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## The Impact of Project Management Technology in the AEC Industry

Project-based businesses face a variety of challenges in driving profitable business. While these challenges are as diverse as the products and services offered, all strive for a common goal of delivering projects on time and under budget. In a recent survey of over 315 companies, including 90 respondents from the Architectural, Engineering, and Construction (AEC) industry, Aberdeen found that the implementation of project scheduling, project costing and project management and reporting applications has a real and significant impact on the ability to deliver projects on time and within budget. For the AEC industry where projects are their business, on time and under budget equates to improved project and enterprise profitability.

### Project Performance

Today's volatile economy and global competition leave Architecture, Engineering, and Construction (AEC) firms with little room to maneuver. In collecting data for Aberdeen's January 2010 benchmark report, *Delivering Project Profitability: On Time and Under Budget*, it was discovered that decreased profit margins are forcing AEC companies to renew their focus on tightly managing projects in order to improve profitability.

The implementation of enterprise-level project management applications was a key factor in addressing these project pressures. In order to gain an understanding of their effectiveness, Aberdeen defined two categories of AEC firms:

- **All AEC** – All the respondents who identified themselves belonging to the AEC industry
- **AEC with Enablers** – Identified as AEC companies that are using enterprise level applications for project scheduling, project cost control, project management, and reporting

AEC companies that implement these project management applications on an enterprise level are better equipped to keep projects on time and under budget (Table 1). In fact, across the board, AEC with Enablers are experiencing higher project performance, delivering 83% of projects early or on time and 89% within budget. AEC with Enablers were also able to achieve an average 15% improvement in profitability, while the entire AEC respondent pool in contrast experienced only a 10% increase. In the case of large, multi-million dollar projects, even a 1% or 2% increase can have a very significant impact; a 5% advantage can translate into millions of dollars.

### Analyst Insight

Aberdeen's Insights provide the analyst perspective of the research as drawn from an aggregated view of the research surveys, interviews, and data analysis.

### Breakdown of AEC Industry Participants

Companies in the AEC industry work on a variety of different construction projects:

- ✓ 36% Industrial / Plant
- ✓ 29% Roads & Bridges
- ✓ 10% Rail
- ✓ 15% Airports
- ✓ 26% Water & Sewer
- ✓ 30% Commercial Retail
- ✓ 55% Commercial Facility
- ✓ 18% Residential

**Table 1: Project Performance**

Definition of AEC Categories	Mean Class Performance
<b>AEC with Enablers</b>	<ul style="list-style-type: none"> <li>▪ 83% of projects delivered early or on time</li> <li>▪ 89% of projects delivered within budget</li> <li>▪ 12% average overrun on projects not delivered within budget</li> <li>▪ 15% improvement in project profitability year over year</li> </ul>
<b>All AEC Respondents</b>	<ul style="list-style-type: none"> <li>▪ 78% of projects delivered early or on time</li> <li>▪ 83% of projects delivered within budget</li> <li>▪ 13% average overrun on projects not delivered within budget</li> <li>▪ 10% improvement in project profitability year over year</li> </ul>

Source: Aberdeen Group, January 2010

### **Change Management**

Managing costs to improve profitability is indeed a key factor and one means of controlling costs is to control change orders. This is of particular significance in the AEC industry since changes introduced after the start of the project is the top single main cause for poor performance by a factor of 3. This reason was cited by 37% of AEC participants, with the next most often cited causes for poor performance being lack of resources and the customer's inability to complete necessary tasks (both 11%).

Yet what makes this even more significant for AEC firms is the high cost of change. Thirty-eight percent (38%) of AEC respondents identified that the cost of a typical change order is more than \$10,000, compared to 28% for all other industries. Changes are most likely to result from lack of communication and collaboration across all stakeholders, including the project owner, suppliers and subcontractors throughout the project life cycle, but most importantly in early stages including the definition and design phases of the project. Mutual setting of expectations and clear communication on designs and specifications can prevent changes from negatively impacting project schedules and profitability.

But changes are bound to be part of the full project life cycle, and the ability to manage changes can have a positive impact on profitability. This makes tools for change management and collaboration all that much more important to add to the mix, in addition to the three applications which differentiate the AEC with Enablers group.

### **Process Management: Best Practices**

The use of these enablers also correlates with other business capabilities that in turn facilitate project improvements. By defining, documenting, and implementing standardized best practices (i.e. those practices that have produced successful results), variability, risk, and unpredictability in schedules and cost are either reduced or eliminated. Standardized best

practices might be defined for responding to requests for information (RFI), requests for proposal (RFP), or bid preparation, including methods for collecting cost and schedule estimates. These standards also apply to the review and approval of the bid as well as the presentation to the customer and ongoing reporting and communication. Best practices applied consistently throughout the enterprise help insure a level of consistency in dealing with owners. This becomes more and more important for long, multi-year projects which may potentially involve dynamically changing or remote project teams. It also insures consistency and continuity of the customer experience throughout a project and in subsequent projects that may represent repeat business.

Standardized processes and best practices are also much more easily streamlined and automated using workflow technology, document management and reporting capabilities. Project management applications often provide templates and can be used to assist in both defining these workflows and reporting standards and also can serve as a means of enforcing them. Fifty-nine percent (59%) of AEC with Enablers respondents have defined and documented best practices for project management, as compared to 48% of all AEC participants, yet only 41% of these "enabled" companies have actually implemented them as standards across the enterprise, leaving more opportunity for improving performance.

## Case in Point

Alberici Group was formed in 2001 and is a wholly-owned subsidiary of Alberici Corporation, a global construction company. Alberici Group provides support services to other Alberici entities in the areas of financial services, information technology services, and employment resources.

Alberici Corporation has operating locations in Canada, Mexico, and three U.S. regions. Its corporate headquarters are located in Saint Louis, Missouri.

For the past four years, Alberici has been a user of Meridian Systems' Prolog. Prolog is a construction project management application that allows people to securely connect and share construction information regardless of location. Prior to implementing Prolog, Requests for Information (RFIs) were sent to contractors via email, and then tracked using an Excel spreadsheet. "Before [implementing Prolog] we had limited visibility into the status of the RFIs. Once we sent the email, it was like the RFI was sent into a black hole. We would have to make phone calls to find out about the status," explained Brooks Williams, Director of Project Controls, Alberici Group. "However, since implementing Prolog four years ago, we've had much better visibility into the process."

Prolog allows subcontractors and other partners to write their RFI within the system. The software allows the architect, engineer, or owner to review the RFI, forward it to someone else or answer it all within one eco-system. Therefore, minimizing non-value added tasks such as re-typing, and working on outdated documents. More importantly, the status of the RFIs can be easily tracked. As Williams explains, "Our subcontractors can log into the

## Meridian Systems

Originally founded in 1993, Meridian Systems ([www.meridiansystems.com](http://www.meridiansystems.com)), a Trimble Company, positions itself as a Plan-Build-Operate technology solution provider for project-based organizations (PBO<sup>2</sup>). Building owners, construction and engineering firms, and public agencies use Meridian software to manage capital building programs and facility assets. Meridian offers construction project management and infrastructure lifecycle management solutions that create a system of record for managing the entire plan-build-operate project lifecycle. Meridian offers two software solutions:

- √ Proliance — An Infrastructure Lifecycle Management (ILM) solution for large enterprises that plan, build and operate complex capital projects, programs, and facilities. Proliance combines project and portfolio management, facilities management, business process management and business analytics into one enterprise system of record.
- √ Prolog — provides robust construction project management by automating all aspects of daily construction processes, from project design to close-out.

system and easily figure out what happened to the RFI that they worked on. They can see where it is in the process.”

Presently, Alberici is rolling out a pilot project to implement Prolog Converge, Meridian’s replacement for Prolog WebSite. “We hadn’t had a major upgrade to Prolog WebSite in four years,” explains Williams. The upgrades in Prolog Converge include an improved user interface, better reporting capabilities and a more efficient document management tool. For Alberici, the benefit from adopting Prolog Converge is two-fold. First, Alberici will gain even better control and visibility into its projects. Secondly, the company will achieve greater efficiency. Alberici will be able to minimize non-value added tasks and gain a level of increased accuracy through the upgrades in the document management tool. As Williams explains, “Prolog Converge does many of the same things as Prolog WebSite – except a million times better. Prolog Converge appears to be a much improved tool and we are excited to roll it out to the enterprise in the coming months.”

**Collaboration**

Another factor that contributes to delivering on-time and within budget is collaboration. Aberdeen's [Delivering Project Profitability: On Time and Under Budget](#) benchmark report found that a culture of collaboration correlates directly to project profitability. This collaboration may span internal as well as external constituents, from IT to line of business, from operations to customer service and delivery, from customer to suppliers and subcontractor. Ensuring that both IT and AEC project staff are involved in the selection and implementation of project management applications increases the likelihood of all stakeholders having access to a single version of data. Those in the category of AEC with Enablers are 32% more likely to make these collaborative decisions (Table 2).

"We have exploited all of our data sources to consolidate project information. The keys to success have been the maturation and standardization of the management processes guided by our project management solution. The key benefits were in distributing information, project performance analysis, from opportunity qualification to proposal development. We used workflow technology to standardize processes and employ change management in IT."

~ Vice President of Information Technology, AEC firm dealing with the Aerospace and Defense industry

**Table 2: Enterprise Level Project Management Applications Support Collaboration**

	AEC with Enablers	All AEC
Business Development and project managers collaborate to set proper expectations with customers	61%	40%
Project Management operations are integrated and coordinated with customer service and delivery organization	54%	41%
Stakeholders across the full project life cycle collaborate early and often	51%	41%
Cross functional teams of IT and line of business individuals involved in both the selection and implementation of Project Management applications	50%	38%

Source: Aberdeen Group, January 2010

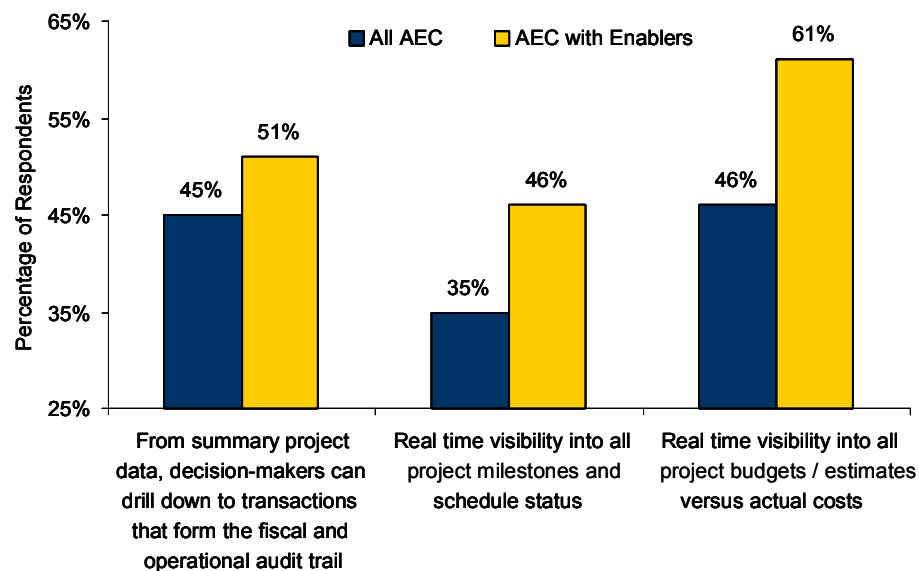
The effective implementation of these enablers creates a collaborative environment, providing project stakeholders with a consistent set of data from which to operate and make decisions. This consistency leads to proper expectations being set with owners / customers and provides an on-going

vehicle to collaborate throughout the project life cycle - from early stages through to delivery and post-delivery service.

## Added and Improved Visibility

Project Management applications provide companies with a higher level of visibility through out the life cycle of the project (Figure 1). As a result of this improved visibility, decision-makers are better equipped to manage possible exceptions, therefore containing schedule and budget overruns. This added visibility also provides greater insight into the causes of poor performance. By being better informed and more proactive in managing exceptions, the impact of these factors can be minimized.

**Figure 1: Enterprise Level Project Management Applications Improve Visibility**



Source: Aberdeen Group, January 2010

Providing knowledge about important events to other departments fosters a culture of cooperation and collaboration among cross-functional teams and enables timely decisions, a foundation to any successful project management program. More importantly, visibility into the status of a project is a key to minimizing the impact of potential problems on cost and schedule overruns. The degree to which these goals are missed can spell the difference between a mildly irritated customer and one that will never do business with you again. In fact, AEC with Enablers are able to deliver their projects within plus or minus seven days, as compared to the rest of the industry who deliver their project milestones at plus or minus 12 days. For those projects that are not delivered on time, delays for all of the AEC companies are 1.3-times greater than that of AEC with Enablers.

### Fast Facts

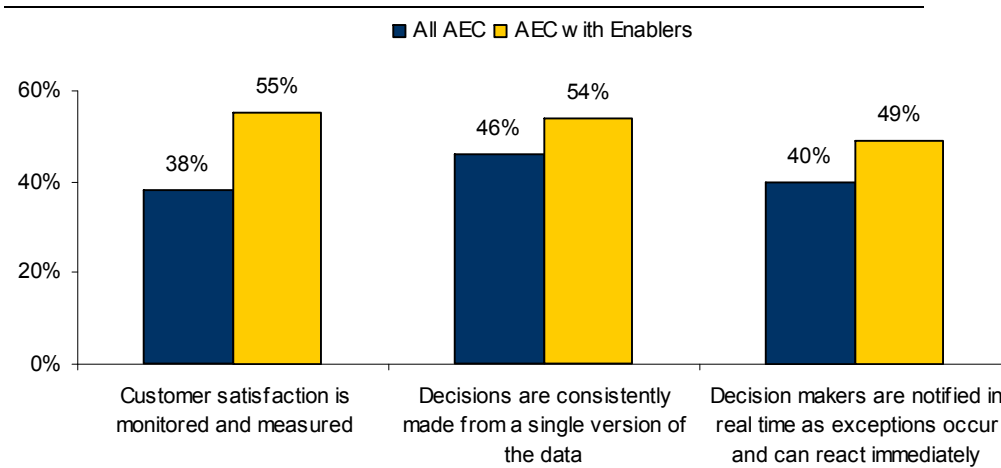
- ✓ All AEC are able to deliver project milestones on average within plus or minus 12 days, as compared to AEC with Enablers who can deliver with more precision...within plus or minus 7 days.
- ✓ For projects that are not delivered on time, the average delay for all AEC is 9 weeks, while AEC with Enablers are able to shave 2 weeks off for an average delay of 7 weeks



## Performance Management Capabilities

The project management applications implemented by AEC with Enablers provide an effective means of measuring performance. AEC companies with technology enablers are able to, and therefore 44% more likely to measure customer satisfaction, and almost 20% more likely to make decisions from using a single consolidated data set. A single version of data shared across the enterprise facilitates more rapid consistent decisions.

**Figure 2: Performance Management Capabilities**



Source: Aberdeen Group, January 2010

"The biggest benefit we have seen from initiatives to improve project performance (including the investment in technology) was the formalization of project budget reporting. Implementation of a standard tracking system has allowed management to objectively review project-specific performance."

~ Manager, Small North American AEC Firm

AEC with Enablers also differentiate themselves by using complimentary tools to enable real-time issue tracking and exception management (49%).

## Additional Technology Enablers

Throughout this report we have been referring to the use of technology in the management of projects. Exactly what kind and category of technology is most used and most prevalent in AEC firms? We defined AEC with Enablers as companies using enterprise level applications for project scheduling, project costing, and project management and reporting. Therefore, you will see 100% adoption of these solutions for AEC with Enablers companies in Table 3, which lists overall technology adoption rates. In each category, desktop tools may exist but AEC with Enablers are 35% more likely to be using enterprise applications than desktop tools, spreadsheets and manual processes.

**Table 3: Technology Adoption**

Application	AEC with Enablers	All AEC
Project Scheduling	100%	70%
Project Management and Reporting	100%	60%

Application	AEC with Enablers	All AEC
Project Costing	100%	73%
Contract Management	57%	43%
Workflow Automation Tools	42%	26%
Change Management and Control	57%	35%
Document Management	54%	43%
Collaboration Tools	41%	33%
Subcontractor Management	38%	29%

Source: Aberdeen Group, January 2010

AEC firms generally operate under the constraints of a contract, therefore making the effective implementation of contract management applications a logical extension of basic project management applications and indeed the AEC with Enablers category are 43% more likely to have extended their solutions with these capabilities. Adding workflow automation to both contract and project management applications better ensures the implementation of best practices and facilitates hand-offs and communication.

The ability to collaboratively share documents and effectively manage change is critical to ensuring project profitability. Numerous documents may be associated with projects. These may vary depending on the nature of the business and the type of project, but may include contracts, design documents, blueprints, specifications, and more. Where project performance is dependent on meeting requirements laid out in these documents and dependent on managing any changes to the documents themselves or changes to the project required by these documents, effective change control and management is critical.

Combining document management and collaboration tools (including electronic communication and conferencing and collaborative management tools) allow distributed team members to better communicate and share the right data with the right person. In doing so, AEC companies are less impacted by project changes and are better able to deliver projects in a timely manner and suffer smaller budget overruns. Change management software is often associated first with managing Information Technology software and software projects but can be particularly useful to AEC firms in establishing change management policies and procedures.

## Key Takeaways

The added visibility and control afforded by enterprise-level project management tools can directly impact the profitability of projects and the AEC firms that rely on them for growth and profit.

Our research shows that simply defining, documenting, and standardizing project management best practices allows AEC companies to deliver 78% of

projects early or on time and 83% of projects within budget. Yet when they were to add enterprise level applications for project scheduling, costing, and management and reporting, we see a 6% jump in on time delivery and a 7% improvement in adherence to budgets.

Those AEC firms that are still using spreadsheets and manual processes should invest in project management solutions to assist in scheduling, costing, and reporting. Those using tools and technology that are confined to the desktop should upgrade to enterprise-level applications that support collaboration, single source of data, and enterprise wide visibility. For those that already have these enablers, look to expand your solutions beyond the basics. Tools such as contract management, workflow automation, document management, and change management are basic needs for every project-based business. Collaboration tools complete the portfolio.

For more information on this or other research topics, please visit [www.aberdeen.com](http://www.aberdeen.com).

### Related Research

[\*Delivering Project Profitability: On Time and Under Budget\*](#); January, 2010  
[\*Managing the Innovation Portfolio: Enabling Engineering Success to Boost Profits\*](#); August 2009

[\*ERP in Complex Manufacturing: Improving Collaboration and Visibility\*](#); December 2008  
[\*The Role of Enterprise Project Management in Productivity\*](#); October 2007

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