

TECHNOLOGY CONTRACTING:

Designing systems for efficiency, interoperability and smart building outcomes

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Over the course of a decade, a best practice has emerged for managing the design-assist, installation and integration of complex building, business and specialty systems. Known as Technology Contracting, it involves assigning a single point of responsibility upfront to bring an enterprise-wide perspective to managing the planning, design, installation, integration, commissioning and service of technology systems, business applications and supporting infrastructure. Technology Contracting can save time, reduce risk and decrease construction and operating costs while ensuring that technology is deployed and integrated in an orderly manner to achieve desired outcomes.

Defining the need

Often, before the construction process begins, the owner selects a construction manager or owner’s representative, as well as the design team. The building goes out for bid and a general contractor wins the project. A separate subcontractor strategy is employed to align budget to design and desired outcomes, and the subcontractors bid on the plumbing, electrical, lighting, HVAC, fire alarms, security, communication and specialty systems, and each takes care of installing their own systems.

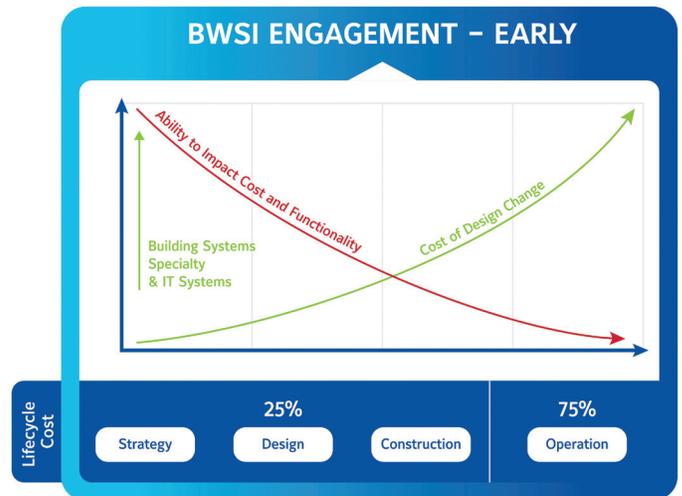
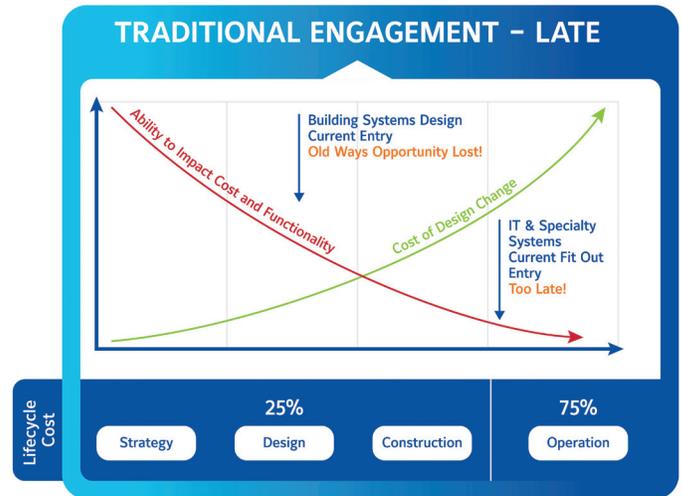
This process can be sufficient when the systems being installed are well defined, however, today with the Internet of Things driving IT standards and smart building outcomes across the enterprise, systems are better able to connect, share and optimize data across technology silos using a common communications language. Consequently, creating this smart, efficient, connected environment can be difficult to accomplish using a traditional construction approach:

- Who is responsible for bringing a holistic approach to technology within budget?
- Who can be counted on to bring the right solutions forward from market-leading partners, maximizing the efficiency, integration and interoperability of the technology systems across the enterprise?
- Who remains committed after installation to provide ongoing technical support, training and insight for the lifecycle of the building?

The traditional design approach is often challenged with leveraging the collective brainpower of different systems types to enable smart building outcomes. Without a coordinated, enterprise-wide approach to large, complex technology initiatives, systems and infrastructure duplications are common, and systems and data are left unsecured across the enterprise. Also, opportunities for integration and installation efficiencies are likely to be missed. It is difficult and costly to take full advantage of these opportunities after the building goes up.

Constructing a smart building that meets energy, technology and operational objectives depends on early collaboration between the owner, design and construction teams, sharing informed, data-driven decisions about connectivity and interoperability. With deliberate expert attention applied early during the planning phase, pitfalls can be avoided. This is why, increasingly, building owners and their team are selecting a single point of responsibility for technologies early in the process.

SMART BUILDING SOLUTION Technology Contracting Process



An updated contracting model achieves defined outcomes

Technology Contracting is a proven strategy to support the owner’s and construction manager’s objectives. It adds a single point of responsibility for the on-time and under budget delivery of connected technology with an enterprise-wide perspective. The technology contractor has the authority and technical expertise to make decisions and influence how the information technology network – as well as HVAC, communications, life safety, asset tracking and business applications – will be chosen, procured, installed and operated, all under budget and on time.

With Technology Contracting, the building is created not as a collection of systems, but as a functional whole, conceived, designed and delivered with the end in mind. Technologies and other key systems are connected to deliver in full the smart outcomes the owner desires for the building and its occupants. Therefore, the time to consider a technology contractor is at the schematic stage of the project, following the definition of the desired building and business outcomes.

While details of the process itself can differ with each project, the approach allows the technology contractor to manage planning, design-assist, installation, integration, commissioning and service of all technology systems in a building.

Why is technology integration so critical now?

Smart connectivity is critical for connecting technologies within and across buildings, creating systems that optimize building operations, reduce resource use, produce meaningful insights and increase productivity. The development of networked sensors, machine-to-machine communications, data analytics and real-time decision making means previously fragmented technology systems within buildings are now converging on standards-based, secured platforms, applications and intelligent infrastructures. The process of translating raw data into useful insight and action is key to delivering smarter capabilities for buildings.

Consequently, building-wide system integration is more achievable than ever before, however, navigating this territory can be complex and costly, and many are left wondering what it means for their facility, how to start the process and where to spend their money. A technology contractor can help the building owner, architect and general contractor plan the best systems, applications and infrastructure for building occupants. The technology contractor is responsible for delivering, installing and supporting the right solution in every area.

While technology convergence is now possible, it doesn't happen without deliberate effort. If integration is attempted after the systems have been installed and construction is complete, the process is more costly, more difficult and more time consuming than if it had been planned all along. A technology contractor will consider the various technology systems and integrations upfront, coordinating so that the systems live up to their full potential and support any future innovations while protecting the existing investment.



What are the benefits?

Owner Benefits

- A design process that aligns technologies with desired outcomes and works on Day 1.
- A holistic approach to maximize technology spend with technology lifecycle considered.
- Integration of individual systems provides a more comprehensive use of technology to support business initiatives while reducing interoperability risk.
- Provides best practices for identifying gaps between system specifications, IT, security standards and intended use.

Construction Professional Benefits:

- Single source accountability for the coordination and installation of all technology systems.
- Mitigates the risks associated with delivery of the owner's desired building design, the project team's integration of selected systems, and provides alternative value solutions to maintain budget integrity.
- Fewer change orders during construction and systems installation.

Design Professional Benefits:

- Gain insight into interoperability issues with various technologies, systems and products.
- Participate in the generation of the design-basis documents and best-in-class technology selections.
- Subject matter experts provide additional insight and expertise.

The Technology Contracting process

A Technology Contracting relationship typically begins at the very early stages of building design. The objective is to respect the project's budget while making the most of the technology investment, achieving significant cost savings which can be used to meet the needs of the facility's prospective occupants. Involving the technology contractor early ensures that overall building architecture and systems are mutually supportive. The process results in mechanical and electrical systems that are efficient, optimized, and future ready.



Planning

Effective planning is the first step in a successful Technology Contracting engagement. In partnership with the design and construction teams, the technology contractor brings together all stakeholders – owner, representatives of different business units and departments, consultant, architect, contractors – for a facilitated planning session meant to uncover defined outcomes related to system and technology infrastructure priorities, maximizing every dollar spent. Beyond facilitating the discussion, the technology contractor's role is to be familiar with the ecosystem of feasible technology options and point out common packages and integrations, then recommend options to suit the project's budget. The technology contractor works with the design/construction project team to select and implement the technologies determined as essential for delivering the planned environment that meets the needs of the building occupants.



Design Assist

During the design process, the technology contractor collaborates with the design team to optimize layout and integration of systems and technologies required to meet the owner's desired outcomes. When all of the potential systems and technologies are identified the design team and technology contractor make objective product selections to maximize the efficiency, integration, interoperability and lifecycle service of technology systems. Moving these decisions to the earliest phase of the design process drives consensus, mitigates construction risk, and results in fewer change orders during construction and systems installation.



Installation and Integration

The technology contractor brings proven, repeatable, best-in-class technologies to the project by leveraging a partner ecosystem of manufacturers, distributors and value-added resellers with the experience, expertise and innovative services and solutions needed to create a connected environment. This ensures that energy, technology and operational objectives are met while reducing cost and risk.

The technology contractor collaborates with the partner ecosystem in the design of an intelligent infrastructure on which to integrate technology and oversees the installation of technology systems, including building systems, business applications and supporting infrastructure.



Commissioning

Commissioning is a systematic process of testing to make sure all building systems perform according to the design intent and the owner's operational needs. The technology contractor works closely with the commissioning agent, because the commissioning process begins in the design phase of the project. The process ensures that commissioning considerations are planned into the selection and integration of systems, that the owner's business processes are fully supported, and that the building, business and specialty systems are integrated into a single secured operating model. Functional documentation, wire diagrams, and use case validation all contribute to the successful commissioning of the building prior to occupancy and make the process significantly more streamlined for the commissioning agent.



Service

Building owners may choose to manage equipment and systems maintenance or the technology contractor may have resources to provide maintenance, operational and management support after the building is occupied. Commissioning benchmarks performance, so the identification and repair of systems that have ceased to operate at acceptable performance levels is easy to manage. Effective systems design and monitoring can reduce expenditures on energy, maintenance and upgrade costs.

The state of the industry

There have been many excellent examples of Technology Contracting in the healthcare facilities market. For example, hospitals use about three times as much energy as a similarly sized office building due to 24x7 operations and energy intensive processes such as operating room conditioning. A typical surgical suite is unoccupied 70-80% of the time during the week and up to 95% on weekends. By integrating the building management system with the surgical scheduling system and electronic patient records, excess energy used to condition, pressurize and ventilate the operating room can be reduced when unoccupied, saving an average of \$6,000 per year while delivering and documenting safer and more comfortable conditions.

Technology Contracting has applications in virtually every sector including education, transportation, state and local government, commercial real estate, industrial manufacturing, and sports and entertainment facilities. Nevertheless, it remains an unfamiliar concept to many architects, engineers and general contractors. Although technology is available to make buildings smart, realizing the full potential of smart buildings requires integrating technology systems that communicate to fully optimize the environment and improve operations. Creating a smart, efficient, connected environment that meets the

owner's business objectives can be difficult to accomplish using a traditional construction approach. To function effectively in the Technology Contracting role, a firm must have knowledge of smart connected equipment, building controls, fire and security, IT networks and systems, and specialty business applications. It must also be well versed in planning, design, construction, installation and commissioning. Ideally, the technology contractor also has resources to provide maintenance, operational and management support after the building is occupied.

Today, few firms possess broad enough expertise to perform well in a Technology Contracting role. In time, the discipline will achieve broader recognition and specialized professionals and boutique firms may find niches within it.

Buildings are huge investments. Particularly in mission-critical environments such as hospitals, life science facilities, manufacturing plants and large scale commercial facilities, the efficiency and integration of systems can substantially affect the occupants' business performance. Taking an enterprise-wide approach to technology enhances integration, optimizes technology usage and maximizes budgets, ensuring building technology fulfills its promise and building owners realize their vision.

About the author



Jim Nannini has worked in the information technology services field for the past 30 years. When Jim joined Johnson Controls in 2005 as Vice President of Building Wide Systems Integration, he brought 20 years of software, voice communications and networking, technology convergence, and enterprise solution development leadership experience in the areas of sales, engineering, operations and marketing, as well as experience with emerging market businesses. For more than a decade, Jim has led a team of highly skilled sales and solution development engineers in the design and delivery of converged technology solutions. Previously, Jim held various leadership positions with a fortune 50 company and technology startups.



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