

This article presents more than a decade of project management learning about distributing a project workforce and the limits and risks of over distribution.

Project Management Best Practices: Improving Schedule Using a Distributed Workforce

by Mark Albano, Bruce Kane, and Robert Thomas

When it comes to project management, speed is king and the drive is to maximize work efficiencies to deliver projects under cost and ahead of schedule. It is actually a very simple equation: the longer it takes for a facility to start up and produce product, the longer it takes for the company to start producing a profit. With the competitive landscape getting more crowded by the day, everybody is rushing to be first to market.

With all of this in mind, the pressure resting on the shoulders of project management teams might be heavier than ever in the life sciences industries where project managers are constantly tasked with the challenge of meeting construction deadlines that only a few years ago would have seemed insurmountable.

The successful solution for situations like this is achieved through a combination of organization and experience. Every project management organization has – or should have – a well tested and established set of best practices and procedures gleaned from working multiple projects in various industries and independently certified professional project managers. Having the foresight and experience to recognize what works and what does not, leads to insight to implement successful strategies in future projects. The easiest way to make a great project manager is to utilize the lessons learned from one project and adapt them for use in the next. Doing these things facilitates the meeting of these challenges – and in some cases exceeding them.

Recent case in point, a 200,000-square-foot, \$250 million biopharmaceutical production facility (one of the world's largest single use sites) was brought online to first production in record time with only two years elapsing from ground-

breaking (April 2008) to mechanical completion (early 2010). However, the typical timeline for a facility like this is five years. The company had a great need to finish construction and begin production in order to meet the demand for much-needed medicine. The installation incorporated extensive single-use technologies on a commercial scale, a more complex process, but profoundly beneficial in that it contributed to a reduced build time of nearly 50 percent.

Many different methods and activities have been attempted in the pursuit of an ever-improving project execution and reduced time lines. Opportunities for improvement in the execution have dramatically increased in the last decade, due to changes in the regulatory environment and more importantly in the technology used by the engineering workforce. The regulatory environment has allowed testing methods to evolve allowing a decoupling of logic and software testing from the target systems, and the introduction of less prescriptive methods. A tremendous opportunity with respect to establishing a virtual workforce has been facilitated by changes in technology.

The successful project manager prides him or herself on having a record of finishing on schedule, under budget, and meeting requirements. When faced with unexpected obstacles, they should demonstrate flexibility and ingenuity in solving complex issues with speed and grace. However, the best tool for a project manager is to plan projects beginning with the lessons learned of the previous project and end projects with the lessons learned to be applied to the next project.

Following a series of major biotech facilities, the automation project management team shares their learning about staffing and project man-

agement information systems. What does this latest iteration of the Project Management Institute (PMI)*, lessons learned process tell us about these topics? The following examines some of the key learning from the latest iteration of this process.

Achieving a Common Vision

One of the key lessons learned is the value of appropriate staffing models. By relying on proper staffing procedures, project managers provide enhanced value to the customer. Working with the right staffing model significantly increases efficiency, speeding up the construction process and eliminating unnecessary work. Having the right people on the team is essential to meeting project goals, but it is also a matter of how many people, when they need to start contributing, where they are located, and how to organize them. With the right management practices and staffing models, the diverse network of teams comprising a project can be a project manager's greatest strength.

The greater the interaction required between vendor and customer, the greater the need for co-location. Interaction between the end user and the implementation teams is used to transfer process knowledge and requirements and to clarify the "intended use" of the equipment and facilities. Clearly, if the teams are in regular contact, clarity is increased and knowledge transfer is facilitated. Co-location provides these benefits, but has higher travel and living costs. Often, in order to minimize the costs involved, only key individuals are asked to co-locate. In addition to the fiscal cost associated with co-location, there is a morale issue with asking people to be away from home for extended periods. For these reasons, a project is seldom fully co-located, and there is a significant degree to which this middle ground optimized by trying to identify the optimal use of co-located assets.

However, trying to integrate many teams to work as a cohesive unit on a multi-million dollar project is not for the faint of heart. Oftentimes, the scope of a project requires the capabilities of a global workforce. A distributed global workforce creates a new set of complexities, as directing resources and equipment across multiple time zones can often feel like a juggling act. With people all over the world working on a single project, the sun never sets on a distributed work force. Progress can be made around the clock, which makes meeting tight deadlines easier and having a distributed and global workforce allows you to staff projects quickly.

However, the difficulties of a distributed workforce can sometimes seem as significant as the benefits. Remote team coordination has proven to be quite challenging. Sharing knowledge and managing work flows require that status, monitoring, and communication tools be developed and incorporated into daily work habits. The simple process of speaking face-to-face and establishing priorities and responsibilities becomes difficult at times due to time zones.

One tool available that facilitates a distributed workforce is the use of virtualization. Virtualization use has increased as the infrastructure for cloud computing has increased. Virtualization is the set of collaborative tools that enable real time communication, information transfer, and global access.

This has enabled teams in multiple work locations to not only report their status and share information but to work on the same configuration simultaneously. Consolidating a project's information into a single database reduces repetition and provides for development that is more consistent and testing. Additionally, virtualization of the physical control layer allows development and testing without the limits imposed by bulk physical equipment.

Striking the right balance of work locations via virtualization is a delicate, but crucial process, because all of the work must ultimately appear as if it was completed by a single author. Early in the aforementioned biotech project, it was identified who would make up remote teams and where they would be located. Then, representatives were selected for each remote location. This representative spent three to four weeks with the leadership team, learning the detail of the manufacturing process, project procedures, and responsibilities for their team, as well as others. This forged a single vision and cohesiveness within the project leadership team. They then took that information back to their remote teams and managed the responsibilities there. Having someone at each location versed in the proper guidelines maintains consistency throughout all the teams involved in the project. Not only does this prevent a remote team from veering off the established plan, it also prevents time zone hang-ups, as remote teams are not reporting problems and waiting 12 hours for the management's answer the next business day.

The perfect work force balance applies to both staffing size and staffing location. Debate over the correct ratio of local and distributed workers is an exercise in futility. The truth is that there is not a single correct ratio that applies to every project, because each project has its unique needs and challenges. However, there are a few rules of thumb to follow that can guide a project manager to finding the right ratio for a specific project.

First, co-location is critical during the design phase. The design phase typically requires significant collaboration between the various stakeholders in the success of the project. The design phase has such an impact on the rest of the project that it makes co-location a necessity. Detailed design plans require face-to-face interaction with management and the customer and development of a solid work relationship based on mutual understanding. Explaining nuances, educating, and influencing each other are accomplished much easier when team members work alongside each other. The simple act of working in proximity makes a huge difference.

Co-location also reduces work redundancies. Having process knowledge experts in the same room as control knowledge experts solving the same problems eliminates repeating work activities and information sharing. Having a good definition of what needs to be completed and only executing it once streamlines execution. With a good understanding of the role and responsibilities, work can then be distributed to different places.

Once the design is agreed upon, the workforce location distribution can shift. However, it is critical that the customer facing team has adequate capability to handle the informa-

tion flow from the customer to remote work locations and adequate capability to perform quality checks on the output of the remote work locations. It is also highly imperative that both the vendor and the customer have this capability. Pushing this distribution too much can cause bottlenecks as information is delayed waiting to be approved or reviewed. However, staffing should be sufficient to handle appropriate quality reviews. Companies should move gradually and evaluate the process as it continues. If possible, as benefits of further workforce distribution are identified, steps should be taken in that direction, but managers must be willing to scale back if necessary.

Co-location may have a critical mass – that is, a minimum size and skill set required to run projects successfully. Shorting on these responsibilities will undoubtedly lead to problems down the line. At a minimum, the on-site team needs representation from all key knowledge areas. Generally, project management including the project manager and lead engineer will spend significant time co-located.

Ultimately, there is no magic number to achieve the proper balance. Some project managers might claim that they have the formula figured out, though in reality the ratio is entirely subjective. Projects change, the people working on them change, and there are simply too many variables in new projects to pinpoint the universal proportion of work dispersal. However, those in need of a good baseline can estimate that a fair starting point is somewhere around one-third local, two-thirds virtual.

When managers can find the right dispersal ratio for a project, teams can more-easily fire on all cylinders, and progress can steadily hum along. Seamless integration between distributed teams means that all know their place and their responsibilities, greatly enhancing efficiency.

Project management has a constant struggle to come through within budget. Distributing work has scheduling benefits, and when properly handled it can help control costs. Nobody wants to cut back on a project's scope, and work distribution is a way to deliver greater value. Distributing work may require more logistical oversight, but properly utilizing it results in considerable labor cost savings. Conservatively, the percent savings can range from 15 to 25%, but can rise to as high as 30 to 40% when truly optimized.

Team Building

The concept of team bonding may seem cliché, but it truly is an integral part of the proper staffing model. Instill a sense of camaraderie and a value of “getting the job done” in the work force. The team that gets work done right – on time, the first time – is the team that shares a common goal. It sounds obvious, but each member of the team knows and understands their roles and that there needs to be an open dialog between the members of the team. Every choice that is made should be made with the ultimate goal of the project in mind. Creating a sense of unity also helps people work together. It should come as no surprise that people work a lot better together when they get along. Teamwork and agility are the defining characteristics of workforces that can deliver, repeatedly, even when faced with remarkable challenges. Less integrated

teams shy away from these challenges and look for the easy way out; others meet these challenges head on and often find new opportunities by doing so.

Establish a culture of safety and productivity by creating a communication plan that encourages feedback, honesty, and openness. A major part of the communication plan for the biopharmaceutical facility was routine field walkthroughs, during which subcontractor owners and senior managers walked around the site and actively engaged the workforce. The goal of this practice is to examine the well-being of the workers by recognizing and rewarding safe work practices, sharing safety messages, and soliciting feedback on safety and management performance. Such conversations reinforce the priority on worker safety, which not only saves time by reducing work stoppages, but also means all workers go home safely to their families at night.

Field walkthroughs also foster a sense of ownership of the project in the on-site workers. This level of personal involvement with the management often means workers develop a new perspective of their roles in meeting goals. It leads to improved honesty and candor between workers and supervisors. The feedback managers receive can be used to evaluate the project and identify areas for improvement. This can generate fresh solutions and raise potential issues that may have otherwise been overlooked. One time saving solution resulting from this process makes it all worthwhile.

Having a good team environment helps to support continuity of personnel. Management must also support the continuity of a team as retraining causes delays due to lost skills and knowledge. Having a consistent team cannot be undervalued. Key individuals should be committed to supporting the project for its duration. The continuity of personnel is a key consideration in choices for team membership and leadership positions. Continuity of team membership and well thought out transition management plans are essential to the dissemination and consistency of the project vision.

Project Management Information Systems Supporting the Common Vision

The same electronic tools that support a distributed workforce also facilitate increased efficiency and reduction in cost. With team members scattered all over the globe, housing documents in a common, easily accessible location is paramount to success. In these biopharmaceutical projects, teams relied on an elaborate digital filing system of cloud storage. This system consolidated every document into one place, provided all revision tracking, and reduced the need for a document control person.

In addition, the team utilized a cloud-based project tracking system to monitor every stage of deliverable development. This system was fully integrated with deliverable work flows requiring minimal manual data entry and supplying real time progress tracking and reporting information on all deliverables. This system helped the team focus on the most critical paths and warned of problems before they became critical. At any point in time, any team member (vendor or customer) could access the system to find out exactly what a team halfway

across the globe was working on at that precise moment. This benefit cannot be overstated; every worker had a clear vision of the project status at any given time. The entire team could implement and test from anywhere in the world, as long as they had access to the cloud. Such great success was had by the team with this application that they extended the concepts to such project management tasks as change management, requests for information, and action items.

This electronic workflow removed the dead time associated with moving physical documents from place to place. Depending on the type of document, it was estimated that review and approval cycles in an electronic workflow resulted in schedule savings of 30 to 50 electronic reviews and tracking of comments along with electronic document approvals provided a more traceable and consistent system to assure all issues got resolved and their status tracked in the documents.

During the course of the project, these processes saved more than one million pages of paper. In addition to the costs of the actual paper, this eliminated the costs associated with managing a mountain of paper. There was no need for printers, ink, shipping, and time saved on the organization of punching and collating materials. Instead of having several people inputting the same information and keeping track of the same records multiple times, all progress was saved online. If someone else had already updated a project tracker, that freed up time to work on something else.

Conclusion

Meeting time lines, staying within budget, and meeting requirements are all goals of any project manager. Falling short in one area can cause problems in the others. Schedule can be maximized by distributing work across several locations, but over distribution also can cause issues. One must be careful to assure that both customer and vendor resources are sufficient to deal with the amount of work produced by distributed work locations. In addition, work systems must be established to assure all project team members can easily follow the project's processes.

There are important points to consider when using a distributed workforce. Upfront planning is critical, and project leadership must be diligent to assure continual alignment. Extra planning for team building and a hand on management style also contribute to the project success. Co-locate early to assure good information transfer and plan for consistency and continuity of team members. Sufficiently train distributed team leaders on the project's processes and requirements. Utilize automated electronic document workflow processes to increase efficiency and traceability; look for and leverage new enabling technologies like virtualization and cloud technologies.

Accelerating schedule is not simply a matter of throwing more people on the job; in order to accelerate a schedule a Project Manager must get the right resources to the right place while balancing cost versus the benefits of co-location.

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**The Project Management Institute (PMI) is a leading not-for-profit membership association for the project management profession, with more than half a million members and credential holders in more than 185 countries. PMI recommends practices and processes for the successful management of projects. Project Management Information Systems (PMIS) is defined as systems that are used to organize and distribute the project specific information. It includes a variety of things that document objectives, schedules, and responsibilities.*