

The Science of Project Selection (Back to [Table of Contents](#))

Introduction

The risk to a general contractor or subcontractor associated with a construction project can be measured in advance. However, the risk differs for each contractor because it is a direct relationship of the contractor's experience with all aspects of the project in question. The performance of an operating entity, such as manufacturing, improves with repetition. In contrast construction enterprises do not usually have enough repetition from project to project to experience much improvement because in almost all cases new projects differ in varying and measurable degrees from previous projects. The closer the new project represents the average of previous projects the more likely estimated or improved performance will be achieved, primarily because the planning and execution is more of the same as opposed to totally unique. Similar projects have less of a learning curve for the organization than projects that differ from prior experience and this also depends on the team members involved. Experience is eventually accumulated institutionally, but is captured individually so the number of members on a performance team with direct experience with previous projects being measured against impacts the likelihood of estimated or improved performance.

The aspects that impact anticipated performances (risk) are, but not limited to: size; type; location; performance team and unusual features, shape, safety considerations and available room to work. These aspects can be measured and weighted to produce a numeric scale of risk projections and can also be updated as a project progresses.

Size of Project

All construction organization produce projects of varying size, however experience indicates that the norm is a good number of small projects relative to their average and large projects; a reasonable number of mid-size or "average" size projects and a smaller number (less than mid-size jobs) of larger projects. The small projects, often performed as a service for good clients, are typically the highest profit as a percentage of sales, but numerically not enough to support the entire organization. Some contractors have referred to them as "nuisance work," and many say "small jobs help pay the rent."

Mid-size projects, which generally earn reasonable, but less profit as a percentage of sales than small jobs, are the projects the company survives on. Mid or average size projects can be described as the company's regular, undemanding even easy projects in that most estimators in the organization can price them, most Superintendents and Project Managers can build them and these projects almost always perform as expected. Because of the depth of experience in these size projects the level of confidence proposing on them is high and the anticipation of successful production and completion is equally high.

There are usually fewer large projects which earn less than the mid-size projects as a percentage of sales, but they help the company meet critical mass, they support growth appetites of contractors and/or management teams and support interests of key employees. These projects differ from mid-size projects in that not everyone can price them, top management takes an interest in preparing the estimate and pricing the work and there may be a long night the day before the estimate is submitted. The greater concern about proposing on a large job (compared

to mid-size) indicates recognition of the greater risk. What may not be clearly perceived is the greater concern is caused by the limited experience with these larger projects relative to the average size jobs the organization has successfully completed in the past. Even if projects of the size in question have been completed successfully there is simply not as many or as long a history as there is with mid-size or average size projects to cause high levels of confidence. The amount of similar experience with any project is directly proportional to the level of confidence in pricing and anticipation of success. Experience with fewer large projects translates to lower level of confidence, recognized or not, and presents greater risk.

Type of Project

Like size of project, prior experience with the type of project is directly proportional to the likelihood of successfully proposing and producing a project profitably, on time and on budget. To use an extreme example; if an organization has been successfully constructing relatively straightforward warehouses and strip shopping centers attempts their first complex sewage treatment plant they would bring no institutional experience to bear and limited if any individual experience depending if any employee or manager had prior experience in treatment plant work. The likelihood of successfully pricing and producing the work would be very limited resulting in high risk compared to an organization that regularly builds treatment plants. The risk can be measured and will obviously be different for each construction organization perusing the work depending on the institutional and individual experience of each enterprise.

As already discussed, most organizations have few large projects, more mid-size projects and a greater number of small projects, If most or all of the prior project are of similar types, the type of work would have little impact on risk which would then be impacted to a greater extent from size of project because experience with previous projects is defined by the number of successful projects—fewer large, greater number of mid-size, greatest number of small. In addition to experience, size impacts risk on a monetary scale. Small projects that do not do well or lose money are simply not in large enough dollar amounts to have much impact the company financially. A mid-size project that loses hurts, but by definition most do not fail which means there are a number of other successful projects to take up the slack. In contrast a large project that underperforms or losses money has the potential to have a material impact of the company's financial condition.

Geographic Area

Because construction work is produced slightly differently in different parts of the country and the world, experience working in an area impacts the likelihood of success or risk to the contractor. An extreme example would be a US domestic contractor attempting their first project in a foreign country. More subtle would be a contractor with exclusive experience in rural and suburban areas taking their first project in a large city or even the reverse. The project would obviously be well outside the organization's experience and would clearly present a learning curve. The likelihood of success would be problematic and a fundamental risk to profitability. Very much like type of work, any departure from the geographic area an organization is experienced in will generally involve a learning curve discovering potential differences concerning labor issues and skill levels; subcontractor availability, pricing and expectations; and other local customs that may impact how the work is managed or preformed.

Project Teams

The issue here was described in the introduction and is self-explanatory: Experience is eventually accumulated institutionally, but is captured individually so the number of members on a performance team with direct experience with previous projects being measured against impacts the likelihood of estimated or improved performance. Institutional experience does not automatically impart that experience to individuals who did not participate in attaining the experience. Therefore, if an organization has experience in all of the aspects discussed herein, such as size, type, location, etc.; but no project team member assigned to the work has direct, personal experience in any one of the aspects, the risk on that aspect is the same as if the organization had no experience on that aspect.

If a team is composed of individuals each of who has experience in one or more of each of the aspects addressed here and all aspects are covered the risk is significantly reduced. However, if the project team has actually gained the experience working together on projects in the past the risk is further reduced. A sub-set of project team experience is team members having previously worked together. If some of the team members have worked together in the past on dissimilar projects risk is reduced. If all of the team members have worked together in the past on dissimilar projects risk is further reduced. And if some or all of the team members have worked together in the past on similar projects the risk is even further reduced. In the measurement of project risk, experience with the work and experience of team members working with each other are meaningful elements of risk.

Unusual Project Features

Most buildings in the US are rectangular or at least straight lines. The largest portion of roads and highways run reasonable straight for much of their length and bridges and tunnels are straight to the extent possible. This is not to suggest there are no curved buildings roads, bridges or tunnels, but that there are simply fewer. Therefore the lion's share of experience collected by construction enterprises is with straight lines and generally conforming structures. Each construction organization has its own institutional and individual experience but it is safe to say that the collective experience of the construction industry is with "traditional" projects. Therefore, if a pending project has curved wall, windows, roof or unique elements it is outside the experience of most organizations and odds are that an organization with such experience, the experience will be limited at best. The same goes for out-of-the ordinary roads, highways, bridges, industrial projects, one-off projects or projects with matchless features. These projects can and will be built, however there is considerable project risk in proposing and producing them because there have been fewer such projects built than what may be described as "traditional" or usual projects. Therefore, if an organization has experience in similar work, and few do, such experience will be and is necessarily limited by the scarcity of uncommon projects. These projects do not have built-in or intrinsic risk because project risk is exclusively a measure of an organization's experience with similar projects which in the case of atypical projects is extremely rare.

Conclusion

The biggest breakthrough in the study of measuring the potential for success of a project in advance of proposing for it or contractor selection is the realization that construction projects have no built-in inherent risk as they stand alone. The risk of project success is a measurement

relative to the contractor and therefore of contractor selected. For example one might want to say that a totally unique, one of a kind, off the wall project is risky in-and-of itself. This is not the case? The contractor that has the closes experience to such a project would have risk, but smaller risk than another with less experience. If no contractor involved had any experience even close then the risk would turn solely on the size of project measured in dollars. The contractor for which the project in question is the smallest dollar value relative to the average size projects the contractor does would be the least risk simple because by size alone if the project failed it would not likely put the contractor out of business. The contractor may be hurt, but would most likely be financially able to complete its contract obligation.

Reiterating the introduction: The risk of success to an owner selecting a contractor or a general or subcontractor deciding on a project to be proposed on can be measured in advance. The project attributes discussed herein can be weighted, placed in a numeric formula and provide an accurate measure of project risk which would be an excellent tool to combine with an owner's, contractor's or subcontractor's selection process criteria.