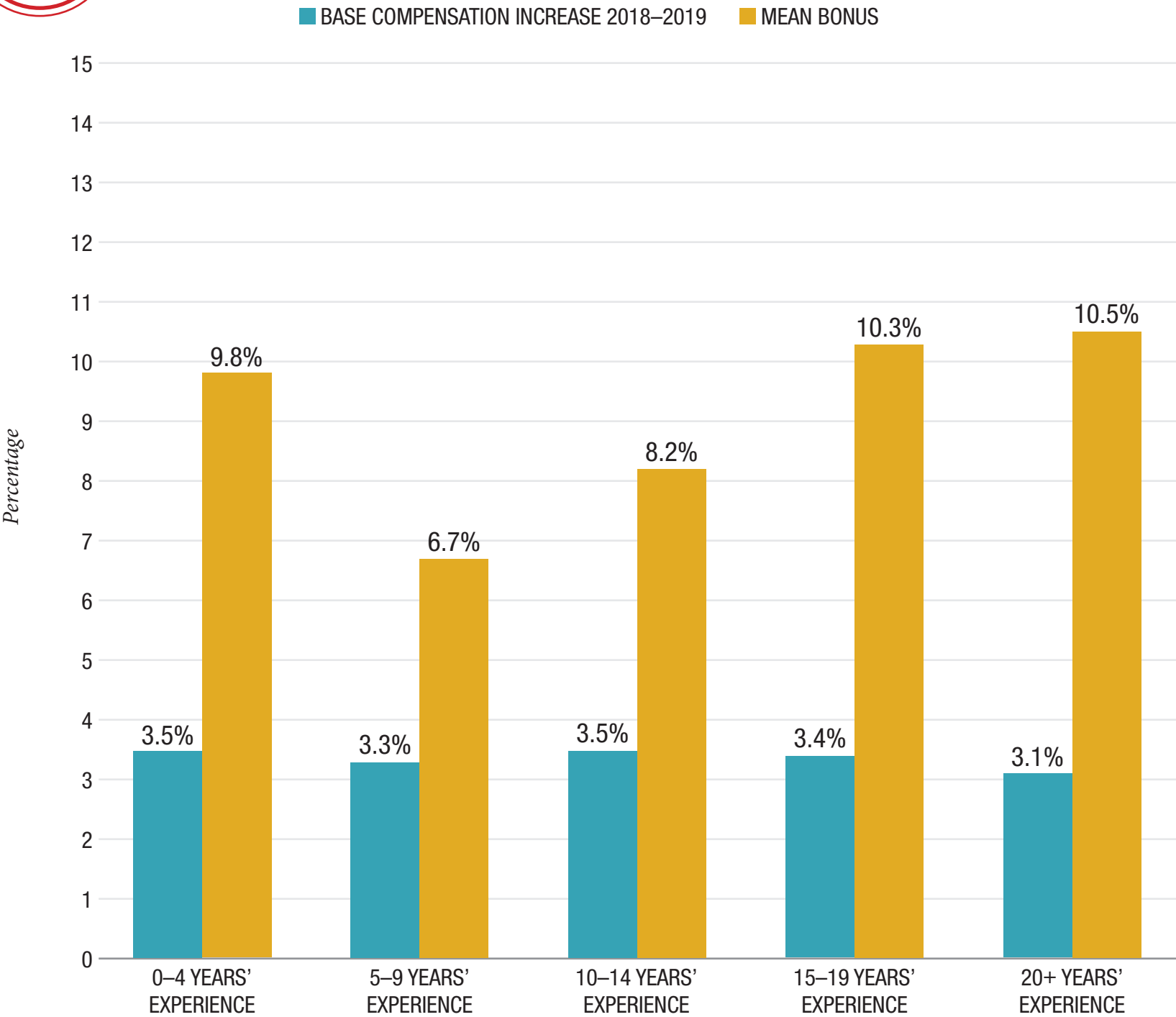
■ BASE COMPENSATION INCREASE 2018–2019 ■ MEAN BONUS



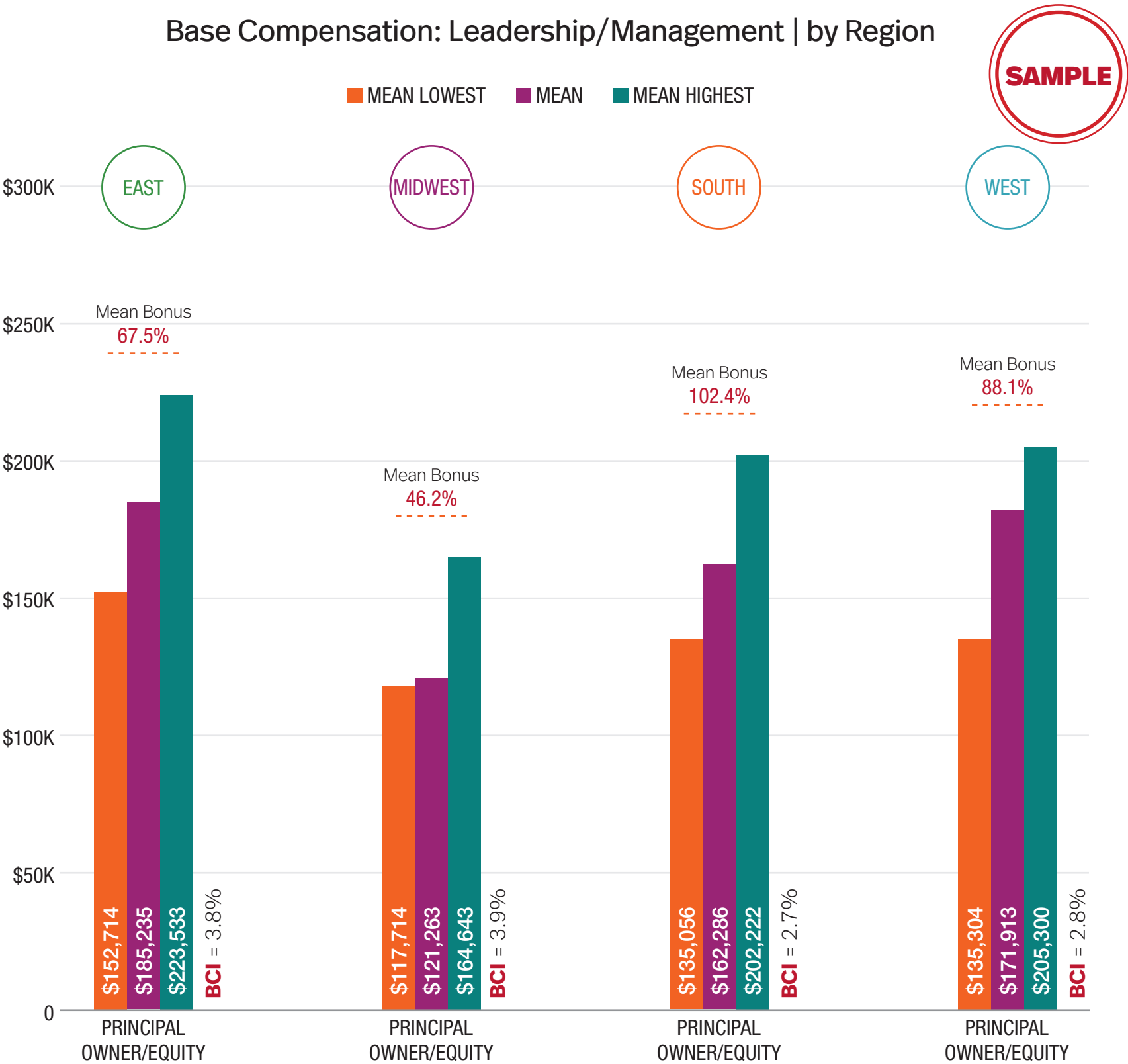
BASE CASH COMPENSATION BY DISCIPLINE & ROLE



Base Compensation: Project Managers



BASE CASH COMPENSATION BY DISCIPLINE & ROLE



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 shine a spotlight on all of the good you're doing in the world.



Louisville's 2019 Commercial Real Estate Awards have been announced, and GBBN-designed The Edge on 4th was acknowledged as the Best Residential Project. Louisville Business First, which bestows the honors, cited the project for helping bring a critical mass of residents to support Louisville's Fourth Street Live theater district as well as the many upscale amenities the building's courtyard offers.

GBBN.com



The American Council of Engineering Companies has recognized 17 HDR projects with national awards. The projects represent a wide range of disciplines and regions across the United States. At the ceremony of ACEC's 52nd Engineering Excellence Awards Gala in Washington, D.C., three projects received Grand Awards; three won Honor Awards; and 11 projects won National Recognition Awards.

HDRinc.com



Image credit: New York State Thruway Authority



The Center for Climate and Energy Solutions and the Climate Registry, in partnership with headline sponsor Bloomberg Philanthropies, recognized Jacobs with a Climate Leadership Award for Excellence in Greenhouse Gas Management (Goal Achievement Award) at the eighth annual Climate Leadership Awards on March 21, 2019, in Baltimore, Maryland. Awardees were honored for exemplary corporate, organizational, and individual leadership in reducing carbon pollution and addressing climate change in their operations and strategies.

JACOBS.com



KPF

KPF design leaders attended the three-day conference in Shenzhen, China, presenting five projects that received Awards of Excellence in the 2019 CTBUH Tall Building Awards, including the Ping An Finance Centre, which received Gold. KPF's design for the world's tallest office building creates an iconic presence for China's second largest insurance company and a centerpiece to the burgeoning city of Shenzhen.

KPF.com



Three RDG Planning & Design projects received design recognition from the Central States Chapter of the American Society of Landscape Architects (ASLA) The projects receiving Merit Awards include: The University of North Carolina at Greensboro (UNCG) Kaplan Center for Wellness, Springfield Railroad Improvements-1908 Springfield Race Riot Memorial, and Walnut Creek Watershed Plan.

RDGUSA.com



The College of Architecture, Planning and Public Affairs will be featured in an exhibition on “Water and Human Settlements” that Dean Adrian Parr was invited to curate, as part of the European Cultural Center’s exhibitions that are held in conjunction with the 2020 Venice Architecture Biennale.

UTA.edu





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:

DFC Leadership Summit on the FUTURE of Environmental Responsibility

September 9–10 (Minneapolis, MN): Since the crusade began to create a more sustainable built environment, our efforts as an industry have gradually become diluted by unhealthy and unproductive forces. Greenwashing, divisive political rhetoric, and well-meaning but misdirected activism have undercut real accomplishments. Yet the need to be successful is more urgent than ever.

As leaders in A/E/C, we are called to re-ground our efforts in substance, giving them a foundational spine that gives the movement ongoing vitality, ensures effectiveness we can measure, and allows us to move past rhetoric to meaningful execution.

The Design Futures Council Leadership Summit on the FUTURE of Environmental Responsibility will gather leading thinkers both within and outside the industry to consider a new context through which we establish our collective work towards environmental responsibility.

International Leadership Summit on Global 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—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.

AUSTRALIA | Leadership Summit on Applied Innovation and Technology—First Movers

JULY 02–03 (SYDNEY): This July, the Design Futures Council will convene leaders in disruption who are innovating to change the world: from those who develop and finance leading technologies, to those who are creating new business models that could challenge the fundamentals and long-held assumptions in the practice and business of A/E/C. The event promises to not only help you better understand the changes that are coming, but also to prepare your organization to thrive in a dynamic new environment.

The 2019 Summit theme is First Movers. In this summit we will explore the culture, technology and strategy behind the emerging first movers within the rapidly adapting the built environment. The content of this event is designed for leaders with national, statewide, or global roles within the built environment.

AUSTRALIA | The Transcend Tour: Breaking New Ground in the Built Environment

JULY 02–05 (SYDNEY, MELBOURNE, AND BRISBANE): The Transcend Tour initiative by the Design Futures Council is designed to cast light on the future of practice, bringing to Australia two global leaders who are re-shaping the built environment. The third in this series, this event will be held in Brisbane.

Notable Quotes
Oscar Niemeyer
1907 – 2012

“I pick up my pen. It flows. A building appears.
There it is. There is nothing more to say.”

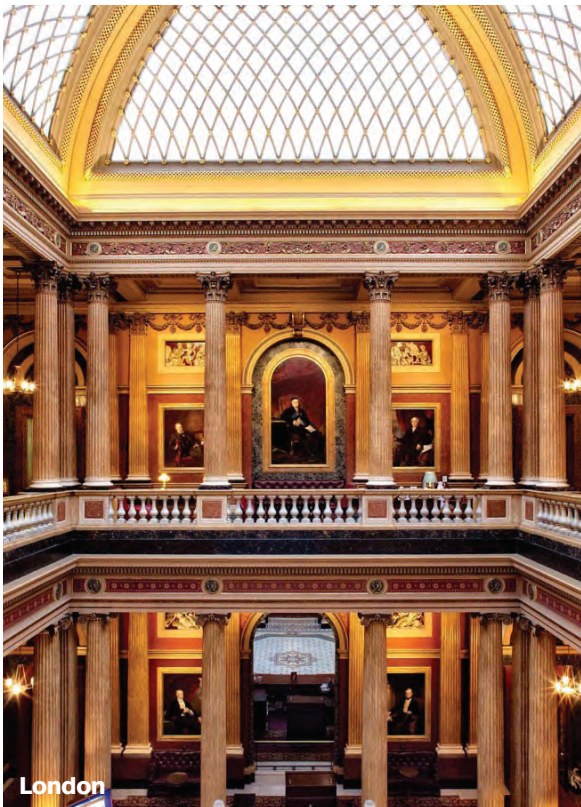
“Camus says in *The Stranger* that reason
is the enemy of imagination. Sometimes
you have to put reason aside and make
something beautiful.”

“It was the drawing that led me to architecture,
the search for light and astonishing forms.”

“Today, architecture is invention. It isn’t enough
to just be rational—it must also be beautiful.”

“Curves are the essence of my work because they
are the essence of Brazil, pure and simple.”

DESIGNINTELLIGENCE ON THE ROAD





New York City



Dallas



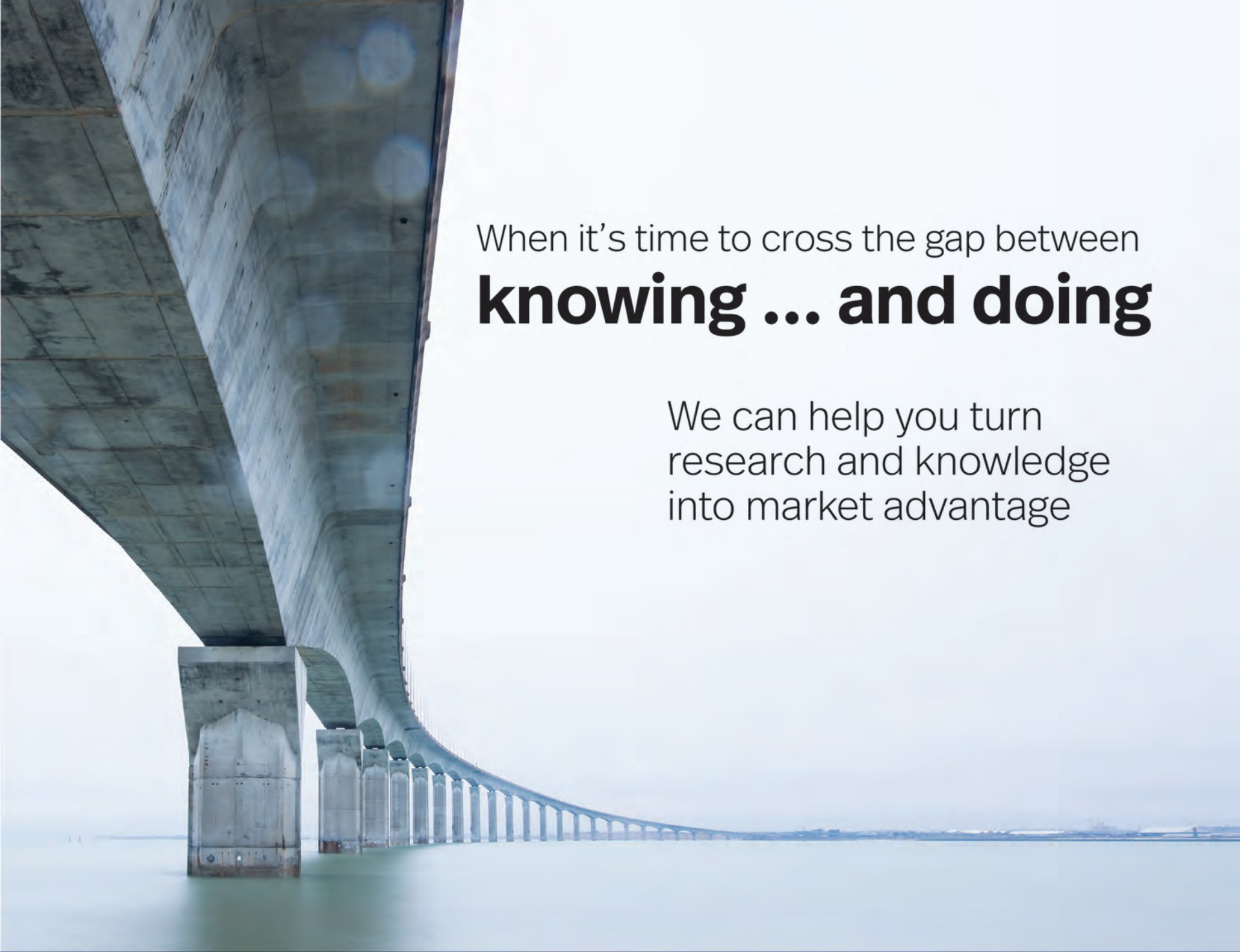
Charleston



Paris



Paris



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knowing ... and doing

We can help you turn
research and knowledge
into market advantage

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COMMERCIAL MEMBERS

AS OF JUNE 2019





PROFESSIONAL EXECUTIVE MEMBERS

AS OF JUNE 2019

ARQUITECTONICA

ARUP

atelier ten



BIG



BURO HAPPOLD
ENGINEERING

CALLISON RTKL
A DESIGN CONSULTANCY OF ARCADIS

cbt



DIALOG

DLR Group



EYP/
Architecture & Engineering

Foster + Partners



Gensler

GGLO DESIGN

HANBURY

HCMA
Architecture + Design

HDR

HED

hga

HKS

HMC Architects



hord | coplan | macht
ARCHITECTURE LANDSCAPE ARCHITECTURE INTERIOR DESIGN PLANNING



KIERAN TIMBERLAKE



WALTER P MOORE





INSTITUTIONAL AFFILIATES

AS OF JUNE 2019





**What do 5,451 students have to say about their
architecture and design education?**



Find out at:
DI-rankings.com

The Way of Authentic Leadership—Part 2

DAVE GILMORE

The Not-So-Common Sense of Leadership Communication

BOB FISHER

DFC FIRM HIGHLIGHTS

JULI COOK

Taking Cues from the Design Process, Organizational
Structure Is Key to a Firm's Creativity and Success

A Strategy to Turn Digital Disruptions into Opportunities

HEATHER L. WISHART-SMITH

Designing the Future: Priorities in Technology Investment

ROBERTA KOWALISHIN

Digital Transformation: How Integrating Technology Can Change Design Culture

NIRVA FERESHETIAN

In the Mix: Integrating Technology into Business

BROOKE GRAMMIER

More Than Just a Deal

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JAMES FRANKEL, ESQ.

Designing Collaborative Education

DESIGNINTELLIGENCE WITH
HANS & MICHELE HERRMANN

Technology, Sustainability, and the Construction Industry—a Case for Change

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PEPPER CONSTRUCTION

Convention Meets Invention: Change, Technology, and the A/E/C Industries

JULIAN ANDERSON

DFC FIRM HIGHLIGHTS

DICK THOMAS

Advocacy: The Impact of Architects

The Death of the Architecture Firm—Part 2

THOM MCKAY

Crossing the Threshold: Moving Toward a Sustainably Digitalised Future

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Industry Interrupted: Build-to-Rent. Embracing Market Disruptions.

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