



POSITION PAPER

THE TIME IS NOW for
HOLISTIC APPROACH
to assessing **SMART**
BUILDINGS

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EXECUTIVE SUMMARY

The information communications and technology (ICT) industry, commercial real estate investment trusts (REITs), building owners and governments are embracing the concept of smart buildings as the new gold standard in today's commercial construction world. According to reports from CABA, Navigant Research and Markets and Markets, the commercial smart building market is expected to grow from \$35 billion in 2018 to \$70 billion by 2023.

Fully integrated systems are enabling advanced building automation for increased efficiency, optimized operations and enhanced occupant productivity, safety, security and wellbeing. Now new 5G, IoT and edge computing combined with advancements in sensor technology, data analytics, machine learning and artificial intelligence (AI) will allow buildings to become even smarter and establish the critical foundation for smart cities.

According to a survey by Johnson Controls, more than 50% of building owners and tenants are willing to pay more for a smart building, and Morgan Stanley claims an estimated 10% increase in equity value for occupant-optimized facilities. REITs are therefore looking to better define investment strategies and implementation procedures that allow them to achieve maximum return on investment (ROI) and increased revenue through higher property values.

Unfortunately, to date there have been no smart building assessment programs that take a holistic approach and consider the entirety of the building. TIA has defined the following six core elements of a smart building:

- Connectivity
- Health and wellbeing
- Life and property safety
- Power and energy
- Cybersecurity
- Sustainability

This paper explores how new holistic smart building assessment criteria will enable wider adoption of smart buildings, both as standalone real estate entities and as building blocks within the larger smart city macrocosm.



THE RISE OF SMART CITIES & SMART BUILDINGS

Smart building applications have rapidly advanced as interoperable building systems converge over unified network infrastructures, communicate via common protocols and share actionable data to generate automated building control decisions. This is enabling a shift away from traditional siloed systems that required building operators to manually collect, aggregate and analyze data across multiple platforms.

Integrated systems and subsystems are critical to streamlining building operations and maintenance, reducing energy consumption and improving operational efficiency, safety and security.

They allow for healthier work environments that are optimized for cognitive performance and occupancy productivity. With system integration critical for buildings to deliver on sustainability goals, reduce lifetime cost and increase overall value, connectivity has been increasingly described as the “fourth utility” and is now considered equally as important as electricity, water/wastewater and HVAC within the commercial building space.



Smart Buildings are Foundational to Smart Cities

Beyond their internal platforms, smart buildings are considered the building blocks that will enable society’s digital transformation through the development of smart cities. A United Nations report estimates that by 2050 the urban population will increase from 54% in 2016 to 66%, by about 2.5 billion people, prompting cities and municipalities to seek ways to achieve urban sustainability and improve public safety and security.

As a microcosm of a smart city, smart buildings will serve as hotspots to collect and analyze information needed to reduce energy consumption and conserve natural resources, while supporting emerging applications like smart traffic and parking systems, self-driving cars, wayfinding and advanced emergency response. Global governments are viewing smart city infrastructure as a path to support these initiatives and improve sustainability. As they look to invest in and establish policies for sustainable smart cities, they will need smart buildings as the foundation.

CHALLENGES FOR THE SMART BUILDINGS ECOSYSTEM

There remain several challenges to planning, designing, deploying and operating a smart building—from a highly complex ecosystem and need for holistic assessment programs, to security concerns and the demand for high-bandwidth, low-latency networks.

SMART BUILDINGS ARE FOUNDATIONAL TO SMART CITIES



The design and build of smart buildings involve a highly complex ecosystem of stakeholders that includes real estate, architects, engineers, construction, ICT, energy, finance and insurance services, transportation and government. This ecosystem spans multiple industries, occupations, building types and lifetime phases.

Commercial REITs, owners and developers are critical market drivers and sit at the top of the food chain within the ecosystem as the primary investors and decision makers.

Architects, engineers and construction professionals play a large role as those who plan and design buildings and their integrated systems.

The ICT industry involved in developing and deploying connectivity to support smart buildings and smart cities encompasses several stakeholders as the network enablers that will tie it all together.

Governments and municipalities investing in smart city initiatives and sustainability efforts to reduce energy consumption and conserve natural resources are also key stakeholders within the ecosystem.

Building operators and facility managers are key stakeholders as they need more efficient systems with predictive maintenance to reduce operating expenses, which currently contribute to up to 75% of a building's lifetime cost.

Finance and insurance companies who fund and underwrite facilities have a stake in a building's lifecycle, risk and liability.

Occupants of smart buildings are considered key influencers as tenants, employees and visitors that demand an overall better experience and improved safety, security, health and wellbeing.

HOLISTIC ASSESSMENT AND RATING PROGRAMS ARE NECESSARY

The definition of a smart building has evolved over time. Early on, smart buildings were referred to as intelligent buildings throughout industry standards and were often considered as facilities that enabled simple building automation features, such as where an HVAC system automatically responds to data collected from its own sensors. But smart buildings are now much more capable. Only when all building systems are fully integrated and sharing data in real time so they be managed through a single pane of glass and respond with minimal human intervention can a building be considered truly smart by current expectations.

Currently, there are several building assessment tools, certifications and ranking indices from a variety of organizations, consultants and even governments around the world. While these initial methods provided valuable guidance as smart building capabilities emerged, they have remained fragmented in their approach, focusing on limited assessment criteria, and they can sometimes be wrought with vendor bias and subjectivity. This has caused confusion in the market, leaving stakeholders without conformity on which criteria to use and, ultimately, what and how to measure and benchmark against.

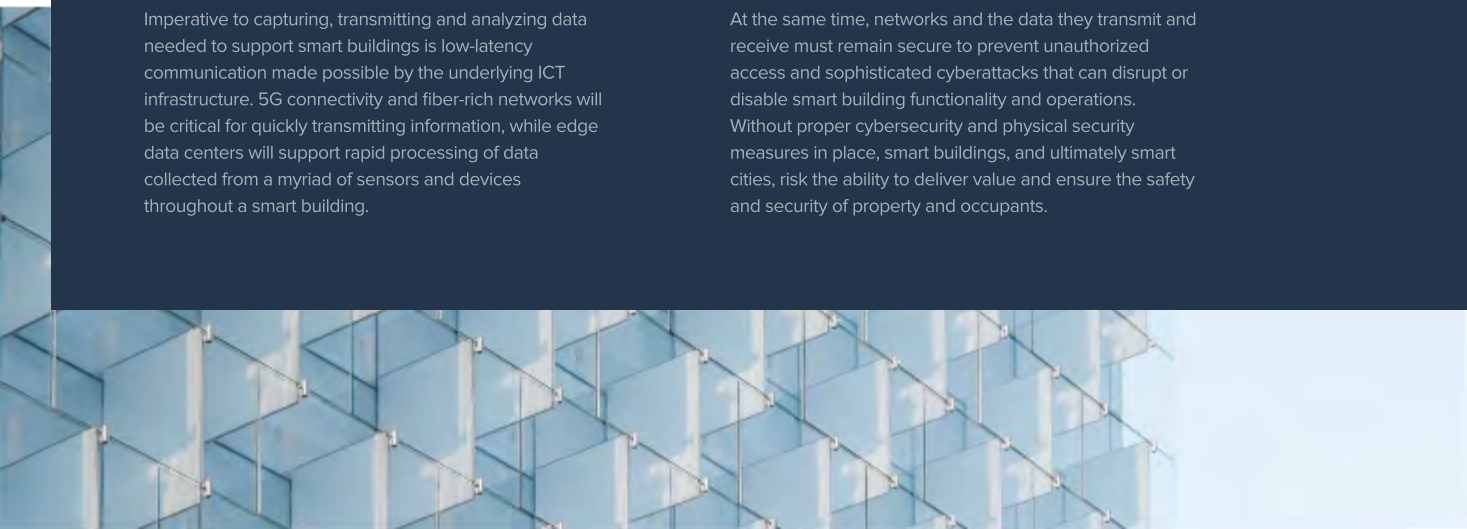


While many existing programs are widely accepted for categories such as sustainability or health and wellness, smart buildings cannot be accurately assessed without comprehensive criteria that account for all six major aspects of a smart building: connectivity, health and wellbeing, life and property safety, power and energy, cybersecurity and sustainability.

SMART BUILDINGS REQUIRE SECURE, LOW-LATENCY TELECOMMUNICATIONS INFRASTRUCTURE

Imperative to capturing, transmitting and analyzing data needed to support smart buildings is low-latency communication made possible by the underlying ICT infrastructure. 5G connectivity and fiber-rich networks will be critical for quickly transmitting information, while edge data centers will support rapid processing of data collected from a myriad of sensors and devices throughout a smart building.

At the same time, networks and the data they transmit and receive must remain secure to prevent unauthorized access and sophisticated cyberattacks that can disrupt or disable smart building functionality and operations. Without proper cybersecurity and physical security measures in place, smart buildings, and ultimately smart cities, risk the ability to deliver value and ensure the safety and security of property and occupants.



THE SMART BUILDING ECOSYSTEM NEEDS A SINGLE SET OF HOLISTIC ASSESS- MENT CRITERIA

The demand for smart buildings is happening now, and emerging 5G, low-latency networking, sensor technologies, and IoT applications are paving the way for advancements like machine learning (ML), artificial intelligence (AI), and machine-to-machine (M2M) communications that will make new and existing buildings smarter. However, a single set of assessment criteria that considers a comprehensive collection of factors for determining building intelligence remains overdue.

To define investment strategies, planning tactics, design principles and operational procedures, stakeholders across the entire smart building ecosystem need to come together under a measurable, verifiable and repeatable framework of criteria, standards and best practices to meet mutually agreed-upon functional and performance requirements. At the same time, they need trusted and comprehensive methods to assess and verify building intelligence, as well as to continuously benchmark efficiency, operations and occupant experiences.





TIA HAS THE EXPERIENCE, AFFILIATIONS AND CAPABILITY TO LEAD

The Telecommunications Industry Association (TIA) has the industry experience, know-how, advocacy and influence to unite stakeholders across the smart building ecosystem by facilitating the development of assessment criteria and standards for smart buildings.



TIA represents more than 400 companies and involves 2,500 key contributors and thought leaders representing all aspects of ICT related to smart buildings and is leading the way to successfully launch new and emerging technologies like 5G, edge data centers and supply chain security that are fundamental to smart buildings and smart cities.

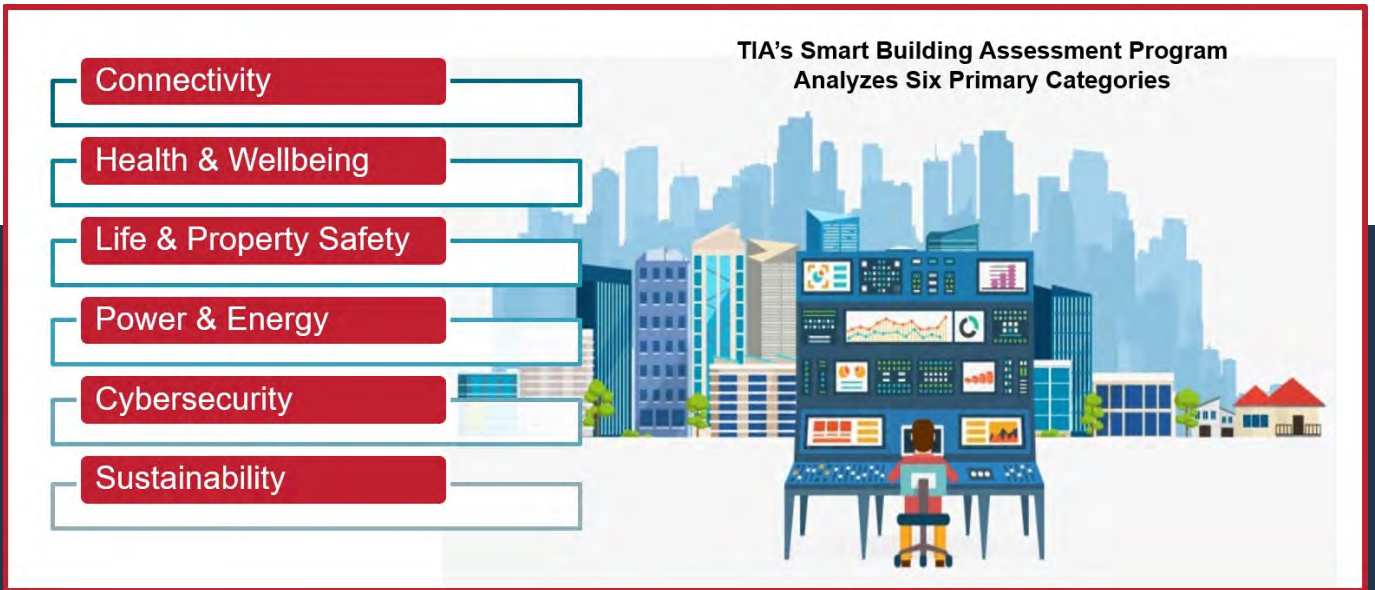
Through the TL9000 Quality Management System, **TIA's QuEST Forum has been successfully helping companies meet requirements through consistent and effective third-party performance-based assessment, benchmarking and reporting for more than 20 years.** This experience provides a successful foundation to develop a common set of assessment criteria and benchmarking to address smart building planning, design, development and operations.

TIA, together with its members, has overtime developed more than 3,600 telecommunications industry standards and continually improves those that are relevant, covering a broad range of technologies, including traditional and edge data centers, cellular towers and antennas, structured cabling, satellites and smart device communications.

With strong government alliances and in-depth analysis of pending legislation, **TIA has the unique ability to engage with global policymakers and advocate for policies that address smart buildings and smart cities.** TIA is already working with U.S. government entities to support the 2019 Smart Building Acceleration Act, as well as Kari's Law and Section 506 of RAY BAUM'S Act. In 2019, TIA signed a memorandum of understanding (MOU) with Telecommunications Standards Development Society, India (TSDSI) to specifically focus on standards related to smart buildings and wireless infrastructure.

TIA has the affiliations needed to address the complex ecosystem of stakeholders that spans multiple industries, occupations, building types and construction phases. TIA is leading the ICT industry in all aspects of the design, development and deployment of supporting infrastructure for smart buildings, while collaborating with REITs, corporations, governments and other industry organizations who are driving the development of smart buildings.

ECOSYSTEM STAKEHOLDERS STAND TO BENEFIT



TIA's holistic approach to assessing smart buildings analyzes six primary categories: connectivity, health and wellbeing, life and property safety, power and energy, cybersecurity and sustainability. Together, these primary categories span a wide range of features and functionality, allowing stakeholders to benefit from accelerated smart building adoption.

BENEFITS THAT SPAN THE ECOSYSTEM ↓

BENEFITS THAT SPAN THE ECOSYSTEM

Commercial REITs, Building Owners and Developers will profit from higher property values and price per square foot. It will allow them to differentiate their properties and amenities within the marketplace, enhancing building occupant experiences that drive higher demand and occupancy rates. At the same time, new sources of data can be used to identify emerging opportunities and revenue sources as smart cities come to fruition, further enhancing the value of their property portfolios.

Building operators and facility managers can decrease operating expenses by improving energy, utility and maintenance efficiencies, while reducing liability and risk by addressing safety and security concerns. New sources of data can be analyzed to establish baseline performance metrics and enhance decision making for improving management, tracking and optimization of building functions.

Service providers, manufacturers, designers, integrators and contractors across the ICT industry profit from the deployment of high-bandwidth, low-latency ICT infrastructure and connectivity. 5G communications and edge data centers will be critical to supporting smart buildings and increased adoption of smart devices, managed services and software solutions that will generate new opportunities. And once smart buildings integrate with upcoming smart cities, the benefit is a future with wired and wireless connectivity needed between buildings, along streets, on rooftops and throughout entire municipalities.



Building occupants and visitors will see improved health and wellbeing via optimized lighting, air quality and temperature. Cognitive performance and productivity are increased as workers benefit from more comfortable surroundings, seamless communication, collaboration and the ability to optimize their own space. Risk is reduced because safety and security measures are improved through the integration of fire safety, surveillance, intrusion detection and access control systems. The visitor experience is enhanced through smart technologies like smart parking, digital signage and wayfinding.

Governments and municipalities can improve public safety, emergency response and quality of life for residents, while increasing the efficiency of public services. Data collected from smart buildings can be used to predict and reduce energy and resource consumption, improve water management and enhance public transportation, lighting, parking, traffic control and sanitation. As smart buildings provide the foundation for smart cities, governments and municipalities will see long-term cost savings from better resource management and reduced city maintenance, as well as revenue and economic growth by attracting more businesses and residents.

WHAT'S NEXT?

As the smart building and smart city movement takes hold, a single, comprehensive set of smart building assessment criteria will allow stakeholders to define investment strategies, planning tactics, design principles and operational procedures for smart buildings. Through TIA's Smart Building Program, the entire smart building ecosystem now has a platform to unify stakeholders around a consensus-based framework to address the need for this vital holistic assessment criteria.

TIA'S SMART BUILDING WORKING GROUP IS DEVELOPING ASSESSMENTS, BENCHMARKING AND STANDARDS PROGRAMS

TIA is leading the development of a comprehensive, consistent, reliable and measurable framework of assessment criteria for smart buildings through its Smart Buildings Program that brings together real estate, architecture, engineering, construction and ICT professionals, thought leaders and subject matter experts across the entire smart building ecosystem into a Working Group to accomplish various goals:

Define smart buildings, identify gaps in existing measurement methods and **develop preliminary assessment criteria** using six primary smart building operational categories: connectivity, health and wellbeing, life and property safety, power and energy, cybersecurity and sustainability.

Develop a smart building assessment program with a leading global partner for verification against criteria that will produce a rating score for smart buildings using transparent and measurable methodologies. Buildings will be scored on a sliding scale and provided with the information and guidance needed to improve scores across all building lifecycle stages.

Launch an online smart building marketplace portal with key partners that serves as a central repository for stakeholders to build their presence within the ecosystem by accessing and exchanging valuable resources, registering their smart buildings and acquiring benchmarking subscription data, assessment and performance reports needed to make informed planning, investment, design, deployment and operational decisions.

Leverage subject matter expertise across the smart building ecosystem and data collected through smart building assessment verifications to **develop consensus-based, industry-driven standards** that are continually maintained and improved to adjust to evolving markets and technologies.

Through these initiatives, the smart building ecosystem will be armed with the criteria, assessment, benchmarking, reporting and standards needed to define investment strategies, planning tactics, design principles and operational procedures for smart buildings. Enabling buildings that deliver higher property values and increased safety, security, sustainability, health and wellbeing will accelerate smart building technology adoption and establish the critical foundation for smart cities.





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Ready to learn about TIA's Smart Buildings Program and join the ecosystem as we develop the framework for assessing, benchmarking and standardizing smart buildings in this rapidly growing market?

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