Key Disruptive Trends Driving Agile Adoption

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Increasingly, organizations create software via a complex, distributed supply chain that spans organizational boundaries and multiple software sources. As a result, communication between business stakeholders and a diverse range of IT resources has become increasingly more problematic. With disparate teams, disparate partners and disparate code sources, how can companies create a coherent, managed approach?

In this context and that of our current, difficult global economy, the business benefits of Agile development approaches become visceral and demonstrable. With highly constrained resources, organizations have little leeway for the long time-to-market, poor communication, and delayed benefits that typically accompany traditional waterfall approaches.

As a result, in part, IDC sees Agile adoption going increasingly mainstream. The disruptive factors of complex sourcing, regulatory and localization compliance demands, mergers and acquisitions, and emerging technology issues (such as Web 2.0, SOA and security concerns) have already driven a majority of organizations towards iterative processes and Agile approaches. For companies that remain solely entrenched in a waterfall approach, the business costs and consequences of long and late software project cycles are becoming untenable in dynamic, global competitive environments.

Along with increased adoption comes the need for effective metrics to validate the benefits of Agile and to evolve enterprise deployments. Quantitative metrics facilitate qualitative decision-making to sustain on-going improvements and support Agile strategies across groups, departments and divisions.

The Potential Benefits of Agile – Faster Time-to-Market and Improved Productivity

IDC research indicates that 70-80% of software development failures result from poor requirements gathering, analysis and management. Proactive, well-managed Agile approaches can help to solve those problems by enabling quick and frequent feedback across the cultural divide between business and IT, and can also bridge the gap to operations and provisioning. Agile engages IT and the business through each phase to chunk larger initiatives into key segments that can improve time-to-market by delivering quickly on the initiatives of greatest priority to the business. Where effective, this enables IT teams to support businesses in being more responsive to emerging, dynamic market needs.

The potential for productivity gains are another key driver for establishing Agile approaches. Additionally, the mentoring of new teams by mature Agile teams can help establish broader Agile adoption and a more dynamic software development approach for business support. In short, one team's success with Agile development can be an example to lead to organizational adoption and further productivity improvements by other teams and across the board. It is also useful to establish Agile as part of an overall application life cycle approach. Understanding community collaboration and Agile development (from requirements through test and build) can help evolve organizations beyond current, typical application creation.

As an example, Agile, iterative testing improves quality. In fact, some Agile practitioners incorporate leading Quality Assurance (QA) staff as ScrumMasters to establish strong links between QA and their Agile process. Managing relevant data associated with Agile projects from an end-to-end perspective provides context for overall integration, and also for the ways in which the software artifacts meet corporate policies and address key business needs and workflow.

Coupled with effective process and organizational strategies, Agile development can enable the software ecosystem to become a strategic asset, rather than spawning disparate, sprawling entities that are isolated from one another and from the business.

Measurement of Agile Impact is Key

Now that Agile is becoming mainstream, it is time to move beyond the question of 'who is adopting Agile?' and ask 'what are the quantifiable, measurable benefits of Agile?'

Quantifying benefits – such as resource and productivity improvements, cost savings, faster ROI to the business, increased business focus, improved collaboration and relevance between IT and the business – facilitates increased adoption of Agile practices. However, it's almost impossible to measure and quantify benefits without first setting up a baseline – performing a gap analysis – in order to measure the benefits of Agile in relation to an organization's pre-existing approach (such as waterfall). It is therefore critical to evaluate existing practices, resource allocation and costs, prior to bringing in an Agile approach.

The Business Value of a Comprehensive ALM Platform

Successful Agile implementations, especially those that span multiple teams and projects, necessitate a purposeful and proactive strategy across the entire application life cycle. Organizations that seek to knit together smaller iterative projects across an enterprise deployment need to establish effective prioritization criteria and decision-making. This often comes in the form of a plan and approach for Agile training, support of various ALM products and an internal knowledge sharing, retrospection and improvement. This can enable adaptive, Agile businesses.

Ideally, companies have broad visibility through a coordinated, Agile ALM approach. Moving beyond ad hoc, one-off Agile initiatives can support companies to unite what could otherwise be a disconnected series of projects or sprints. The potential benefits to be gained by deploying a comprehensive Agile ALM solution include: faster creation of a richer code base, earlier and faster repair of defects, the incorporation of key changes, and most importantly, relevant deployments that are well coordinated with business needs and visibility across the enterprise.

A company's responsiveness to dynamic, global competitive pressures is particularly critical in a difficult economy (resulting in part from the sub-prime mortgage and financial crisis, a weak dollar and other factors). It is all the more important that organizations consider and adopt iterative, Agile approaches to development.

Conclusion/Recommendations

Companies and users should evaluate and leverage Agile approaches to software development for increased collaboration and productivity, faster time to market, improvements to code quality and better alignment with the needs of the business. Moreover, it is important to measure the benefits of Agile initiatives with and against a benchmark of pure waterfall projects. Since Agile adoption involves significant process and organizational change, it is critical to success to focus initially on the human and cultural issues involved, to perform a gap analysis and transition proactively. Companies making the shift should establish effective mentoring and process change with pilot teams, and then socialize other parts of the organization to evolve to a successful Agile implementation.

The Agile Impact Report: Proven Performance Metrics from the Agile Enterprise

Executive Overview

In May 2008, Rally Software commissioned third-party research firm QSM Associates (QSMA) to assess the performance of Agile development projects against plan-based or waterfall industry averages in three key areas: productivity, time-to-market and quality. The purpose of the study was to evaluate the performance of companies that have implemented Agile development practices and utilized them throughout the entire lifecycle. QSMA benchmarked 29 Agile development projects – eight of which were executed by Rally customers – against a database of 7,500 primarily traditional development projects.

QSMA concluded that, as compared to industry averages, the development teams utilizing Agile practices were on average:

- 37 percent faster delivering their software to market
- 16 percent more productive
- Able to maintain normal defect counts despite significant schedule compression

Rally initiated the study to provide software-driven organizations with proven metrics – supported by actual project examples – that accurately measure the performance of Agile development projects across the enterprise.

Background

Objectives and Study Methodology

QSMA used its SLIM (Software Lifecycle Management) suite of benchmarking, software estimation and modeling tools to obtain objective data and benchmark Agile development projects against QSMA's large, heterogeneous database. The SLIM-Metrics database represents over 7,500 projects across 500 organizations in 18 countries and adds between 200 and 400 projects per year.

The objectives of the study were to:

- Assess the performance of Agile development projects across enterprise teams
- Benchmark Agile projects (both those that used Rally's Agile lifecycle management solutions and those that did not) against plan-based or waterfall industry averages for time and effort
- Measure the projects with respect to time-to-market and productivity/quality and benchmark the approach to consider automating ongoing measurement

Participating Companies

The measured projects included in the "Agile Impact" study represent a variety of industries and project sizes with sixty to over a thousand Agile practitioners. Five Rally customers – Accuro Healthcare Solutions Inc., BMC Software, CNET (http://cnet.com), HomeAway, Inc., and Moody's (NYSE: MCO) – contributed data for eight Agile development projects and provided additional information for in-depth case studies.

Accuro Healthcare Solutions Inc. is a leading provider of proprietary Internet-based solutions to a broad range of healthcare providers, enabling them to more effectively manage the complexities of the patient registration, billing, collection and reimbursement process. Accuro Healthcare initially adopted Agile practices in early 2008 and brought on Rally products and coaching a few months later. The company now has over 150 Rally licenses and Agile practitioners. This study assessed one major release with a schedule of almost two months with seven full-time employees delivering approximately 168 story cards and was comprised of roughly 19,675 lines of new and modified code.

BMC Software is a leading global provider of enterprise management solutions that empower companies to automate their IT and align it to the needs of the business. For the four fiscal quarters ended December 31, 2007, BMC revenue was approximately $1.7B. BMC initially adopted Agile practices in 2005 and at the same time brought on Rally for its Agile lifecycle management products and coaching services. Since then, Agile development practices at BMC have spread from a small pilot project to more than 1,000 Agile practitioners dispersed over three international locations. This study assessed two major BMC releases with schedules ranging from four and a half to five months, 90 – 95 full-time employees delivering approximately 1,450 story cards, comprised of roughly 1.4 million lines of new and modified code.

CNET (http://cnet.com) is where people go to discover the latest in tech and consumer electronics. CNET initially adopted Agile practices in 2005, and the company now has 65 Rally licenses. This study assessed two major CNET releases with schedules ranging from three and a half to almost six months with 41 full-time employees delivering approximately 30,000 lines of new and modified code for complex web applications.

HomeAway Inc. is the largest international network of vacation rental web sites with 284,000 paid listings of rental homes, condos, apartments, villas, cottages and cabins in more than 100 countries. HomeAway initially adopted Agile practices in 2006 and brought on Rally products and coaching in 2007. The company now has 70 Rally licenses and a similar number of Agile practitioners. This study assessed two major HomeAway releases with schedules ranging from six to seven months with eight full-time employees delivering approximately 233,000 lines of new and modified code.

Moody's Corporation (NYSE: MCO) is an essential component of the global capital markets, providing credit ratings, research, tools and analysis that contribute to transparent and integrated financial markets. Moody's KMV, a division of Moody's Corporation, is a provider of quantitative credit analysis tools. Moody's KMV initially adopted Agile practices in 2006 and brought on Rally products and coaching in 2007. The company now has 210 Rally licenses distributed globally. This study assessed one major release with a schedule of almost four months with 30 full-time employees delivering approximately 116,000 lines of new and modified code.

Additional companies in this study that rely on Agile practices, but are not Rally customers, are all part of multi-billion dollar enterprises with large, international client bases and represent a variety of industries and project sizes.

These include:

- A leading global supplier of medical analytical instruments and technology solutions - Four projects were studied with peak staff of eight to 15
- A medical IT company that delivers mission-critical healthcare decision support solutions and software tools - Eight projects were studied with peak staff of five to 65
- A leading international financial services organization that provides diverse insurance protection and wealth accumulation products - Three projects were studied with peak staff of 26 to 29
- A leading software company that provides universities, libraries, and schools with a wide range of educational tools and services – Six projects were studied with peak staff of 26 to 39

For the above companies, data was collected from 2005 to 2007 with the exception of one project in 2004. Only one of the companies had more than two years of Agile experience.

Agile's Impact on Time-to-Market
Agile Projects are 37% Faster to Market than Industry Average; Rally Projects are 50% Faster

Software development teams, especially when they have large and geographically dispersed teams, often struggle to deliver their software on time. By adopting Agile practices, companies measured in this study were able to produce large-scale enterprise software in four to eleven months, compared to the six to thirteen months a typical organization required to deliver comparable software. Overall, Agile companies experience an average increase in speed of 37 percent. Rally customers who participated in the study saw an average increase of 50 percent in their time-to-market when compared to the industry average.

Especially noteworthy is the fact that Agile processes succeed in spite of teams being large and geographically dispersed. According to QSMA's data, many companies with distributed teams experience longer schedules, but the companies involved in the study with globally dispersed teams, did not. According to Rally's own customers, this success is due in large part to the use of Rally's Agile lifecycle management products.
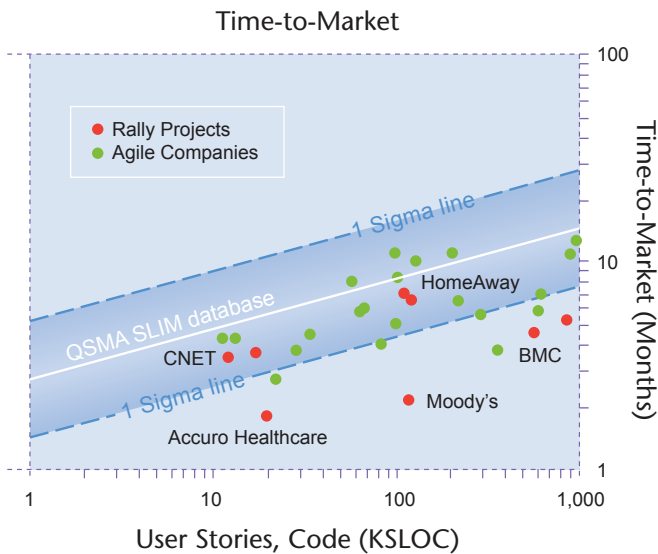
Time-to-Market

Fig. 1
Agile Projects are 37% Faster to Market than Industry Average, Rally Projects are 50% Faster

Agile's Impact on Team Productivity

Agile projects experienced a 16% increase in productivity compared to industry average; Rally projects experienced a 25% increase

QSMA's Productivity Index (PI) is an objective measure of the efficiency that is achieved in building a software product. It encompasses all of the processes that influence the performance of a team given the complexity of their task and the development environment. The equation that calculates the Productivity Index takes this conceptual form: Quantity of Function = Process Productivity * Effort * Schedule.

A number of elements contribute to an organization's Productivity Index, including: tooling and methods, technical difficulty, personnel profiles, and integration issues. The Productivity Index is an aggregate of both the product and the process, and it quantifies the net effect of all factors that makes one project different from another. Because of its many different contributing elements, a team's productivity is often the most difficult measure for an organization to change.

According to QSMA, productivity metrics for large, globally distributed teams are often lower. This is caused both by the increased number of lines of communication and lower efficiency of these lines due to time and distance constraints.

On average, the Agile projects measured in this study experienced a 16 percent increase in their teams' productivity – a significant increase given the different variables included in the PI measurement. Rally companies on average saw a 25 percent increase in their teams' productivity compared to the industry average.
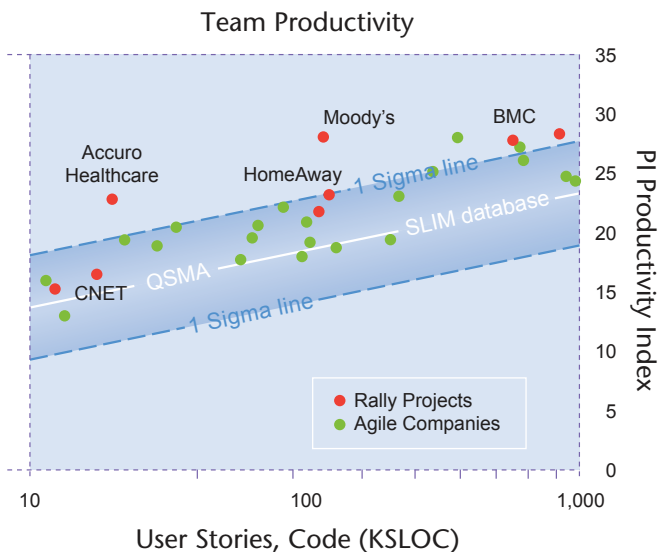

Team Productivity

Fig. 2
Agile projects experienced a 16% increase in productivity compared to industry average; Rally projects experienced a 25% increase

Agile's Impact on Quality
Defect counts mostly steady despite cutting schedules by more than 50%

QSMA's prior research shows that bug counts rise geometrically as schedules are compressed. Typically, "haste makes waste"; when large teams cut delivery schedules to four or five months as these teams did, defects will conservatively exceed industry averages by about four times. Instead, these companies experienced total defect counts that were significantly better than would be expected under these conditions. In fact, despite cutting schedules by more than 50 percent, results show the defect counts for the measured projects remained mostly steady. Two Rally customers maintained average defect counts and two customers were on the upper end of industry averages when compared to similar sized projects taking more than twice as long to deliver.
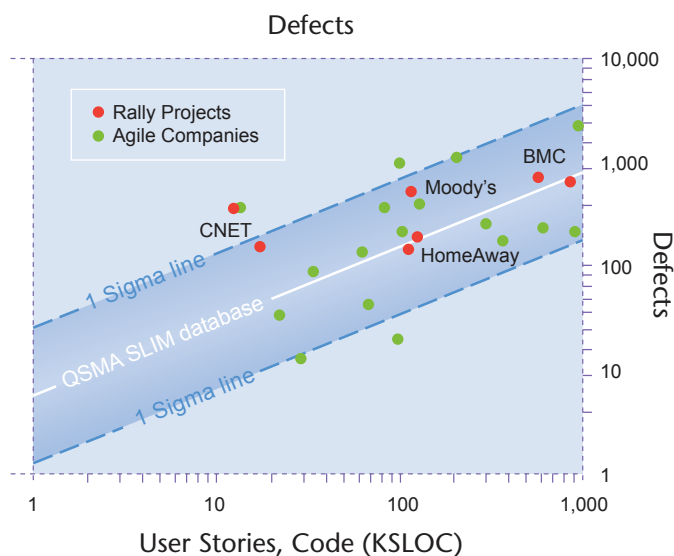
Fig. 3
Despite Dramatic Schedule Compression, Agile Projects Maintained Normal Defect Counts

It is important to note that the study did not measure *when* defects were captured and fixed during the release cycle. Neither did the study track how many defects were open at any one time. It is common for Agile projects to have a large impact on these two metrics over test-last development processes.

Agile projects use short time boxes to produce potentially shippable code. A two-week iteration will implement new stories, but it will also fix high priority bugs, re-factor existing code and add new tests to the regression suites that validate the stories are ready for acceptance. Along with Agile engineering practices such as continuous integration and test-driven development, these behaviors promote a "fail fast" philosophy where expensive defects are typically discovered and fixed earlier and more evenly throughout the release cycle. While not always lowering the total number of defects found in a given amount of code, these techniques enable teams to respond to flaws before they can negatively impact release dates and the customer experience. Another benefit is that Agile teams can have significantly lower open defect counts and their associated management overhead.

The one downside of Agile projects being far less "defect-driven" is that classic defect metrics used to manage the release end game can become irrelevant. For example, when there are few open defects, charting defect find and fix rates in hopes of forecasting a ship date no longer provides useful information. Instead, these reports are replaced by questions into which failing tests or bugs stand in the way of accepting specific stories as "done." This change can take some adjustment and may require new ways of reporting release readiness.

Conclusion

QSMA's landmark study resulted in unprecedented productivity and time-to-market metrics for major Agile development initiatives at enterprises with varying levels of team and project sizes. Through the adoption of Agile practices supported by lifecycle management tools, many with coaching from Rally, companies involved in the study were on average 37 percent faster delivering their software to market and increased their teams' productivity by 16 percent. These improvements were achieved while maintaining total defect counts in line with traditional projects that took over twice as long to deliver similar functionality. All of the companies involved in the study continue to scale Agile practices across their organization and improve their agility by inspecting and adapting their processes.

About Rally

Rally is the #1 partner for Agile success through its family of products, coaching and community support. With a dedicated focus on Agile practices, Rally helps organizations of all sizes shorten their development cycles, minimize risk, and collaborate across teams and silos. Rally's on-demand Agile lifecycle management products were honored with three-time Jolt Product Excellence Awards (the industry's Oscars) in 2006, 2007 and 2008 and currently support over 900 corporate customers and 35,000 users in 50 countries. Rally's end-to-end solutions for Agile development also include Agile University, the largest source for Agile training, and Agile Commons, the largest collaborative Web 2.0 community dedicated to advancing software agility. For more information, visit www.rallydev.com.

About QSMA

QSM Associates, Inc. helps organizations measure, plan, estimate and control software projects. QSMA offers the SLIM (Software Lifecycle Management) Suite of tools, so managers can benchmark and forecast Agile, waterfall, in-house, and offshore/multi-shore software projects. SLIM contains statistics from a worldwide database of more than 7,500 completed projects, enabling productivity benchmarking on the desktop.

Using SLIM to dynamically run 'virtual project simulations,' companies routinely model and forecast waterfall and Agile releases to deliver on time, within budget with > 90% estimation accuracy. SLIM can also derive ROI achieved by Agile methods and other process improvements. QSMA offers consulting, training, and coaching to help accelerate this capability. For more information, visit www.qsma.com.

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Appendix Notes
In 2007, BMC Software independently commissioned QSM Associates (QSMA) to assess their Agile performance. Results from that study have been included in the most recent study conducted by QSMA on Rally's behalf.