
A Conversation with
A Global Citizen
DesignIntelligence
Quarterly

DR. CALVIN KAM

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Dr. Calvin Kam talks about his journey in technology evangelism: to reinvent and integrate the industry

DesignIntelligence (DI): You've been a technology evangelist for more than two decades, wearing multiple hats. At any given time, you maintain your role as an Adjunct Professor at Stanford CIFE, a Vice President for Strategic Innovation at Optima. You continue at the General Services Administration (GSA) where you pioneered and wrote their industry-leading BIM adoption program. You were one of the chairs of the AIA TAP knowledge community. As an entrepreneur, you've founded several companies to consult on BIM adoption, metrics and technology: bimSCORE, Strategic Building Innovation, and PlanMeetDone.com. What is your mission internationally?

Calvin Kam (CK): Thank you Mike—we've had a great friendship and a fantastic journey. We've seen how the profession and the world have changed so much in that time, yet many aspects are still the same. I do think of myself as a global citizen, passionate in digital practice and industry transformation - for the AECOO professions, the built environment industry. Charles Matta and Steve Hagan and I worked at the GSA, spreading these ideas broadly throughout the organization, and supporting adoption.

Once concepts get out there, we need global evangelists and ambassadors to make sure we appreciate the global intelligence

and nuances of digital practice. Sometimes we need global warriors to fight the battles and the skeptics and to lead the work - one project, one enterprise, one country, one agency at a time.

18 years ago, with the GSA, we could have easily said: "Well, 10 pilots in a year, we've got a mandate, we've done all that, mission accomplished." But guess what? 18 years later I'm still working with the GSA to make sure those concepts and pilots we developed – the innovations – are things we can sustain. Can they withstand leadership changes? We have seen different budget and management directions. The work is still in its teenage years, but can it weather those changes?

DI: You've been an ambassador for technology, describing yourself as a "global citizen." Can you talk about that?

CK: Yes, I am a global citizen. Wherever I am, whatever it takes. My focus now is on owner-driven innovation. I'm working with public owners like the GSA, and in recent years with other federal agencies who have a significant footprint. Also, with various private entities in the U.S. from Optima, a development company, to pharmaceutical companies, to theme park owners/operators, and globally with a number of public and private owners/operators.

In addition to owner-driven innovation, for the last 10 years I've brought management science - so much of the DNA of business - to our industry. Having an objective management perspective is not something we often find in design. Things like Key Performance Indicators and metrics.

I have email addresses that end in .com, .edu, .gov, and .org. And over the last 10 years or so, I've formed several business ventures. From serving as a management consulting firm to startup solutions, and a web service delivery firm. For 20 years, I've been at Stanford University and I'm currently serving as an adjunct professor there. I'm also still with GSA after 17 years. I now serve as a senior program expert consulting for

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… Evangelist, ambassador, warrior.

their National BIM Program. In more recent years I've been increasingly active with buildingSMART International. relaunching the USA chapter we have in the US and serving the global open standard movement more broadly.

DI: It is a journey, because the work is never done. Your focus on owner-led innovation is so needed because we've heard it at the conferences over the last 20 years. Inevitably, owners lead the charge. They have the gold, so they make the rules, and if we don't change their minds, change won't come. And metrics are so valuable. We need to keep score.

CK: Bringing management science mindsets and methodologies into the world of BIM, VDC and AI is key. Too often we get into technology blindfolded or with blinders on, without asking about the objectives. Why are we doing this? What are the goals? What will we measure? How are we doing?

DI: Congratulations on your AIA Fellowship. The breadth of your exposure - the boundaries you cross - are wide. It makes me wonder - as someone who began with an architectural education, you made an early decision to transcend traditional practice and devote your career to technology adoption and integration. What steered you there, and to cast such a wide net? Not everybody has such broad interest.

CK: I'm honored and humbled to join you and the other great leaders in the AIA College of Fellows. My wide reach may be part of my DNA. I'm inspired by my elder sister. She got a triple major in college. College came early for me – I was a freshman at the University of Southern California at age 16. I came to a decision point: what major should I declare? I was passionate in building, architecture and construction, yet was also attracted to the problem-solving aspect of civil engineering. Civil engineers made sure things would stand and withstand earthquakes. I had a hard time choosing between the two. I thought: "If my sister could go for three majors, surely, I can go for two. It should be easy." So, I declared a double major in architecture and civil engineering as a freshman at USC and never turned back. That meant I had to take well over 200 units during college when most of my friends needed only half as many. Today, I'm a licensed engineer, a licensed architect, and I still enjoy the added perspective that we should appreciate more than the forms and aesthetics – the engineering, mechanics, science, and management behind things.

My architecture education was during the early days of digital practice — when ink-on-mylar, 2D-CAD, and 3D were all available. The emerging 3D software appealed to me the most, that I could develop 3D models, cut sections, get perspectives with all interlinked in the same data set. I have never turned back and have been engaging in the field ever since.

A key part of my drive is persistence. To continue with the journey, never give up, nor say mission accomplished. You wonder: "How can I handle so much? Can I juggle all those?" But in the end, they all are converging and complementary.

Appreciation of architecture and engineering has opened my mind and is why I appreciate integration and computer-aided BIM and VDC.

I landed at Stanford after my undergraduate years because of CIFE, the Center for Integrated Facility Engineering. The I of CIFE, which stands for integration, struck me. The integration of people, process, information, and technology. CIFE is an amazing hub that attracts global peers and experts. We speak different languages. We come from different time zones and parts of the world. For the last 20 years and counting, working with CIFE has allowed us to bring all those aspirations together.

Maybe I was naive to think I could handle architecture and civil engineering together. It wasn't easy. The toughest years in my life were being an undergraduate. But once I signed up and got into it, I never wanted to give up. I wanted to enjoy the amazing possibilities it offers. I still do.

When I declared a double major all the academic advisors said, "No way. Nobody had done that before. It's not possible. You are out of your mind." I ended up going to three colleges at the same time because they were running out of courses at USC. I went to UCLA. I went to a local community college to get all my units and stay on course. I've learned to never say never and never take "no" as a response. Those experiences shaped my role as an evangelist, ambassador, and BIM and digital innovation warrior.

DI: Clearly you were in a different place than I was at that age. That you were focused on integration, despite having never even been in the industry is amazing. The lack of integration remains one of the biggest issues in our industry - ongoing fragmentation. "I'm just an architect, I'm a mason, I do my job, we're separate, we're fragmented, we don't share data." Your early interest in integration and your desire to take on those kinds of challenges is quite a story.

Let's look to the future. I can't think of anybody with more global exposure to the technology world than you. What's the next big thing, the next great force in AEC Technology or beyond we should look to?

CK: The next big thing for AEC is likely to come from outside the industry. Something other than the AEC industry adapting and finding the sweet spot and penetrating from within. So far, we have seen translational technology coming in to disrupt our industry. We have more adoption of technologies and innovation because of commodity electronics and computing powers from our cell phones to our daily electronics, and mobile networks.

But AEC has not generally proven to be at the forefront of innovation, due to underfunding and a host of other reasons. That's something we hope will change. To me, it's about resiliency, climate change, this changing world with COVID-19, and everything else. How will our industry adapt to the new and unfolding normal? Even before COVID-19, we had climate change, and we have many other major challenges ahead. Natural disasters, like the California wildfires, earthquakes, floods and similar challenges, hopefully can motivate us

to address and solve these systemic problems.

The next big technology needs to help us better adapt to this new normal, better respond to natural disasters, and be more resilient to climate change. It's a huge opportunity. I hope that the focus on those big problems can promote exciting new technologies.

5 TIER INNOVATION

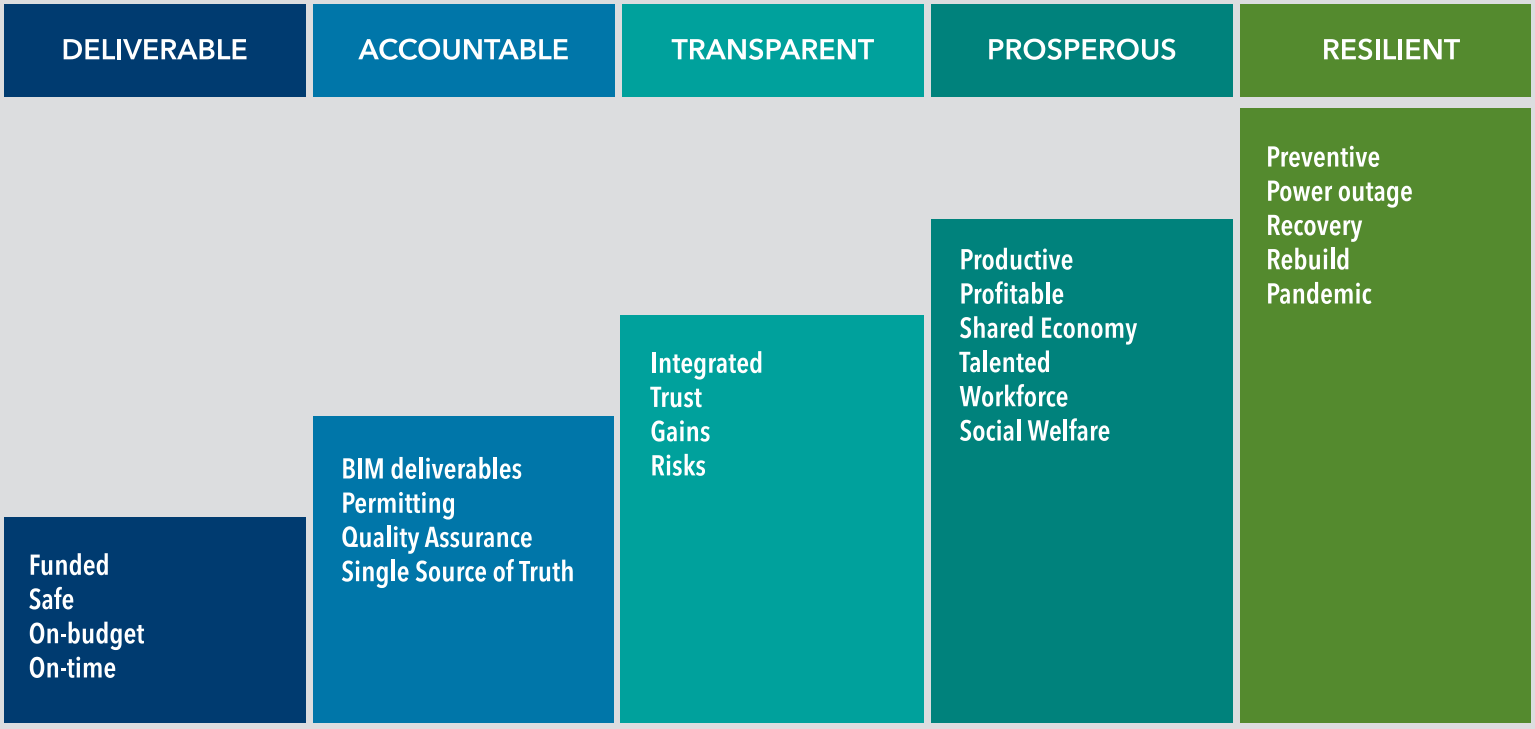
To illustrate this, I've developed a five-tier innovation diagram that offers a maturity framework that outline the drives for innovation.

The First tier, DELIVERABLE, is about project delivery, how we can leverage construction innovation technology to help us deliver our projects better.

The Second Tier, ACCOUNTABLE, is how we can be more accountable with our delivery, and depend on the information, the single source of truth. Not only do we deliver it well, but we can rely and be accountable on the information for the project lifecycle or longer.

The Third Tier, TRANSPARENT, is about the trust and interpersonal dynamics – the people side. Yes, the

5 TIER INNOVATION DIAGRAM *COURTESY OF SBI*



information may be reliable, and may be a good single source of truth for the lifecycle of the project. But, can we also trust one another, can we be more transparent about the IPD approach?

The Fourth Tier asks whether we are becoming more PROSPEROUS? It may be about diversity and inclusiveness, but I was calling that more prosperous. Yes, it's about productivity, but can we also be more prosperous? Can we attract, recruit and retain the younger generation?

The Fifth and the final tier is RESILIENCY. Can we be more productive, profitable, efficient, and prosperous, but can we also leverage innovation in construction, in the building industry, to make our world, and society more resilient?

So, I hope the next big thing is approaching the far right-hand side of that diagram. We do see more and more automation and optimization from robotics and AI, but we're also hoping those can land with a good purpose. Driving that towards resiliency and prosperity is something I'm hoping that we will see.

Right now, we cannot easily nor reliably simulate a building or our infrastructure with water leakage or wildfire risks. But imagine if we can fast forward that and allow digital design to help us to better understand from an urban scale, climate change, natural disasters, and wildfires. That can help us predict or simulate the effects with buildings, power grids, wind, and weather simulations. My hope is that we can move more rapidly to integrate BIM into urban scale simulation, and that it will give us amazing analytical power.

DI: Over the years we've talked of BIM moving from representation to simulation and dynamic, data-rich systems with, connected systems analysis. The tools are finally moving that way.

Has COVID had an impact on you and your organization and how you work?

CK: Thankfully, we have been COVID-free and are grateful for that. You and I both traveled a lot before COVID-19. Suddenly we are all grounded.

We are thankful we can keep being productive. We may even be more productive because we spend less time going through airport security or commuting. We can spend more time with work if we choose to. But we all miss the opportunity to have those face-to-face social moments. I look forward to a future mode in which we can still travel by choice and not have to be either traveling or working from home by necessity.

DI: How is the technology outlook different in China, India, the UK, and other places from what we're doing in the US? In his book, Tom Friedman wished the United States could turn into a dictatorship for one day so we could force everybody to connect all the power grids and share, and then go back to being a democracy. The same could be said for data sharing. Are you seeing any different mindsets internationally

than we have in the US with our capitalistic, free-market, every-software-for-himself approach?

CK: The other Tom Friedman notion I espouse is: "Think big. Start small. Act now." It's something I follow and practice a lot. We are driving open BIM and thinking about digital design with federal agencies in the US. Conversely, for the last 20 years or so, we are constantly reminded that there are tens of thousands of federal, state, and local jurisdictions across the US, and each jurisdiction has a different idea about technology and digital review.

Although the GSA or other federal agencies champion BIM, open standard, and beyond, they still only represent a minority in moving the needle to embrace change. In the US, the AECOO ecosystem supply chain certainly doesn't have that "one day of dictatorship" (to imagine in Tom Freidman's world) and so we don't have a shared electrical grid, a common shared BIM platform, or a standard permit approval process. On a global scale, the US has seen amazingly innovative owners, design firms, construction companies, subcontractors and supply chains all innovating and driving change without much government leadership or involvement. In the US, if the government is not getting in the way by asking for more taxes, or red tape then we are happy. In the US we see that, especially with the startup community we see in Silicon Valley, Atlanta, Boston, and many other parts of the country.

On the other hand, I would say that Scandinavian countries such as Finland and Norway, are in a sweet spot. They are influential enough, but also have a small bubble of community and industry around them that gives their leadership more leverage than do the major public clients in the US.

For those European countries where their public agencies have mandated open BIM digital delivery requirements, we have seen better adoption of open standards than we see in the US. The US is still a little bit too unique and one-off.
The European union is embracing certain standards like ISO and open

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standards. Some have public leaders who look for technical driven companies to drive change. In the Netherlands we have seen good examples of digital twins, and BIM and GIS integration. Other countries have embraced BIM for facility management, open standards and VDC are strong there.

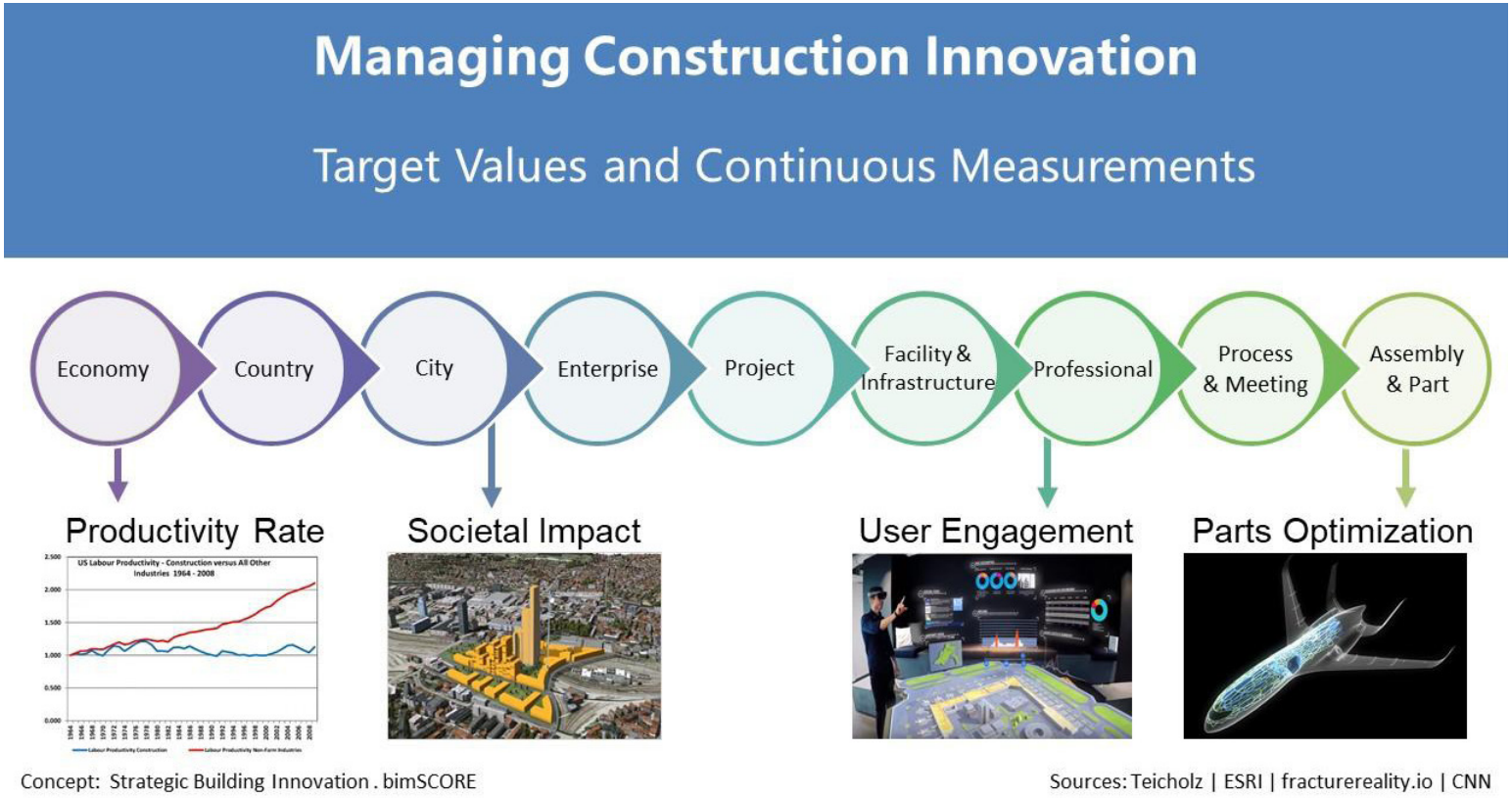
In the US, we tend to see more project-driven delivery methods and innovation changes. More wild-west, cowboy, one-off innovations. We can easily replicate such practices.

It's ironic, because we go to industry events across the US and hear major construction or design firms doing amazing things. But often, even within those firms - depending on which project team you work with - we have witnessed a forefront example of BIM, VDC or IPD on one jobsite and then see the same firm doing something opposite on other projects. Diffusion and implementation across a firm is one thing, let alone across the country. It remains challenging, but we have seen some good pockets of innovation influencing things globally.

I've been traveling and working with the Asian communities quite a bit. Government leadership and government mandates in Asia are not at the same level as they are in Europe. Singapore, Hong Kong and certain countries have come up with mandates: you must use BIM, you must embrace VDC. You must use certain forms of industrialized construction or you cannot get government approval, or you may not be able to get a piece of government land, for example.

Government influence is strong in certain Asian communities. I've also been advising and working with the Singapore government for the last 10 years now. There, the stick and the carrot have been clear. The government is forward-thinking, embracing everything. They would even fund the industry to innovate.

But because everything is more spoon fed, in those countries the industry is less driven to change. There is more inertia for private innovation based on value propositions. That's why technology adoption in the US may be the best



hybrid form of public leadership and open innovation. The European Union could be amazing with open standards. In Asian countries, we've seen some locations with strong government leadership, but industry mindset and workflow are not quite adapting to those new normals. The perfect case is if you can combine the ecosystem, innovation spirit, or cowboy creativity of the US, with the balanced approach and diffusion we see in Europe, with the government leadership and subsidies we see in Asian countries. That would be the best of the three paths.

DI: You talked about "project focus". You're an exception, but most of us in this industry have been trained and educated to focus on "our building, or our project." It's a very narrow focus. How do we change those mindsets? This goes across all AECOO: architects, engineers,

contractors, manufacturers, owners, to begin to look, think and act in a more connected way. Are there role models? You've faced this issue. I realize it's psychological and sociological but where's the leverage?

CK: It's a journey and a mindset we all are trying to embrace and remind ourselves of. We have seen the idea of IPD, integrated project delivery. 10 years or so ago, Peter Beck with Beck Group talked about "the integrated enterprise" - to go beyond the projects - and even beyond that. We've seen certain companies forming integrated alliances. Groups of integrated enterprises can also form alliances and look beyond one project and one enterprise.

Thinking broadly is something we have to constantly remind ourselves of. Because we have seen different projects under the same company have such diverse behavior, DNA, and culture. Project team members come and go. So, we don't even maintain consistent processes for a single project lifecycle, let alone for an enterprise, or an industry. That's why I enjoy working with clients and partners beyond one project - we can see how we can grow over a longer term. And that's why I think by introducing the management science perspective we can measure things. How do you focus on leading indicators and metrics, under the value proposition that it's important and scalable?

I have a spectrum of Key Performance Indicators. On the left-hand side of the slide you see the macro productivity index and GDP. On the right side of the scale is how do we measure a part, or a component within a building, facility or infrastructure? Somewhere along that continuum, we need to be able to measure individual projects, enterprises, and their economic impacts.

By having repeatable, scalable, and universally applicable measures, we can remind ourselves - whether we're talking about a company or a project - there are certain measures and metrics and KPIs we can repeat and follow. It's important to understand how one small action or decision can impact not just a project but also an enterprise or the industry's bottom line in the long run. That's why I'm often working with government agencies on policies on a broader scale.

An offshoot, to measure progress, is our solution called PlanMeetDone.com. It's a web service that focuses on a meeting – one commitment and one action at a time –so we can track meeting efficiency results and progress. Have we been thoughtful about the meeting agenda, the invitees, the actions, and the follow-up? After the meetings, can we focus on the commitment reliability? Because we often don't even get a meeting or commitment follow through right. Then, things start to slip and snowball. In the AEC industry we have metrics and controllable factors, but we've had to get by using lagging indicators, say, whether a project is profitable, or on time. Too often we become aware of those outcomes too late. Tracking leading indicators is something we still need to bring into our industry — and our team proposes that we focus on one meeting and one action at a time to begin doing that.

DI: What are you thinking about these days?

CK: I enjoy being a global citizen because in this industry, we need to unite every country and all professionals because the problem is so huge - and we are so far behind in terms of our current performance. It's heartbreaking to see how our world may be unfolding geopolitically and with respect to COVID-19. I hope we will not become more isolated and can keep finding means for positive collaboration.

That's why in recent years I have been involved with buildingSMART International, working with Patrick MacLeamy, Ian Howell, and many other volunteer leaders to revive the US chapter. I also enjoy working with the buildingSMART International headquarters team in Europe. They have their own isolation issues with EU and Brexit. Globally we all need to pay attention to digital twins, IOT, BIM, and having a standard we can all conform and contribute to. I hope that will grow our industry and that we can maintain the energy and expertise to collaborate and go forward.

DI: Noble aspirations: unity, hope, more collaboration, and forward movement. You're teaching and training your replacements. What does the next generation look like? Do they give you hope?

CK: At Stanford, it has been exciting to see the diversity, gender balance, and sparks from the newer, younger generation. We still have a huge gap in terms of needing to recruit and retain more diverse talents in our industry. But beyond the younger generation, let's not forget about all the amazing knowledgeable friends and experts we have. People like yourself, Mike. Amazingly experienced, knowledgeable, retired and reinvented, in a lead role contributing to DesignIntelligence while having published a book of your own! That's an inspiration and role model for me to follow.

Our industry shouldn't forget about our senior leaders since wellness and healthcare are increasing life expectancies, perhaps to 100 or 120 years old. What are we doing with all these amazing sources of intellectual capital who may be leaving their firms? People on sabbatical from the profession, or transitioning into new roles in the profession they love? How do we retain and continue to engage all these knowledgeable, passionate, still-capable individuals?

To name a few in the technology space, people like Patrick Macleamy recently retired from HOK after five decades rising from a junior architect and retired as the Chairman and CEO, but still driving, and thinking passionately, and CIFE's Paul Teicholz and John Kunz. Arto Kiviniemi, is another great friend of mine. He's 70-some years old, but still extremely sharp and knowledgeable. They may all be retired but we can tap into them more. How can they continue to inspire others within the profession?

So yes, I'm excited about the newer generation, but let's not forget our experienced colleagues. You may hear my children in the background

- I'm working from home. It makes me reflect on the ways to bring those mindsets, DNA, and aspirations to my own son and daughter. That's something that I've got to learn and be reminded of every day.

DI: That's wonderful. Thank you for those kind words. We old dogs are not done yet, and there are a lot of us out there. Your discussion spanning the gap from the 60, 70 and 80-year-olds, all the way to your children is a wonderful thought. I'm going to end with one final question. What's your secret? You have so many balls in the air. You're the energizer bunny, your reach is vast, and you show no end in sight. How do you keep it all going?

CK: Constantly prioritizing is something I've been doing since college. There's always so much going on I need to remind myself how to prioritize. I thought I would be more up to speed during COVID-19. I'm not. The to-do list is shorter, but it's still too long. The means and methods may be different. I used to do it by paper and pen, and then with various software, but it's still about prioritizing tirelessly to see how I can best spend my time. Then, how to do that with my team. I also have an amazing family - my sister and my wife in particular - who care for the family. That gives me a boost to focus on career issues. I'm so appreciative of that.

DI: I thank you for sharing with us, and for what you've already accomplished to better our industry - and your quest to reinvent it. I'm certain you still have miles to go and I look forward to your journey - and our continued journey together.

CK: Likewise, thank you so much, Mike. Thank you for talking to me.

Dr. Calvin Kam, FAIA, PhD, PE, LEED AP is the Founder/CEO of Strategic Building Innovation, bimSCORE, BIM Supporters Group, and PlanMeetDone.com—the "GPS Navigator" for construction innovation. He is Adjunct Professor at Stanford University's Center for Integrated Facility Engineering (CIFE), specializing in strategic innovation - Management Scorecards, Building Information Modeling, Virtual Design and Construction (VDC), Sustainable Developments and Smart Cities Evaluation. He was a Co-Founder and Senior Program Expert of GSA's award-winning National 3D-4D-BIM Program since 2003 and is an appointed international expert for APEC, Singapore and the United Kingdom. Calvin serves on the Executive Committee of buildingSMART USA and Chairs its Education and Professional Certification Committee. An elected member of the Board Knowledge Committee at the American Institute of Architects, Dr. Kam is a former national chairman of AIA's Technology in Architectural Practice and Center for Integrated Practice. Elevated to the AIA College of Fellows, Dr. Kam has received various AIA, ASCE, SOM, Stanford University, and USC Alumni Awards and Fellowships, as well as the ENR's "20 under 40" and the BD&C's "40 under 40" awards. Calvin received his Master's, Engineer Degree, and Ph.D. from Stanford University. At age 21, he became the first and youngest to receive dual bachelor degrees in Architecture and Civil Engineering from the University of Southern California (with the highest honor bestowed on a graduating senior for distinguished leadership and excellent scholarship). He has given many keynote and plenary speeches, published multiple book chapters, journal and conference papers, and has presented at over 100 industry events, conferences and universities in 20 countries.