Supplier and Platform Selection Criteria and Evaluation

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Selecting the right automation system supplier and platform is a critical step for both greenfield and brownfield projects. Here's how to quantify, streamline, enhance and improve the process to produce a more objective and better choice.

The basic process control system (BPCS) running a process manufacturing facility is its brain and nervous system. It might encompass an entire facility or just a single unit, but it affects every aspect of the operation for decades to come (Figure 1). A BPCS platform is a major investment, with an expected life of 15 to 20 years, and configuring and installing one is a huge project. Selecting a BPCS supplier is therefore one of the most important decisions a company can make.

For some companies the choice of supplier is dictated by corporate policy, while others start from scratch in every situation. The individuals who have the responsibility to choose the supplier and system will set the course for the facility or unit for many years to come. A good choice will have a positive effect on the facility's ability to produce effectively and profitably. The operators will find the system "easy to drive," and there will be room to improve and optimize the process. A bad choice can have opposite effects.

The teams or committees assigned this selection task will likely understand the gravity of the situation. Most teams find the task difficult for a variety of reasons. Some individuals will approach the task with prejudice toward or away from specific suppliers: "Company X bought Platform Y and they hated it. They tore it all out after two years." It is just as easy to have an overly positive view. The problem is when these views are subjective and even emotional, the team can lose focus on delivering the best solution. Unfortunately, in many situations, there is little else to go on. Sales reps make convincing presentations and thinking can be erroneously swayed.

There are tools and methods to help shed more objective light on these situations, so groups can make more clear-headed decisions. Once a dispassionate and calculating approach replaces emotion, a team can make a selection based on the specific needs of the facility and process, taking a variety of critical factors into consideration.

Figure 1: A BPCS ties together all the automation elements of a process manufacturing unit

Selection Process Mechanics

The supplier selection process should begin by identifying what the company makes, how these products are produced, and what specific elements have the greatest effect on quality and efficiency.

We call those elements Critical to Quality (CTQ) parameters, and any automation project, large or small, must begin with determining what they are. All the stakeholders need to be involved in compiling the list:

- Operators
- Process engineers
- Maintenance
- Production management
- HSE specialists
- And others

One of the first questions to ask is what makes for a "good day" from an operational standpoint, and how does the BPCS fit into that picture? The list of CTQs should be stacked as one side of a matrix, with one on each line, putting the most important at the top (Figure 2).

CRITICAL TO QUALITY ELEMENTS	SUPPLIER A	SUPPLIER B	SUPPLIER C	SUPPLIER D
Has an extensive installed base in our industry.	3	7	8	4
Has modules to support APC strategies.	2	5	6	8
Supports smart I/O for smart devices and diagnostics.	5	5	5	7
Supports high-performance HMIs.	2	6	4	5
Easy to add instrumentation.	4	4	6	7
Our existing control strategy will transfer well.	3	3	2	2
Strong track record of user support.	5	6	5	7
TOTAL	**24**	**36**	**36**	**40**

Figure 2: Arranging and categorizing CTQs and suppliers helps sort out strengths and weaknesses of each BPCS so they can be compared easily.

The vertical columns should list the BPCS suppliers competing for this project. From here, the next step is ranking each supplier on its ability to satisfy each CTQ. If you've done a good job with the CTQs and you have a good handle on the capabilities of each supplier, this task will be easier, but it's never simple.

Companies launching a project with a strong supplier selection team can generally compile a good list of CTQs, but most invariably still miss a variety of critical items. Moreover, very few companies know how to rate suppliers objectively because there is so little opportunity for gaining practical experience with these types of projects due to their infrequent occurrences. Fortunately, there are those who can help on both counts.

Help from a System Integrator

One of the most helpful consultants you can have for a supplier selection process is an experienced system integrator company. Experience in this context means a long track record executing successful BPCS installation and migration projects, in a wide variety of facilities, working with all the suppliers you are considering. Large integrators typically have specialists who have worked with the main suppliers and they can bring their experience to bear for your team.

The primary consultant at the integration firm assigned to your project can work with your stakeholders to outline your CTQs. When this list is compiled, the integrator's specialist for each platform can rate the respective suppliers on each point. Here are some of the critical elements they can consider:

- Continuous, batch and hybrid processes have much different control needs. While one supplier might be well-suited for batch, it may not be best suited for continuous.
- Does the supplier have a history of making the system easy to upgrade? Some readily adopt new technologies and the systems are easy to keep up to date, others do not.
- Does the supplier have an extensive installed base in the customer's industry?
- Is the system robust when used in this kind of application?
- How does the system handle the trade-off between simplicity versus a more versatile system with a higher level of complexity and/or expandability?
- Does the customer have the means to maintain the system when it's installed? If not, does the supplier provide the required level of support?
- Can the customer benefit from new technologies, or should it stay with more established and proven methods?
- Does the supplier have local support available?

The system integrator's technology expert, within the integrator's consulting team, can draw on real-world experience when considering these questions and the others on the CTQ list. Is Platform Y used extensively in the customer's industry? "Yes, there are several examples where we have installed it over the last ten years and it is doing well in all facilities. However, we had to work with the supplier's software group to solve a major HMI problem (Figure 3), and this application will need the same fix. With some give-and-take engagement with your team, the list can focus on the smallest group of contenders.

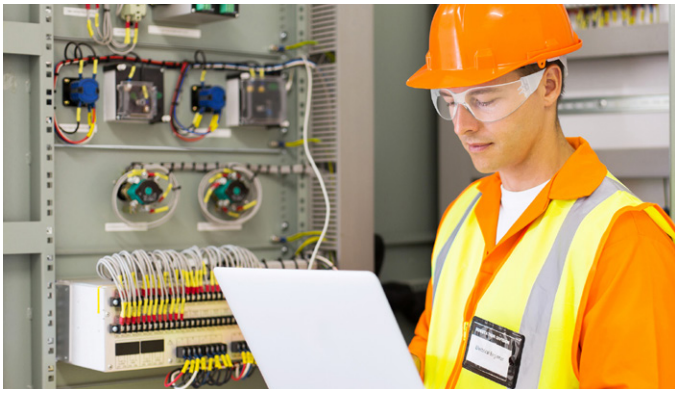

Figure 3: Diagnosing problems and making site-specific modifications to a BPCS is part of the integration process.

Down to the Short List

If the list starts out with six or eight choices, eliminating half will be an easy task because it doesn't take long to see which are clearly not suitable. When it gets down to two or three suppliers, the individual trade-offs become more subtle, and this is where having experienced voices makes the biggest difference.

At this point the procedure will likely call for extending a request for proposal (RFP) to more than one supplier so the team can have some hard numbers and dates to consider. But getting an accurate proposal depends on having an accurate scope, and having a system integrator as a consultant is an enormous advantage because scope writing is complex and easy to get wrong for individuals who don't do it frequently.

Key items for the RFP include:

- General scope of work, describing the full extent of the project
- Basic facility statistics, such as the tag count, number of loops, number of controllers
- Other facility systems connected indirectly to the project
- Current and desired control strategies, such as regulatory control moving to APC
- System adaptability to anticipated HMI and instrumentation changes
- System connectivity for now and the future as the IIoT moves in
- Ability to implement and possibly extend remote acces
- Cyber security needs
- System expandability to accommodate more equipment in the unit
- Requirements for operator training during installation and ongoing
- Real estate requirements within the rack rooms and control rooms, and
- Redundancy requirements s

Most of these items will need to be considered for both now and in the future because the human resource and technology needs of tomorrow will be much different. Unfortunately, how they will change is not easy to guess outside of general trends. The availability of qualified human operators is hard to predict, but there will likely be fewer of them (Figure 4).

Figure 4: The way facilities use people will change as work-force demographics evolve. Will the BPCS supplier be able to support these new directions?

Are there tools and procedures to use the smallest number of people to the greatest advantage?

Suppliers must be able to deal with these emerging technology trends. For example, some systems made the move from proprietary platforms to Windows, or serial networks to Ethernet, more easily than others. Such track records can be useful to predict how a supplier will respond to new waves of technology.

Sorting Through the Proposals

Once the proposals begin to come back, the evaluation can get even more complicated. Trying to compare companies A, B and C, even if they have the same scope, may prove more difficult than one would imagine. BPCS suppliers tend to characterize and describe elements of a system in ways that reflect well on themselves, but are not always easy to compare.

The system integrator's consultants can be especially helpful at this critical final evaluation stage by using their:

Objectivity—A team member might be swayed by a strong sales presentation, but it is important to look carefully at the steak and not be distracted by the sizzle. Similarly, another team member might have a bad attitude about a different supplier and want to reject an excellent proposal. The ability to see and think through prejudices can make a huge difference.

Experience— Very few people working in a process manufacturing facility for any length of time will have participated in more than one major BPCS installation or migration project. Most will have no experience whatsoever. Experts from the supplier have probably done a dozen or more projects with a given platform, but only on their own platform. Engineers working for a system integrator may work on two or three projects each year. This valuable experience is not available any other way.

Knowledge—After working on a few projects, integrators collect experiences and compile lessons learned from each. This information piles up to the point where it is difficult to miss the pitfalls and gotchas common to the selection process. This is particularly important when there are requirements to interface with third-party systems. The BPCS supplier may have no experience with some of the site-specific elements of the project, but such things are part-and-parcel of an integrator's work.

These integrator capabilities are also important if your company has a policy to use a specific supplier. Such situations do not give the supplier carte blanche to do whatever it wants, and the system integrator can ensure everything is done efficiently and effectively. Many of the same questions must enter the discussion, but in slightly different ways, and the right consultant can make sure you get the best answers.

Do Your Homework

Working on a BPCS installation or migration project is exciting, but it also requires an enormous amount of work and the risks are high. A bad decision now will remain with the company and facility for many years to come, or could require great expense to fix. You and your colleagues on the supplier selection team are undoubtedly able engineers, you're conscientious, and you have the best needs of your facility at heart. However, in all likelihood, you are moving into uncharted waters where few of you, if any, have relevant experience. This kind of project may only take place once in a career, so it is important to get help from experts.

A system integrator company with a deep bench of experienced people will help ensure your project is successful in terms of budget, schedule and performance. The right guidance will make sure you and your decisions are remembered positively for many years to come.

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