An Empirical Analysis of Agile Methodologies and Firm Financial Performance

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Agile software development methods promise substantial benefits in terms of productivity, customer satisfaction, employee engagement, quality, time to market, and reduction in project management overhead. As these methodologies begin to reach beyond the software development industry, if they are going to be widely accepted it is critical to tie the use of these methodologies directly to firm financial performance. This study links the usage of several individual and blended approaches with multiple firm financial performance metrics in order to show that Agile Software Development as it is currently being implemented is proving to be a competitive advantage.

**Topic Relevance:** Correlation between use of Agile methodology and financial performance metrics validates the use of Agile methodologies as a competitive advantage for software development firms and may indicate significant benefits in other industries as well.
When I received my Scrum Master training:

- Agile, and Scrum in particular offer:
  - Saving of over 80% of project management and reporting costs
  - Hypervelocities, with productivity increases of 400% or more possible
    - The best scrum teams average 750% gains over velocity of waterfall teams
    - “The highest performing team ever recorded was a Borland team audited by Bell Labs. They were 50 times faster than waterfall team industry average.”
  - Increased Quality, order of magnitude reduction of defects
  - Time to market goes from years to months
  - Greater alignment with business needs that drive revenue
  - Flatter organizations, greater employee engagement
  - Greater customer engagement, greater customer satisfaction

I have seen these things, but they are not the norm!
**QSM State of Agile**

- 37% faster time to market
- 16% more productive teams
- Maintain defect counts with 50% schedule cut

According to Jeff Southerland:

“The average Scrum team delivered a 35% improvement in velocity at Yahoo where teams properly coached delivered 300–400% improvements.”

Time frame from idea to release dropped to 6 months from almost a year.
The most comprehensive study to date:

- Dr. David Rico has explored Agile Business Value and ROI for Agile Methods.
  - Measurement of ROI for implementing a model such as ISO, CMMI, PSP, etc.
  - His Agile benefit measures focus only on reducing costs while maintaining current volume and revenue.
  - Some traditional methods did very well relative to Agile methods, though Agile methods did perform well.
  - The primary performance driver was cost to implement.
Basic Research questions

1. Have the implementations of Agile Software Development methodologies been generating reduced costs, increased revenues, and improved performance to constitute a competitive advantage as measured in firm financial performance data?

2. Does the particular Agile Methodology affect overall firm performance i.e. are some Agile Methodologies translating to competitive advantage when compared to waterfall organizations or organizations using other Agile methodologies?

3. Do organizations that implement Agile methodologies exhibit improvement after the implementation and what, if any, is the lag time before improvements occur? Does this vary by methodology?
Challenge 1: How to show Firm Financial Performance Improvement

- Proving performance impacted by methodology
  - There are so many factors that can impact firm financial performance that even great results could remain virtually undetectable.

- Financial metrics?
  - Traditional metrics such as Return on Equity and Return on Assets don’t necessarily capture operational efficiency. Neither would net sales, gross sales, or revenues.
  - Stock price could be a proxy, but there is a well documented phenomenon that implementation of improvement efforts often leads to improved stock performance, regardless of actual impact.
  - Operating Expense Ratio should capture both improved sales and revenues as well as reduced operating expenses.
Identify organizations where impacts in the development organization will have the largest impact on the company bottom line.

- This means primarily software development organizations, either product or SaaS, where even more modest results have a chance at showing up in the bottom line.
- Also, it means I need organizations where the vast majority of the organization is utilizing similar methods. Most likely small to mid size organizations, or organizations that have an Enterprise model.
1. Have the implementations of Agile Software Development methodologies been generating reduced costs, increased revenues, and improved performance to constitute a competitive advantage as measured in firm financial performance data?

- This should be straightforward. Just take a list of companies and perform a Two Sample T test in Minitab based on whether they are using Agile or Traditional methods. Perform this for chosen financial metrics and see if there are differences.

*example of data output using dummy data*
According to the Version One State of Agile report:

- “A total of 43% of respondents worked in development organizations where the majority of their teams are agile. Only 4% of respondents work in a completely traditional/ non-agile development organization. Contrast this with the 2009 report, in which (31%) of the respondents worked where there were two teams or less practicing agile!”

In other words, I have been unable to find target organizations that predominantly use traditional methods.
Testing the hypotheses

2. Does the particular Agile Methodology affect overall firm performance i.e. are some Agile Methodologies translating to competitive advantage when compared to waterfall organizations or organizations using other Agile methodologies.

- Again, relatively straightforward. Using One Way Analysis of Variance (ANOVA) I can detect significant differences between the means of organizations predominantly using different methodologies.
- Then, using Tukey’s Honest Significance Test I can perform a pairwise comparison of the means.

*example of data output using dummy data
Testing the hypotheses

3. Do organizations that implement Agile methodologies exhibit improvement after the implementation and what, if any, is the lag time before improvements occur? Does this vary by methodology?

- This is difficult. I can perform a 2 factor T test to show ‘before and after’ behavior, repeated measures ANOVA (probably best).
Now the boring part is over........

Time permitting....
Ninja!

- Circle with 5–10 people
- Choose facilitator to start round by saying “Bow to your opponents”
- Hands together and bow
- Strike a “Ninja” pose with 1 hand behind back
- Game begins to left of facilitator or with last winner
- Try to slap hand of anybody else in circle
- You can dodge slaps but must remain still otherwise unless you are slapping
- If your hand is slapped, you are out