Agile Team Perceptions of Productivity Factors

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Who are we?
Today’s Agenda

1. **Understand** the **motivation** to explore Productivity in the Agile field

2. **Discuss** software productivity **definitions** and factors

3. **Share our findings** on agile team perceptions of productivity factors
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Agile phenomenon

Approach that simplify the software development process

Aim to shorten the development time and deal with the inevitable changes resulting from market dynamics

Rapidly became mainstream development approaches
Agile productivity claims

2008

– 82% of participants indicated that agile teams have somewhat higher or much higher productivity
  • 3,061 participants in 80 countries

2009 and 2010

– One reason to adopt agile: Increased productivity
  • 2009: 2,570 participants from 88 countries.
  • 2010: 4,770 participants from 91 countries.
Lack of empirical evidence

- Evidence based Education
  - Professional Wisdom
    - Individual Experience
    - Consensus
  - Empirical Evidence
    - Scientifically-Based Research
    - Empirical Information
There is growing evidence from the research community

(Martin Fowler, “Answering the ‘Where is the Proof That Agile Methods Work’ Question”)
But:

- Recent studies discuss productivity factors\(^1\), including *development method* as a factor
  - none consider how agile methods can influence team productivity.

- Dybå and Dingsøyr\(^2\) reviewed 36 research studies and found:
  - 4 studies analyzing the impact of agile methods on team productivity using *Lines of Code (LOC)*.
Software development is knowledge work, whose nature is far more complex and harder to evaluate than LOC.
Knowledge Workers (KW) are described as high-level employees applying theoretical and analytical knowledge, acquired via formal education and experience, to develop new products or services\(^1\)

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Defining software productivity

• Traditionally, *productivity* refers to the amount of work, accomplished in a specific amount of time → Output/Input.
  – LOC/hour
  – Function points/hour
  – Story points/iteration (~ team velocity)
Defining software productivity

• Traditionally, *productivity* refers to the amount of work, accomplished in a specific amount of time → Output/Input.
  – LOC/hour ×
  – Story points/iteration (~ team velocity) OR Function points/hour
    • They still express only the notion of *volume/quantity*
    • Do not necessarily imply in *customer satisfaction/value*
Towards a definition of agile team productivity

“Satisfy the customer through early and continuous delivery of valuable software…”

“Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.”

(Some principles of the Agile Manifesto)
Agile (knowledge worker) team productivity

• (some) Knowledge worker productivity dimensions

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Our Research Questions

1. How do agile teams define productivity?

2. What do agile team members identify as the main factors impacting on productivity?
   - How do these factors impact positively, or negatively on the productivity of agile teams?

3. Which agile practices are perceived to impact on a given team's productivity?
Partner companies

• We conducted 2 case studies:
  ▪ 2 Brazilian large (> 250 employees) companies
    ▪ Financial
    ▪ Cloud computing/data center

• Selection criteria:
  ▪ Applying agile methods for, at least, 2 years
  ▪ Projects
    ▪ running for, at least, 6 months
    ▪ > 4 team members
Research steps

• 6 months:
  – Visiting
  – Watching
  – Learning
  – Recording
Iterative process within and among interviews to identify and describe: productivity concepts and factors.

Exploring the relationship between concepts and factors.

Links to the research on literature.
I. How do agile teams define productivity?

Most **team members** (total = 13) **did not share the same understanding of the concept of productivity**

- **3** mentioned **timeliness** is a criterion for measuring or perceiving agile team productivity.
- **3** mentioned **quantity** (~ traditional productivity definition)
- **2** mentioned **quality**
- only **1** mentioned **customer satisfaction** as a criterion
- In most of the interviews, the team member’s definition for productivity was unclear for the researchers
I. How do agile teams define productivity?

But if a team delivered high quality software on time, **without satisfying the customer**, they would not achieve the overall iteration/release goals → they would not be productive!
2. What do agile team members identify as the main factors impacting on productivity?

Team composition and allocation (+/-)

- Mixed teams
- Small teams
- Full time allocation
- Whole teams
2. What do agile team members identify as the main factors impacting on productivity?

- (+) Mixed teams
  - Experienced team members contribute to work adding knowledge, while others contribute being flexible

- (+) Small teams
  - Better communication and alignment among team members
  - Easier conflict management and coordination
  - Sense of commitment and responsibility

- (+) Full time team members
  - Team more focused, without work interruptions

- (-) Whole teams
  - Important to have all required skills on the team, which is difficult to provide
2. What do agile team members identify as the main factors impacting on productivity?

- External dependencies (-)
- (poor) Inter-team coordination policies
- (lack of) Sense of teamwork
2. What do agile team members identify as the main factors impacting on productivity?

- **External Dependencies**
  - (-) Organizational definitions/policies do not consider agile team needs
    - Coordination of external dependencies is not compatible with the agile project pace
  - (-) External teams do not consider themselves part of team
    - This compromises teamwork and focus on project’s overall goal
2. What do agile team members identify as the main factors impacting on productivity?

Staff turnover (-/+)

- resign
- retire
- recruit
- sack
- make so
- promote
- give notice
- (early) retirement
- fire
- dismissed
- take on
- dismiss
- absenteeism

Staff Turnover
2. What do agile team members identify as the main factors impacting on productivity?

- **Staff turnover**
  - (-) Loss of critical knowledge due to lack of documentation, even using job rotation
  - (+) Opportunity to learn new things and make improvements
3. Which agile practices are perceived to impact on a given team's productivity?

Pair programming (+/-)
3. Which agile practices are perceived to impact on a given team's productivity?

- **Pair programming**
  - (+) Enables knowledge dissemination
    - Even when team members work on different schedules.
    - Especially when people have different backgrounds (e.g., domain vs technical).
  - (+) Helps in creating commitment, supportiveness and trust. Increases the level of communication.
  - (-) Full time pair programming
    - Counter-productive and demotivating in easy tasks
    - Controversial issue when resolving complex tasks - it depends on the individual cognitive process of problem solving.
3. Which agile practices are perceived to impact on a given team's productivity?

Collocation (+)
3. Which agile practices are perceived to impact on a given team's productivity?

- **Collocation**
  - (+) Helps in requirements negotiation and planning (re-planning)
  - (+) Improves communication and cooperation.
  - (+) Varies as a function of the workspace layout
    - Even when the team is collocated, team members want to be radically collocated
In short, we hypothesize

- Coordination processes used to manage external dependencies matter
  - impact on agile team productivity, due to the need for synchronization between the teams involved;
- Task complexity degree affects motivation to work in pairs, which in turn, affects productivity
  - In easy or complex tasks
- Workspace layout matters for productivity
  - even when teams are radically collocated.
Questions and answers

Thanks!

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