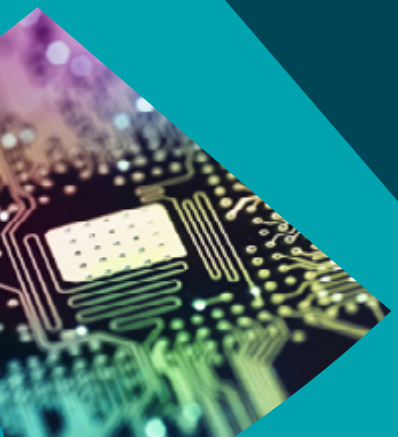
CORPORATE REAL ESTATE 2020

FINAL REPORT May 2012



TECHNOLOGY TOOLS

The Future of Corporate Real Estate and the Workplace

CoreNet Global

CORPORATE REAL ESTATE 2020

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FINAL REPORT May 2012

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INTRODUCTION

Corporate Real Estate 2020 has brought together more than

280

of the industry's most thought-provoking and leading minds.

Have you ever tried to imagine what work will be like in 2020? It's not easy, but that is exactly what **CoreNet Global's Corporate Real Estate 2020** initiative is all about – envisioning the future of corporate real estate (CRE) and the workplace. Corporate Real Estate 2020 is a research and leadership development program designed and managed by CoreNet Global members to address the business environment in the future and to collect and distribute best practices, tools and studies to meet future business needs effectively. A follow up to **Corporate Real Estate 2000** and **CoRE 2010**, Corporate Real Estate 2020 has brought together more than 280 of the industry's most thought-provoking and leading minds, as well as several other professionals from areas outside the CRE realm.

Given today's climate of protracted economic uncertainty, forecasting has never been more challenging. Predictive modeling is often an inexact science, yet considering the outcomes of many of the forecasts CoreNet Global has made in previous renditions, it can prove to be an effective tool for setting expectations. Volatility withstanding, companies, industries, professions and other types of networks need to set a baseline to gauge and anticipate change as best as current indicators and history allow.

This report explores the major trends discovered and studied by the Technology Tools team to aid corporate real estate executives and professionals in becoming the most effective leaders in an increasingly complex business environment.

II. RESEARCH METHODOLOGY

Corporate Real Estate 2020 began in August 2011 and continued through May 2012. The program was launched at the **AT&T** headquarters in Dallas, where a group of more than 70 senior thought leaders convened to discuss the business environment in the year 2020 and create an overall vision of the future and what the impact on CRE will be. From this discussion, it was concluded that the research would be carried out by breaking down the profession into eight dimensions unique to CRE.

Following the official launch meeting in Dallas, each of the eight teams was tasked with defining its goals and predictions. Using the overall vision of the world in 2020 and its impact on CRE as context, each team created a set of **Bold Statements**.

The Bold Statements were developed, evaluated and finalized throughout the first months of the project using recent research findings from a variety of resources and topic-specific group discussions. The statements, a prediction of where a typical CoreNet Global member firm would stand in 2020, were based on what the teams "thought" would happen, not what they "wanted" to happen, reflecting varying degrees of forward thinking.

Using the overall vision of the world in 2020 and its impact on CRE as context, each team created a set of Bold Statements.

EIGHT RESEARCH AREAS

- EL — Enterprise Leadership
- SD &O — Service Delivery & Outsourcing
- LS RP — Location Strategy & the Role of Place
- S — Sustainability
- PK SF — Partnering with Key Support Functions
- T — Technology Tools
- PO AM — Portfolio Optimization & Asset Management
- W — Workplace

The predictions were also presented at the CoreNet Global Paris, Atlanta and Singapore Summits, where members from the across the globe were given a chance to provide feedback on the Bold Statements. These predictions served as the research questions to be validated based on in-depth qualitative interviews with CRE leaders and topical content experts plus a quantitative survey of CoreNet Global's end-user members across the world.

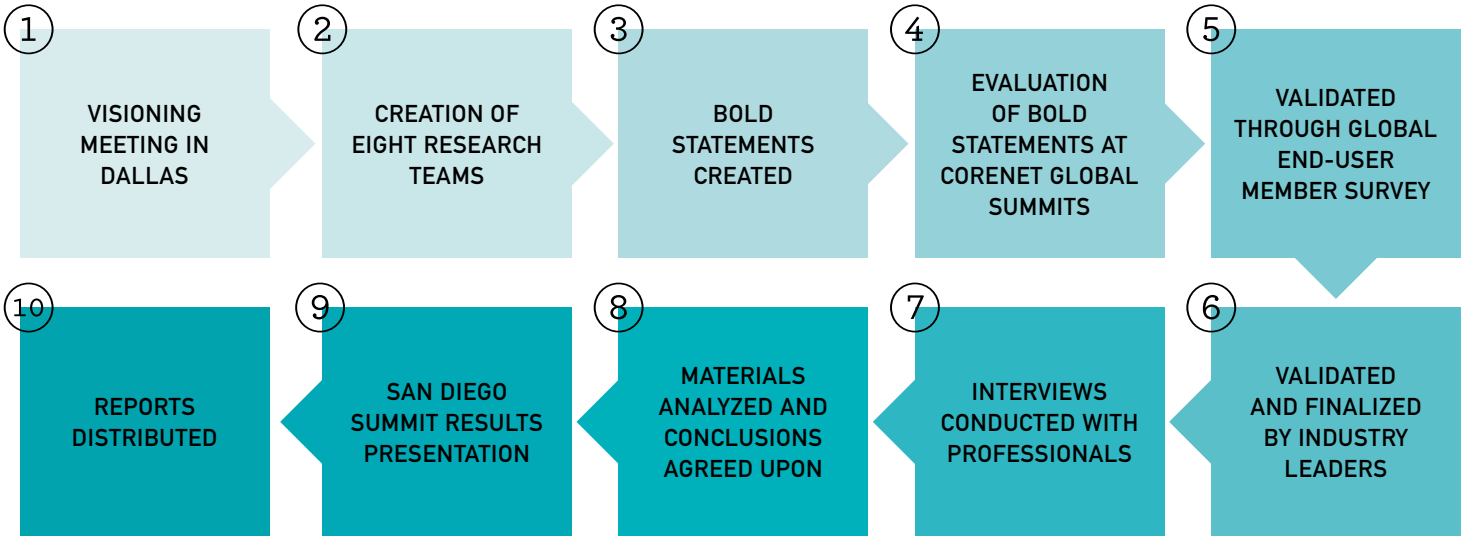
Throughout the process, leading organizations and industry experts were identified for interviews and further research. Telephone and in-person interviews that followed a structured interview guide (Appendix C) were documented and analyzed for patterns to help the teams understand the current views and future perspectives of these business leaders. In addition, case-study materials were solicited as part of the interview process, and some of those real-world examples have been incorporated into this report. The research teams also used articles, books and reports to ground the theories and compare results.

II. RESEARCH METHODOLOGY

Interview insights, materials and Summit feedback were synthesized on a number of levels. The research team met regularly to review the materials collected to determine emerging viewpoints and implications.

The following diagram illustrates the research timeline/process. Appendices B and E list the Technology Tools team members and organizations interviewed.

FIGURE 1.1 | KEY STEPS IN RESEARCH PROCESS



III.

EXECUTIVE SUMMARY

The changes are here, and the question lies in whether they are challenged or embraced in the executive suite and what unintended consequences such changes might thrust upon the business enterprise if it is not adequately prepared.

While the corporate real estate (CRE) executive works furiously every day to support corporate strategies, unyielding forces outside office walls are creating their own agendas for today's workplace. It's the very nature of technology, and our Corporate Real Estate 2020: Technology Tools report provides a glimpse into how today's leaders are coping with these fast-moving dynamics.

These external forces affecting the workplace aren't surprising or particularly remarkable given the now-constant breakthroughs in consumer technology. In 2005, **Gartner, Inc.**, analysts predicted that the consumerization of technology would be the most important trend to affect corporate IT departments over the next decade. The changes are here, and the question lies in whether they are challenged or embraced in the executive suite and what unintended consequences such changes might thrust upon the business enterprise if it is not adequately prepared.

In our report, questions posed to real estate and technology experts across the world focused on six key trends currently shaping their decision making. The experts contemplating these six Bold Statements are of varying degrees of tech-savviness and represent a wide range of career positions. They also show similar diversity in their current perspectives and predictions.

Key Issues

Few caveats to broad acceptance of emerging technology tools rank as challenging among today's CRE executives as security. In fact, security for corporate information, data and intellectual property is in a very real race with the pop culture of today's technology.

In this culture, access to proprietary information shifts very quickly from one heavily marketed remote device to another, in an increasingly wireless – and vulnerable – way. The means of risk management here are relatively unfamiliar and certainly costly for the corporation. However, there lies an opportunity, perhaps, to shed overhead by allowing the employee (i.e., the consumer) to share responsibility for the hardware in exchange for personal choice and mobility.

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EXECUTIVE SUMMARY

The exodus away from the office is likely, our experts warn, to lessen the sense of community among employees that often spurs the kind of employee creativity on which companies rely.

Such a tradeoff – heightened and increasingly complex requirements of security, in exchange for reduced capital expenditures on computer hardware and a greater degree of employee satisfaction – is just one example of the realities of risks vs. rewards that play out in each of the scenarios prescribed by the Bold Statements in the report.

Another reality, which also stems from the pervasiveness of wireless networking and the proliferation of truly personal devices, is a distributed work force. For better or worse, more employees have the capability – if not yet management's permission – to work away from the office. While this mobility poses greater supervisory challenges to management, it is viewed as potentially fostering an output-driven worker modality – not a bad bargain for some.

The new mobility also presents a greater opportunity for employees to work closer to or more closely with the client, regardless of that client's location. The same can be said for the rise in video technology, which was given a nod by many of those interviewed for the report as providing a very real and current benefit. The companies they represent are taking full advantage of the access across borders to meet "face to face" while saving very real dollars on transportation costs.

Still, with the mobility of today's work force, security once again becomes an issue. Thus, our report covers the CRE perspective on means of controlling access at the building level, such as with sensing technologies, as well as at the device level, where biometrics could play an important role. These technologies are at varying degrees of buy-in, and only time will tell, say most, in which direction they will evolve.

The mobile worker poses other risks and rewards that are top-of-mind for many of our experts simply given the sheer weight of their effect on the future of the workplace.

- The exodus away from the office is likely, our experts warn, to lessen the sense of community among employees that often spurs the kind of employee creativity on which companies rely. Many of the experts interviewed cite this as a real risk in management's being too lenient with such workplace rules.
- When these mobile workers are in the office, they will be expecting freedom from the cubicle or similarly cramped quarters.

III. EXECUTIVE SUMMARY

Open, collaborative workspaces were mentioned often in the reaction to the Bold Statements in our report. Our contributors say they represent a growing appreciation (or, at least, a greater vocalization) at the employee level for the ability to work alongside coworkers, not a full- or even half-wall away. Thus, capital expenditures will likely be allocated to reconfigure spaces.

- With fewer and fewer workers on location at the corporate office at any given time, there are very clear winners and very clear losers. Lessees face the opportunity for reducing their real estate budgets; lessors face the threat of racking up unoccupied commercial space. The experts who touched on this topic in our report vary in their predictions as to just how distributed the work force will be by the year 2020, but few deny the overwhelming implications of the trend.

Some risks inherent with adopting new technology tools, according to our experts, simply aren't worth taking any time soon, at least not in the current economic environment. Dollars for intuitive environmental sensing devices, for example, are best spent elsewhere until such technology matures to render the return worth their current costs. Risks here include pushback from employees who are protective of their personal liberties; rewards include real energy management and other space-utilization capabilities.

Perhaps the technology type of most concern to our experts with regard to the lack of any real return on what investments could be made now is seen in the area of industry-wide interoperability standards. While the development of such technologies has a relatively long history on the collective wish-list of companies large and small, the entire initiative still stands for the most part at the starting gate. Monies – and, currently, the industry's willingness – to drive it onto the track are hampered by short-term and company-specific, "good-enough" solutions.

Still, many of our experts point to the possibility of industry-born applications, similar to those developed daily for smart devices by their users and then shared, as being the launch pad for these interoperability standards. Such organic development could very well be viewed as a model for how today's technology so adeptly addresses such industry challenges.

IV. BOLD STATEMENTS

Setting the Vision for 2020

Corporate Real Estate 2020 was launched in August of 2011 in Dallas, Texas. At this meeting, some of the industry's brightest from highly respected national and international corporations analyzed the trends and challenges facing businesses of today as well as the impact this has on the CRE profession.

While there is not enough space here to summarize all that was discovered at this session in Dallas, the expansive 2020 business environment vision the group developed is an extremely valuable resource that all CRE leaders, managers and other professionals should be aware of.

Key Observations from Dallas Visioning Session

- Devices = Conveniences
- Cheaper data storage means more efficiency
- Data transmission will get more efficient
- Security improvements will become more problematic
- Mobile commerce will become bigger
- Augmented reality will become ubiquitous
- Better voice – translation management
- Presence technology to determine space usage
- Unrestricted collaboration
- More personalization, mass customization
- Nanotechnology, miniaturization
- Capture of intellectual capital, knowledge sharing
- IT outsourcing to the cloud
- Government monitoring of social media rising

2020 Business Environment – Implications for CRE and Technology

The CRE executives who met in Dallas did come to one unanimous conclusion: The volatility and complexity of the business environment today has made prediction of the future an extremely difficult task. This is especially true with respect to technology. Technology's relentless advance has only become more concentrated, it is hard to imagine another external factor with as much far-reaching effect. Envisioning the impact technology will have in 2020 requires some serious thought and to some extent imagination. Nonetheless, the Dallas group did set a baseline for further analysis indicating the likely impact of technology.

Bold Statements

Armed with a vision of the future, a set of research hypotheses branded Bold Statements were created with the expectation they would be modified over the following months as more data and industry experts weighed in. Once the Technology Tools team had carefully crafted and consolidated the Bold Statements, they were presented to more than 20 end users, service providers and other respected industry professionals. Our sources range from early adapting corporations embracing the new path technology has enabled to the more traditionally focused CRE operations, from smaller companies with operations in one to three countries to worldwide operations.

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BOLD STATEMENT 1

Always networked wireless devices with seemingly infinite memory have converged voice, data and video communications in support of immediate and time-shifted smart access to business conversations, meetings and presentations.

Advances driven by **Moore's Law** have increased memory, speed and application capability for mobile devices. An extension of what we have seen may indicate that future smartphones become miniature application and data servers that maintain connection to secure networks – in themselves "personal clouds" that in aggregate bring the corporate IT infrastructure to the palms of our hands. This enables storage and retrieval of all forms of unified and connected communication: email to voice to video to instant notes, etc., leading to more immediate value creation.

By themselves, smart wireless devices that include, considerable memory, voice, data and video components already represent well-fueled, maturing technologies. But just how ground-breaking the concept is behind this Bold Statement appears to be a case of the whole – i.e., universal adoption at the enterprise level – being greater than the sum of its parts.

Greater, but more challenging.

"People will drive this more than companies will," said **Daniel Johnson**, Workplace Innovation lead for **Accenture**. "And those companies will have to respond and react more quickly than they would probably be comfortable doing."

"I see cracks in the wall," said one interviewee. He is witnessing, albeit slowly, the kind of influence that sophisticated consumer-level products are having on corporate policies. One example: allowing employees to access corporate e-mail via their personal smart devices. "I'm sure for the information security manager, it's making life a little bit more strenuous," he added.

Security, in fact, is the biggest drawback to wholesale buy-in of Bold Statement No. 1, perhaps on equal footing with the expense of the proposition, our contributors indicate.

"The natural tendency, when you go to IT with these sort of things, the automatic default answer is 'no,' mainly because of cost and security," said **Dave Clute** of **Zurich North America**. Two other barriers – legislation and the competitive landscape of service providers – are also obstacles, according to Clute, when technology developments reach this scale.

For pharmaceutical companies such as **AstraZeneca**, caution must outweigh curiosity where new technology is concerned, said **Andrew Glennon**, the company's Global Real Estate Commercial Director. The company equips its sales and marketing staff with a full range of communications technology, but is more deliberate with its scientific staff because of security and intellectual property concerns.

Thus, Glennon does not consider AstraZeneca to be a game-changer in communications technology.

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BOLD STATEMENT 1

"We're trying to follow, really, and just see exactly what technologies are emerging that we can adapt and that are cost-effective," he said.

That approach sounds similar to that of many companies where implementation is happening to a degree and in a very targeted way. While it's easy to get caught up in a utopian vision, where you'll have your mobile device – or whatever the mobile device in eight years will be – and you'll be able to do everything on it, everything you can do today on your PC or in person. It is important to take the approach of making investments where it makes sense and enables the employees to get the most out of those devices.

Glenn Gold said from **Microsoft's** perspective, Bold Statement No. 1 has been realized to a certain extent given technology such as smart phones, instant messaging and video teleconference maturity, which allow individuals to be anywhere, anytime. But industry-wide, it's at a five, tops, on the matrix (See Matrix discussion below). He says the key issue behind implementation is specific corporate culture and whether – or how soon – such technology becomes more accepted and widespread.

Another important factor in adoption is controlling data. If a company has its own internal cloud, it might be able to control data better than by putting all data on personal devices. We are seeing companies moving more toward a cloud.

Early Adopters Go for Video

For its part, Johnson said, Accenture is making a significant investment in video. "In fact, everything that is new about our collaboration strategy right now is video-based," he said.

If a company has its own internal cloud, it might be able to control data better than by putting all data on personal devices.

According to another interviewee, that's one of the best examples of this trend. "People are wandering around workplaces with laptops in their hands – laptops with video," he said. "They walk around the rooms interconnected with voice and video coming through the single device. That is obviously here already and can only proliferate."

Two video brands already recognized by our experts include **Cisco's** TelePresence product, favored by workplace strategist **Cindy Froggatt**, and **Hewlett-Packard's** Halo "immersive collaboration" technology. The HP product is used in 12 locations around the world by AstraZeneca, said **Steve Ashton**, who has a lead role in the company's Asia-Pacific region.

Video can be especially valuable when working with colleagues or clients in high-context cultures where body language speaks volumes. It is important to see the people and the expressions on their face. Culturally, if there are challenges, then videoconferencing works well. However, as one of our interviewees noted, "I'm not sure people always feel the need to go to videoconferencing when teleconferencing works pretty well." The technology is definitely there but the cost of such systems can be prohibitive given their sometimes-marginal advantage over teleconferencing.

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BOLD STATEMENT 1

Predictions on Other Tools Vary

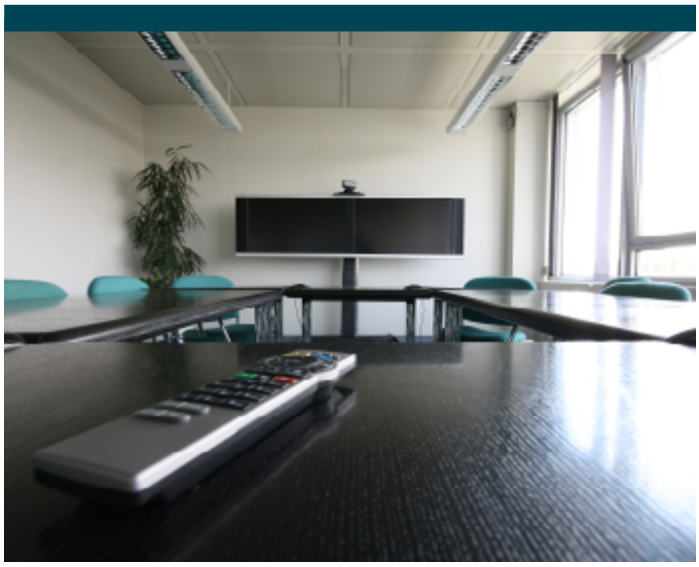
Beyond the increasingly widespread implementation of video, there's not a significant amount of agreement with the experts interviewed as to when other technologies referenced by this Bold Statement will permeate the business sector at large.

Ron Blanken, Head of Global Portfolio Management for **Philips International**, believes this convergence will happen sooner than later because the total cost for ownership of all the systems is not sustainable any more.

"If you look at data centers within corporations, it just costs too much money," he said. "So if there are smart systems like computer clouding, that'll be a bigger help, in many ways, to corporations: on the cost part, on the manageable part, maybe also on the outsourcing part because it supports outsourcing."

Ian Dunning of **Unilever** said this convergence is already happening at his company. He added that wireless technologies are coming along and creating a lot more bandwidth. "We are going to take some pretty startling steps forward by 2015," he said. "We'll shift to (employees) using them on a day-to-day basis to deliver their work."

One person with whom the technology team spoke with sees the technology behind the hardware evolving dramatically. "I think we're going to see our handheld devices be much more powerful than those tools are today," he said, predicting the eventual demise of laptops and desktops. "Already, there is a tablet that is as powerful as your desktop and everything that you could do (with a desktop) can be done and just be taken with you in easier and more mobile ways."



He says this hardware development will be matched by a software evolution. "Everything from cloud computing to the interfaces and the speed at which we can graphically see data in dashboards and other types of tools are just completely transforming what we've been used to over the last 10 years."

Trex Morris of **Ernst & Young**, however, is more bearish on the prediction. "To me, it's kind of like the paperless office," he said. "There are technology elements that have progressed rapidly; however, there is still significant work to be done to address parity in use of these tools globally, cultural, generations, industries and statutory consideration that will have an impact. Even moving entirely to wireless communications globally is something that may take time to complete," he added. "The vision makes sense, but the timing is tough to predict and may take longer than many of us would like."

The technology team found that service interruptions are still an obstacle to becoming fully wireless. In some areas the technology may not be there to support it, resulting in reliability issues. **Jim Walter** of **Cushman & Wakefield** acknowledges

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these service interruptions as an issue but stated, "I am astounded by the progress that has been made in that area in the last year or year and a half, and eternally frustrated by the kinks in the technology. I would say it would probably be there in another 18 or 24 months, and it will be probably generations old by the time we get to 2020."

Even with advances in wireless devices, **Andy Thomas** of **Virtual Premise** believes there will always be a network basis to their connections. "I can get something on my desktop; and then I can get something through my network off my desktop; and then I can get something off my network off a personal device. Now, I can get something off a personal device from the cloud, which, in effect, is really just a different form of network, really," he said.

Matthias Grimm of **SAP AG** said always-networked wireless is important, but difficult, to implement. He cited an example of using a mobile device to book a meeting room. He said the system should allow a user to book the room or be able to reach out to double-check its status if it shows as already booked. That way, he said, the user can see if the timeframes for using the room overlap or the user can adjust the time he needs the room.

"This is one example," Grimm said, "but there are several examples and I think in all aspects of real estate and facility management, the impact of technology will increase, particularly that of wireless devices."

Sometimes the shortcomings can be attributed to the user's capabilities and not necessarily to the technology interface, suggests **Peter Miscovich** of **Jones Lang LaSalle**. He said, for example, it's important to better enable and train Baby Boomers to become more technology literate and fully equipped to adapt to these new emerging technologies. From mobile cloud storage capabilities, to multi-device activity for meetings, to unified communications combined with virtual video collaborative activities, he said, these emerging technologies will soon be ready for large scale implementation. Security thresholds notwithstanding, "these technology tools are already here and they will soon begin to scale at accelerated adoption rates," said Miscovich. "It's now a question of the timing for implementation and when these emerging technologies will take hold with their ultimate roll out at the enterprise level – globally – the future is now I believe."

From mobile cloud storage capabilities, to multi-device activity for meetings, to unified communications combined with virtual video collaborative activities, these emerging technologies will soon be ready for large scale implementation.

IV. BOLD STATEMENT 1

Conclusion

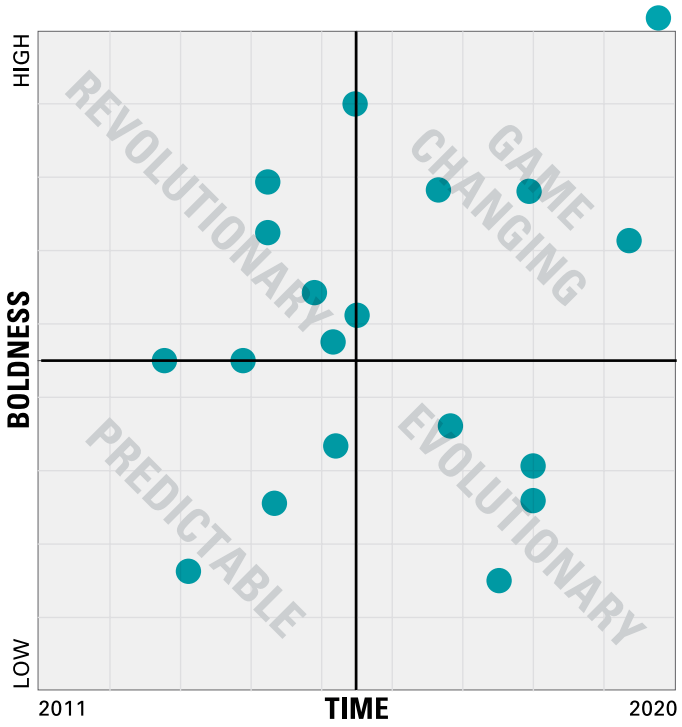
Driving the concepts behind Bold Statement No. 1 is the sometimes frenetic consumer-driven, rather than more pragmatic IT-driven, technology choices being made and the rapid increase in technological advances being brought to market. In aggregate, these choices are about a personal empowering of the worker-consumer where choices around technologies and new business apps on personal devices make their work and personal lives easier by allowing them to do more in a custom fitted work solution.

With important securitization of their intellectual property and other assets on the line, companies are faced with important options. One, embrace the new world of the well-connected, tech-savvy employee base and implement the technologies, such as cloud computing or apps, needed to support their productivity while protecting company assets. Or, slowly evolve toward the ideal, building on the technologies already in place, such as video conferencing, to strategically develop a workplace that provides ongoing balance between worker demands and everyday business objectives. This may require corporate IT organizations to better understand the technology "context" that workers are creating around them to predict the effect these choices may have on infrastructure and "guide" employees in the right direction when market driven choices may impair the company. The executives who weighed in on this Bold Statement showed that the decisions aren't always so clear-cut.

BOLD STATEMENT 1 MATRIX:

Always networked wireless devices with seemingly infinite memory have converged voice, data and video communications in support of immediate and time-shifted smart access to business conversations, meetings and presentations.

To help visualize how our interviewees reacted to our Bold Statements, we asked them to place a dot on the matrix below. We used the x-axis to gauge the timeframe of when they felt each statement would become a reality and the y-axis dictates the "boldness" or impact of each statement on corporate real estate.



IV.

BOLD STATEMENT 2

B.Y.O.T. (Bring Your Own Technology), enabled by wearable interfaces and transparent, biometric-based security, seamlessly supports how, where and when we work.

The thrust of this Bold Statement is on the matter of maximized mobility. With the consumer marketplace constantly offering new technologies or adaptations, workers intuitively scan for "better" and "easier" to support their work and personal environments. Organizations that are intently interested in security (e.g. **DARPA – the Defense Advanced Research Projects Agency**) have now gone beyond fingerprints and retina scans and are favoring keystroke timing as unique – and continuous methods of securing computing environments. Wearable interfaces now include everything from tattoos to **Google Goggles** with more to come based on electronic fabrics, use of lasers, capacitive (touch) technologies and of course the ubiquitous interface that ties it all together. It's a prediction that most of our executives expect to materialize well before 2020, but for which few expect front-page headlines.

One recent exception, of course, is Google, which made headlines with **Project Glass**, its effort to create a wearable computer through eyeglasses. It's the type of technology that's not lost on Andy Thomas of Virtual Premise, who recalls reports of airline maintenance workers accessing manuals through such eyewear, and can see such technology applied in real estate.

"For the facilities management and maintenance management arena, the whole concept is a very interesting and strong possibility," said Thomas, whose office sits in proximity to the Atlanta campus of **Georgia Tech**. He reads the institute's alumni magazine and is encouraged. "The things that are going on there in terms of nanotechnology research are just unbelievable," he said, "and will lead to advances that still are unimaginable by most."

As for the concept behind BYOT, personal and business technologies have been converging since businesses moved from pagers to cell phones to smart phones to tablets.

Blanken said he absolutely believes the BYOT prediction will come to fruition, and quickly. He sees each new generation adopting personal devices more easily than the previous one. "They just invest in their own equipment very easily, and they exchange technology for more modern technology in an easier way," he added.

At Philips, employees are bringing their own devices, despite not being compensated for their use. "This also will release the company from all kinds of management models for devices that the company currently supplies," said Blanken. "So if you find an easy way of supporting your BYOT team policy, it is definitely going to be there sooner than later."

Dave Clute of Zurich North America said his company is looking at implementing a BYOT policy specifically aimed at smart devices. "Quite a number of people have gone out and purchased their own iPhones and iPads independently," he said. As a result, employees end up carrying multiple devices: their corporate-issued Blackberries, along with their iPads and iPhones.

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With respect to wearability, Clute said, the devices need to be easily removable for airport and security reasons. "Now, if you take it to its extreme, where it is embedded in your clothing and it's part of your attire, I'd say it's quite a ways out in terms of timing," he added. "We may not even see that by 2020 because of other restrictions."

Peter Miscovich said BYOT already is occurring across a number of his clients. "BYOT is not quite wearable yet and it's not quite biometric, however, I think that's coming in the next several years in the near very near term future," he said. "I have one client right now with 85,000 people globally and with 35,000 people already bringing their own technologies into the workplace." That client has been able to reduce its IT support cost by 40 percent because the IT support becomes the responsibility of the employee – the company provides secure and reliable technology network access capabilities.

Another major contributor to BYOT into the corporate workplace will be the accelerated growth of the "contingent" and contract work force – expected to comprise up to 60 percent of many organizations in terms of total overall employee headcount by 2020. "I think in some ways," he said, "that private cloud or hybrid cloud computing platforms will allow us even more freedom with even greater levels of technology access and security to bring our own personal digital devices into the corporate workplace. At this time - we are no longer tethered to the Mothership of enterprise technology – as we have been set free and we can become 'mobile digital nomads.' Therefore, the physical corporate workplace becomes one of the many options available for mobile knowledge workers – in terms of work environment choice and in terms of our personal preference for superior work performance."

> "BYOT is not quite wearable yet and it's not quite biometric, however, I think that's coming in the next several years in the near very near term future."
> - Peter Miscovich

Another of Miscovich's clients is beginning to push the envelope on voice recognition. "(The company has) a 3-ft.-by-4-ft. interactive technology screen that you talk to and that you can touch and interact with utilizing natural interface technology capabilities. We will soon not be typing any longer on our keyboards; and soon we will be speaking to vertical intelligent 'smart wall' technology systems; whether oriented as a 'smart' vertical wall or 'intelligent' large-scale horizontal tablet like technology systems. These interactive natural interface technologies will be able to also provide live feedback to our activities with real time intelligence and interaction," he said. Such technology, he added, is not so far away. "The question will be how the corporate real estate (CRE) world wakes up to these new workplace technology opportunities and what types of IT investment will be made within the corporate workplace as these technologies advance and mature," he said.

Ian Dunning of Unilever said his company's efforts at BYOT have been met with varying success. He said it has worked well with lightweight users, but with more complex workers using ERP systems and the like, it gets more challenging. "(It will) take another three to four years to mature a little bit more," he said. With respect to biometrics and wearable technology, Dunning believes it will take to 2020 for them to be adopted.

At AstraZeneca, 2020 is the target for having developed a strategy for BYOT (or, rather, BYOD,

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for "device") based on a reimbursement model, one that might be considered part of an employee-benefits package. By then, the company is looking to provide some $2,000 in allowances for employees to buy their own dependable, high-end devices – smart phones, laptops and others – as well as maintenance plans, said Andrew Glennon and Steve Ashton.

Why the wait? According to Glennon, it's the fact that their three main locations – in the U.S., the U.K. and Sweden – treat these technology allowances differently when it comes to taxation. "Once we get through that," said Ashton, "I think certainly we've got a pilot to test the technology in place."

Also, by that time the devices selected will have matured to have biometric security features built into them, Glennon said, including eye, voice, iris and fingerprint recognition. "That's all around the expectation that you would have only one PC to take home with you," he said. "The last thing you want is your kids accessing your work-based documents and getting rid of them all."

It is quite possible we will see a natural progression toward BYOT based on the better-equipped consumer/employee who tends to update his or her computer equipment more frequently than do most companies. "Companies will just assume an employee has that device and that it can run any applications, so I don't see why a company wouldn't just have an app that you load onto your personal PC, or iPad, or tablet, or whatever it is. Then, you just access their world through your application," one of our interviewees' stated. In this instance, as their IT department moves from a capital-expenditures model to one more focused on operational expenses, company servers are being moved out-of-house, and more cloud technology is being utilized. It results in employees becoming more mobile, working when they want to work. "That then

leads to people being judged by the results, So, (the work) is output-driven," he added.

Some Still Skeptical

One person we spoke with is not completely convinced about the prediction for BYOT because of the need for high quality and consistency in interactions and interfaces. "I certainly believe that it will be enabled," he said. "All the security barriers of today will definitely be resolved so that would be possible. But whether or not companies actually decide that's the best platform or the best method of fulfilling the technology offering or not, I'm not convinced."

Daniel Johnson of Accenture believes that security needs and technical support issues will limit BYOT. "Certainly for us, the nature of our business, especially the connectivity between Accenture and client networks, may preclude opening up the BYOT thing completely," he said. "But I think in certain parts of our business, it will be quite significant."

As one of our interviewees points out BYOT will progress but it won't be universal. To support this they point to financial institutions, which have to be

BOLD STATEMENT 2

very protective of their data. "The more data you have in the cloud, the easier it is, then, to steal," he said. "One way we get protected is by using our own equipment or using corporate equipment versus (employees') own devices because if I let you go, how do I know the data on your device is not going to be there, assuming that it's not all in the cloud? Even if you wipe the hard drive clean, the concern is that there's still information on there."

The adoption of BYOT might be a case of the consumer market having an impact on the business systems or, more specifically, an impact on the chairman of the board according to one interviewee. "Our chairman of the board got an iPad. And he said, 'Hey, we're supposed to be a technology company bringing anti-friction (solutions to clients); why can't I use my iPad to get to work stuff?' So the chairman kind of pushed IT along a little bit." "Still," an interviewee said, "I think it's going to take us longer to adapt a full BYOT environment."

Intrusiveness a Concern

With regard to biometric devices, Glenn Gold, Senior Manager of Corporate Real Estate for Microsoft, said, "I put that one in the evolutionary ranks, just beyond about 2015 to 2016. I think one of the biggest issues around something like that is really how much PII (personally identifiable information) is involved. This is a prohibitor in the adoption of that type of technology."

Gold said it's one thing for companies to have employee badges or card keys that are swiped for building access. It's another to subject them to a retinal scan. "I think there are a lot of people out there who are pretty shy of that," he added.

Still, the idea of body-specific recognition tools for

The adoption of BYOT might be a case of the consumer market having an impact on the business systems.

the sake of security was met with greater overall acceptance by our group of industry executives than was the idea espoused in Bold Statement No. 4 regarding the tools for intuitive environmental sensing. Said workplace strategist Cindy Froggatt, "I think these tools just make it easier for people – most of us gravitate toward new things that make it easier for us to do our best work."

Jim Walter sees real resistance from his clients. He said in his experience, in extremely secured environments there has been huge pushback against use of scanners or hand scanners and things like that. "The other practical challenge that I see constantly is complexity of the databases that are necessary to bring all these pieces together," said Walter. "The ability to handle that complexity is not a skill set that most people in the CRE universe can even speak to, much less execute."

Even as technologies are becoming theoretically closer together, Walter sees big holes in terms of user acceptance and industry skill sets that need to be filled before biometric-based security becomes a practical reality.

Trex Morris, believes biometric-based security is going to happen. "We clearly see some of this today. In fact, in our business, security and data sensitivity is fundamental," he said.

In regard to interfaces and biometric tools, a few ergonomic issues arose as well as concerns over ease of use. Blanken has used a PDA with

IV. BOLD STATEMENT 2

fingerprint recognition and found it to be cumbersome, so he just switched that feature off. "It's about what you think an individual needs to maintain for a security level or easy access level and, as a corporation, what you have to protect," he said. "Even in today's market it's very difficult to find a balance between security measures and ease of operation."

The practical side of technology also influences another person with whom we spoke. He's not caught up in a utopian vision of capabilities for these devices but does see value in their core elements for corporate real estate, like predicting building occupancy. "That's useful data that we can turn into actionable information in terms of how we operate the building and how we size the building to accommodate the number of occupants. Right now, the technology is too clunky but that's one (area) where we'll see leaps and bounds over the next eight years."

Conclusion

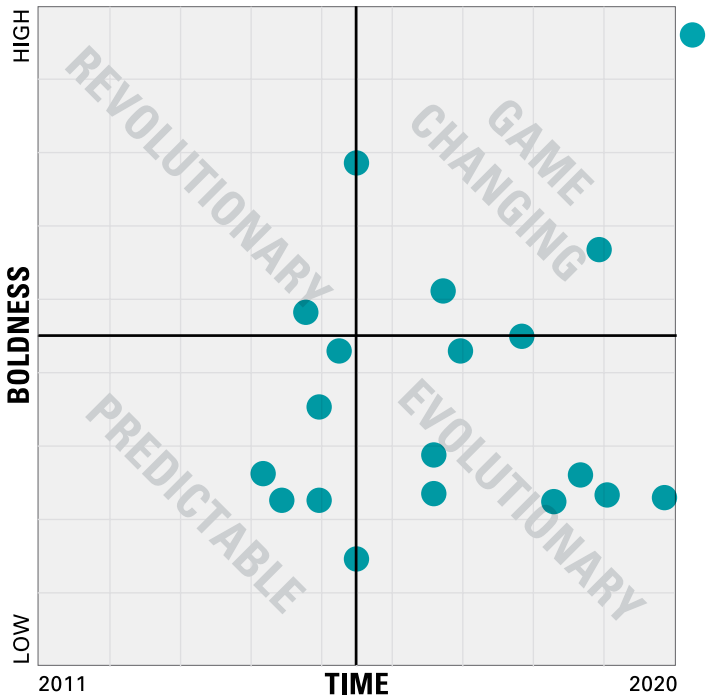
Once again, security for company data poses the biggest barrier to companies' full-scale adoption of the concepts of this Bold Statement where bring-your-own-technology is concerned. It may also turn out that security may become less onerous to tackle using emerging concepts around continuous security based upon interfaces (touch, keyboard strokes, and voice) that are always paying attention. A proliferation of unique, personal devices connected to the company trough of information is a scary proposition for most IT departments. On the other hand, as personal and business technologies continue to merge, there are greater means for managing the transition.

One emerging idea that must be further investigated centers around ownership of the information contained in and transmitted by technology. Today's smart devices have options for users who may elect to store corporate files along with their personal and entertainment information. Who owns (is responsible for) what? Companies can reap some rewards by taking on less responsibility – even support – for the growing diversity in the hardware from which employees choose. As for the other aspects of this Bold Statement, there is much more work to be done before their potential is tapped. Privacy and personal-liberty concerns will moderate the rise in wearable devices; currently, voice recognition is as far as many companies have gone. Other technologies, so far, lack clear purpose and ease of use to be on many wish lists for 2020.

BOLD STATEMENT 2 MATRIX

B.Y.O.T. (Bring Your Own Technology), enabled by wearable interfaces and transparent, biometric-based security, seamlessly supports how, where and when we work.

To help visualize how our interviewees reacted to our Bold Statements, we asked them to place a dot on the matrix below. We used the x-axis to gauge the timeframe of when they felt each statement would become a reality and the y-axis dictates the "boldness" or impact of each statement on CRE.



IV.

BOLD STATEMENT 3

Interoperability standards such as OSCRE International (Open Standards Consortium for Real Estate) have driven applications such as Integrated Workplace Management Systems (IWMS) to become the Enterprise Research Planning (ERP) systems of corporate real estate.

The shorthand reaction of our acronym-savvy experts to this statement is that it's a logical step they hope and expect to see. The result will be faster and more efficient industry-wide understanding of conditions, trends, costs and solutions to common problems. Enterprise Resource Planning (ERP) systems found wide adoption from the 1990s through today by large corporations wishing to automate their internal systems driving manufacturing, human resources, finance and accounting among others. Where this technology was broad in its implementation and acceptance, it did not cover real estate and space management in a way that caught on. This is possibly because of the differing management controls in real estate as compared to other internal functions and a much broader service sector tied to real estate than finance and accounting sectors enjoyed.

A broader understanding of this statement, however, requires explication of terms and how its elements will work together. OSCRE, or the Open Standards Consortium for Real Estate (see below), is an international organization dedicated to developing industry standards for exchanging data. Standards such as **OSCRE** serve multiple functions – to define terms and concepts for broad use, identify typical processes defining common actions within workflows to achieve desired results (e.g. reporting, lease abstraction, measuring space utilization) and creation of a platform to communicate information made up of common data elements. OSCRE has chosen eXtended Markup Language (.XML) as the language for data sets that enables predictable, reliable communication of information between ERP, IWMS and other single point solutions that owners and service providers use to manage their workflow and internal processes. OSCRE is striving to enable software developers to make their applications compatible across the CRE industry, including corporations, public agencies, service providers, management consulting organizations and suppliers.

Glenn Gold, Senior Manager of Corporate Real Estate at Microsoft, said, "I think it will change the way that corporate real estate looks at technology solutions and can take them to that next level of providing the intelligence to the decision makers and the corporation and how it impacts their businesses."

At the same time, those interviewed predicted that success in fulfilling this prediction will require time, commitment from industry leaders and a willingness of vendors to invest in independent development. On our matrix, they almost unanimously pegged this statement as developing late in the 2020 timeframe and as evolutionary.

IV. BOLD STATEMENT 3

Real estate applications are categorized as either Single Point (i.e. generally separate database repositories designed to service a single element of the real estate lifecycle, such as Lease Management) or Integrated Workplace Management Systems (IWMS) (i.e. generally providing the opportunity to select individual elements, any combination or a suite of integrated functionality, as detailed below, with a common database structure). IWMS offerings typically accomplish the five functions below:

- Portfolio Management
  (leased, owned, locations, etc.)
- Project Management
  (capital improvements, transactions, etc.)
- Facilities Management
  (demand, preventive maintenance, etc.)
- Occupancy Management
  (space utilization, allocations, etc.)
- Environmental Sustainability
  (carbon footprint, etc.)

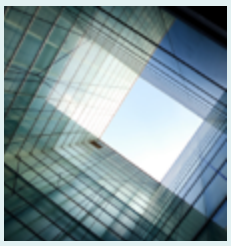
IWMS is often considered the "ERP of Real Estate" because of the capability to accomplish for real estate what established ERP systems could not.

One interviewee noted, "A lot of folks, ourselves included, have done 10 to 20 years of development of home-grown applications or off-the-shelf applications that we've customized, and that's served a lot of folks well," he said. "I think the next step in the evolution is how we decrease our operational costs by moving to one platform."

"IWMS applications can provide unique insight and forward looking visibility serving both as a GPS for CRE (i.e. helping users understand their current leased and owned positions, critical dates, economic obligations relative to market, capacity utilization, facility service provider performance, etc.), as well as a Compass, identifying opportunities for action," said **Michael Swanstrom**, President & CEO for **Business Integration Group**, Inc. (BIGe). "Organizations desire to prudently manage spend, to increase occupant satisfaction and their focus on core business objectives and to enhance communication and productivity among real estate practitioners. IWMS applications bring a common framework to accomplish these objectives."

Looking ahead, one interviewee sees exciting changes. "You're going to be integrating video, text, dashboards; you're going to be able to drag and drop and create (in) real time where are we in a portfolio for the year," he said. "You'll know exactly where you are; you'll know exactly how much saving has occurred; you'll know exactly how many transactions have been done."

Open Standards Consortium for Real Estate (OSCRE)



OSCRE is a non-profit, member-supported, market-led standards body that facilitates increased business productivity and efficiency through the development and delivery of standards across the real property sector.

OSCRE's mission is to engage all sectors of the real estate industry to make full and effective use of the interchange of information enabled by the digital economy. Members include owners, tenants/occupants, investors, operators, developers, service providers, regulatory agencies, consulting firms, lawyers, vendors and suppliers. OSCRE is the only global e-commerce standards body for the US and UK real property sector. OSCRE also provides guidance on early opportunities across the membership in emerging areas such sustainability and intelligent buildings.

IV. BOLD STATEMENT 3

He also predicts a proliferation of strategy-specific applications. "We're seeing applications now that will allow the user base to put tools in the hands of our corporate real estate world and we'll have libraries of processes that we will be able to choose from." He likened it to **Wikipedia**, a knowledge base built solely by its users, or to an App Store for commercial real estate.

"So let's say you have a market study or a financial model. All these tools will be readily available at our fingertips, (plus) literally thousands of processes that the user will build and make available to its base of users. (You'll) just choose from and start applying your portfolio against these tools as opposed to having to reinvent them as we've had to do in the past," he said. "Everybody will leverage other people's work."

Challenges Lie Ahead

All the moving parts needed to fulfill this statement, however, prompts some skepticism.

Ron Blanken, Head of Global Portfolio Management for Philips International, said current practice suggests that widespread adoption of IWMS might not happen. Few companies, he said, can afford to have these systems in place. "It takes a very solid kind of back-office structure to make sure that it is widely applicable within a different range – and I'm just looking from a service-provider perspective," he added.

Adding to the problem of resources is variation among CRE organizations.

There is a lot of work being done, but progress might be slow. "There are so many different ways and nuances to how individual enterprises view their real

IWMS as a single product might spread sporadically in the industry, since different users of space can have very different needs.

estate and their planning," one CRE professional said. "Getting a single sort of common definitions, a single set of common ways of looking at it, is possibly unlikely." He expects some companies will believe they need unique real estate metrics.

Andy Thomas of Virtual Premise agrees that IWMS as a single product might spread sporadically in the industry, since different users of space can have very different needs. For example, he said, a company that leases the majority of its space typically deals with a landlord who manages maintenance for their buildings. "I believe that the integration of various systems will however be the way that corporations manage their real state over the course of time," he said. "I just don't believe that IWMS, as it's defined by Gartner, is the model that's going to have as much success as hoped for in some circles."

Workplace strategist Cindy Froggatt's reaction to the lack of progress on this topic is somewhat acerbic. "I have been at this for more than 25 years and that statement, (even) 25 years ago, seemed simple and logical, like, why wouldn't you do it?" she said. "And yet, it hasn't happened."

Froggatt said people have taken many runs at it and, for some reason, it doesn't materialize. "It's still nearly impossible to figure out how many people, from which teams, are actually assigned to a particular building or campus, given that sometimes several corporate systems track people

IV. BOLD STATEMENT 3

in different ways, right?" she said. "So, while I have high hopes for this one, I actually have low expectations that companies will see this as a top priority for implementation."

Dave Clute of Zurich North America said continued education and awareness are needed to drive the evolution of this change. "The other driver for this will be getting enterprise companies, like owner-occupiers, like Zurich and others, to require compliance through contractual mechanisms," he said.

Some specific companies are getting ahead on the trend. Ian Dunning of Unilever said the realm of interoperability standards is one in which his company is seeing huge growth. "Most organizations are seeing this as a strategic investment," he said. "There is far more integration between the real estate and the facility management piece now."

AstraZeneca's Steve Ashton said his company has bought into OSCRE standards and has been trying to roll out an Enterprise Management System (EMS) software package to specific regions. In 10 years, he said, the system should be the "window on the world" for all of their global real estate assets. The company's current system, called One View and developed with Jones Lang LaSalle, is a lease-management system at a basic level. "We're looking to evolve that solution," said Ashton.

Peter Miscovich of Jones Lang LaSalle said big changes are coming within CRE technology, and these changes are long overdue and they are mandatory.

"I think some of the BIG DATA and Advanced Analytics technologies that are coming from the IT world will be very powerful - and these IT Analytical

tools may supersede many of the current integrated workplace management systems (IWMS) that are being offered today" he said.

"I don't see enough investment being made by most corporations into the integrated CRE + IT + HR technology realm - and we may soon discover the evolution of Advanced Analytics Technologies from the IT world encompassing and integrating all of the enterprise infrastructure functions under one comprehensive IT umbrella - including the corporate real estate functions as well," he said.

For building integration and data exchange, Miscovich said, progress can't be soon enough. "If comprehensive support for the high performing workplace environment gets full endorsement and lift-off with next generation integrated IT solutions - then we will realize fully integrated protocols (where) information is readily available, data is easily comparable and completely transparent across the enterprise," he said.

IV. BOLD STATEMENT 3

"At this time, we will then finally realize the powerful integration of corporate IT and CRE and HR technology systems across the global enterprise.

"This is also when we will begin to realize that the CRE function can become truly high performing - when it has been fully enabled by advanced IT platform capabilities – we will then have the fully integrated CRE + IT + HR workplace performance information management capabilities that we have been seeking for so many years historically."

Conclusion

There is an inherent irony behind this Bold Statement that, perhaps, has so far kept it from coming to fruition. One reason is that both single-point and consolidated IWMS applications require significant introspection within organizations and their service providers to define their processes and expected outcomes to standardize their workflows. This is a sometimes complex process requiring a time investment from key constituents that reliably results in transformational change resulting in higher efficiency and better accounting for results. As long as companies individually meet their ERP needs outside of any standardized, industry-wide system, the broader OSCRE effort to standardize frameworks, while unquestionably in high demand, will continue to be jeopardized and still facing a lack of time, leadership commitment or vendor investment. According to some experts, however, there might be some hope that stems from user-created "wiki-type" internet-based initiatives and user-developed, user-shared applications similar to those created for today's smart devices. This reflects the camp that believes single-point solution results can be aggregated through XML language and OSCRE standards to engage a reliable conversation between data sets and a common reporting platform. As these materialize and are distributed, some could very well rise to the level of broad-scale adoption, or, at least, serve as industry benchmarks. In the meantime, our experts say, costs and back-office support are still legitimate barriers to current systems, but education and awareness might help drive progress in this area.

BOLD STATEMENT 3 MATRIX

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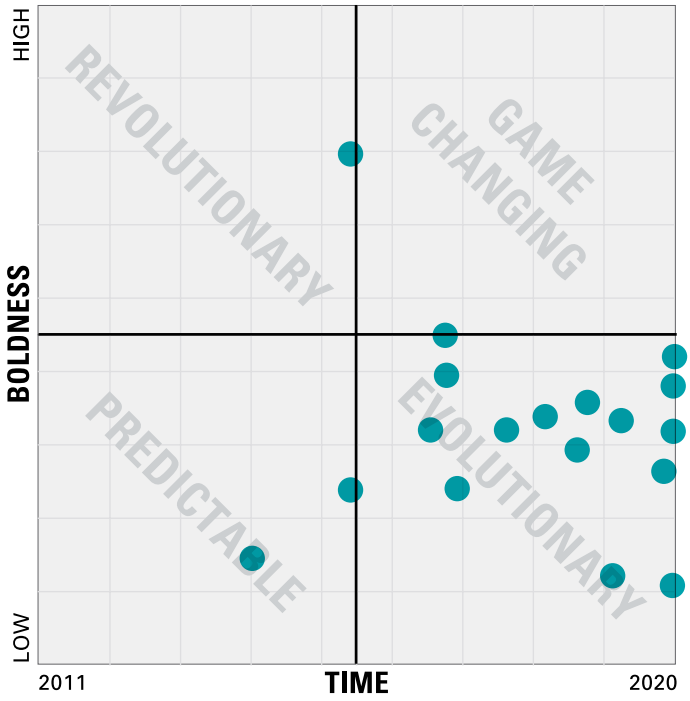


IV.

BOLD STATEMENT 4

Intuitive environmental sensing provides emotional intelligence cues leading to reduced stress and increasing the efficiency and effectiveness of space use and communication in the work force.

Of the six Bold Statements in Corporate Real Estate 2020, none ranked as bold or not-ready-for-prime-time as this discussion over the use of technology to better define the area and context around us. Overall, the conversation revolved around the expense and feasibility of such technology, as well as its "ick factor."

In our boldness/time matrix, Statement No. 4 wedged up in the extreme corner of the "game-changing" quadrant. Many of the experts interviewed believe the expense of using technology to sense temperature, lighting, sound and other measurables in a room – and to gauge the emotional state of its occupants, perhaps the most technologically extreme of the predictions – would be greater than the return, particularly in today's economic climate.

Adoption and implementation of either technology could hinge on the economics of energy and continued use of teleworking or other non-presence based employee contributions. For example if facilities were appropriately commissioned after construction and prior to occupancy, building operational target set-points may indeed change in a very short period of time, based on actual conditions, causing them to operate inefficiently resulting in greater energy use, occupant discomfort and loss of productivity. The small cost of sensing basic environmental factors compared to the large cost of inefficiency could make the integration of sensors with building operations an economic imperative.

"I think the capability will be there," said Daniel Johnson of Accenture. "But I think people for the next 10-plus years in most organizations are going to be struggling with right-sizing and optimizing their portfolios."

Another of our interviewees had a similar view. He described Bold Statement No. 4 as a "nice to have" kind of development. "These things require lots of investment without a lot of return, so, this is one I would say you'll see it, but it won't be pervasive," he added.

One interviewee said he's had some experience with the limited sensing technologies now available. "Even though times are good, and we've had two of our best years, everybody is still really penny-pinching," he said. He's tried to get room lighting with automatic sensors, but saw it cut from the budget. "For us then, we need to do a financial analysis requirement to cost-justify the environmental sensing."

With development of technology and its implementation seen as far away, the details and effectiveness of environmental sensing still are unknown. Ian Dunning of Unilever said that while great technology is appearing, especially in the environmental area, he doesn't see it necessarily

BOLD STATEMENT 4

reducing stress. "It is still in its infancy," said Dunning, "Sometimes these technologies induce more stress instead of helping."

Feasibility Not a Factor

None of our experts questioned the technological feasibility of measuring and reporting key environmental characteristics of a room or of a person. According to one CRE professional, "It's within reach I think, advancement in that type of technology – sensing and, you know, some of the Cisco stuff that's out there, really intelligent control systems – will continue to evolve."

In fact, assistive communication technologies have been used in the health care industry for years to accommodate patients with limitations of senses. And, of course, face-recognition technology already exists. The migration to the office environment on any widespread scale is a matter of what can be done with the information obtained.

All data being of value, there will certainly be interest in collecting this information, predicts Ron Blanken, head of global portfolio management for Philips International. "To be fair, I would love to have these (sensors) providing (emotional) communication in this area because it's a kind of risk reducer, especially if you're working in an (industrial) environment," he said.

A CRE professional said understanding the emotions of employees will enhance flexible working. "When you can actually see and communicate the way we can with the work force, that will improve the workplace for the employees," he said. "It certainly is taking into account how the employee feels. The opportunity to gauge that is going to get better and better over the next eight years."

Backlash Might Be Barrier

Whether this kind of technology can fight its way beyond the "ick factor," however, is another matter. It might be economically and technologically feasible, but reporting such things as participants' emotions of surprise, ambivalence or anger is considered by some a heady price to pay in terms of possible backlash by important constituents.

Workplace strategist Cindy Froggatt speaks for many when she judges the application of this idea to be too intrusive. "Picking up on people's emotional wellbeing, that makes me go, 'Uh, too much information'," she said.

Whether using emotional sensors will be a problem is still unknown. While some worry about resistance to this kind of data collection, he believes people will get much more comfortable over time. "There will be more and more of that type of thing, so if the technology is available I don't think they'll

IV. BOLD STATEMENT 4

put up too big of a wall in terms of being able to get the better experience as long as it's beneficial," according to one interviewee.

This trend is still "a little out there," as Peter Miscovich of Jones Lang LaSalle described it. He is unsure whether it has viability in the near term. "I know that the **MIT Media Lab** has conducted several advanced research studies that have shown how a person is feeling when working within the workplace and how emotional cues can be communicated externally via mobile and wearable technologies," he said.

"I think there may be personal and privacy issues that arise in terms of personal privacy and personal and confidential communication within the workplace. Our emotional state should be a private and personal matter – and these privacy issues may become potential constraints and inhibitors - from an HR perspective for this technology to become fully embraced and implemented at scale," he added.

Miscovich states "I do believe that human performance, workplace wellness and workplace well-being – all of these human issues - will be major areas of focus and priority for most global corporations in the years to come."

One interviewee said the "ick factor" could be most pronounced in the U.S. "I bring that up because of privacy concerns, especially how the U.S. feels about privacy concerns," he said. He says everyone has read body language in situations such as job interviews. "Now, instead of having to read body language, I can get all of that through emotional intelligence sensors or behavioral sensors," he added, "but as soon as someone starts doing that, he'll be accused of invading privacy."

"Cost and caution may combine to slow development of this technology." - Jim Walter

Resistance from users would slow adoption, according to Dave Clute of Zurich North America. "I think people prefer to look each other in the eye and read the body language from their true human indicators, as opposed to machines interpreting that for us," he said. "That's purely a personal view."

Clute said he's spent a lot of time in tele-presence suites. "It's interesting to gauge people's behavior when they know they're on view," he said. "They can't multi-task, and they're struggling to maintain eye contact, but they're not sure which lens to look into to establish that. So, we're not quite there in terms of tele-presence, but it's getting close."

"Cost and caution may combine to slow the development of this technology," said Jim Walter of Cushman & Wakefield. He describes this statement as, "A nice theoretical, but not one that I've seen out in the real world yet." He agrees with those who worry about the "ick" factor of intuitive emotional sensing. "I would put it in the category of under-floor air distribution 15 years ago: great theoretical possibility, not a lot of people who knew how to pull it off, so you have smaller technical barriers to success hiding behind larger user acceptance barriers," he said.

In time, Walter and others predict the situation likely will be far more advanced; times are changing. Costs of these installations will drop, and employees will grow less skittish about privacy issues.

Still, just about everyone agrees, we'll have to wait at least until 2020 to see if Bold Statement No. 4 is on the mark.

IV. BOLD STATEMENT 4

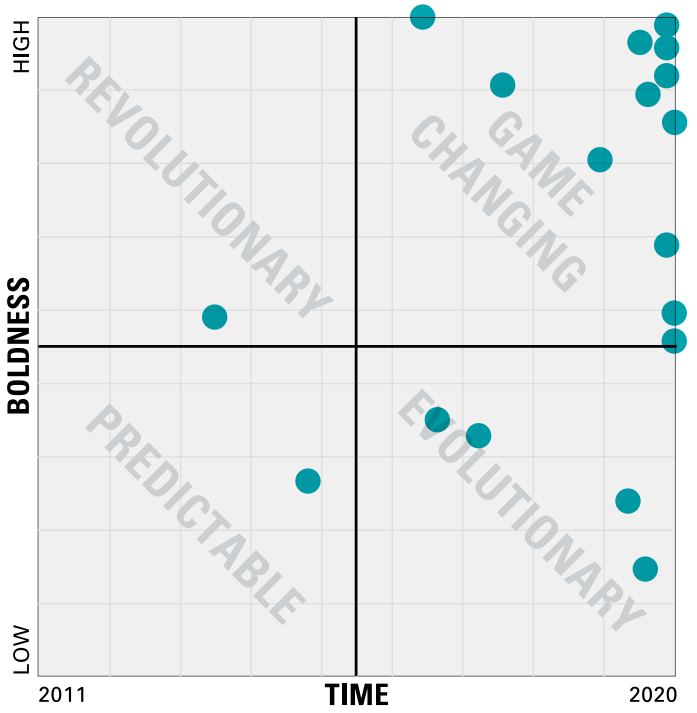
Conclusion

The biggest pushback from our real estate experts was prompted by this Bold Statement. While they do not question the capabilities for these types of technologies, many see them creating more anxiety than they might mitigate, at least in the near-term. Putting emotional measurement in place would almost certainly require that terms of employment would begin changing to accommodate employer "interpretations of emotional context" in ways similar to corporate IT guidelines now in effect. Why? In a word, the "ick" factor. Privacy and personal-liberty concerns are seen as being compromised, and these concerns are likely to restrain growth in the placement of these sensing technologies, regardless of any potential benefit in the way of real estate analytics. For now, face-recognition programs and tele-presence tools provide a glimpse of the potential for the usefulness or acceptance for any advanced equipment, but our experts believe it might even be beyond the year 2020 when we put that to the test. Of the six Bold Statements in this technology section, this one may represent a future business opportunity that could stand extensive R&D both in technology and in the marketplace.

BOLD STATEMENT 4 MATRIX

Intuitive environmental sensing provides emotional intelligence cues leading to reduced stress and increasing the efficiency and effectiveness of space use and communication in the work force.

To help visualize how our interviewees reacted to our Bold Statements, we asked them to place a dot on the matrix below. We used the x-axis to gauge the timeframe of when they felt each statement would become a reality and the y-axis dictates the "boldness" or impact of each statement on CRE.



IV.

BOLD STATEMENT 5

Corporate Real Estate strategy now includes "goodwill assets" that include third places (e.g., home offices and coffee shops) in supporting diversified workplaces that increase productivity, recognizing the value of the worker ecosystem.

The proliferation of tools that allow us to work from almost anywhere is a prime example of how rapid and revolutionary changes in technology can be. No sooner do you adapt to the move from the desktop to the tablet than you're faced with the potential wholesale exodus of employees from the office building for the better part of the work week.

Until now, the concept of "third places" was based on anecdotal stories about coffee shop hangouts for the Wi-Fi enabled. There had not been a rigorous analysis of non-CRE space used to benefit corporations in supporting worker space needs. Today, companies like **Regus** have made a business around temporary offices, firmly establishing themselves as a third-place provider. **Zappos** CEO **Tony Hsieh** has planned the move of their corporate headquarters from Henderson, Nevada to downtown, Las Vegas. With the plan comes an investment in neighboring buildings that will house businesses beneficial to the employees – and serve as third places to support their work outside the offices. Investments include 4G wireless and collaboration areas that are a tweak from the typical restaurant-coffee shop space planning routines.

"If you look at the data, it's all trending that way as we give people the technology they need," an interviewee said. "People become more and more productive as a result of that, so I think by 2020 what may seem very bizarre today to a lot of folks will be mainstream for some companies." From a real estate perspective, he added, "If you can shed the space, you can decrease your bottom-line cost."

Following the trend, then, to its most extreme conclusion, are we talking here about a good deal of costly office space sitting idle?

One interviewee believes it's a distinct possibility, for better or worse.

"It's potentially a big problem for the real estate market in terms of every company working on the basis of reducing its space by going to more flexibility, with people working from home, working from the beach," he said. "The need for space starts to diminish.

"The way we look at it is that it directly impacts the bottom line," he continued. "It's measurable. It's year-on-year. The more you can consolidate space, the more cost effective it is."

Already in the U.K., the average size of workspace has decreased dramatically in recent years, from 300 to 400 square feet (28 to 37 square meters) per person to 150 to 200 square feet (14 to 18.5 square meters). That's still a bit more generous than the 100-sq.-ft.-per-employee low that's predicted by CoreNet Global for some 40 percent of U.S. companies within the next five years. That figure is based on a CoreNet study in February 2012 of

BOLD STATEMENT 5

more than 465 CRE global managers. They predict a greater emphasis on collaborative spaces over single-employee spaces in the future profile of the average office in the U.S.

Shifts in Space

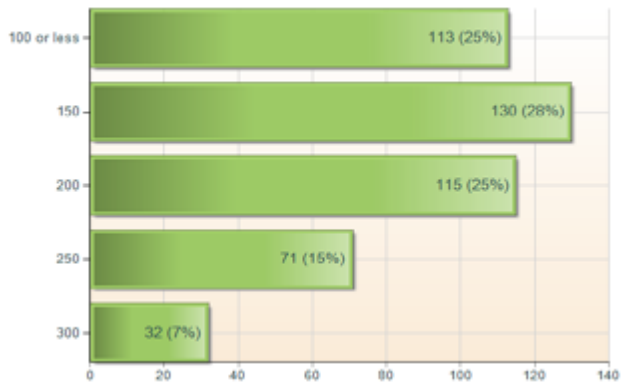
Collaborative office spaces is one example of the diversified workplaces referenced by this Bold Statement, and increased productivity is what you expect, or hope to get, as a result of adding more of it to the office environment. Such interest in the ability for employees to interact seems to run counter to the increasing demand by many to do more work away from the office in more isolating ways, but its popularity is proven.

Trex Morris of Ernst & Young said his company already has a flexible work environment "reflecting current work patterns of our people and the technology investments made. Enabling work outside the office as effectively in the office is strategic in our support of our clients and our people. This translates into ensuring that when our people are in the office, the environment supports collaboration, teaming, knowledge sharing and learning, things that may be difficult to do outside the office. Today, more than 50 percent of our people are Generation Y, and this number will continue to grow. Millennials are now joining us. These generations have grown up with and expect more virtual working, greater collaborative space and increased flexibility in working hours and location. Looking at this globally, it is not happening at the same pace, so the trick is looking ahead but recognizing the real differences and adjusting accordingly."

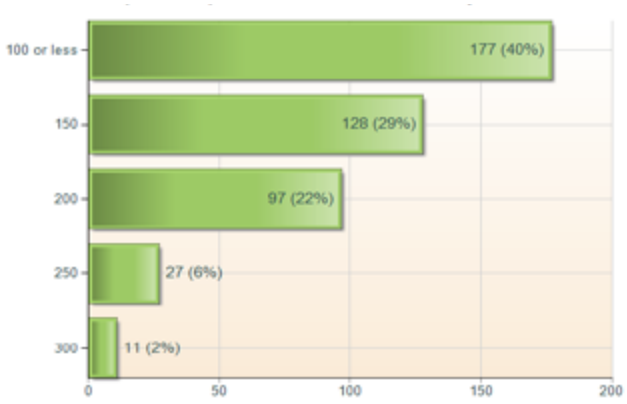
Speaking from Germany, Matthias Grimm, who, as Vice President, heads Global Facilities Management for SAP AG, said this trend is already here – a shift from individual workspace to more common, flexible, collaborative workspace. "We've already done a lot in the past," said Grimm, "but there's still a lot of room for improvement. If (a) company has not started

CORENET GLOBAL STUDY RESULTS, February 2012

In your company, what is the average of dedicated square feet per office worker?



In your company, what do you estimate the average amount of dedicated square feet per office worker will be in five years?



IV. BOLD STATEMENT 5

to go in this direction then it's missing a great opportunity."

One interviewee says collaboration on the corporate scale goes back as many as seven years for his particular organization. "We looked at it to say, 'OK, we can now start getting a lot more conference (space) in our facilities and, of course, we pay for it. Or, we can go out and we can start looking for places where there is a coffee shop or something where people can collaborate,'" he added.

He said the collaborative-space dynamics are the water-cooler gatherings of past generations. "The coffee shops are the water coolers," he said. "Yes, I can go and be in a meeting room, but it's kind of boring. Let me go somewhere else where I can have a social lubricant called a coffee, or a juice. Make it a little bit easier, where there's a lot more of an informal structure'."

Strategy Over Spontaneity

"To set a strategy about space, you have to not only understand but also be able to predict where your folks are going to need the space, when they are going to need it and how they are going to use it," said **Robin Ellerthorpe**, Vice President at **HOK, Inc.** He suggests that in addition to the common areas, management begin accounting for the heavily frequented "third places," which are described as the places between office and home, be it a coffee house, gym, hotel, library or local café. He said while companies don't own these third places, they do depend on them and they can become, deliberately or by accident, factors of brand equity.

Andrew Glennon of AstraZeneca says the pharmaceutical giant has a policy on third-place work, which includes working at home, at hotels,

SPECIFIC STRATEGIES AT WORK

Glenn Gold, Senior Manager of Corporate Real Estate for Microsoft, cites the company's Workplace Advantage strategy and Connector bus as examples of how the software giant supports its near-legendary, "freedom to work anywhere, with anyone, anytime, on almost any device" promise.

CoreNet Global's new 9,000-sq.-ft. (836-sq.-m.) headquarters in Atlanta, Georgia, exemplifies the office of the future with its built-in openness. Office doors are made of glass. Cubicles are replaced with collaborative work areas. Employees sit randomly at unassigned desks. And desktops appear archaic, as most are replaced with laptops or tablets.

Andy Thomas of Virtual Premise sees large consulting firms encouraging their employees to work from home or from their clients' sites, so much so that the clients' offices are actually becoming the third places. While Thomas believes the worker-mobility trend will result only moderately in reduced office space usage (10-15 percent), he does expect an increase in the use of third places by individual employees as well as by teams.

Daniel Johnson said Accenture has a stated strategy of designing its consulting and business-practice offices to support collaboration and community, not individual work. He believes the CRE function must be closely aligned with a company's human capital and culture to provide employees a sense of belonging.

"Ernst & Young is interested in developing a range of creative solutions that improve client service, employee engagement, productivity and well-being. Ensuring strategy alignment for HR, IT and real estate will only heighten benefits and leverage opportunities," Trex Morris said.

According to one CRE executive, sales offices are intended to encourage client visits so office spaces are consolidated and reduced in numbers; engineering, marketing and customer service functions, however, are still at a one-to-one workstation-employee ratio.

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in business centers, in coffee shops and other alternative work locations. The policy is largely targeted at the sales and marketing staffs, which benefit from it the most.

At the same time, according to AstraZeneca's Steve Ashton, much of the company's work force is in static locations for manufacturing and research and development; they don't need the alternative options as much. "You know, you can't do science in your bedroom at home," said Ashton. The company's mission now is to reduce the cellular space and increase the collaborative space for their scientists as a way to better support the sharing of ideas.

To that point, the type of job that's being done certainly determines the viability of the work-from-anywhere model, as do a number of other issues, such as whether the work is valued for the output ultimately achieved vs. the task itself as it is being performed.

But perhaps the most common detractor for the type of scenario described in Bold Statement No. 5 is the lack of buy-in from management, who still might believe that "out of sight" means "out doing something other than working."

"Getting people to adapt to certain kinds of technology is very easy, but getting them to change their mindset about how people work and what's best for their performance is just so much harder," said Workplace Strategist Cindy Froggatt. In 2001, she wrote Work Naked: Eight Essential Principles for Peak Performance in the Virtual Workplace, a book that profiled how nearly 50 organizations (public and private sector) had leveraged the value of mobility to improve productivity. Froggatt finds it frustrating that there hasn't been as much progress as there could have been in the past 11 years when

SPECIFIC STRATEGIES AT WORK

At Zurich North America, according to Dave Clute, policies support a mobile work force. "There is an active move to support increased mobility and getting more face time in the customer setting or an acceptable third-party location between office and customer sites," he said.

Ian Dunning said third places are a huge area of focus for Unilever, which is looking at the cost of sustainability. "Now (that) it is accepted that people can work in these places, some of the management processes could catch up a little bit," he said. "It will be interesting to see how managers integrate strategy as more people move to third places like Regus, coffee shops, etc."

One interviewee described his office as multifunctional. "(It's a space) that provides breakout areas and soft areas, meeting areas, coffee areas and playful areas, adding the popularity of one area outfitted with the Wii system. Those kinds of things are important for some people, less important for other people," he said.

Workplace Strategist Cindy Froggatt said some companies are part of the way toward fulfilling this prediction through corporate policy. For example, more are now giving salespeople and other mobile employees access to the network of places offered by ready-to-use offices such as those provided by Regus.

Jim Walter of Cushman & Wakefield said third-place workplaces will be the standard by 2020. "You can see steady progress to work acceptance of that today," he added. "When even historically stodgy Kraft Foods is adopting programs to move in that direction, it's pretty clear that's where we're all going."

Peter Miscovich of Jones Lang LaSalle described today's APPLE retail store as the model for the future workplace. "An APPLE retail store is really a social experience enabled by technology combined with the design of a high-performance physical environment – this powerful retail environmental combination creates a strong branding and social experience," he said.

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it comes to giving people the freedom to make smart choices about how, when and where they do their work.

On the other hand, companies must do what they can to minimize risks.

Ron Blanken, Head of Global Portfolio Management for Philips International, said he believes company support for "goodwill assets" actually will decline, suggesting companies would prefer to have the individual employee take ownership of his own workplace situation.

"You hardly can reward an individual when that individual mostly would like to work from home and in his own environment," Blanken said. He asks why a corporate strategy should support the individual decisions employees make. "If you have somewhere with free Wi-Fi like McDonalds and Starbucks, let people make their own choices. But as a corporation, you're not going to support it as far as your corporate real estate strategy," he said. "CRE will actually decline or reduce their strategy and leave it more to the individual to find their own way of working."

An interviewee provides another note of caution in taking things too far, too fast. "What's practical? What works most effectively?" he asked. "There is always going to be a need for leadership and management and how you can effectively motivate people on the job. We clearly are continuing to press the envelope for efficiency, so I see that being able to work from anywhere is going to become more and more practical over time for the jobs that allow for that."

This was echoed by a colleague. "The fact is that you can essentially be productive with laptop in hand, with handheld device in hand. You can access pretty much anything you need to be productive from anywhere these days," he said. At the same

time, however, he warns it can be overdone. "I have seen where that can go too far, where individuals just forget that there is value to being in the same four walls for a percentage of time."

"Within the APPLE retail store - we interface and interact with others socially, we can learn something within this physical environment and we are completely immersed and enabled by technology – all of this activity occurs simultaneously and seamlessly within the APPLE retail environment," said Miscovich. "The APPLE retail environment is experiential, it's experimental, it's social, and this environment has what I would describe as providing a very strong 'emotional human psychic imprint' experience."

The offices of the future, he added, will need to provide a similar strong "emotional human psychic experiential" effect to be successful. "The corporate workplace will need to provide advanced technologies that we won't be able to access or

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experience either within the home or through our personal mobile digital devices.

"The corporate workplace will need to deliver an environmental design 'experience,' something that is very special and one that is not attainable elsewhere in the world in which we live and work and play." What that means for CRE, Miscovich explained, "is that the future corporate workplace will need to be much more technology enabled and technology provisioned – to support these new levels of human performance and to achieve the benefits of advanced collaboration, interactive socialization and superior human productivity."

Conclusion

By far, this Bold Statement drew the most feedback. On the whole, few of our experts question the likelihood that worker mobility, supported by fast-moving, personal-computing technology, will render the traditional office environment a near-historic relic. In fact, this one trend is likely to have the greatest impact on physical CRE space than any other, and there is no sign of it losing momentum. An intriguing question is whether companies begin accounting (subject to regulations) for third places that support their businesses in a way similar to corporate

Are You Attractive to Tomorrow's Employees?

If your office looks like a law firm from early episodes of NBC's Law and Order, you might need to rethink everything about your commercial property.

Michael Pereira, Global Program Manager for **Polycom, Inc.**, recently reviewed with real estate executives attending a CoreNet Global Summit his perspective on how new technologies and younger employees will affect the workplace as part of a Young Leaders session, The Future of Workplace and How We See It.

For starters, Pereira said, "Someone who is 25 and just got out of college doesn't want to work for a law firm; they want to work for Google – you know, that has a skateboard ramp in the next room."

He was being only somewhat hyperbolic. "Maybe you don't need to go to that level of Google by any means, but at least if you don't understand it," he said, "you're going to miss out on that group of people."

Pereira said it's specifically technology that's driving the change in the workplace. He imagines a conversation that many employers, attuned to the new needs, would likely have with their new hires.

"They say, 'Okay, I'll get you a tablet and you needn't use your laptop anymore. And I can put a dashboard on there with all of the KPIs (key performance indicators) that you want. It'll have all your e-mails on there, and you don't have to ever use or come to the office; you can do everything off your iPad or your tablet'," Pereira described.

"That idea is pretty foreign to a lot of people, right? It's totally doable, but if you don't at least take that into consideration," he said, "it can definitely be something (you) could lose out on because the technology's there. And if it's not, then are we really doing the right things to get to there?"

At the Global Summit, topics covered by Pereira and other panelists included how new technologies, new office strategies and new means of interaction affect – and will continue to affect – the working world. Many of those things, such as a balance of collaborative teamwork vs. "head-down work," are simply foreign to many managers, who must begin to think in terms of output and results vs. number of hours in the office.

They also must think in terms of real estate utilization and the potential for greater efficiencies through the new work model that's supported by technologies such as video conferencing. "If you were to take away the 40-hour work week…and you're down to, say, a third of the week that you're actually utilizing the space for the year, or if someone only comes in two days a week, how much of the space is really being used?" Pereira asked.

It's just one of the many implications that new technology, combined with the new users and their expectations, will have on CRE moving forward. Today's real estate decision maker, Pereira said, should consider them all.

"As companies are evolving and building their systems and new locations, what does that mean to the younger generation, the Millennials? How do you develop your location for that?" he asked.

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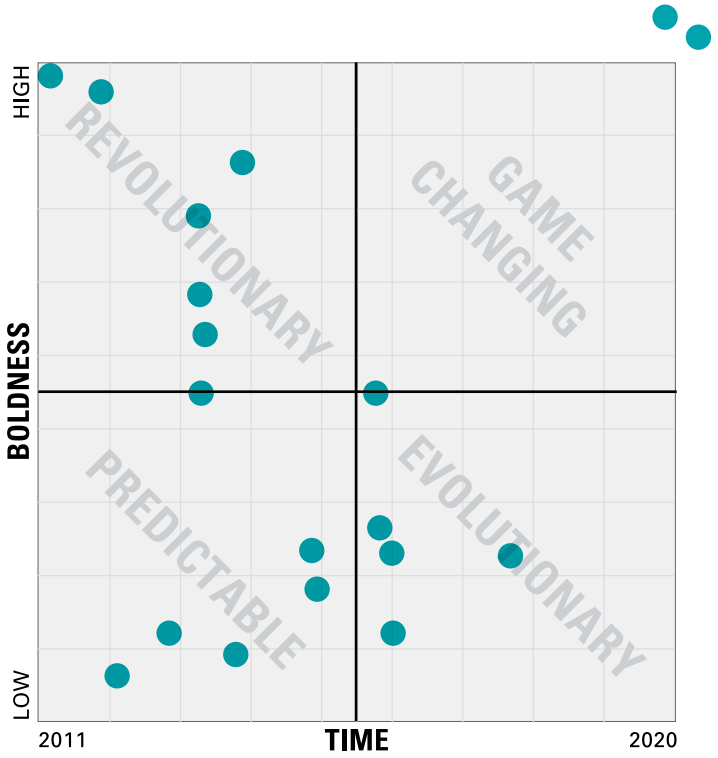
accounting for the "good will" of their brands and relationships with customers. Most of our experts have witnessed co-workers taking advantage of the blurred lines between office and home, or between work hours and off-hours. But the operative words for naysayers, to be sure, are "taking advantage." They insist that turning employees loose outside the boundaries of the office will have detrimental effects on overall business goals, and they warn against full-scale implementation. In the meantime, employee-to-workstation ratios are shrinking quickly, and in-office collaborative spaces are on the rise, both driven by a younger generation of employees who prefer to be out of the office but, when in the office, prefer to work closely with colleagues. Adoption of the principles behind this Bold Statement varies by job type, by company, by industry and by country, with the strongest resistance seen in the U.S., but many companies are setting policies for their mobile work force as they negotiate ways to support their distributed staffs.

BOLD STATEMENT 5 MATRIX

Corporate Real Estate strategy now includes "goodwill assets" that include third places (e.g., home offices and coffee shops) in supporting diversified workplaces that increase productivity, recognizing the value of the worker ecosystem.

To help visualize how our interviewees reacted to our Bold Statements, we asked them to place a dot on the matrix below. We used the x-axis to gauge the timeframe of when they felt each statement would become a reality and the y-axis dictates the "boldness" or impact of each statement on CRE.



IV.

BOLD STATEMENT 6

Sensors placed in building systems enable real-time management of space availability, quality and energy leading to lower costs and increased communication and perceived value by occupants.

While some of our experts interviewed see positive signs of movement in this arena, most agree that the industry is still a long way off from wholesale adoption of sophisticated sensor technology. What will drive more widespread implementation? Decreasing costs of products, increasing sophistication of software and, just as important, the corporate will and prioritization to make it happen. It may be that implementation of this statement will evolve over time as space is created or renovated. Wireless technologies that bind IP addressed sensors will reduce costs as will increases in energy efficiency and use of constant commissioning of building assets.

When faced with building problems affecting the bottom line, companies are implementing packaged sensor systems to provide evidence of errors in vendor measurement systems. For example, **Dick's Sporting Goods** has implemented weather stations on its stores to document degree day calculations supporting energy use and tied that into their IWMS application. They determined that electric meters have an inherent percentage of error in measuring consumption; the result was savings as a result of well-documented billing protests. That said, the vision conjured up by this Bold Statement is quite compelling in the eyes of many. A CRE executive said, "I could see us moving more and more toward having a sensor-driven building that picks up where people are and applies the heating to that location, rather than heating a massive building just because you've got somebody on the top floor."

Ron Blanken, Head of Global Portfolio Management for Philips International, said the industry is anticipating the arrival of real-time management of space availability, quality and energy. In offering his own vision of the future, Blanken said Philips is testing technology to give IP addresses to lighting systems in ceilings. If the system picks up movement in a room, he said, it also could signal the heating system to operate.

Microsoft's Glenn Gold stated, "If you have a highly evolved building where controls are completely automated and tied into a smart reservations system, then just from your handheld, laptop or desktop, you could reserve that room and set your temperature preference."

"But," he added, "There's a lot of cost involved in being able to do that. Down the road, as technology changes, it'll be more cost effective to deploy. But, for the existing infrastructure throughout the world, it doesn't lend itself to retrofit without significant costs."

And therein lies one of the biggest hurdles our contributors see before us.

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ROI is Key Concern

Workplace Strategist Cindy Froggatt suggests that the costs of sensor systems, at least for existing buildings, might outweigh the savings. "The technology is there to do it, but there isn't enough of an energy savings to make sensor installation/ maintenance cost effective," she said. "The connected-buildings proposition will happen on a larger scale when the installation, integration, and operation of the systems get really inexpensive, shockingly inexpensive, and the savings are more compelling."

One interviewee also cited cost, noting that the development of low-cost wireless sensors will be a key. According to him, to go into a building and retrofit it with sensors is just not cost effective today. Nevertheless, he noted, the trend toward sensor technology is critical, "when you look at the opportunity for productivity in making buildings more efficient and smarter. But that lower cost of entry has to happen so you can easily retrofit buildings, or so you can easily build new spaces that incorporate this technology."

Some clients of Jones Lang LaSalle already have these capabilities in their building energy management systems, said Peter Miscovich. In real time, they're able to manage energy demand and consumption quite effectively.

"As the costs of sustainability and energy management technology systems continue to diminish over time," said Miscovich, "we are going to see more of these integrated energy management systems come into the marketplace."

He also noted price as an issue, but says if companies can link comprehensive energy sensory and response networks together at a very low cost per sensory device combined with low-cost, powerful, integrated wireless networks - then this becomes an attractive business opportunity. "But we're not quite there yet," he added.

"As the costs of sustainability and energy management technology systems continue to diminish over time, we are going to see more of these integrated energy management systems come into the marketplace." - Peter Miscovich

One interviewee said, "If they're cheap to install – you can literally just stick it through a wall – then that helps. But it's best if you can demonstrate a return on the investment. That's why green policies don't always take off unless it's a mission of the company to be seen as green. But in the absence of that commitment, everybody's going to look at the bottom line, and ask, 'what's the return?'"

The interviewee does see movement eventually, saying, "As more people get into this, I think the costs will come down. Coupled with rising utility costs, it makes it easier to demonstrate a cost savings."

Yet, according to Dave Clute of Zurich North America, the cost of sensors is coming down. "I think companies like Cisco and Intel and Microsoft are driving that aggressively," he said. "The more the cost comes down, the sooner it will happen because people are interested in achieving real-time building management and real-time utilization data, particularly as mobile and unassigned workspace increases."

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Daniel Johnson of Accenture concurred, adding, "We're having very regular conversations with companies in all industry groups around this issue of optimizing the real estate portfolio and using technology to help do that, because people are finally understanding they've got an underperforming asset." He said sensors can help companies understand their true utilization of office space and help support the new workplace described in Bold Statement No. 5 – the more mobile and less dedicated, "drop-in" work setting.

Ian Dunning of Unilever said he's already seeing intelligent-controls technology for certain assets, such as lighting, but he sees too great a disconnect between what technology can do and what human behavior demands. "So, while the concepts sound good," he said, "the practicality is difficult." He believes such systems will add value but will need more "human diagnostic work" to be fully accepted.

Andrew Glennon of AstraZeneca echoed that sentiment when he said his company now uses "blunt instruments" in this area. "We have intelligent lighting and building-management systems that turn the heating off during certain times of the year or certain times of the day or certain times of the week. What we don't have is an intelligent HVAC solution," he added.

His colleague, Steve Ashton, said that unless local conditions force adoption of some of these measures, AstraZeneca is unlikely to take a lead. "In places where we build ourselves, the reality is we probably won't put a lot of effort into putting sensors in to make the change described in this Statement," he said.

The Potential is Impressive

Yet, in the eyes of some, it's about waking up to the enormous potential for long-term savings and other benefits embedded in smart building technologies. And some, including Ron Blanken of Philips International, believe it's lack of awareness, not cost, that's inhibiting their adoption.

"I think we hardly realize what is all possible out there," said Blanken. "Once we implement (sensor technology), we'll have more data and a greater ability to manage and influence the workplace than anything else at the moment." In the meantime, he added, corporate leaders need to show a greater commitment to information technology and specific protocols for building management in order to compare that data.

One of our interviewees views intelligent building systems as functionally stratified. "You've got your intelligence on the top, you've got your interoperability in the middle, and you've got your instrumentation at the lowest level." Once low-cost wireless sensors can be produced, he said, they

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can be put anywhere – data-center environments, other high-energy-use environments or any place where you need to manage the space as efficiently as possible (i.e., in high-rent markets).

The key is the software. He explained, "Intelligent, rules-based software (like IWMS) sitting on top of well-instrumented buildings can tell you things you wouldn't otherwise know; that's the future, from a corporate real estate perspective."

He continued, "The biggest factor is bringing your software together so that you have the data right at your fingertips, and you know that the data is high quality because it's coming directly from the source and hasn't been sanitized 15 times up through the chain."

Another interviewee seconded this thought. "To me, the big issue is the intelligence of the software and the quality of the real-time analytics," he said. "If you can get the systems to start doing a lot of the work of data collection and analysis, that's key. You can collect a whole bunch of data on energy efficiency or space availability and have some smart guy cull through it and figure things out. But if you want to do anything in real time, you need software that knows how to do that as well. So, the big thing that has to happen to make all this more likely is that intelligent software."

But, again, it might ultimately come down to institutional will and management prioritization to see such technology come to fruition.

According to Matthias Grimm of SAP AG, the trend to use sensors for real-time management of buildings will take several years to mature precisely because it may not be a top priority for many companies.

"There are so many challenges in front of us and optimizing the space is important," said Grimm,

It might ultimately come down to institutional will and management prioritization to see such technology come to fruition.

"but it will not be the first priority. It will take time until some established systems are available, and then it will also take some time until the benefits are really visible and companies are able to implement these systems."

Jim Walter of Cushman & Wakefield came to a similar conclusion. He sees the use of sensors in building systems as a case of the technology being ahead of the willingness to implement. "How widely it will be adopted is the question in my mind," he said, "Unless there are a lot of people willing to make the investments in the next couple of years to conclusively demonstrate the payback."

Another interviewee also believes sensing technology won't happen quickly, but he offered an intriguing scenario where momentum within a given company drives implementation. He explains, "When we did our SAP rollout for the company, we got one area on, which was a pilot, and then the second and third area online," he said. "By the time we got three big business units using it, there was a scramble because it made sense to have everybody on the same page to be able to share that information."

"You might see that same type of a waterfall event here," he added. "If you can get several of your plants sharing information and consolidating, then you might get a rush to bring all the stragglers into the same system."

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Conclusion

Behind this Bold Statement is a strong desire for the capabilities but perhaps an even stronger refusal to pay the current price to implement them. For starters, unless the systems are put in place during construction, they are not likely to be adopted, as retrofit costs are deemed too high for any expected return. Currently, intelligent lighting controls are the most widely adopted building-systems-management technologies, and many of our experts foresee similar technology in place for managing other utilities. Greater customization, however, is sought for maximum savings in operating costs, particularly if worker mobility continues to reduce density in building occupation. Overall, it is hoped that as 2020 approaches, the industry's focus on sustainability and our ability to measure and report on increased ROI as a result of implementation will drive more products to market, that these products will include intelligent software, and that their costs will provide greater margins on operational savings.

BOLD STATEMENT 6 MATRIX

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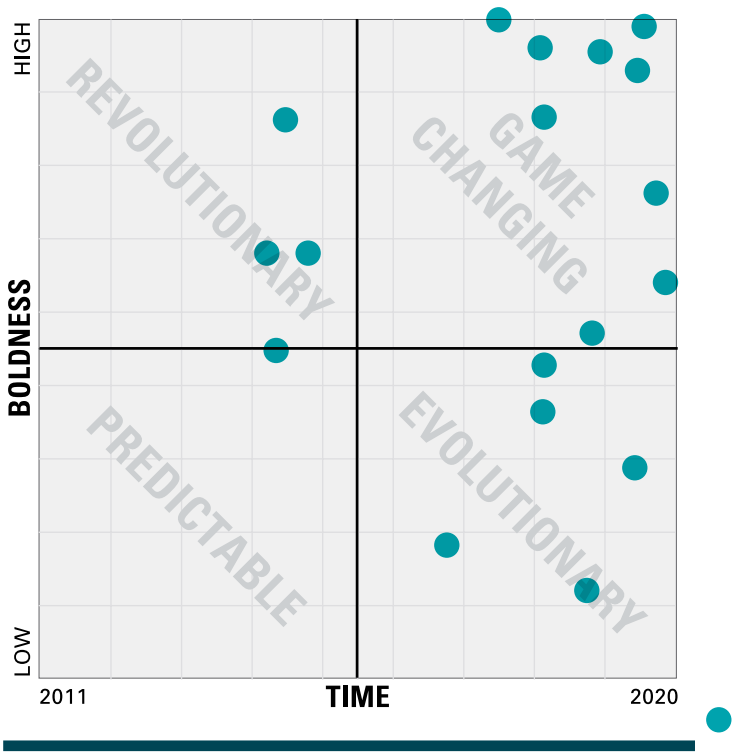

IV. OTHER BOLD STATEMENTS FOR 2020

Some of the experts interviewed for Corporate Real Estate 2020: Technology Tools provided a glimpse into other areas of interest worth tracking over the next decade. The following are specific topics they see significantly affecting either their employers or corporate real estate as a whole by the year 2020:

> Drawing on the rise in social media popularized by the new generation of workers, AstraZeneca has created an internal knowledge-based Wiki tool called **Yama** to enhance sharing of information at the company. "We all recognize that there's a massive amount of information in any organization, but the availability and transparency of it is not obviously always there," said Glennon. "The interesting thing is some people embrace it wholeheartedly; some sit on the sidelines, watching; and another large portion of the company just completely ignores it. We're trying these things out; it will be interesting to see how much the uptake is and whether it maintains and endures."

> Energy management, Andy Thomas said, is going to be critical over the next 10 years, and building technologies will play an important role in this advancement. "It's about how technology is applied to buildings in order to achieve meaningful savings," he said, "and how building technology is utilized to increase productivity and satisfaction of the employees who are working in those buildings." Thomas also said that the predictive nature of technology will require bringing information together not just from the real estate sector, but from other areas of the enterprise, as well, to make better decisions and make them more quickly.

> One professional we spoke with offered a strong word of caution on one front – the mobile work force. "There's been this sort of massive push toward supporting the mobile worker, and that's changing the work environment," he said. "But there is, I also do believe, a little bit of a potential rebound on that, the question of what it's doing to the team base, the question of what it's doing to the general collaboration and action between people on a personal level." Having worked in an environment that's bullish on mobility, he speaks from experience. "I have seen where that can go too far, where individuals just forget that there is value to being in the same four walls for a percentage of time," he said. "Everyone loves the mobility; we all get that. And being productive everywhere is fantastic. But how do you structure it such that you optimize the benefits of the productivity and technology while further optimizing the ability to spark that idea?"

Technology moving forward is fundamental; people simply need to use it more, in more sophisticated ways to gain all of its benefits.

> Froggatt's perspective on technology moving forward is fundamental: that people simply need to use it more, in more sophisticated ways, to gain all of its benefits. She pointed to online meeting and seminar tools such as **WebEx**, **Live Meeting** and **GoToMeeting** as examples of seasoned technologies that are sorely underutilized. "I can't tell you how many teams I work with who say, 'It's just too hard for us to get everybody logged on to that, so we're not going to use it.' But you have to practice," she said. "So, it's not as effective a tool as it could

IV. OTHER BOLD STATEMENTS FOR 2020

be for distance collaboration when people are reluctant to spend time practicing using it in new ways." Even easier, she said, would be to have content-analysis tools to help manage the flow and decision-making processes of meetings and track follow-up assignments, but in the interim, "practice using all the features of the existing tools."

- Another interviewee said he is looking for technology to make things easier, more standardized and more efficient with regard to facilities utilization. In short, he wants answers, quickly. "You know, the ability to answer questions more quickly about: what is your facility utilization?" he said, "And, how many square feet per person?" Whether they're high-level questions or questions requiring more drilling for information, he hopes technology can help provide the benchmarks that are necessary for providing the right answers.

- One of our interviewees' interests lies in how the work force is going to enhance the value of tools and what tools are going to be available in the future. "There is going to be that ease of development and availability of very effective tools that can even be used in a very structured corporate environment," he said. "By the time we get around to 2020, just like there is an App Store for everything and you see how efficient the marketplace has made those apps, the cost of them, etc., that's where I am envisioning the real estate technology going in the future, as well."

- Another interviewee urged that as we move toward 2020, we keep in mind the nature of a world that's not homogenous and the implications of that where technologies are concerned. An example of where that mattered

significantly, he said, is in the destruction of the telecom companies in the 1980s and the four simple factors that led to it: cheap bandwidth, security concerns, 1960s-style focus on the human condition and certain government control in varying degrees worldwide. "Different countries are doing things differently because of they're on different GDP economic lifecycles," he reminded us.

- Glenn Gold places the maturity of the portable smart devices among the trends that will have the largest impact on how CRE providers serve their clients. One example: the ability to use these devices to effortlessly transmit photos of building issues that must be addressed directly to the work-order system. "That's just going to become more and more prevalent as we move down the road," he said. In addition, Gold believes smart-building technologies, such as those focused on energy management or equipment-performance monitoring will certainly be the proper focus for the future.

IV. OTHER BOLD STATEMENTS FOR 2020

> Ron Blanken sees the future of technology from a different perspective, often away from the computer monitor but nonetheless tied to the workings of the internet. His company, a leader in the lighting industry, is focused on how internet technologies can affect the workplace environment in ways never before imaginable. Providing internet protocol addresses, for example, to lighting fixtures can provide a level of intelligence for ultimate control over lighting, as well as other systems, such as heating, that can be tied into the lighting network. "I think we hardly realize what is all possible out there," he said.

> As part of a recent presentation about the impact of technology on the workplace of tomorrow, Miscovich recently summarized six specific emerging technology trends on which companies need to stay focused:

- Advanced Analytics + BIG DATA
- Cloud Computing + Virtualization
- Geospatial/Locational + Mobile Networks
- Internet of Things + Machine to Machine (M2) Computing
- Pervasive Connectivity + Public Wireless Networks
- Social Business + Open Innovation

Collectively, these emerging technologies will all begin to converge to provide greater organizational flexibility, reduced operational and occupancy costs, increased workplace efficiencies and effectiveness and real-time analytics with greater transparency of data and information.

This emerging technology convergence will lead us to enhanced workplace performance, utilization and optimization – and ultimately providing the enterprise with greater levels of business performance and human productivity.

Emerging technologies will all begin to converge to provide greater organizational flexibility, reduced operational and occupancy costs, increased workplace efficiencies and effectiveness and real-time analytics with greater transparency of data and information.

V. POTENTIAL CONSIDERATIONS

- Consider, subject to regulatory/organizational/other, etc. requirements, the possibility of linking smart devices with significant memory supported by cloud infrastructure to enhance device based analysis and reporting.

- Research, monitor and potentially formalize how employee technologies are incorporated into corporate IT and business workflows.

- Establish an appropriate decision framework about technologies you will early adopt and manage those decisions to quickly support or eliminate and move forward.

- Potentially partner with technology security companies to stay at the forefront of development; early adopt and push those technologies that best support your needs.

- Research OSCRE initiatives and as appropriate, potentially support standards development by participating.

- Evaluate the potential value of documenting workflows and investing in IWMS solutions.

- Consider the impact of rapid change on working environments and how to support and enable staff with situation based appropriate tools.

- Research and dimension the impact of incorporating third spaces into your organizational asset counts.

- Become familiar with building commissioning and energy management processes and systems and consider the impact of integrating environmental sensing into your building management systems.

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APPENDIX A

CORPORATE REAL ESTATE 2020 TEAM LEADERS AND SPONSORS

CoreNet Global

Enterprise Leadership

Mark Schleyer, *AT&T*
Michael Creamer, *Cushman & Wakefield*

Location Strategy and the Role of Place

Mary Jane Olhasso, MCR, SLCR, *County of San Bernardino*

Partnering with Key Support Functions

Craig Robinson, MBA, *Cassidy Turley*

Portfolio Optimization & Asset Management

Jack Burns, *Cresa*
Keith Keppler, *Cresa*
Russ Howell, MBA, *Jones Lang LaSalle*

Service Delivery & Outsourcing

Blake Layda, *Jones Lang LaSalle*
Scott Bumpas, *Cresa*
Lisa Huls-Fry, *Cassidy Turley*

Sustainability

Leigh Stringer, *HOK*

Technology Tools

Larry Sweeney, *AT&T*
Robin Ellerthorpe, *HOK*

Workplace

Anne Nathe, *Johnson Controls, Inc.*
Chris Mach, MCR, *AT&T*
Cindy Beavers, *Steelcase Inc.*
Margaret Gilchrist Serrato, Ph.D., MBA, AIA, ASID, LEED AP, *Herman Miller*
Michael Leone, *Regus*
Patricia Roberts, *Jones Lang LaSalle*
Rob Wright, *Johnson Controls, Inc.*
Russ McFadden, *AT&T*
Steve Hargis, MCR, LEED AP, *HOK*

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APPENDIX B
PROFESSIONAL LEADERS INTERVIEWED

Corporate real estate and workplace leaders who were interviewed by the Technology Tools team included:

Accenture
Daniel Johnson, Global Director, CRE Workplace

AstraZeneca
Steve Ashton, Regional Director – Asia Pacific
Andrew Glennon, Real Estate Commercial Director

Cisco Systems
Michael Zamora, MCR, Senior Manager, Asia & Pacific Regions

Cushman & Wakefield, Inc. / Kraft Foods North America Facility Management
Jim Walter, Vice President – Account Executive

Ernst & Young
Trex Morris, MCR, Global Real Estate Leader

Fischer & Company
Cliff Fischer, CEO

Google
Anthony Smith, Director, Real Estate and Workplace Services – Asia - Pacific

IBM
Paul Egan, Senior IT Architect
Derek Kruse, Global Process Integration Manager

Jones Lang LaSalle
Peter Miscovich, Managing Director

Microsoft
Glenn Gold, Manager, Global RE&F Global Resources Team

Pfizer
Troy Humphreys, MCR, Associate Director

Philips International
Ron Blanken, Vice President, Philips Real Estate

SAP
Matthias Grimm, Vice President / Head of Global FM

Timken
Lyndon Thomas, Manager, Facilities Planning

Unilever UK
Ian Dunning, MBIFM, Global Facilities Director – Workplace Services

Virtual Premise
Andy Thomas MBA, MCR, President & COO

Workplace Strategist and Change Management Expert
Cindy Froggatt

Zurich Financial Services
Dave Clute, Vice President / Head of Workplace Technology

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APPENDIX C

TECHNOLOGY TOOLS INTERVIEW GUIDE

The purpose of this document is to assist the research teams in setting up the interview by providing consistent information on the background of the project, research areas, purpose of the interview, timeline, deliverables and expectations. Some of the people being interviewed may be very familiar with the project, while others may not. Reviewing this information prior to the formal interview can help to ensure that all interviews are conducted in a consistent manner and the people being interviewed have a clear understanding of the overall project and their role in the process.

Background

CoreNet Global is the world's leading association for corporate real estate (CRE) and workplace professionals, service providers and economic developers. Nearly 7,000 members, who include 70% of the Fortune 100 and nearly half of the Forbes Global 2000, meet locally, globally and virtually to develop networks, share knowledge, learn and thrive professionally.

Program Description

Corporate Real Estate 2020 is a research and leadership development program designed and managed by CoreNet Global to address the business environment in the future and to collect, package and distribute state-of-the-art best practices, tools, models and case studies to help our members prepare to meet future business needs.

To achieve this objective, we are interviewing a number of senior industry leaders to validate a new vision for the industry and develop a series of transition strategies to assist CRE organizations in transforming themselves to meet the challenges ahead as the economy changes and new business models evolve.

There are three major steps in the overall process as indicated below:

- Vision Validation
- Development of Research Areas
- Transformation of the Industry

New Vision for the Industry

Using materials collected throughout our discovery process and at our Launch Meeting we developed a draft vision for the industry that has been preliminarily validated by the research team. This vision will continue to change as our research proceeds and new information is obtained.

Research Areas

Based on the vision of the future we have also developed a number of key Research Areas to assist our members in migrating from their current real estate practices to the new skills and strategies needed to survive and grow over the next two to five years. These include strategies for the following areas:

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APPENDIX C

TECHNOLOGY TOOLS INTERVIEW GUIDE

Research Process

There are numerous steps in the overall research process including the development of a research premise, goal and hypotheses for each of the above research areas – which are, in turn, validated through one-on-one interviews with industry leaders and experts, industry surveys and other techniques.

Deliverables

Deliverables from this project will include research reports; web-based white papers; executive development seminars; workshops and panels at Summits; material and speakers for chapter programs; articles in *THE LEADER*, industry and business press; and topics and speakers for other learning events.

Timeline

Corporate Real Estate 2020 was officially launched in August in Dallas where the research teams first met to define and validate the vision and refine their thinking on the Research Areas. Based on that meeting our goal is to complete the interview process over the next several weeks and start producing programs, reports and other materials by the CoreNet Global Summit in San Diego in April 2012.

Intellectual Property

Before we begin, I also want to explain the intellectual property guidelines for Corporate Real Estate 2020.

Please do not share any confidential or proprietary information with any member of the research team.

If we use any specific information or materials from this interview that refer to you or your Company, we will offer you the opportunity to review that information prior to publication.

Purpose of the Interview

The purpose of this interview is to capture your knowledge and thoughts on Technology Tools in 2020.

Do you have any questions before we get started?

Interview length approximately 1 hour

Validate the correct spelling of your name and official title:
Name:
Title:
Company:
Date of Interview:

Background Information

Note: Interviewers are encouraged to review the Annual Report and 10K form for the firm prior to the interview.

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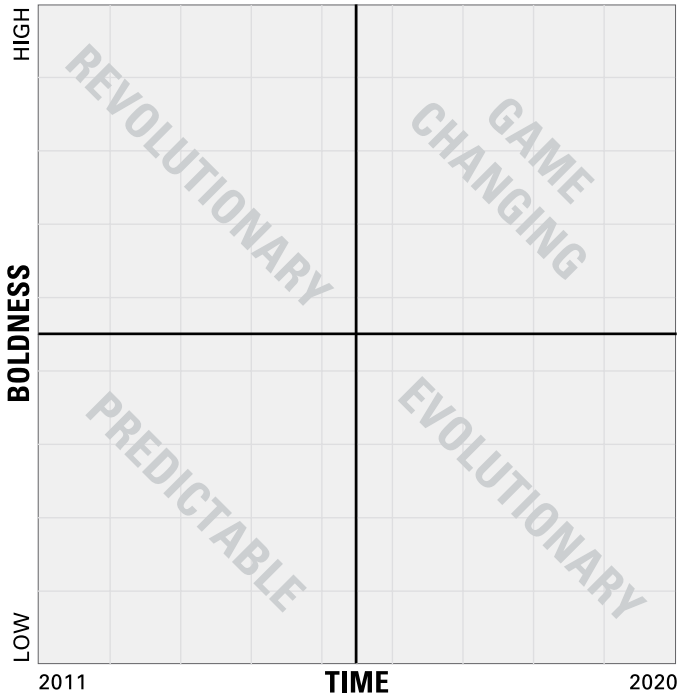
APPENDIX C

TECHNOLOGY TOOLS INTERVIEW GUIDE

Research Questions

A. 2020 Matrix



B. Are you a Technologist? (rate yourself on a scale of 1=not so much thru 10=absolutely)

C. Technology Tools Questions:

1. Always networked wireless devices with seemingly infinite memory have converged voice, data and video communications in support of immediate and time-shifted smart access to business conversations, meetings and presentations.
   a. Where on the Matrix?
   b. Why will or why won't this happen?
   c. Policies in your organization or examples outside your organization.

2. B.Y.O.T. (Bring Your Own Technology), enabled by wearable interfaces and transparent, biometric based security seamlessly supports how, where and when we work.
   a. Where on the Matrix?
   b. Why will or why won't this happen?
   c. Policies in your organization or examples outside your organization.

APPENDIX C
TECHNOLOGY TOOLS INTERVIEW GUIDE

3. Interoperability standards such as OSCRE International (Open Standards Consortium for Real Estate) have driven applications such as Integrated Workplace Management Systems (IWMS) to become the Enterprise Research Planning (ERP) systems of Corporate Real Estate.
   a. Where on the Matrix?
   b. Why will or why won't this happen?
   c. Policies in your organization or examples outside your organization.

4. Intuitive environmental sensing provides emotional intelligence cues leading to reduced stress and increasing the efficiency and effectiveness of space use and communication in the work force.
   a. Where on the Matrix?
   b. Why will or why won't this happen?
   c. Policies in your organization or examples outside your organization.

5. Corporate Real Estate strategy now includes "goodwill assets" that include 3rd places (e.g. home offices and coffee shops) in supporting diversified workplaces that increase productivity, recognizing the value of the worker ecosystem.
   a. Where on the Matrix?
   b. Why will or why won't this happen?
   c. Policies in your organization or examples outside your organization.

6. Sensors placed in building systems enable real-time management of space availability, quality and energy leading to lower costs and increased communication and perceived value by occupants.
   a. Where on the Matrix?
   b. Why will or why won't this happen?
   c. Policies in your organization or examples outside your organization.

What other thoughts do you have regarding technology's effect on CRE in 2020?

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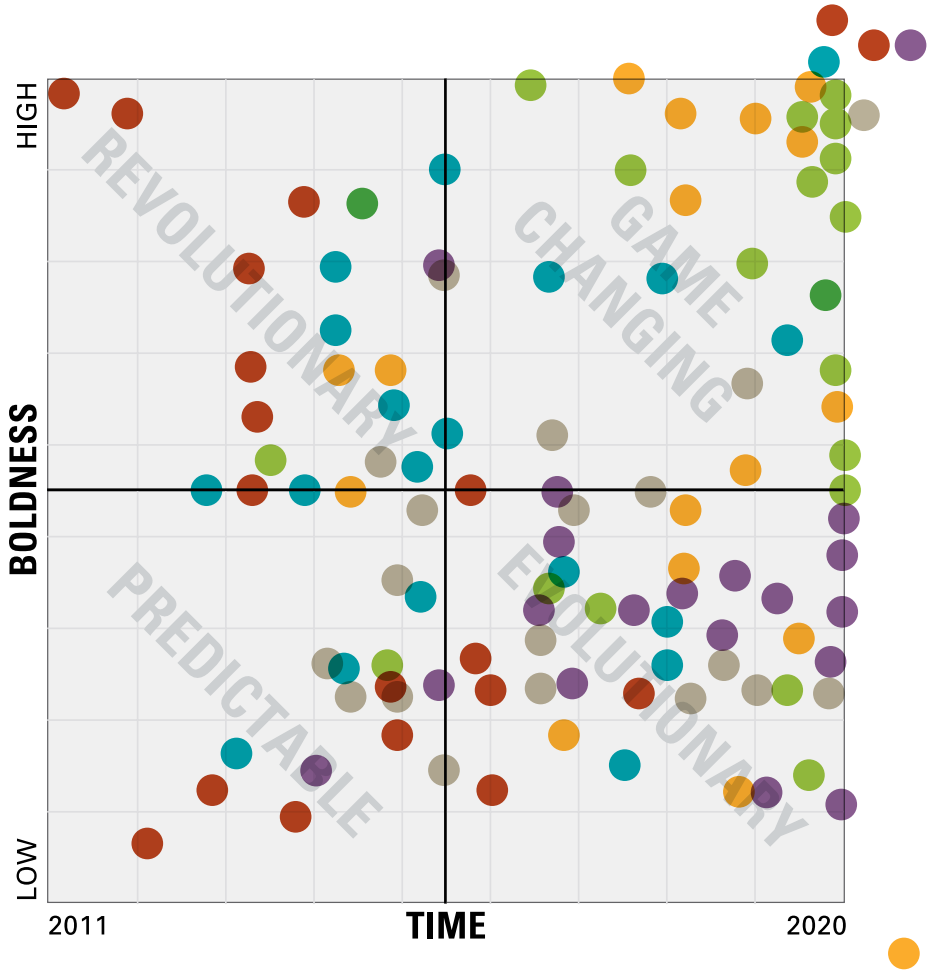
APPENDIX D

SUMMARY OF RESPONSES TO BOLD STATEMENTS



BOLD STATEMENTS MATRIX KEY

1. Always networked wireless devices with seemingly infinite memory have converged voice, data and video communications in support of immediate and time-shifted smart access to business conversations, meetings and presentations.

2. B.Y.O.T. (Bring Your Own Technology), enabled by wearable interfaces and transparent, biometric based security seamlessly supports how, where and when we work.

3. Interoperability standards such as OSCRE International (Open Standards Consortium for Real Estate) have driven applications such as Integrated Workplace Management Systems (IWMS) to become the Enterprise Research Planning (ERP) systems of Corporate Real Estate.

4. Intuitive environmental sensing provides emotional intelligence cues leading to reduced stress and increasing the efficiency and effectiveness of space use and communication in the work force.

5. Corporate Real Estate strategy now includes "goodwill assets" that include 3rd places (e.g. home offices and coffee shops) in supporting diversified workplaces that increase productivity, recognizing the value of the worker ecosystem.

6. Sensors placed in building systems enable real-time management of space availability, quality and energy leading to lower costs and increased communication and perceived value by occupants.

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APPENDIX E

TECHNOLOGY TOOLS TEAM PARTICIPANTS

Bob Canavan, MCR, SLCR, AIA, Head of Real Estate Process, *Nokia Siemens Networks*

Charles Dalrymple-Hay, Director, *Guardian Global Systems*

Mike Dennehy, CEO, *Vision Software*

Robin Ellerthorpe, FAIA, Director, Real Estate Technology, *HOK, Inc.*

Kelly Evans, PMP, Director, Client Technology, *Studley, Inc.*

Michael Holland, B.Sc., FRICS, M.Sc., MCR, CEO, *ASSETZ PROPERTY GROUP*

David Jones, MRICS, Director, Occupier Services, *DTZ*

Bruce Kellogg, MAI, Senior Vice President, *ARGUS Software*

Edward Lubieniecki, Managing Director, *RealFoundations*

Sally Maxwell, MCR, Program Manager, *IBM Corp.*

Michael Pereira, MCR, Global Program Manager, *Polycom*

Keith Perske, Principal, *eBusiness Strategies*

Christine Ross, Director, Americas RE & Facilities, *BMC Software*

Dipesh Shah, Vice President, Technology, *Jones Lang LaSalle*

Matthew Sheldrick, Vice President, Business Development, *Qube Global Software*

Michael Swanstrom, President & CEO, *Business Integration Group, Inc. (BIGe)*

Larry Sweeney, Executive Director, Evolving Technologies, *AT&T Services, Inc.*

David Willett, MCR, Solutions Architect, *Rogers Lake*

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APPENDIX F

CORPORATE REAL ESTATE 2020 PARTICIPATING COMPANIES

Accenture
Adobe
adidas
ADP
Aedas
Air New Zealand
Allsteel
Altisource
American Airlines
American Express
American Medical Systems
ANZ
Associated British Foods
AstraZeneca
AT&T
Atmos Energy
Bank of America
Bank of New Zealand
BASF
BB&T
BMC Software
Boston Scientific
Brenau University
BusinesSuites
Carnegie Mellon University
CASP-R
CBRE
CBS
Chevron
Ciena
Cisco
Citigroup
Coca-Cola Refreshments
Colonial First State
Cornell University
Corporate Portfolio Analytics
DEGW
Delft University of Technology
Deutsche Bank
Dow Chemical
eBay
Eli Lilly
EMC
Equifax
Ericsson
Ernst & Young
Fidelity Investments
Fischer & Company
Ford Land
Future of Work...unlimited
Genentech
Gensler
Georgia Institute of Technology
Georgia Institute of Technology, School of Building Construction
Global Workspace Association
Google
Harvard Business School
Haworth
Hewlett-Packard
Hilton Hotels and Resorts
Hindustan Unilever Limited
HOK
Honeywell
IA Interior Architects
IMC Octave
Infinera
Infrastructure Ontario
ING Bank
Intel
Interface
inVentiv Health
iOpener Institute
Iron Mountain
Jacobs Engineering
JDS Uniphase Corporation
John Deere
Johnson & Johnson
Johnson Controls
Jones Lang LaSalle
Kraft Foods
Lance Capital LLC
Liberty Mutual Group
Lockheed Martin
Marsh & McLennan Companies
Martin Prosperity Institute, University of Toronto
Mary Kay Inc.
Massachusetts Institute of Technology
McCarthy Consulting Group
McKesson
MetLife
Michelin
Microsoft
Microsoft India
MillerCoors
Morgan Stanley
NetApp
Nokia
Nokia Siemens Networks
Northern Trust
Novellus
NVIDIA
Oracle
Pacific Gas & Electric
Pan-European HR Network
Parsons
Pfizer
Philips International
Polycom
Procter & Gamble
Prudential Financial
Raytheon
Red Hat
Regus
Royal Dutch Shell plc.
Salesforce.com
SAP
Shell Oil Company
Siemens AG
Siemens Building Technologies
Sony Electronics
Southern California Edison
Sprint Nextel
Standard Chartered Bank
Staples
Steelcase
Sybase
Target
TD Bank Group
Teknion
Telstra
Tenet Healthcare
Texas Instruments
The Hartford
The Occupiers' Journal Limited
The Sage Group
Thomson Reuters
TIGNUM
Time Warner
Timken
T-Mobile
Travelers
U.S. General Services Administration
Unilever
Unilever UK
UnitedHealth Group
University at Buffalo SUNY
University of California, Berkeley
University of Michigan
University of Texas at Austin
Verint
Virginia Polytechnic Institute and State University
Virtual Premise
Visa
Vodafone
Vodafone NZ
Westpac
Yahoo!
Zurich Insurance Group

CORPORATE REAL ESTATE 2020

CORPORATE REAL ESTATE 2020

EIGHT RESEARCH TEAMS

Enterprise Leadership

Location Strategy & the Role of Place

Partnering with Key Support Functions

Portfolio Optimization & Asset Management

Service Delivery & Outsourcing

Sustainability

Technology Tools

Workplace

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CORENET GLOBAL