

Building

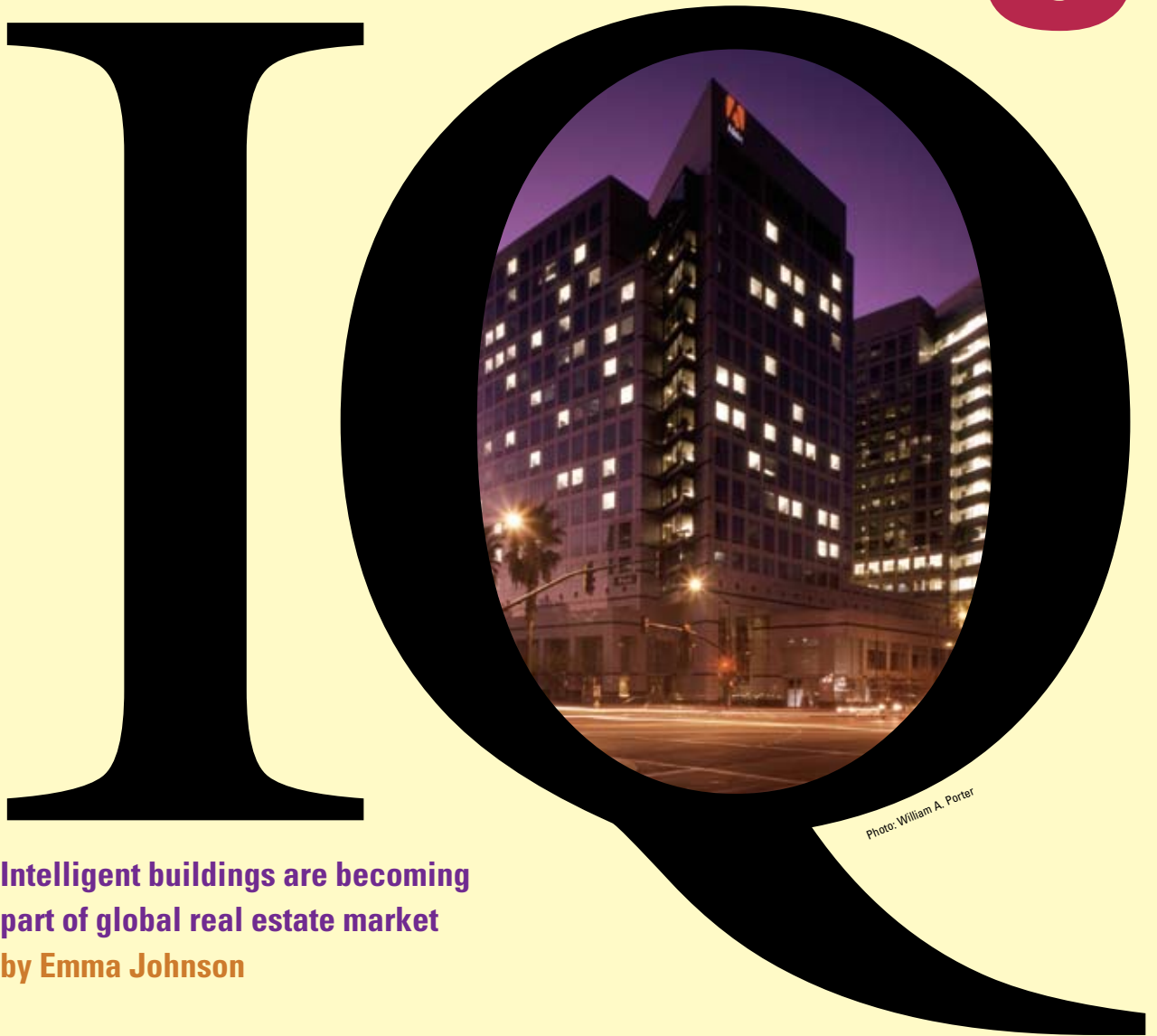


Photo: William A. Porter

Intelligent buildings are becoming part of global real estate market
by Emma Johnson

At one time, security cameras capturing an entire building's entrances on a single wall of monitors elicited "oohs and aahs." Today, a skyscraper's every system—including HVAC, signage, elevators, light and temperature control, and yes, even security—can be monitored on a single video wall by a single person.

Intelligent buildings are nothing new. Long embraced and now commonplace in new developments in Asia and the Middle East, these smart buildings with their high-tech networks and business systems are not just gee-wiz things of the future, experts say.

Rather, they are becoming an inevitable part of the global real estate market. Increased pressures on connectivity, energy efficiency and marketplace competition now force developers, leasing agents and real estate managers to consider investing in intelligent buildings to differentiate themselves—or even to stay in the game.

"People have been dying to learn about this technology, but they require return on investment proof before they begin," said Tom Shircliff, co-founder of Intelligent Buildings Group, a Charlotte, N.C.-based consultancy that creates ROI investment modeling for commercial properties. "As technology becomes more mainstream, advanced, and more common sense and obvious, people take it more seriously."

IT'S INTELLIGENT DESIGN, STUPID

While intelligent buildings are nothing new, neither is the confusion surrounding their ambiguous definition, said Paul Ehrlich, founder and president of Building Intelligence Group, a Minneapolis-based intelligent building consultancy.

"I'm not sure people know what intelligent buildings are," Ehrlich said. "It means many things to many people."

To some, intelligent buildings—also referred to as smart buildings or integrated buildings—are defined by energy efficient or environmentally friendly technologies. Others define them by way of high-tech tenant amenities like digital signage and directories, broadband and wireless services, and building automation. In the most basic sense, intelligent buildings require one or more of their systems to be automated and interconnected.

Ballantyne Village, in Charlotte, N.C., is one such building with an integrated system. The 800,000-square-foot mixed-use entertainment, retail and condominium property's HVAC systems, security, signage, lights and fountain

controls are operated via a central location.

Ballantyne has sensors that monitor carbon dioxide, and as a result can count the number of people in a room and automatically adjust climate control. Dispensers for restroom soap, toilet paper and paper towels automatically communicate with facility managers when empty. Swiping an access pass opens doors for tenants, while concurrently turning on the lights and heating system.

Despite examples like Ballantyne Village, however, the lack of concrete parameters defining smart buildings has stunted their growth in the United States. Their value—as it relates to energy efficiency, tenant satisfaction, reduced labor and long-term cost savings—is misunderstood, Ehrlich said.

He said because the technology is largely untested in the

CONNECT THE DOTS

Integrated systems can connect a variety of building components

The number of systems that can be integrated continues to grow. Any number of the processes below can be linked with others to increase efficiencies. In the most integrated systems, one or just a few interfaces interconnect and operate all of these components. The result is ease of use; tenant satisfaction; ease of upgrading as new technology becomes available and necessary; and, in nearly every case, savings of money.

- Lighting
- Energy and HVAC efficiencies
- Elevators
- Security and access
- Fire alarms
- Tenant amenities like digital signage, interactive touch-screen directories, broadband services, video conferencing, voice-over IP and guest access
- Automated business operations like accounts payable and receivable, the ability to review RFPs, leases and other contracts electronically and online, and track a construction project on the Web
- Green building technologies that ensure energy and water efficiency as well as environmental friendliness
- Design that makes a building useful for its tenants, such as flexible work space

Opposite: Adobe Systems' energy and environmental retrofits to its San Jose, Calif., headquarters saved the company \$728,000 in five years.

states, convincing profitable U.S. developers, investors and real estate managers of its value is difficult. Converting to integrated building technology almost exclusively would require the re-education of nearly every level of the industry—from architects to developers to leasing agents and property managers.

Once builders become acquainted with smart building technology and see its potentially positive impact on their bottom line, Ehrlich said they will warm to integration.

“It’s all about the investment on return. The returns on these investments are ridiculous—in the hundreds of percents.”

JUSTIFIABLY SMART

While U.S. developers are merely warming to smart buildings, places like Seoul, Tokyo, Singapore, Hong Kong and Dubai have moved full-speed ahead with integrating systems in their new developments. Well-funded smart buildings have been sprouting up in record numbers, well outpacing the number of large-scale, ground-up commercial projects in the United States.

Jim Young, founding partner of Realcomm, a research firm specializing in the intersection of real estate and technology, said because intelligent buildings have become mainstream in Asia, developers there no longer have to cost-justify such projects. That makes getting them up and running easier.

“These are new benchmarks for building construction, so it’s not like business developers are forcing designers and engineers to cost-justify every aspect of a project,” he said. “There, [integrating systems] is mainstream. It’s like asking someone here to cost-justify an elevator.”

He said integrated systems have been paying off in Asia with cost savings for property owners and managers as well as giving them a competitive edge in an increasingly global real estate marketplace.

U.S. developers, however, have been reluctant to develop smart buildings because of the expense involved and the training required—and because developing high-tech buildings simply wasn’t necessary. The strong U.S. real estate market during the past several years allowed developers to turn a profit by merely flipping properties even in mediocre locations. Little innovation or competitive edge was required.

“Builders were not looking at long-term investments,” Ehrlich said. “It was all turn and burn.”

Further, despite rising fuel costs, oil and electricity continue to be extremely affordable in the United States compared with other countries—giving U.S. builders and consumers



SMOOTH OPERATOR

International Financial Center II in Hong Kong integrates operating functions

This mixed-use retail, office and hotel property completed in 2003 and designed by famed architect Cesar Pelli combines many of the property’s operating functions into a single, centrally located interface. At 88 stories, the building is the city’s tallest. Occupied by the world’s top financial firms, International Financial Center II is at full occupancy and is considered one of the most desirable addresses in Hong Kong.

The building’s control system, located in the basement, is one of the most sophisticated in the world. A wall approximately 20 feet wide and 15 feet high contains 300 monitors and a “desk control system that would rival NASA,” Realcomm’s Jim Young said.

Systems monitor the climate control for each tenant, 17 elevators, lights, broadband, security cameras, tenant and visitor access, chillers and water systems. This network requires just one to two personnel to manage the data on the monitors at any time.

International Financial Center II is outfitted with raised floors for better management of the dual lead-in fiber optics as well as column-free floor plans for flexible workspaces.

less incentive to invest in energy-saving technologies.

Still, smart buildings are beginning to have a presence in the U.S. market, and more projects are on the horizon. Lakeside Hospital in Omaha, Neb., which opened just over two years ago, routinely makes “most wired” lists thanks to multiple integrated systems enhancing its patients’ experiences, improving accuracy in care and billing, and saving the facility money in the process.

Lakeside Hospital uses centralized, digital patient data, allowing doctors, nurses and administrators to access and update medical and billing information from anywhere in the hospital system. Further, a secure patient portal allows individuals to go online to make appointments, check test results, receive coaching for smoking or obesity and apply for financial assistance. These features increase patient access to information and decrease demands on hospital personnel.

THE ROI FACTOR

Before intelligent buildings can take off in the United States, real estate professionals across the country must be convinced of their efficiency with some hard numbers. Realcomm managing partner Darlene Pope said Realcomm’s customers look for returns on investment in 18 months or less, though some technologies require more than that.

Shircliff said builders save about \$2 per square foot right away by employing basic cable infrastructure efficiencies that reduce the number of cable pathways from 9 or 10, to two or three. He said the leaner networks save the owner \$1 per square foot per year thereafter. They also serve as the framework on which more elaborate intelligent systems can be built as the owner or tenant requires—at a cost lower than if a less efficient network were in place.

“This is common-sense construction planning,” Shircliff said. “Something more organized and efficient is always better than something that is spaghetti.”

Ehrlich said the technology in one of the smart projects he worked on paid for itself in 18 months. The 700,000-square-foot project included integrated HVAC, lighting, security, card access and fire alarm systems. During off-hours, the integrated system recognizes individual workers and adjusts lighting, security and climate control specific to that person’s workspace—not the whole building or floor

Retrofitted systems are more expensive because they require replacing systems in an existing building, as opposed to including them in a new construction. Still, they can ultimately have big payoffs.

Software maker Adobe invested \$650,000 in energy and environmental retrofits to its San Jose, Calif., headquarters in 2001. Some improvements included an irrigation system that automatically adjusts to real-time weather conditions and

SIGN LANGUAGE

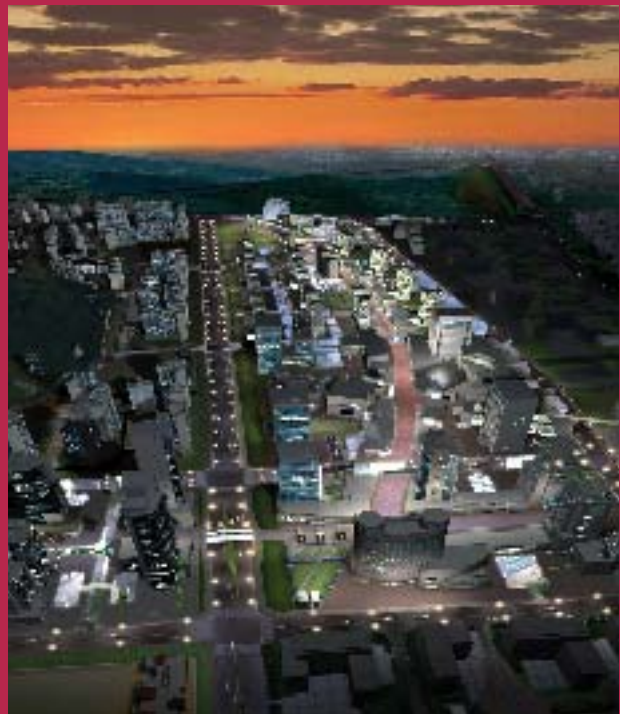
Digital Media City in Seoul communicates through digital signage

This three-million-square-foot media and entertainment center is being built ground-up as part of a new business and residential center in Seoul that includes the World Cup Center and a 7,000-unit residential complex—all of which are built upon a capped landfill and are heated by gases generated by the waste.

With groundbreaking in 2003 and completion scheduled for 2010, Digital Media City is a frontrunner in street-level integrated systems. It will feature many media highlights.

Global positioning navigation systems in private cars will communicate with street markings, signs and traffic lights to keep traffic moving and help drivers find parking. Bus stop kiosks will display real-time information on routes and schedules.

Street-level interactive signs will provide information about Digital Media City, events and navigation tools for visitors and residents alike. This information will also be delivered to cell phones and Blackberries.



sensors that adjust exhaust fans to carbon monoxide levels to improve air quality. Five years later the company reported 115-percent savings of \$728,000.

However, even as companies start to track their dollars saved, the return on investment can be a nebulous figure, Ehrlich said. He said a tenant might pay per square foot—on average—\$25 for rent, \$1.50 for energy and \$150 for employee expenses.

An intelligent building could provide a benefit of \$1 to \$3 per square foot in reduced expenses and increased productivity, including 1 percent increased employee productivity, or 3.5 minutes per day, stemming from a more comfortable work environment. This trickles down to the developer and property manager in tenant satisfaction, rent premiums and improved occupancy rates—as well as the potential for increased revenues from services and reduced operating expenses.

“The purpose is to increase occupant comfort and productivity, while at the same time reducing both energy usage and operating staff expense,” Ehrlich said.

PRESSURE COOKER

If the return on investment doesn't spur action in the United States, pressures on the horizon will likely incite developers to make new properties—if not existing buildings—intelligent. Real estate professionals of all kinds are feeling the pinch from a slowing market.

As the marketplace becomes more global and multinationals expand their overseas operations, commercial real estate in different hemispheres will be compared side-by-side. International Finance Center II, an intelligent building in Hong Kong, is populated by flush financial service firms from around the globe that are beginning to consider state-of-the-art properties like the finance center as the new standard.

“As the world gets more global, people will look at New York and it will look very 20th century,” Young said.

Intelligent buildings might also alleviate profit pressures inherent in the proliferating real estate investment trusts. Ehrlich said the pressure from REITs to develop smart buildings comes from Chief Investment Officers and “bean counters” who say attracting top tenants means providing the latest technology and the cost efficiencies integrated systems can offer.

Additionally, although rising energy costs aren't as high in the states as they are abroad, investors still want to cut

GADGETS GONE WILD

Ubiquitous Dream Hall in Seoul makes Jetson lifestyle a reality

Technology giants like Samsung are on board in this state-of-the-art live-workshop center in Seoul's center.

Creating a Jetsons-like universe, the prototype apartments boast features like robot vacuum cleaners that automatically sweep while residents are at work; a refrigerator that generates recipes based on its contents, placing an emphasis on soon-to-expire items; window shades that automatically drop when a movie is played; and a mirror that allows a would-be-wearer to try on various outfits by projecting digital images in front of the individual.

Similarly futuristic-seeming gadgets for the workplace (teleconferencing with automatic, simultaneous language translation), car (GPS that provides directions based on road conditions and weather) and healthcare settings (3-D images of organs that aid diagnosis) are equally impressive. Such technologies are interconnected with bus terminals, supermarkets and residents' workplaces as well as remote locations, allowing for apparently seamless transportation, retail, commerce and communication.



costs—causing developers to seek out energy-saving measures. Smart building technology can reduce energy bills by 20 percent.

Finally, commercial properties lag behind the residential market in the ever-booming surge of consumer technology. Consumers have come to expect technology like wi-fi access and integrated business operations at work because such systems are commonplace at home, Realcomm's Pope said.

"People expect the same amount of technology where they work as where they live," she said. "At home they have a wireless system, but at work their cell phones don't work."

Despite the U.S. real estate industry lagging behind other countries in developing integrated buildings, experts said interest in smart buildings is on the rise.

"Ten years ago if you didn't add fiber to your building, that was OK, but today if you don't have high-speed Internet access, you're not going to be able to lease office space," Pope said. "Five years from now if you don't have wireless in your buildings you're not going to be competitive." □

Emma Johnson is a contributing writer for *JPM*. Questions regarding this article can be sent to kgunderson@irem.org.



Photo: Jon Silla Photography

Ballantyne Village, in Charlotte, N.C., features integrated technology that allows tenants to open doors, turn on the lights and activate the heating system with one swipe of an access card.

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