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Managing Complex Projects Is Not a Simple Matter

By Kathleen B. Hass

Editor's Note: This paper by Kathleen Hass, PMP, Project Management and Business Analysis Practice Leader at Management Concepts in the USA was prepared exclusively for PM World Today and submitted for publication by Trade Press Services in February 2008.

Key practices of traditional project management are based on the concept of reductionism, which holds that complex entities may be better understood by reducing them to their simpler constituents. For instance, a Work Breakdown Structure (WBS) decomposes a complex project into the deliverables that must be created to meet the project objectives. Subsequently, the project team can determine the skill sets and resources needed for each deliverable and schedule the necessary tasks, and then focus on completing each deliverable to achieve project objectives. If only it were that simple!

While a “reductionist” model such as this one may work in physics to describe the interactions of subatomic particles, and even in project management for very simple undertakings, it just does not work for complex projects.

Principles of Adaptive Project Management

Much of traditional project management is based on two theories. The first is reductionism, and the other is control theory, which holds that, in order to achieve optimal outcomes, one only needs to manipulate the constituent parameters of a complex system. Only in theory can tools such as the WBS help build a solid project management plan, set a firm schedule and predict how much the project will cost. Only in theory can one rigorously control and minimize changes to a project, avoiding all distractions until one reaches the goal.

“Projects that are characterized by high uncertainty, high speed and high complexity, both technical and political complexity – in other words, highly volatility projects – do not fit the traditional reductionist mold,” says Doug DeCarlo, author of *eXtreme Project Management: Using Leadership, Principles, and Tools to Deliver Value in the Face of Volatility* (Jossey-Bass, 2004). “The dynamics of these extreme projects are simply not compatible with traditional project management, which attempts to nail down everything up front and then tries to control what happens later to keep it within the confines of the plan. In most cases, the plan is obsolete as soon as it is printed.”

With highly predictable projects, the theory works well enough. For instance, in the construction industry, builders may break down a project into foundation, electrical, plumbing, drywall and other elements and organize a development project according to lessons learned from building a model home. Provided no customizations or work order changes are permitted, the building of each subsequent home in the same development will be pretty much predictable in terms of schedule, budget and physical and human resources.

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But try to apply those techniques to a major, complex, unpredictable project that has never been attempted before, and the result will likely be huge cost overruns and a schedule extended by months if not years. Take, for example, Boston's "Big Dig," the Central Artery/Tunnel Project, which began construction in 1991, ran into major problems and has yet to be finished. It was originally supposed to cost about \$2.5B and is now up to over \$14.6B. Because such complex projects have complicated, unpredictable interrelationships and interdependencies, they require a much more flexible and adaptive approach to project management. Such an approach, guided by the following four principles, is now gaining hold in project management.

1. *Agile Development*

Validating the Agile Development Model (Ambler, Scott W., Agile Analysis, <http://www.agilemodeling.com/essays/agileAnalysis.htm>), adaptive project management is a highly iterative and incremental process. Its steps are:

- Gain a preliminary understanding of the basic requirements, without going into great detail.
- Based on those requirements, start the project as quickly as possible, building small components of the solution, one at a time.
- Learn from those initial steps and make adjustments to improve the process with the next iteration.
- Keep building and learning, improving with each subsequent iteration.

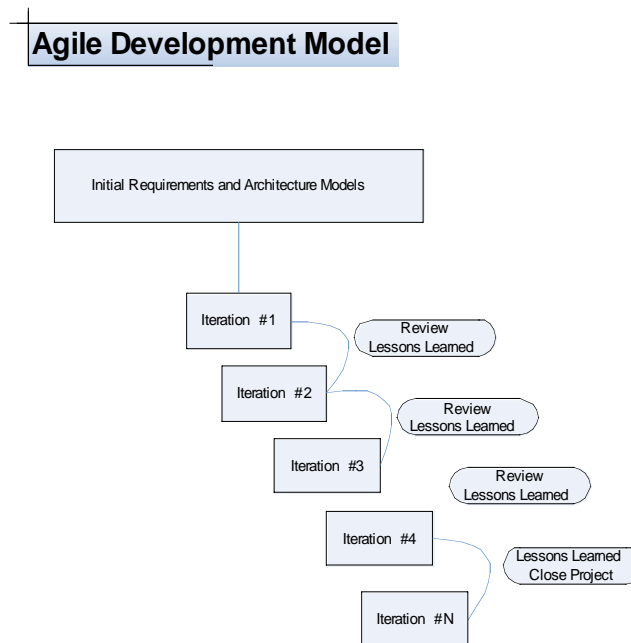


Figure 1: Agile Development Model

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2. *Chaos and Complexity*

Adaptive project management further validates chaos and complexity theory, which accounts for today's complex business environment and the projects intended to change it. Unlike reductionism, complexity theory accounts for systems with interwoven, mutually dependent components that are more than a sum of their parts. What better way to describe the modern business system! Businesses today are rejecting traditional management structures to create complex organizational communities comprised of alliances with strategic suppliers, networks of customers and partnerships with key political groups, regulatory agencies and even competitors.

While traditional project management creates a WBS, assembles a plan and rigorously guards against change while marching toward the goal, complexity theory acknowledges the constant change that characterizes the business environment. It recognizes that there are interdependencies that are often invisible and difficult to understand, manage and plan for. Because unintended consequences are bound to occur, project management must be flexible enough to learn from them and adapt. In such an adaptive approach the project plan evolves slowly and the solution *emerges* rather than being planned for and controlled.

3. *Emergence*

Emergence is an important concept that goes hand in hand with complexity theory. Adaptive project management moves away from the concept that there is one and only one optimal solution to a business problem or business need. In fact, the paradigm of one best solution prevents continuous learning, adaptation and evolution of the solution. It makes assumptions about requirements and business needs that may be poorly understood at the outset. In adaptive project management, on the other hand, the solution that *emerges* from learning and adaptation along the way will be better than any solution that could have been planned from the start.

Systems in nature, such as ant colonies and beehives, have survived and flourished in all their complexity. By adapting, evolving and developing creative techniques to enhance survival, they have emerged successful through the generations.

Now apply that to project management. Get a team of experts together in a room and encourage them to question, experiment, brainstorm, collaborate and build prototypes. They will argue and adapt to each other's ideas, and eventually the most creative solution will emerge. At times they may appear to be at the edge of chaos, but the process is far superior to one in which a leader presents three possible solutions and asks the team to choose one.

4. *The Last Responsible Moment*

Another principle of adaptive project management is to delay decision-making, especially in the design of a solution, until the "last responsible moment" (LRM). It means that project managers do not firm up a design decision until it would be irresponsible not to do so because it would delay the project. That does not mean, however, to keep changing and changing, never

delivering anything. The project manager needs to know when that last responsible moment has arrived and when to call a halt to the creativity and brainstorming. It takes a very mature project leader who expertly works in the strategic zone and interacts with senior executive leadership when needed. At the same time, executive leadership places its trust in the project leader and his or her group of experts, not interfering in their experimentation and brainstorming.

Traditional reductionist approaches lead to successful outcomes only if a project is well understood and predictable. With all other projects, making decisions too quickly and considering designs immutable precludes changes that could add value to the solution. It precludes learning, improvement and adaptation to the ever-changing business and competitive environment. A non-adaptive project team cannot keep its finger on the pulse of the business. As a result, the project's outcome, when finally achieved, may no longer meet the business need. Frozen in time, plan, budget and schedule are not relevant to the present or future.

“Extreme, agile or adaptive project management consists of practices for keeping high-change projects in control and at the same time, delivering value as defined by the customer,” says DeCarlo. “Traditional project management assumes that with enough research you can nail down customer requirements up front. Agile project management recognizes that understanding customer requirements is a discovery process that happens real-time during the project. The goal of traditional project management is to produce the planned result. The goal of us *agilests* is to produce the desired result, which is likely to be much different than the planned result.”

Reality Rules

Adaptive project management is a new way of thinking. It is a dramatic paradigm shift from PMBOK's reductionist theory, control theory and traditional change management. PMI is currently researching what makes projects complex and how its approach may need to change.

Among leadership teams, adaptive project management will require a huge culture change. “Typically, the higher you go in an organization, the more Newtonian the thinking becomes,” says DeCarlo. “There are many good reasons why executives desire predictability,” he explains. “They are responsible for bottom-line results, forecasting with accuracy and pleasing the Wall Street community. They respond by establishing strict policies and procedures, and calling for robust project management methodologies to keep control and stay loyal to the plan. The impact is loss of flexibility to adapt to new opportunities and threats. Agile project management allows management to better balance both predictability and flexibility,” DeCarlo adds.

According to a survey conducted by Robert Kaplan, co-author with David Norton of the Balanced Scorecard, only 10 percent of well-formed strategy is actually executed. Further, executives average only one hour a month on strategy execution. That hour is barely enough to review a list of projects, nod in approval or add a few more to the list. Leadership teams that invest in complex, transformational projects that are critical to achieving business strategy need to become accustomed to spending much more time providing oversight of ongoing projects. They must always ask, are those projects still good investments and are they still on target to achieve business strategies? They must allow project teams to experiment and be on the edge of chaos at times until they can evolve the best solution. They must be open to changes as the team

adapts to what it has learned and what is changing in the marketplace. At the same time, project teams will have to become better at providing executive teams with updates on what they are learning as the project evolves.

“The Newtonian deterministic mindset is in opposition to the reality of the world,” says DeCarlo. “Reality does not care what your plan is; it never has. So you have a choice: you can change your mind to adapt to reality, or you can try to change reality to fit your plan. Management typically has a difficult time making that mental switch of allowing plans to be fluid, that is, until they experience the benefits of agile project management practices.

“Management has the right goal – to keep projects in control and to ensure predictability,” says DeCarlo. “But they need to adopt a more quantum world view on projects and let the project management community provide the tools for the new approach rather than dictating a deterministic methodology that does not account for the dynamics and fluidity of today’s projects. The secret to succeeding on highly volatile projects is to remember that you cannot manage the unknown the same way that you manage the known. The first thing to do is not to change the project management tools, but to change your mind. The right mindset is, Reality Rules. Make the practices fit reality rather than trying to change reality to fit the practices.”

One of the reasons the financial services industry is currently in total disarray is that, for the last 10 years, companies have continuously merged and acquired, throwing together different IT systems and different business practices. These companies have become unmanageable jumbles, and executives are spending their time putting out fires rather than executing strategy. No traditional, linear project management practices can possibly hope to guide a vast change management effort such as the one that must surely follow the recent acquisition of Countrywide by Bank of America. If executives simply heave it all on the shoulders of IT, and if project managers are not guided by complexity theory and adaptive project management, the new corporation will fall like a house of cards.

Learning to Add Value

Adaptive project management is not about command and control. It’s about leadership, collaboration and encouraging an environment of experimentation and creativity. It improves project performance for several reasons. First, the solution to a business problem will be more creative because it has not been cast in stone prematurely. Further, the components of the solution, delivered by project teams along the way, will be actual working sub-solutions that add value much earlier than waiting for an ultimate outcome, which may or may not meet the objective at that time. As project teams work and adapt, they continually learn from previous iterations, so they can build new learning into the plan for realizing the next increment. New learning, added value and creativity amount to the continuous improvement and innovation that make companies succeed.

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