



## Bonzar Agility and Agile Methods

B. Rama Krishna

Department of Information Technology,  
SIR C.R. R. College of Engineering, Eluru (A.P.), India  
rama.krishna855@gmail.com

S Phani Shashank Tharashasank .D

School of Computing, Blekinge  
Institute of Technology,  
Ronneby, Sweden

Dr. A. Yesu Babu

Dept. of Computer Science and Engg.,  
SIR C.R. R. College of Engineering, Eluru (A.P.), India

Shafivullah Mohd\*

Dept. of Electronics and Instrumentation Engg.,  
SIR C.R. R. College of Engineering, Eluru (A.P.), India  
shafivullah@yahoo.com

**Abstract:** What are the drivers for the burgeoning interest in agile methods? Have these drivers stimulated a similar rethinking on other fronts? What have we discovered? In this paper, I take a reflective stance in order to look at these larger issues and patterns. This stepping back is informed primarily by involvement in a multi-year research project on Quality Software Development @ Internet Speed and ongoing research on diffusion theory and the practices of technology adoption. This transition state is “between paradigms” and turbulent, marked by relentless change and volatility. The transition is a work in progress and by no means complete.

**Keywords:** Agile, agile methods, organizational dynamics

### I. INTRODUCTION

Agility and agile methods have been popularized through the proponents of the Agile Alliance, their Agile Manifesto, and related writings (Agile Manifesto 2001). The concept of agility also has a longer history in manufacturing. More recently, Grover and Malhotra (1999) studied the interface between operations and Information Systems and Kathuria et al. (1999) linked information systems choices to manufacturing operations in order to understand how information systems support manufacturing operations and competitive strategy. Dove (2001) claims that agility requires an “ability to manage and apply knowledge effectively, so that an organization has the potential to thrive in a continuously changing and unpredictable business environment”. Initially, he characterized agility as having two key elements: response ability and knowledge management. Subsequently, Dove (2005) added a third dimension of value propositioning. For agile approaches to be fully understood—to mature and to gain ground—we would be wise to consider what agility means as part of a larger landscape, and what kind of shift it marks in technology development and in organizational behavior and change.

This is the concern of this paper: to reflect upon the current preoccupation with agility, describe some of what we have learned about Internet-speed software development, and characterize challenges for the future. What are the drivers for the burgeoning interest in agile methods? What have we discovered? In this paper, we take a reflective stance to look at such larger issues and patterns. Primarily, my stepping back is informed by two efforts: (1) Involvement in a multi-year research project on Quality Software Development @ Internet

Speed and (2) Ongoing research on diffusion theory and the practices of technology adoption.

Agility in software development has implications for organizational agility. We will suggest that the shift to agile methods and models signals a larger transformation in the workplace toward the organization of the 21st century. This transition state is turbulent, marked by continuous change and volatility. Experimentation in this time of turbulence has attempted to break down and speed up old models, disrupting traditional approaches and turning conventional concepts and methods on their heads. No clear or easy solutions have resulted. The transformation is a work in progress, one that is by no means complete. To be realized, it will require a melding of inquiry across a wide range of disciplines and initiatives, including organizational development, diffusion of innovations, process improvement, knowledge management, complex adaptive systems, chaos theory, systems thinking, software engineering, and information systems. We begin by looking briefly at definitions of agility, considering connotations and metaphors for agile behavior. Then, we discuss the current state of agility and Internet speed software development, as informed by our research findings. Finally, we speculate on a desired state—and on challenges that the future holds for a next generation of agile approaches. Discussion of the future also involves consideration of conundrums and dilemmas.

### II. DEFINING AGILE

What do we mean by agile? Is it simply fast? Are agile and fast one and the same?

Agility implies speed, although something that is fast is not necessarily agile. Developers and customers alike

appreciate speed, through being “first to market” and in terms of responsiveness. We know that developers are invested in how the use of agile methods emphasizes discovery, improvisation, and patterns. Members of the Agile Alliance have expressed the following preferences and values (Agile Manifesto 2001):

- a. Individuals and interactions over processes and tools
- b. Working software over comprehensive documentation
- c. Customer collaboration over contract negotiation
- d. Responding to change over following a plan

Do customers support agile methods? Perhaps, but not in precisely the same way that developers do—rather, they care as the use of such methods translates into the results, benefits, and profits that they seek.

Unfortunately, these same customers are often at a loss when it comes to identifying an appropriate means for governance—for oversight and monitoring agile development efforts. Gazelles, deer, and big cats may be agile. Elephants and hippopotami are not agile, or so we believe.

Agility, then, for purposes of our discussion is made up of several attributes. We can liken it to a table which stands on three legs:

- a. Speed: quick, fast.
- b. Nimble: able to improvise, and use patterns creatively to construct new solutions on the fly, flexible.
- c. Adaptable: responsive (sense and respond), dynamic and interactive in response to a customer, or to changing circumstances.

### III. WHAT WE HAVE LEARNED SO FAR: THE CURRENT STATE

In this section, we will briefly summarize key research findings from a multi-year study (2000–2003) on Quality Software Development @ Internet Speed. Detailed findings are available elsewhere. This is not a survey; rather, this is intended to serve as a catalyst for discussing a future state and the challenges ahead. Passing references are made to related research on agility and fast-paced development to a limited extent.

Our three-part study on Internet-speed software development used a mixed-methods research design involving the collection of multiple kinds of data. Case studies of Internet-speed software development in Phase 1. were complemented with a Discovery Colloquium held in Phase 2. Phase 3. Continued the original case studies.

#### A. Phase 1: Case Studies of Internet Software Development

During the first phase, in Fall 2000, we conducted detailed case studies of Internet software development at 10 companies in two major metropolitan areas. The firms ranged in size from 10 employees to more than 300,000 employees, in different industries in the private and public sectors including financial services, insurance, business and consulting services, courier services, travel, media, utilities, and government services.

Some of the firms were new Internet application start-up companies while others were brick-and-mortar companies with new Internet application development units.

As a result, a new development process that depends on new software development cultures evolved. In this process, software product quality becomes negotiable. Eight identifiable practices (see Figure 1) characterizing the Internet-speed software development process emerged from Phase 1.

#### B. Phase 2: Discovery Colloquium

Our Phase 2 objectives were to synthesize knowledge on best practices for quality and agility in Internet-speed software development. We held a one-day Discovery Colloquium on Innovative Practices for Speed and Agility in Internet Software Development using innovative open-forum search techniques to enable what has been called creative abrasion

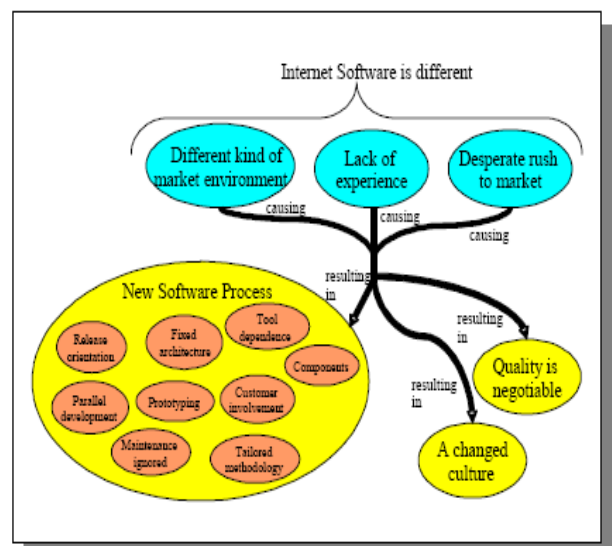


Figure 1. Results from Phase 1

The colloquium benefited from the Phase 1 findings and included participants from Phase 1 companies as well as selected experts. Software practitioners from entrepreneurial small companies and large brick-and-mortar companies, Internet business strategists, and leading software development experts also participated. Participants joined one of several breakout groups dedicated to exploring a core issue.

The groups first identified observations relating to their core issue, and then developed hypotheses about possible associated factors. The groups tested the hypotheses, identifying linkages, contradictions, and interdependencies among them. They identified principles, promising practices, and other dynamics. Although the findings from the colloquium distinguished Internet speed as a set of practices, it denoted the underlying principles as principles of agility.

Each Internet-speed development practice can also be found in traditional Software development. What distinguishes the practices is how Internet-speed developers combine and apply them—sometimes to extreme. Our results yielded at least four implications for software management:

- a. Cost and quality do not drive Internet-speed software development. Rather, development speed is paramount.

Quality becomes negotiable, a moving target in play with functionality and product availability.

- b. Project management in Internet-speed development differs from project management in traditional development. Projects do not begin or end, but are ongoing operations more akin to operations management. Development problems are chunked into small jobs that can be rolled out as small, tailor-made products.
- c. Maintenance in Internet-speed development is sometimes merged into the specification–build–release cycle along with new functionality, or maintenance cycles become small project cycles interspersed with larger project cycles.
- d. Human resource management differs in Internet-speed development. Team members are less interchangeable, and teams require people with initiative, creativity, and courage as well as technical knowledge, experience, and drive.

### C. Phase 3: Case Study Continues

In 2002, we returned to study our original 10 companies which were developing application software for the Internet. At the time of the interviews, only five of the original nine companies remained in business or were available to participate in the study. Only one of the small Internet software houses had survived.

To maintain the representative nature of the selection of companies, we added an additional company—a small innovative Internet software house. In all, six companies participated in Phase 3. In 2002 (as in 2000), we used semi-structured interviews as a forum for collecting data, following the same study guide. Again, the data were analyzed using grounded theory techniques to develop a central story line or core category.

We traced trends and changes and observed new circumstances. A comparison of the 2000 and 2002 data shows how major factors, such as market environment and lack of experience, emerged to change the software process and the attitude toward quality. The interrelationship between the core factors of speed and quality, together with the other major factors, unfolded in a decision process wrought with trade-offs and balancing decisions at multiple levels in the software organization. This trade-offs and balancing decisions—a high-speed balancing game—were taking place at three different levels: the market, the portfolio, and the project.

Two major changes had taken place from 2000 to 2002. First, quality was no longer being treated as a disadvantaged stepchild. Speed and quality must be balanced for companies to survive in the newer market. Second, related monetary factors have been reversed: the unending supply of money characteristic of the boom has dried up; and good people are no longer scarce resources.

The study suggests that the nature of the balancing game has evolved with the shifting of the market and organizational environments over recent years. The peak of the dot-com boom was characterized by few constraints on financial resources, but severe constraints on availability of qualified personnel and very tight deadlines. At this peak, the balancing

game was focused more toward achieving speed, often at increased project costs and lower levels of quality. This situation later evolved into market conditions that expect higher levels of product quality and lower costs while still demanding product development agility.

As a result of market changes, the balancing games at the organizational and portfolio levels have grown in importance compared to the dominance achieved by the project balancing game in 2000.

## IV. WHERE ARE WE GOING: THE FUTURE STATE

Use of agile methods and agility is consistently associated with software development techniques. But more recently, we have seen fledgling signs of expansion. Ironically, the contracting of the market and the tightening of resources has contributed to an enlarged scope and increased complexity in enacting the balancing games at the portfolio and organization levels. This may spur further growth for agile approaches in atypical areas. That said, the current state for agile methods is still isolated and limited.

We have a partial understanding of what agility means for software development activities. For example, we know that agile methods work well with small teams (especially those that are collocated), where requirements are emergent, and in a turbulent environment of constant change. Agile methods are not recommended in the development of life critical systems; and its use in developing embedded software remains unclear.

We have little understanding of the consequences of agile approaches for technology adoption and implementation activities. Within the development and adoption arenas, we have yet to fully grapple with the implications of agility for people, process, and new technology.

Our best insights into agility are still achieved through discrete activities—through projects which exist like islands in our organizations. From the development perspective, we have information on different agile methods, where they apply, particular emphases, and some acknowledged limitations. From an adoption perspective, we can speculate that an agile approach would favor pilots, trials, and demonstration projects; and from a knowledge transfer perspective, an agile approach would favor high customer involvement through face-to-face interaction or “body contact.”

## V. CONCLUSIONS

For agile approaches to be fully understood—to mature and to gain ground—we must consider what agility means as part of a larger landscape, and what type of shift it marks in technology development and in organizational behavior and change.

What are the drivers for the burgeoning interest in agile methods? What have we discovered? In this paper, we step back to consider these questions, as informed by my involvement in a multi-year research project on Quality Software Development @ Internet Speed and ongoing research on diffusion theory.

we begin with a brief look at definitions of agility, and conclude that agility is more than speed, extending beyond to

encompass nimbleness, adaptability, and resourcefulness. Then I discuss the current state of agility and Internet-speed software development, using case study findings from 2000 and 2002.

Our case study suggests that a balancing game has evolved with the shifting of the market and organizational environments over recent years. In 2000, the peak of the dotcom boom was characterized by free flow of financial resources, severe constraints on availability of qualified personnel, and very tight deadlines. Project activities formed the focus for the balancing game and speed was to be achieved almost at all costs. A new development process that depended on new software development cultures emerged.

## VI. REFERENCES

- [1] Agile Manifesto. "Manifesto for Agile Software Development," 2001 (available online at <http://agilemanifesto.org/>).
- [2] Ambler, S. W. *The Object Primer* (3rd ed.), Cambridge, England: Cambridge University Press, 2004.
- [3] Austin, R., and Devin, L. *Artful Making: What Managers Need to Know about How Artists Work*, Upper Saddle River, NJ: Pearson Education Inc. Publishing as Financial Times Prentice Hall, 2003.
- [4] Baskerville, R., Levine, L., Pries-Heje, J., Ramesh, B., and Slaughter, S. "How Internet Software Companies Negotiate Quality," *Computer* (34:5), May 2001, pp. 51-57.
- [5] Baskerville, R., Levine, L., Pries-Heje, J., Ramesh, B., and Slaughter, S. "Is Internet-Speed Software Development Different?," *IEEE Software* (20:6), November-December 2003, pp.
- [6] Boehm, B. "Get Ready for Agile Methods, with Care," *IEEE Computer* (35:1), January 2002,