



System integration in the digital age: Why you need it and how to get the best

By Jose Rivera and Lisa Richter

Control System Integrators Association (CSIA)

To meet the challenges of an increasingly competitive marketplace, many manufacturers (end users) must focus on their core competencies (i.e., their secret sauce) and outsource the rest to experts.

System integration is not a core competency for most end users and many are outsourcing it. In fact, the trend of outsourcing system integration has been going on for decades, and it is likely to continue. Meanwhile, end users are elevating their internal engineering departments to play a new key role, one as an orchestrator of a wide and complex ecosystem of suppliers to deliver on the projects needed to support their companies' strategies.

Top three most significant industry verticals for SI clients*

Food and beverage (including bottling/canning)	47.25%
Water & wastewater	30.40%
Chemicals and petrochemicals	26.37%
OEM/industrial equipment	23.44%
Oil & gas	20.51%
Power & energy	20.15%
Life sciences	19.78%
Automotive and tire	19.05%
Metals, mining, aggregate, cement	16.12%
Packaging and Material handling	16.12%
Consumer goods/Household products	15.38%
Other (please specify)	12.09%
Building automation	11.36%
Defense/Military	5.86%
Commercial/Institutional	3.66%
Semiconductor & electronics	3.30%
Entertainment	0.37%

*Data based on 273 respondents.
Source: 2019 CSIA/IIP Morgan Spring Survey

This takes place at a time when technology has gained a much more prominent and visible role for the success of the overall manufacturer. While Industry 4.0/Internet of Things (IoT)/Industrial Internet of Things (IIoT)/digital transformation goes beyond technology, technology remains a key foundational element and true enabler.

Most end users' projects have seen their solution scope expanded, going beyond the integration of traditional systems and reaching into functions that may have been too hard or expensive to integrate in the past. Many aspects of technology have become easier and more intuitive — in particular, around the user experience. Integration overall has become more difficult. In addition to an expanded solution scope, system integration faces the challenge associated with brownfield installations with a patchwork of legacy systems.

Specifically:

- Many of these legacy systems weren't designed to provide the streams of data at the required speeds.
- The proprietary nature of most legacy systems complicates the integration. To make matters worse, many manufacturers have ended up with myriad systems from various generations and vendors, often the result of purchases over time (including machines delivered with their control system), the ability of plants to dictate their preferred suppliers without corporate guidelines to follow and the diversity brought by mergers and acquisitions.

System integration as a core competency

It's no surprise system integration is the core business of system integrators. Therefore, system integrators (SIs) often offer their clients (end users) several advantages. SIs provide:

- Continuous investment for technical competence of its resources. This includes the need to stay current on industry standards (e.g., safety, environmental and so on). This is not a small challenge because of the high speed of technological development and the scarcity of competent resources.

- Experience development through ongoing exposure to a wide range of projects across various verticals (i.e., crosspollination). This is not easy for end users with only in-house resources to obtain as their “playground” is limited to what is currently in their own plants.
- Methodological approach to system integration including project definition, project execution and change-order management and documentation.
- Flexibility to staff projects, following real project demand cycles.
- Ability to identify and mitigate risks.
- Experience to advise and guide end users in the complex digital transformation environment to become strategic partners in decision making.

Digital transformation’s impact on SIs

The digital transformation also will transform the system integration business.

- The value added by SIs is migrating from one of technology deployment to one of deep domain expertise (industry vertical and, in some cases, application within a vertical). This migrates the “generalist” to a “specialist” SI.
- The scope of their solutions keeps expanding and no single company, no matter its size, can deliver all that is required. Like information technology (IT) workers, SIs need to master the skills associated with alliance/partnership management. Increasingly, they will be asked to participate or lead an alliance required to meet their end user clients’ full solution requirements.

The key role of SIs

At a very high level, it is important to recognize the key role played by SIs in the success of end user projects and underlying initiatives.

- The role of the SI is one of strategic importance, and the development of a long-term partnership needs to be the goal for the end user and the SI. Time invested upfront will help make the right selection.
- Projects where SIs are involved get funding because they represent an expected positive economic return. Delays in the start of production and/or cost overruns impact the bottom line. This means their role is very critical.

CSIA best practices and certification

The Control System Integrators Association (CSIA) is a not-for-profit, global trade association that seeks to advance the industry of control system integration. Its mission is to advance the industry of control system integration by promoting the benefits of hiring a certified control system integrator. CSIA has more than 500 member companies in 35 countries.

The core of this professional organization is the CSIA’s Best Practices and Benchmarks guide, which outlines a standard approach to many of functions required for the professional management of a SI company.

Why choose a CSIA certified company?

CSIA member companies that are CSIA certified have demonstrated through an independent audit that they adhere to CSIA’s Best Practices in key areas of their business, ranging from product management to financial management, along with nine other vital areas. CSIA certification identifies a company’s long-term commitment to quality and longevity in the industry. An audit is required every three years.

To learn more about CSIA visit www.controlsys.org and to CSIA certified SIs, visit the CSIA Exchange at www.csiexchange.org.

At a high level, end users need to ask themselves:

- Can I envision a strategic, long-term relationship with this SI?
- Can we partner for mutual, long-term success? (This requires an upfront, direct and honest relationship. It is very important to specify the scope of work and rules of engagement at the start and throughout the project. It also is key to have a solid relationship to handle the possible surprises when they occur.)
- Does the SI have the required domain (industry vertical or potential application within the vertical) expertise? Are they open to develop the areas they don’t master today? Is this SI committed to this industry vertical?
- Will this SI be able to deliver the assigned projects on their own or as part of an alliance?
 - Do they have the technical proficiency, and can they build it out if needed?
 - Can they lead a group of companies? Can they be a team player with my team? ...with the external companies?



System integration in the digital age

- Does this SI have the right quality system and a continuous improvement mindset in place to ensure their viability in their company in the long run?
 - Are they CSIA or ISO-9001 certified?
- Can this SI be a partner in my digital transformation journey?
- Do we have the right fit/chemistry?

Practical steps to SI selection

Selecting an SI is more than a technical capabilities decision. Diligent preparation increases the odds of a successful project. If you are an end user, the following are four practical steps for you to follow during the integrator selection process.

1. Define the project.

- a. What are the objectives, scope, resources, schedule and budget?

- b. What is the motivation behind this project?
- c. What are the project objectives?
- d. What do you want this project to look like when it's finished?
- e. What are the risks of the project? Are you prepared to manage those risks?
- f. What is your communication plan?

2. Establish the criteria.

- a. Does the SI have experience in your industry?
- b. Does the SI have dedicated engineers with knowledge on the latest technologies, trends and issues?
- c. Can the SI show proof of project management competencies?
- d. Is the SI financially stable?
- e. Does the SI provide post-delivery services and support?

3. Identify the candidates.

- a. Does the SI have the technical sophistication level to handle the project?

The anatomy of a great association

By Lisa Richter

In 2019, the Control System Integrators Association celebrated a quarter of a decade — and came full circle — when it returned to North Carolina 25 years later, April 29 - May 3, for its Executive Conference.

The event, which drew more than 530 attendees from around the world, offered education and networking — both formal and informal — to help system integrators stay current, grow their businesses and prepare for the future.

It also offered the opportunity to celebrate an important milestone — 25 years — and a chance to reflect on its humble beginnings.

The Steve Jobs of CSIA

Originally known as systems houses or simply integrators, control system integrator emerged as an independent profession in the 1960s, when computers first arrived on the factory floors

and inside industrial control houses. The people who developed the expertise to program and connect the technology that heralded a new industrial revolution came from various academic and professional lineages; no single forum existed for members of this emerging profession.

Charlie Bergman, a retired engineer, recognized the emergence of the control system integrator as an independent profession and began publishing a four-page newsletter in 1989. It supported this emerging profession by publishing information on how to run a successful business. Subscribers could benchmark their progress by sharing sales trends and other key statistics.

The foundational values

Less than five years later, 25 of Bergman's readers met at the Shell Island Resort, a small hotel in Wrightsville Beach, North Carolina. Many were understandably skeptical about con-

sorting with competitors and potentially giving away their secret sauce.

But instead of finding a you-can't-touch-this mentality, these pioneers discovered a culture of sharing and support.

"Most of us were guarded at best," recalls CSIA Co-Founder Jamie Jordan, who is currently president of Stravicom Global Inc., a professional services firm in Charleston, South Carolina. "But Charlie encouraged us by telling us that those who share with others will be strengthened and also will strengthen the industry."

Co-founder Robert Zeigenfuse, president of Avanceon, in Exton, Pennsylvania, agrees. "Charlie established, with his now infamous pitch, 'Share one idea and get 10 in return and save \$50K of consulting,'" he said. "He [Bergman] established the norm of unselfishly sharing of business practices. This alone sets our organization and industry apart from all others I have seen."

- b. Check for certifications.
- c. Does the SI have strong business skills?
- d. Does the SI have HR programs focused on development, training, recruitment and retention and in compliance with all applicable state and federal laws?
- e. Does the SI follow industry best practices?
- f. How deep is the SI's bench?
- g. How strong is the SI's project management experience?
- h. Does the SI rely on subcontractors, and if so, what systems do they use to monitor and control workflow?
- i. If an internal system integrator team will be involved, what will the roles of the respective groups be?
- j. How complete is the proposal?
- k. Are things quantified in the bid?
- l. Are the SI's expectations outlined (i.e., number of review cycles, review and response times)?

4. Find the best fit.

- a. Narrow the pool of candidates to three.
- b. Are you comfortable asking the SI questions? Are they giving timely and solid answers?
- c. Ask to see references and completed project books.
- d. Does the SI's strategic objectives and goals align with your business?
- e. Visit the SI's business or factory to see firsthand how they work.
- f. Ask to meet with the project team.

Where to start searching

System integration is not a very visible market, and very few SIs have company names that aren't recognizable to those outside the industry. It also is a very diverse market that allows SI specialization along a broad scope of technologies, industries and geographies (see Figure 1).

A good place to start is in the Industrial Automation Exchange, a community of SIs and suppliers hosted by the Control System Integrators Association. Filters allow

The result: A great association

Profits from the first meeting seeded the second conference in 1994, where attendees voted to form the association as an affiliate of the National Electrical Manufacturers Association, which would eventually be the standalone CSIA.

Through the years since, the association has grown steadily from the intimate group of early adopters to its current size of more than 500 member companies in 35 countries. The association also has expanded on its core competency of exchanging ideas, solutions and lessons learned to create additional member benefits such as a Best Practices and Benchmarking manual, certification and continuing education, and insurance and legal programs specific to system integrators.

In short, from Bergman's vision came the key, defining concept of the future of CSIA: Sharing knowledge, best practices and key performance in-

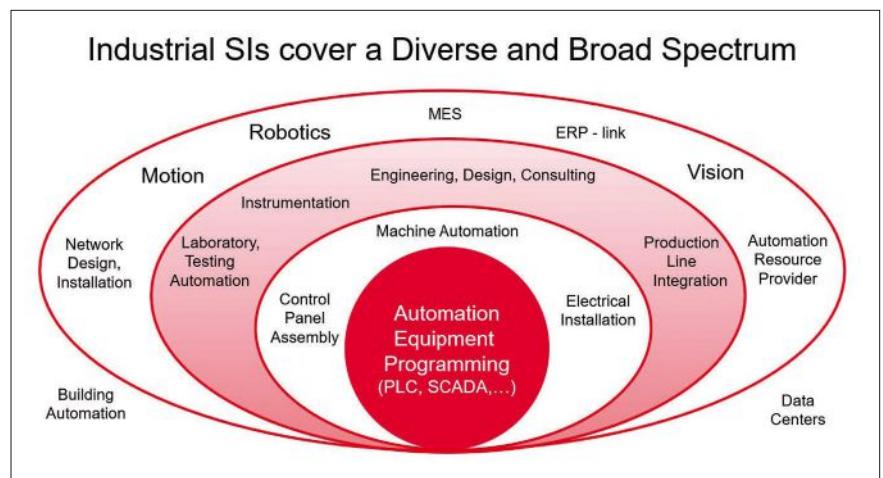


Figure 1: System integrators cover a very broad a diverse set of functions, creating the opportunity for specialization. A common denominator is PLC and SCADA programming, which is a function done by the vast majority of SIs. Courtesy: Control System Integrator Association (CSIA)

dicators to advance the success of all.

Co-founder Pat Miller, chair, Engineered Energy Solutions Inc., Somerville, New Jersey, who was instrumental in organizing the earliest efforts, sums it up this way: "Charlie told us

to share ideas with one another and it would come back tenfold," he recalls.

To learn more about the founding of CSIA, visit www.controlsys.org/about/history.



System integration in the digital age

end users to search suitable SIs based on their requirements: industry vertical served, application and/or product specialization, vendor specific technical platform and/or CSIA management certification (see

Table 1). Most SIs have their own websites the Exchange links to, allowing further exploration. Some SIs also participate in trade shows and attend industry events, mostly from the automation equipment vendors

providing an opportunity to meet in person.

It's your move

Outsourcing to SIs allows end users to focus on their strategic core (i.e., their "secret sauce"). For SIs, system integration is their core business, one in which they consistently invest. Digital transformation (IoT, IIoT, Industry 4.0, smart manufacturing) is a key initiative for end users; one that can further elevate the role of advice and support by SIs. Because of all of this, when it comes to selecting the right SI, time is worth investing. The nature of the relationship should be focus on mutual, long-term success, like any true partnership.

Jose Rivera has led a successful global career in the automation industry working in six countries, most often in a regional or global role. Since March 2015 he has been the CEO of the Control System Integrators Association (CSIA). In this position, he has worked to advance the system integration industry by expanding the adoption of the CSIA Best Practices and by helping members recognize emerging trends and pursue associated business development opportunities. The CSIA Best Practices help independent system integrators build better companies.

Lisa Richter is industry director of the Control System Integrators Association, where she helps members grow their business, share industry expertise and advance the industry of control system integration. She also is host of the popular Talking Industrial Automation podcast. Prior to joining CSIA, Lisa was vice president of marketing and communications for a commercial cleaning industry non-for-profit, as well as an award-winning consultant to the association industry.

New Dual-Channel Programmable Transmitters & Signal Splitters

- Dual channel saves you money
- Front facing terminal blocks saves you time
- High performance increases accuracy

Visit www.Acromag.com/sc
TO LEARN MORE

Remote I/O solutions that you can depend on.