Innovation Reimagined

Application Development
Where Lean Principles Meet Agile and Global Software Development
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As organizations mature and globalize their operations, IT must embrace innovative processes and structures that deliver business applications faster, better and cheaper.

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Amid ongoing economic challenges, IT organizations continue to seek ways to reduce application development cycles to control costs, achieve faster time-to-market and ensure end-user acceptance. Many are looking to Agile development and its less linear approach to software development as a means to this end.

Agile’s core principles – including more timely and effective end-user collaboration, short development iterations with targeted goals and frequent interactions among team members – are increasingly attractive to IT managers at a time when project funding comes with major strings attached.

Agile adoption has grown swiftly over the years. IT organizations have learned to adjust to Agile’s nuances and have remade their cultures and processes in ways that improve application delivery efficiency. The biggest change is fitting Agile into the emerging model of global delivery. The ubiquity of global delivery is motivation for IT organizations to leverage Agile to get the best from both methodologies across individual projects and large-scale programs.

However, even if Agile and global delivery can be effectively blended to raise the quality of application development/delivery, each is insufficient unto itself to rescue IT organizations from the spaghetti-code sins of the past. As a result, the “Lean” philosophy is beginning to make inroads from its roots in manufacturing into the software development process.
With its focus on maximizing system-level throughput, eliminating waste and reducing variability at each point of interaction — as well as identifying and removing rigidities in IT processes — Lean principles offer IT organizations yet another lever to pull for increasing the effectiveness and efficiency of application development and support in a global, distributed delivery model. Since Lean does not prescribe specific solutions, some of the approaches and interventions for solving business-IT issues seem indistinguishable from other software development methodologies, including Agile.

Management through measurement is critical in distributed teams to ensure that resources are optimally applied across the team. Productivity has always been an elusive measure in the IT industry. While many organizations have yet to reach internal agreement on a mechanism to formally measure and improve productivity, some organizations have matured in their application of Lean principles, creating a framework for building a measurable form of throughput maximization.

Organizations must combine Agile, Lean and distributed delivery to not only optimize their IT investments but also to leverage each methodology to create software that drives business innovation.

Common Agile and Lean themes entail reducing waste and optimizing code delivery. Agile is already optimized to an extent by creating just enough documentation, focusing on working software and allowing changes in the middle of the software development lifecycle (SDLC), in addition to giving top priority to the most critical or high-value feature. However, there is still scope for further optimization by leveraging distributed Agile methods.

Nearly every organization that has applied Lean principles, Agile methodology and/or the global delivery model has reported tangible success over a period of time. Organizations have reported faster time to market, reduced cost and improved end-user acceptance using all three of these approaches. Hence, organizations must combine Agile, Lean and distributed delivery to not only optimize their IT investments but also to leverage each methodology to create software that drives business innovation.

Three basic steps should be considered when integrating Agile, Lean and distributed development processes:

- **Establish an office** of Agile adoption (OAA).
- **Reinvent IT development lifecycle activities** to integrate Agile, Lean and distributed team models.
- **Align the organizational structure** to better administer the integrated delivery model.

**Office of Agile Adoption**

Many organizations do not have a company-wide technology office that establishes guidance and enforces controls on Agile adoption across the enterprise (see Figure 1, next page). Whether the office is an independent entity or part of an existing one, an OAA helps avoid the introduction of nonstandard processes and tools, which can become a nightmare if centralization is desired at a later point of time. Sharing best practices, collaborating among the development community, introducing reusability across the company and linking Agile experts/expertise across the enterprise — all of these goals become easy to meet when a focused control entity manages it.

Note: To generate a scaled up view of Agile and Lean implementation, we have taken the approach that, in general, Agile (as a solution) is implemented at the execution team level (leaf-level teams). It is likely
to be the end IT execution team, as opposed to Lean, which in principle is applied within an ecosystem that makes these leaf-level teams interact and coexist under various umbrella programs.

A typical OAA should focus on the following:

- **Strategy**: Develop an Agile adoption strategy that clearly lays out the overall vision of the IT organization and the benefits assured. The strategy should enhance the capabilities of global delivery and the benefits of Lean if they are already implemented within IT. Losing the benefits of Agile adoption is the last thing the CIO wants to see.

- **Planning**: Chart a course for expected Agile standards in terms of processes, engineering practices and tools (e.g., continuous integration, automated regression packs, etc.), key roles of individuals and their responsibilities, a proposed organizational structure for ongoing governance and a set of clear measures. The plan should also focus on necessary adjustments to effectively introduce key Agile processes. This should include steps for Lean implementation (i.e., optimizing processes and resources) and for identifying variability in the Agile adoption process. This way, any potential “waste” can be identified and eliminated in advance of applying Lean. The planning process should identify potential value levers, if any, on which the execution team should focus, so that each iteration yields the expected execution values. Additionally, it is important to establish a collaboration forum through which distributed teams can continuously connect.

## Office of Agile Adoption: Functional View

![Diagram of Office of Agile Adoption: Functional View](http://cognizanti.cognizant.com)
Aligning: The established strategy and processes should be aligned with the overall IT organization by means of effective and ongoing communication, training on established standards and embracing required processes and tools. Necessary adjustments in the existing IT lifecycle activities need to be made. It is important to understand the mindset, capabilities and workforce culture (both IT and business) to effectively align Agile, global delivery and Lean processes across the organization.

Monitoring: The OAA should monitor the execution of the established methodology. It is extremely important to reinforce the need for tirelessly observing and measuring value levers (KPIs) to continuously eliminate waste and identify areas of improvement. It is equally important to establish a mechanism to evaluate the skills of resources across geographies to enable continuous improvement. An operating committee needs to be appointed to resolve ever-present queries and concerns. And necessary mechanisms should be devised to connect with external forums and industry players (consultants, integrators and vendors) to introduce best practices and drive continuous improvement over time.

Reinventing the Development Lifecycle

The global delivery model (GDM) provides cost efficiency through resource optimization across geographies by harnessing talent across teams that are not co-located. In contrast, Agile centers on co-location and close interaction among team members. Getting both to meet is critical to unleashing process innovation and the tangible benefits of software that powers process innovation and business advantage.

Comparing Agile with the fundamentals of GDM, we observe many mismatches and key adjustments that must be made to deliver the best of both methodologies (see Figure 2, next page). An assessment of how each of the Lean and Agile components should be administered by globally distributed teams will help plug the gaps and decide on the necessary remedies. The following should be considered:

- **Modularizing the scope** to help development teams make adjustments to achieve co-location of talent and task distribution.
- **Validating the communication and build processes** to drive adjustments of code management practices.
- **Analyzing the roles and responsibilities for each location** to realign people management practices.
- **Aligning the business, IT and partner teams** to reveal gaps in quality assurance and knowledge management techniques.
- **Brainstorming on the important measures that are needed for continuous improvement** to help define Agile, Lean and GDM metrics and the associated measurement mechanism.
- **Binding the OAA with the existing steering and operating governance bodies** to streamline overall IT administrative processes.

It is important to understand the mindset, capabilities and workforce culture (both IT and business) to effectively align Agile, global delivery and Lean processes across the organization.
Aligning the Organizational Structure

The Lean philosophy calls for identifying and eliminating waste to improve overall system-level productivity. Such betterment should happen as part of the business-as-usual process and not through an external one-time audit. An analysis of a typical team model of Agile reveals that there are few roles that can be availed when identifying “waste.” Additionally, the GDM relies on intimate team coordination. Redefining and aligning the role of site coordinators and team leaders will help implement Lean and Agile processes more effectively.

Having observed successful programs that effectively administered Agile, GDM and Lean processes, there are numerous personnel adjustments that we recommend for tying these models together to broaden the implementation scale. Key organizational structure and role changes include:

- **Leading Group**
  - **The coach/master**: Coordinates and solves group problems.
  - **Adjustment needed**: Coaches per site will help synchronize decision-making. We have seen successful models in which a coach adopts multiple sites and is involved in key coordination and decision-making activities. Eventually, the coaches can function as site coordinators when it comes to multiple (primary and secondary) sites. Similarly, coaches should be part of the GDM site management team to effectively oversee execution of Agile program delivery. As Agile is a project-level activity, an important part of the coach’s activities is intra-project or program-level communication alignment and team structure/team information flow.
  - **The tracker**: Manages the group diary, measures group progress, manages and updates the boards.
Adjustment needed: The tracker should focus on Lean measures, as well as tracking Agile implementation progress. Since measurement is a continuous activity, we recommend having a tracker for every site/team. Giving teams a culture of self-reporting and self-analyzing will advance the cause in the longer run.

The methodologist: Guides and supports the other team members on the software development method applied in the course.

Adjustment needed: The methodologist should be familiar with Lean and GDM processes, so it is important that (s)he is trained in these areas, as well.

Customer Group

The customer: Tells customer stories, makes decisions pertaining to each iteration, provides feedback and defines and develops acceptance tests.

Adjustment needed: It is important to educate the customer on Agile processes. Equally important is to educate them on the existing GDM and Lean processes to a level that is pertinent to the organization.

The acceptance tester: Works with the customer to define and develop acceptance tests, guides the topic of test-driven development and communicates this to the other team members.

Adjustment needed: It is important to involve the user group in any QA adjustment processes that are made at the OAA. Automation at the atomic level is an extremely valuable activity that will help improve efficiency. The role of the tester is critical in a test-driven development model.

Success requires periodic evaluation and evolution, with a focus on continuously improving as more and more projects are executed combining these methodologies.

Maintenance Group

The presenter: Plans, organizes and presents presentations and demos, as well as schedules allocations.

Adjustment needed: The presenter should be provided with necessary templates to present Lean and Agile measures.

The documenter: Plans, organizes and presents the project and process documentation.

Adjustment needed: The documenter should have proper templates to gather and report Lean measures, as well.

The installer: Plans and develops an automated installation kit; supports and instructs other teammates in the process.

Adjustment needed: A key success criteria is the ability to work with each site’s code group. By design, establishing a clear connection with multiple sites will ensure the success of the installer.

Code Group

The designer: Maintains the current design, works to simplify the design, searches for refactoring and ensures proper execution of the design.
Adjustment needed: Lean measures gathered during the course of the project should be fed back to the designer for improving design and execution. It is important to involve coaches and designers at the measurement definition stage.

The code reviewer: Establishes and refines group coding standards; guides and supports the maintenance of the standards and tools.

Adjustment needed: It is extremely important to educate code reviewers on opportunities to identify reusability, waste and better coding.

The unit tester: Establishes an automated test suite; guides and supports team members in the development of unit tests.

Adjustment needed: There should be a clear focus on automation at the atomic level. Unless the unit testers are trained and provided assistance, automation is not possible. It is important to visualize the entire scope, iteration and coding strategy to establish an Agile project automation project plan.

The integrator: Establishes an integration environment, including source control; publishes rules pertaining to the addition of new code using the test suite; guides and supports other teammates in the integration task.

Adjustment needed: As in the case of the installer, the integrator should also align with site coordinators of multiple sites to ensure control.

Management Matters

As methodologies evolve and mature, management processes should evolve in parallel to enable organizations to better control IT activities and derive greater value. It is extremely important to put the structural components in place in the form of dedicated bodies for companies to have meaningful control over Agile, global delivery and Lean models. Balancing the level of detail in managing these components is certainly a challenge. The only way it can be achieved is by having a clear understanding of the organization’s culture, processes, standards and tools.

It is also not a one-time job. Success requires periodic evaluation and evolution, with a focus on continuously improving as more and more projects are executed combining these methodologies.

In the past, many development models, such as waterfall, object-oriented, iterative etc., have been successfully integrated with global delivery models. Sure enough, Agile, global delivery and Lean will also be successfully integrated to drive IT process innovation and enable businesses to more effectively leverage the value of software applications that are not only delivered more cost-efficiently and effectively but support innovation initiatives across the business, as well.

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