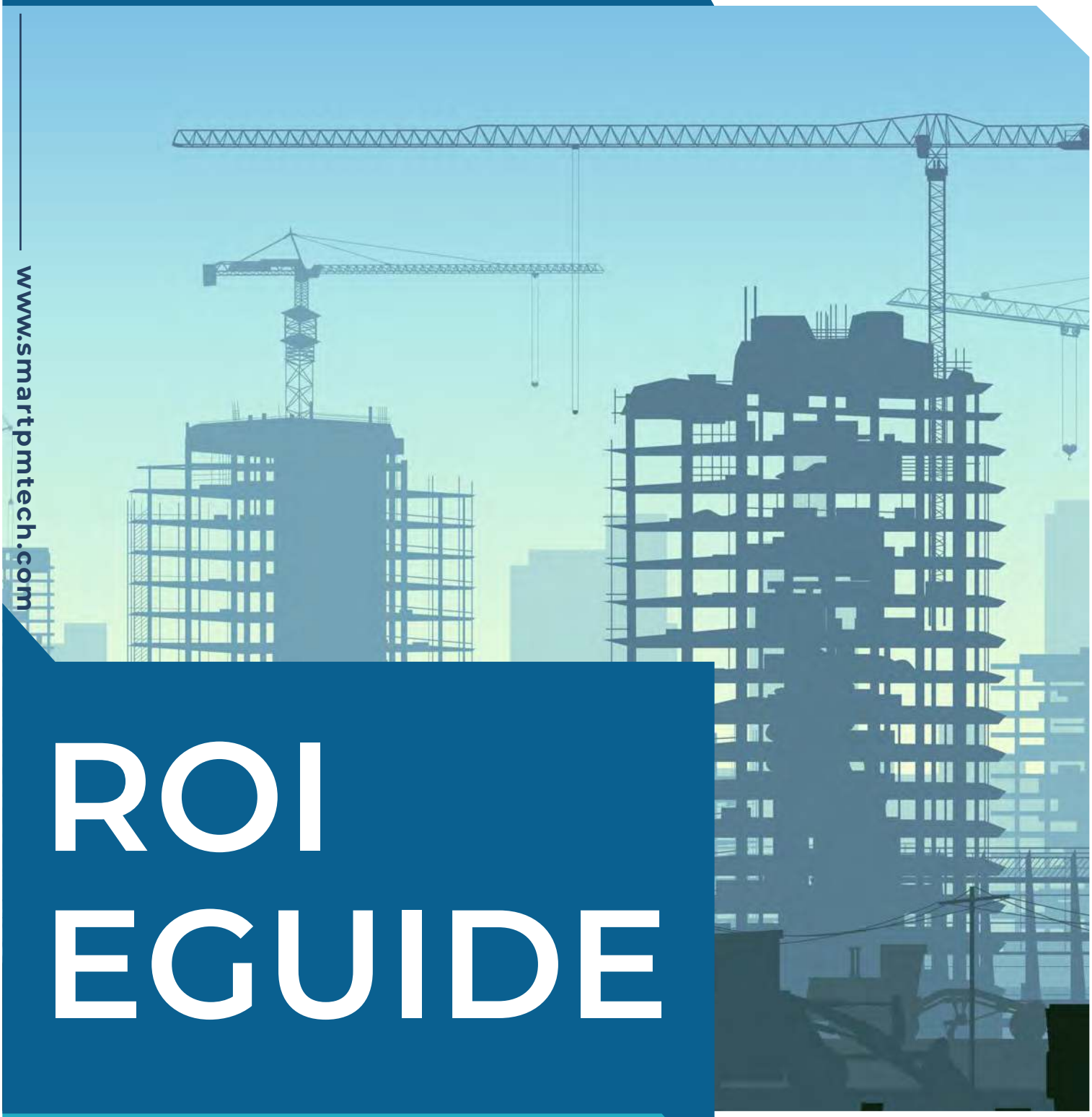
How SmartPM™
Delivers Quantifiable ROI

www.smartpmtech.com



# ROI EGUIDE

Project Analytics Built for Construction


CONTACT US

41 Perimeter Center E
Suite 650
Atlanta, GA 30346
404-329-3000
info@smartpmtech.com


SmartPM™

# The Construction Industry's Epidemic of Cost Overruns

It has been well-documented that the Construction Industry suffers from an epidemic of delays and cost overruns. McKinsey recently reported that 98% of mega-projects become delayed or over budget. But what is this costing companies involved in commercial construction? According to a recent study by FMI, global construction waste amounts to a financial loss of $1.4 Trillion annually. In addition, similar industry articles state that approximately 60% of this loss is caused by project delays, which is why it is critical to closely monitor project schedules and cost data to understand which activities are driving these delays and cost overruns.

To put it plainly, disruption due to delays negatively impacts everyone involved in construction projects. Owners risk paying for something that could have been avoided, increasing their cost basis, reducing the return on investment, and potentially crippling stock prices and shareholder confidence. Contractors risk not being paid for legitimate time extension requests. Investors watch their ROI dwindle before their eyes. And in the end, many stakeholders are forced to hire consultants and lawyers to find their way out of the mess.

# Reduce Avoidable Overruns by an Average of 60% Using Project Analytics

A recent KPMG study indicates that the average cost overrun in Construction is 10% or more of the total project value.

Other studies have shown that approximately 50% of Construction Cost Overruns are avoidable, and on average, 60% of Avoidable Overruns are caused by project delays.

Clearly, implementing an effective Project Analytics Program is the best way to manage project delays, it is safe to say that at least 60% of Avoidable Overruns can be avoided through Schedule-Based Project Analytics.

### Example: $50M Project

1. Average Cost of Overruns = 10% of Total Project Value
   [10% X $50M = $5M]

2. Average Avoidable Overruns = 50% of Overruns
   [50% X $5M = $2.5m]

3. Average Delay-Driven Overruns = 60% of Avoidable Overruns
   [60% X $2.5M = $1.5M]

4. Delay-Driven Overruns are avoidable using Schedule-Based Project Analytics

   [10% X 50% X 60% = 3%]

**CONCLUSION: Schedule-Based Project Analytics reduce total Construction Costs by an average of 3%.**

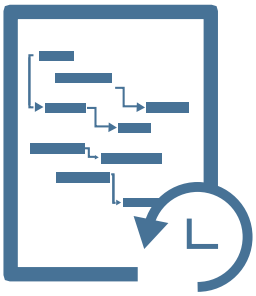
# Root-Cause Project Analytics Are Key to Understanding and Managing Delays and Cost Overruns

All signs point to Root-Cause Project Analytics. To truly understand project delays and overruns, you need the ability to pinpoint their root causes, which means you must fully understand the complex network of interdependencies among project stakeholders, activities, and cost data. By closely and systematically evaluating project schedules and cost data over time, all project stakeholders can better understand progress, performance, delays, and future risk.

Quite simply, better Project Analytics discipline across the project life-cycle results in enhanced accountability, better performance, increased collaboration, improved decision making, and a higher likelihood of meeting expected project outcomes.

# The SmartPM™ Approach to Project Analytics

**1. Schedule Quality Review**



**2. Delay Analysis**

**3. Predictive Analytics**

According to industry-accepted best practices, as well as DCMA and AACE guidelines, there are three important steps to conducting an effective Project Analysis; 1) Schedule Quality Review, 2) Critical Path Delay Analysis, and 3) Predictive Analytics. It may seem obvious, but it's worth noting that you cannot analyze delay without first reviewing and correcting schedule quality and integrity. You cannot predict feasible end dates without first understanding historical causes of delay. Therefore, the only acceptable order of operation for analyzing project data is 1) Analyze Schedule Quality; 2) Analyze Delay; 3) Run Predictive Analytics. Anything less is likely to be inaccurate and misleading.

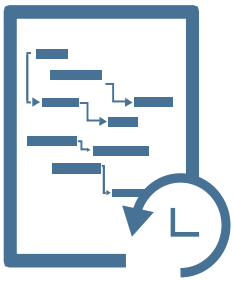
**SmartPM™ proprietary algorithms rely on these best-practice methodologies to deliver superior schedule and cost analytics - in a faster, easier, automated way.**

## Step 1: Schedule Quality Review

A well-structured project schedule is at the heart of every successful construction project, which is why Schedule Quality Review is essential to the Project Analysis process. Schedule Quality is also the easiest and most commonly managed aspect of Project Analytics, which explains why there are so many tools designed to help with this step. Unfortunately, most of these tools stop at Quality Review, overlooking Delay Analysis and Predictive Analytics, and ultimately providing very few (if any) actionable insights or business intelligence.

In contrast, SmartPM™ identifies high-risk issues affecting the critical path, as well as the key changes impacting the structure and integrity of the schedule. SmartPM™ makes it easy to assess and correct the quality and integrity of every schedule in a fraction of the time, while adding a level of intelligence that no other system provides.

# Step 2: Critical Path Delay Analysis



Critical Path Delays are among the most common drivers of overruns, and delay-driven overruns are the most heavily disputed of all overrun issues. This is because for any project, there are likely multiple delays occurring at once, and understanding all of them requires significant time to study the data and develop a complete picture. This process of wading through minutiae to derive supportable analytics that will show the true causes of delay and cost overruns is a lengthy, tedious one. There are proven methodologies for doing it well, which consultants utilize to make sense of all this data. However, they are manual processes, which often lead to subjective interpretations, and ultimately, further disputes.

The high costs associated with delays are well documented and usually in the millions of dollars on commercial projects. While many analysts believe they are capable of understanding delays and overruns by simply "eye-balling" schedules and/or cost data and attending OAC meetings, truly understanding delays and overruns requires much more. For example, your team should be analyzing delay pro actively, on a regular basis, throughout the project life-cycle, course-correcting as needed, and never getting to the point where consultants and lawyers are needed to manage overruns. But without an automated and data-driven way to conduct continual, contemporaneous delay analyses, most owners and contractors do not have the time or resources necessary to make that ideal a reality. SmartPM™ is the only tool that can do in minutes or hours what would take consultants or scheduling experts several weeks or even months to accomplish.

# Step 3: Predictive Analytics

Predictive Analytics are critical to planning appropriately and avoiding cost exposure caused by uncertainty. Predictive Analytics enable stakeholders to identify the best path to project success. By constantly analyzing historical performance and variance, an organization can identify trends and derive insights that can be applied to future projects. As with Schedule Review and Delay Analysis, Predictive Analytics require a significant amount of time to be done well. Unfortunately, most companies have inadequate resources to effectively review schedule quality, analyze delay, and run Predict Analytics on every project. As a result, they expend their available man-hours on the first two, leaving them at risk of relying on unrealistic end dates. Given that critical decisions are made based on a project's projected end date, missing that date often puts organizations at significant financial risk.

By using SmartPM™, companies can increase productivity of project analysts by an average of 8X, which provides enough bandwidth to completely analyze every project at every schedule update in less time. By improving Predictive Analytics, companies avoid the high costs associated with missed end dates and bad business decisions made based on poor information.

# What Does it Take to Analyze Projects The Right Way?

After reviewing industry-accepted best practices, studying thousands of project schedules, and conducting countless surveys, SmartPM™ has documented the optimal number of man-hours required to MANUALLY manage risk at each phase of the Project Analysis process – based on the size of the project.

## Optimum Monthly Man-hours

| | Quality Review | Delay Analysis | Predictive Analytics |
|---|---|---|---|
| Projects > $10M | 4 | 13 | 12 |
| Projects > $25M | 6 | 20 | 15 |
| Projects > $50M | 8 | 22 | 16 |
| Projects > $100M | 14 | 32 | 26 |
| Projects > $250M | 18 | 36 | 29 |
| Projects > $500M | 29 | 56 | 35 |
| Projects > $1B | 43 | 83 | 40 |

## Optimum Annual Man-hours

| | Quality Review | Delay Analysis | Predictive Analytics |
|---|---|---|---|
| Projects > $10M | 48 | 156 | 144 |
| Projects > $25M | 72 | 240 | 180 |
| Projects > $50M | 96 | 264 | 192 |
| Projects > $100M | 168 | 384 | 312 |
| Projects > $250M | 216 | 432 | 348 |
| Projects > $500M | 348 | 672 | 420 |
| Projects > $1B | 516 | 976 | 480 |

As illustrated above, if done manually, approximately six (6) hours per month should be dedicated to reviewing schedule quality on a single project valued at $25M - $50M – or 72 hours in a year. Delay Analysis, if done manually, requires approximately twenty hours per month – or 240 hours in a year, and manually running Predictive Analytics requires an additional fifteen hours per month - or 180 hours per year. The optimal number of man-hours for each phase of a manual, Project Analysis process increases steadily from there (as seen in the charts above).

# SmartPM™ Reduces Time Required for Project Analytics by 90%

The SmartPM™ Difference is the difference between what is required to MANUALLY conduct an effective Project Analysis versus what it would take to perform the same level of analysis with SmartPM™. The chart below illustrates the man-hours required to effectively manage risk across five $25M projects over the course of a year. In this example, SmartPM™ reduces the time required to run Project Analytics by 90 percent. The larger the project, and the more projects being managed concurrently, the more time SmartPM™ will save.

## Annual Hours Required to Analyze (1) $25M-$50M Project

| $25M - $50M Project | Schedule Quality | Delay Analysis | Predictive Analytics | Totals |
|---|---|---|---|---|
| Hours Required to Effectively Manage Risk Manually | 72 hours | 240 hours | 180 hours | 492 hours per year/per project |
| Hours Required with SmartPM™ | 12 hours | 24 hours | 12 hours | 48 hours per year/per project |

The SmartPM™ Difference is astounding. In fact, it almost seems too good to be true – until you try it.

Check out what SmartPM™ customers have to say at www.smartpmtech.com/customers.

# CASE STUDY: Managing Risk on 5 Medium-Sized Projects Using Project Analytics

SmartPM™ helps customers save time and money on projects of all sizes – from $25M multi-family development efforts to $1B infrastructure projects. In fact, the larger the project and the more projects managed concurrently, the greater the savings. However, for purposes of illustration, we have created a simplified scenario using Company X, a fictional firm with a project executive and PM team overseeing five (5) ongoing $25M - $50M Construction projects.

As discussed earlier, research suggests that a certain number of man-hours are required at each phase of the Project Analysis process – based on project size. As you may recall (and as illustrated here), for each $25M - $50M project, Company X must dedicate 72 man-hours to Quality Review, 240 man-hours to Delay Analysis, and another 180 hours to Predictive Analytics on an annual basis – to minimize the risk exposure of overruns and delays.

That adds up to 492 man-hours per project per year for a total of 2,460 man-hours required each year to optimally manage five projects. This means that Company X must allocate an entire FTE to conducting schedule analytics for 5 projects to effectively avoid delays and cost overruns. Most firms do not have an entire resource dedicated to analyzing schedules across the entire portfolio, never mind five projects.

## Optimum Annual Man-hours

| | Quality Review | Delay Analysis | Predictive Analytics |
|---|---|---|---|
| Projects > $10M | 48 | 156 | 144 |
| Projects > $25M | 72 | 240 | 180 |
| Projects > $50M | 96 | 264 | 192 |
| Projects > $100M | 168 | 384 | 312 |
| Projects > $250M | 216 | 432 | 348 |
| Projects > $500M | 348 | 672 | 420 |
| Projects > $1B | 516 | 976 | 480 |

## Company X Calculations

| Each $25M - $50M project | Entire Project Portfolio |
|---|---|
| 72 manhours of Quality Review<br>+ 240 manhours of Delay Analysis<br>180 manhours of Predictive Analytics<br>**492 manhours per year per project** | 492 manhours<br>x 5 projects<br>**2,460 manhours per year** |

Of course, if Company X uses SmartPM™, they will reduce the number of man-hours required to manage each project by 90% and accomplish in just 48 hours (per project) what would otherwise require close to 500.

**Let's examine how Company X is actually managing their project portfolio.**

# How is Company X Currently Managing Their Project Portfolio?

As discussed earlier, Company X must dedicate 2,460 hours per year to effectively managing their project portfolio - using manual analysis. However, like many companies, Company X does not invest in enough resources to comprehensively analyze their projects. Instead they allocate a portion of their current resources to Schedule Analysis, effectively analyzing progress, performance and risk part-time across their project portfolio.

As illustrated herein, Company X allocates the equivalent of 50% of a full-time-employee and four consulting hours per project per month to these five projects, which adds up to a total of 1,240 budgeted man-hours per year – 1,220 fewer than required.

| Data Point | Company X's Data |
|---|---|
| Project Size | $25M |
| Number of Projects | 5 |
| Duration of Projects | 12 months |
| # of Full-Time Employees | .5 FTE<br>(80 hrs/month;1000 hrs/year) |
| # of Consulting Hours Budgeted | 20 hours/month<br>(240 hours/year) |
| Total Analyst Hours Allocated for Project Portfolio | 1,240 hours |
| Total Analyst Hours Required to Effectively Manage the Portfolio | 2,460 hours |
| Gap in Total Manhours | 1220 hours |

The key question for Company X is:

**How much risk exposure does that missing 1,220 hours represent?**

# Calculating Company X's Risk Exposure on 5 Medium-Sized Projects

There are four areas that need to be calculated in order to calculate Risk Exposure.

## 1 Estimate Risk to be Managed Using Project Analytics

In order to convert man-hours to financial risk, we need to first estimate the value of the risk that CAN be managed by Project Analytics.

The total amount of risk that Company X can manage using Project Analytics can be calculated as:

- ***Average Cost of Overruns*** = 10% of Total Project Value (5 X average project value of $25M)

  [10% X $125M = $12.5M]
- ***Average Avoidable Overruns*** = 50% of Total Overruns

  [50% X $12.5M = $6.25M]
- ***Average Delay-Driven Overruns*** = 60% of Avoidable Overruns

  [60% X $6.25M = $3.75M]

**Total Estimated Risk to Be Managed with Project Analytics = $3.75M**

## 2 Divide Risk Up by Phase of Project Analysis Process

Next, we need to divide up the total risk to be managed ($3.75M), into the three phases of Project Analytics such that each phase represents a cost overrun risk of $1.25M.

| | Quality/Progress Review | Delay Analysis | Predictive Analytics |
|---|---|---|---|
| Value of Risk | $1.25M | $1.25M | $1.25M |

## 3 Apply the Order of Operation Rule

We then compare what Company X is currently managing at each phase of the Project Analytics process to what they should be managing to determine their risk exposure. Given that the Project Analysis process has a specific order of operation, man-hours will be allocated to Quality Review first, then Delay Analysis, and lastly, if there are any leftover, Predictive Analytics.

| | Quality/Progress Review | Delay Analysis | Predictive Analytics |
|---|---|---|---|
| Value of Risk | $1.25M | $1.25M | $1.25M |
| Hours Required to Manage Risk | 360 | 1,200 | 900 |

## 4 Convert Unmanaged Risk to Financial Value

The result is that Company X's 1200 budgeted hours will be allocated such that 360 will be dedicated to Quality Review, the remaining 880 will be assigned to Delay Analysis, and zero hours will be left for predictive analytics.

| | Quality Review | Delay Analysis | Predictive Analytics |
|---|---|---|---|
| Value of Risk | $1.25M | $1.25M | $1.25M |
| Hours Required to Manage Risk | 360 | 1,200 | 900 |
| Hours Budgeted to Manage Risk | 360 | 880 | 0 |
| VARIANCE | 0 | 360 | 900 |
| Percent of Risk Exposed | 0% | 30% | 100% |
| Value of Risk Exposure | $0 | $375,000 | $1.25M |
| **Total Risk Exposure** | **$375,000 + $1,250,000 = $1,625,000** | | |

Using the table above as a reference, it is clear to see that the risk exposure on 5 medium-sized projects is approximately $1.6M when a company apportions 1200 man-hours annually to specifically analyze data. Unfortunately, most organizations apportion even fewer hours across their portfolio, making SmartPM's ROI even higher on average.

# SmartPM™ Delivers Quantifiable ROI

In order to calculate the ROI on Company X's SmartPM™ investment, we now need to examine their risk exposure before and after SmartPM™ along with the cost of managing risk with and without SmartPM™.

Given that SmartPM™ enables Company X to manage their entire risk of $3.75M in 240 hours per year as opposed to 2,460 without the tool, Company X can manage the entire $3.75M if they use SmartPM™. In addition, SmartPM™ scales Consultant hours by 400%, which reduces their consulting fees by $36,000.

After factoring in the annual cost of SmartPM™, which is approximately $20,000 annually for five projects, Company X's total cost to manage risk with SmartPM™ is equal to $136,000. However, as shown below, the cost to manage risk without using SmartPM™ is even higher - at $148,000.

| | Currently | With SmartPM™ | Value Gained Using SmartPM™ |
|---|---|---|---|
| Total Cost for FTE's on Analytics | $100,000.00 | $100,000.00 | |
| Total Annual Fee for Consultants | $48,000.00 | $16,000.00 | $36,000.00 |
| SmartPM Fees | - | $20,000.00 | |
| Total Fees to Manage Risk of Losses | $148,000.00 | $136,000.00 | $12,000.00 |
| Total Overruns Avoided | $2,167,000.00 | $3,750,000.00 | $1,583,000.00 |
| Total Expected SAVINGS | | | $1,595,000.00 |
| | | | |
| ROI % | | | **7875%** |
| | | | |
| **Total FTE Hours Available vs. Needed** | **-1,260** | **1,000** | **1,000** Hours to Reallocate |

In the above example, SmartPM™ usage by Company X saves money, manages more risk, scales consulting hours, and frees up hours of staff time, which can be reallocated to strategic work that may ultimately remove the need for consultants altogether. This results in a value of approximately $1.6M annually on 5 projects, for an annual cost of $20K. The best part is that the cost of SmartPM™ can be funded by the dollars it saves in the consulting budget.

Bottom line, Company X's return on their investment in SmartPM™ is almost 8,000%, which is consistent with actual SmartPM™ customers. In fact, the minimum ROI reported by a SmartPM™ customer is 5,000%.

Let us demonstrate the SmartPM™ Difference for your company with a complimentary, custom ROI analysis.

**Sign up today at [http://info.smartpmtech.com/roi-analysis!](http://info.smartpmtech.com/roi-analysis!)**

# About SmartPM™

SmartPM™ is the first of its kind, cloud-based, project analytics platform designed specifically for the construction industry. Unlike other construction software, SmartPM™ is a full-cycle project-based, analytics solution, which provides project stakeholders with a 360-degree-view of every project within their portfolio. Key features include: Automated Schedule Analysis, including Schedule Quality Review, Delay Analysis, and Predictive Analytics, which forecasts feasible end dates and helps owners avoid future delays and overruns; Automated Reports, which provide project stakeholders with objective, real-time information about planned versus actual project progress; Executive-Level Dashboards, which provide leadership with a single, integrated view of the entire project portfolio, along with the key insights they need to make informed business decisions, and effectively prioritize the issues and projects that need immediate attention.

SmartPM™ was developed by industry veterans who spent their careers analyzing construction project data to assist stakeholders in effectively managing risk, delays and overruns on their commercial projects.