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**FMI**  
QUARTERLY  
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# **New Frontiers: Focusing on Technology in Facilities Engineering and Design**

By Russell Clarke and Greg Powell

**How technology and integration expertise are becoming key competitive differentiators for design and engineering firms focused on facilities and buildings.**

The continued infiltration of technology into our daily lives has brought with it advanced capabilities, new efficiencies and greater connectivity on many different levels. It has also brought headaches along the way. This same dynamic (of technology advances causing heightened expectations and complexity) is occurring in today's facilities and buildings industry—driving the need for skilled technology-focused engineers to design, integrate, maintain and maximize the increasingly complex, integrated and connected systems.

Technology design and system integration expertise is developing into a prerequisite for engineering firms focused on vertical buildings, allowing firms with strong system integration skill sets and user-friendly analytical tools to capture a growing market need.

Key benefits accrue to those firms that can extend their technological expertise and capabilities across a broader range of the facility project life cycle—spanning the upfront design, systems integration and ongoing technical service needs. This depth of expertise positions the provider as the first call for new projects, as well as the trusted advisor for future facility needs.

## What Is Driving the Change?

Simply put, today's buildings are more complex and sophisticated than in the past, and people have higher expectations from their buildings. No longer are well-functioning HVAC systems, smart lighting, strong Wi-Fi, video-enabled meeting rooms and classrooms, and easy controls things that building stakeholders want—these are now things they have come to expect. New buildings are designed and built with the latest technology systems, and owners are retrofitting older building stock with new technologies. These systems have made significant strides from those even five years ago, and now stakeholders expect them to interact and function seamlessly as one.

Analysts predict there will be over 25 billion connected things in use in 2020, a major increase from the 4.9 billion in 2015. Sensors and systems are interacting to deliver optimal temperature, air quality, lighting levels and security. As these traditionally separate systems are integrated and controlled as one, the ability to enable effective interaction is more critical than ever before. Garry Montgomery, vice president and head of technology at Dynamix Engineering, states, “It is also the most rapidly changing building system. Technology systems impact workflow, efficiency, expectations, safety, communication, connectivity and so many other things.” The skill set needed to design and then blend multiple systems to function as intended is most valuable. Without the proper integration of open protocol systems, buildings will remain stuck in decades past, even despite having the most up-to-date “smart” systems. Additionally, engineering firms with a product-agnostic stance and flexible capabilities can best allow the integration to take precedent over the product. Facility stakeholders can therefore achieve the goal of smooth and proper functionality—all without being reliant on one brand name, proprietary system or specialty service provider.

Roles of service providers are continuing to blend as facilities become smarter and more connected. The blending of these roles further drives the need for someone that can “make sense of it all” and bring the many moving (and traditionally independent roles) together to work as one. No longer does only the facilities manager control the building. The roles of HVAC service companies, electricians and facility service providers are all evolving as well, with each entity relying on data-driven, connected systems. In many cases, facility managers act as the boots on the ground but don't necessarily know how to utilize the data and analytics. Engineering firms with these technology and analytical capabilities can help with both proactive and reactive systems management and optimization. These firms bring significant value by analyzing systems data to plan for maintenance activities and direct the boots on the ground to correct problems as they arise. This solution relies on technologically sophisticated engineers who can design, internalize and leverage systems data through remote monitoring. As this capability becomes more widespread, the value that these outside providers bring to on-site facility and IT managers will continue to grow.





## What Are the Skill Sets?

The ability to bring fully functioning systems, simplicity and actionable insights to end users requires a unique blend of skill sets. These skill sets span the facility life cycle from initial technology design to integration expertise and remote monitoring of building systems.

### *Initial Design for Technology-Focused Systems*

Designing the data, voice, video, network, energy management, security and similar systems is a growing skill set and key differentiator for design engineering firms working on large vertical building projects. The ability to sell these services separately from more traditional MEP engineering services also provides inroads into new projects at an earlier phase, where the technology component of the project can lead to an expanded role and future work. Montgomery sums up the point, “Technology engineering is now the fourth utility in an industry traditionally based around three (mechanical, electrical and plumbing). It is also the most rapidly changing building system. Technology systems impact workflow, efficiency, expectations, safety, communication, connectivity and so many other things.”

### *Systems Integration Expertise*

Vendor-agnostic control system expertise is key to solving problems and delivering an optimized facility. Control system engineering and the ability to connect disparate systems are important to bridging gaps among the mechanical, electrical and security contractors—ensuring proper functionality of the various systems. Control integrators are critical players in the facility landscape, increasing their value beyond the initial project and ongoing maintenance processes. “There are system integration opportunities that exist today that could never successfully be realized in the past,” Montgomery adds.

### *Continued Commissioning and Service Mindset*

Continuous monitoring and maintenance of facility systems is key to maintaining a “first-call” position with facility owners. The ability to collect and analyze data to help prevent and solve problems is an important core competency that allows stakeholders to derive actionable insights from the massive amounts of data that too often go unused. In a recent CBRE report, Matthew Eastwood states, “You can measure a million different things—but focus on what you want to control and do it differently.” The ability to collect and analyze data also permits service providers to communicate both proactive and reactive solutions to a facility manager or subcontractor. These teams can then act on-site to troubleshoot the identified issue with purpose, avoiding potential problems and solving issues faster as they arise.

## Who Has the Expertise and Skill Sets?

The landscape of true technology experts and smart facility providers is not always obviously identified. The unique combination of skill sets needed to bring all of this expertise together currently sits in various places within the broader industry landscape. As time goes on, the skilled leaders will further emerge, and increased consolidation will likely occur. The early leaders able to build a large base of loyal clients will benefit the most. This evolving competitive landscape will impact industry stakeholders differently:

### *Engineering Firms*

Traditional MEP design and consulting engineering firms have varying depths of technology practices—from zero to extremely advanced. Those firms that are more deliberate in developing technology design and integration capabilities across key end markets are more likely to enjoy a stronger competitive position. “Today, building occupants across all asset types expect 24/7 connectivity and a positive user experience,” says Val Loh, principal at Syska Hennessy Group. “That’s why we view our capabilities in technology design as a core component of our services rather than as a specialty add-on. Because our technology practice is fully integrated into our team structure, we can offer our clients a form of holistic design that differentiates us from other engineering firms.”

### *Original Equipment Manufacturers (OEMs)*

Skilled controls professionals inside OEM organizations are a recognized talent pool in the industry. The difference between an OEM representative and a controls engineer from a product-agnostic firm is the knowledge and ability to integrate one specific product type (as opposed to taking a broader view). As more systems and users move toward open systems not tied to a single product provider, the value assigned to the expertise and ability to work with multiple systems will increase. This will likely pressure the OEM providers to broaden expertise and/or further utilize product-agnostic service providers to execute the integration.

### *Facility Managers*

Certain facility managers possess the skill sets needed to optimize building systems, but they’re focused on responding to problems and fixing tangible issues. Utilizing well-designed technology with remote systems expertise, analysis and support from technical service providers, on-site facility managers who live and work with the equipment every day can truly maximize the performance of the buildings they manage.

### *IT Managers*

As new technology is integrated into buildings and facilities, and as equipment becomes further integrated, greater reliance and power have shifted to IT managers. IT managers are increasingly the gatekeepers for critical facility system decision-making and troubleshooting. The role of IT staff and the accompanying core information technology knowledge is a key component of today’s properly functioning facility. As a result, the IT staff is a group that is likely to see an increased share of responsibility among facility stakeholders. Montgomery states, “Additionally, many traditionally managed systems (i.e., building automation systems) are now being managed and operated by IT personnel as these systems become more data-driven. Organizations/companies desiring to truly separate themselves from the competition are pushing for greater levels of technology and often hiring the professionals that plan/design such systems independent from traditional MEP engineers.”

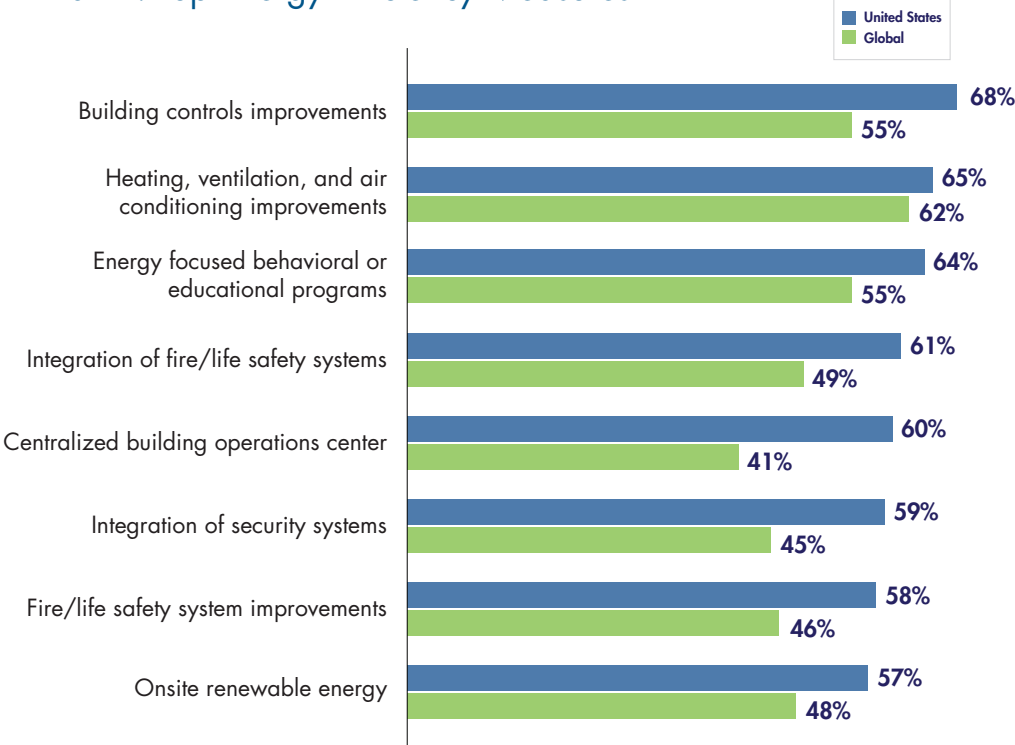
Talented practitioners skilled in the design, integration and ongoing technical services of the technologies embedded in today’s facilities are in high demand. The ability to find, retain and train an optimal talent base is hampered by the specialized skill sets spread among these disparate providers. In addition to having a fragmented talent pool, the competition for talented engineers is intense as the technology giants continue to grow. Engineering talent with three to seven years of experience is more valuable than ever, and acquiring such talent is a critical obstacle in building the best facility technology teams.

## The Acceleration of Growth in Technology Spend

Technology is expanding as a component of overall building investment. This trend offers providers value through revenue diversification from the more traditional design segments and can offer improved margins for those increasingly commoditized firms.

A recent energy efficiency survey by Johnson Controls clearly identifies the expected growth in technology-enabled facility systems and integration (Exhibit 1). Sixty-eight percent of respondents plan to invest in building controls over the next 12 months, up from only 38% of respondents two years ago, exceeding Johnson Control’s expectations. Survey results show that six of the eight top measures that organizations plan to implement in the next 12 months relate to connected technological building systems requiring specialized design and integration. This trend highlights the significant growth opportunities available to engineering firms in the technology market.

**Exhibit 1. Top Energy Efficiency Measures**



Source: “2018 Energy Efficiency Indicator Survey. United States.” Johnson Controls. 2018.

## Opportunity Abounds

The market is demanding increased technology capabilities across all facility service providers, but the landscape of skilled providers as well as the underlying talent base remains fragmented. Firms that recognize, develop and prioritize expertise in the initial design of technology systems, system integration and ongoing technical services are likely to benefit significantly. Capitalizing on this opportunity has greatly benefited early movers in the industry and may benefit many additional firms as technologies continue to advance and become further embedded in today's facilities.

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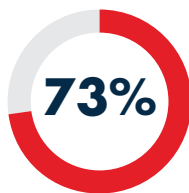
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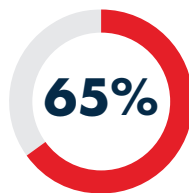
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- Utility T&D

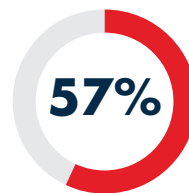
## FMI Client Highlights



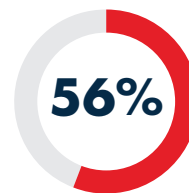
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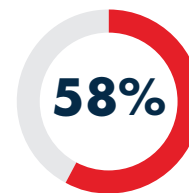
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