

Beliefs Underlying Teams Intention and Practice: An Application of the Theory of Planned Behavior

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Topics

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Research Context

- Long-term case study involving with **real world data** of software industry → 2,5 years in 2 cycles:
18 months +12 months.
- For the **1st cycle¹**, we employed a **combination of techniques**: observation, interviews, document analysis and focus group.
- For the **2nd cycle** (phase I) ² using TRA model, we conducted **focus group meetings** and **interviews** with professionals involved in agile software projects.
- For the **2nd cycle** (phase II) using TPB model from a set of **interviews** with practitioners. → *(the focus of this paper)*

[1] Passos, C., Braun, P., Cruzes, D., Mendonça, M. 2011. *Analyzing the impact of beliefs in software project practices*. Proc. of ESEM'11, Banff-Alberta, Canada, September.

[2] Passos, C., Cruzes, D., Mendonça M. *Applying Theory of Reasoned Action in the Context of Software Development Practices: Insights into Team Intention and Behavior*. Proc. of EASE'13, Brazil, in press.

Paper Motivation

- To identify and characterize significant relationships between **team belief system** and **software practice**.
- Understand how a **team belief system** and their **underlying factors** actually influence software industry **practices**.
- And contribute to an improved understanding on **how to apply behavioral theories** to study SE practices.

Case Study Goal

- A study to characterize a **belief system** by applying the Theory of Planned Behavior (TPB)^{3,4} to project teams in terms of **origins**, **sources** and **impacts** of beliefs on **software development practices**.

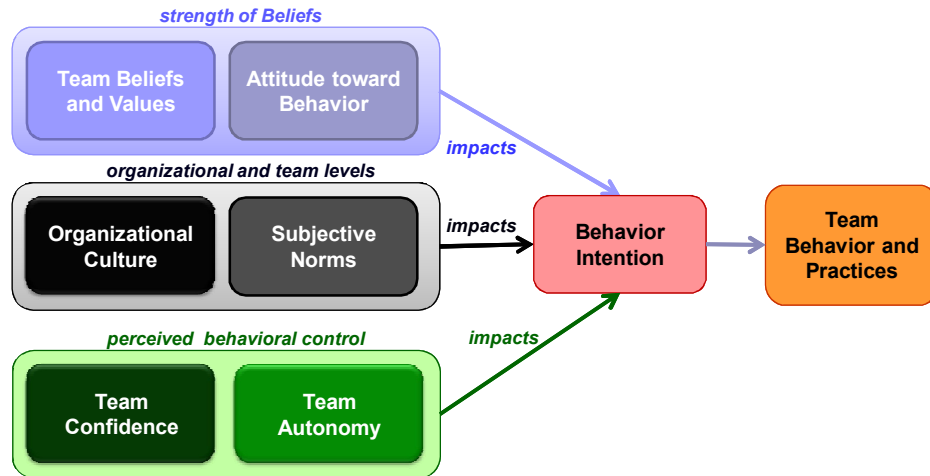
[3] Ajzen, I. "From intentions to actions: A theory of planned behavior". In J. Kuhl & J. Beckman (Eds.), *Action control: From cognition to behavior* (pp. 11–39). Berlin: Springer-Verlag, 1985.

[4] Ajzen, I. "The Theory of Planned Behavior". *Organizational Behavior and Human Decision Processes*, 50(2):179–211, 1991.

Research Questions

- RQ1. How do **beliefs** and **attitude** influence **team practices** in software organizations?
- RQ2. How do **organizational culture** and **subjective norms** influence software team **behavior** and **practices**?
- RQ3. How do **team autonomy** and **confidence** impact software **practices**?

Conceptual Framework



[4] Ajzen, I. "The Theory of Planned Behavior". Organizational Behavior and Human Decision Processes, 50(2):179–211, 1991.

Methodology

- The study involved **professionals** from different project teams in **3 companies**.
- We applied an **interview approach**, asking **insightful questions** and drawing **the projects context**.
- During the process, all the perceptions and difficulties were **recorded** and **compared** with the **qualitative research literature** and relevant examples of **application of TPB**.

Interview Questions

- Based on *storytelling* technique – the **war story**⁵ form;
- The questionnaire structure was composed of:
 1. **Warm-up questions** → introduction to the subject.
 2. **Past experience questions** → influence of living experiences.
 3. **Lessons learned questions** → beliefs that emerged and evolved during the software project.
 4. **Reaction questions** → participants' reactions and opinions.
 5. **Metric-based questions** → beliefs related to practices and project results.

[5] Lutters, W.G., Seaman, C.B. "Revealing actual documentation usage in software maintenance through war stories". IST 1(49):576–587, 2007.

Case Study Context

Table 1. Companies under Study

Company	Age	Personnel	Software Process Certification
1	11 years	800	ISO-9001 and CMMI Level 2
2	03 years	15	---
3	19 years	42.000	ISO-9001 and CMMI Level 3

Table 2. Participants Profile

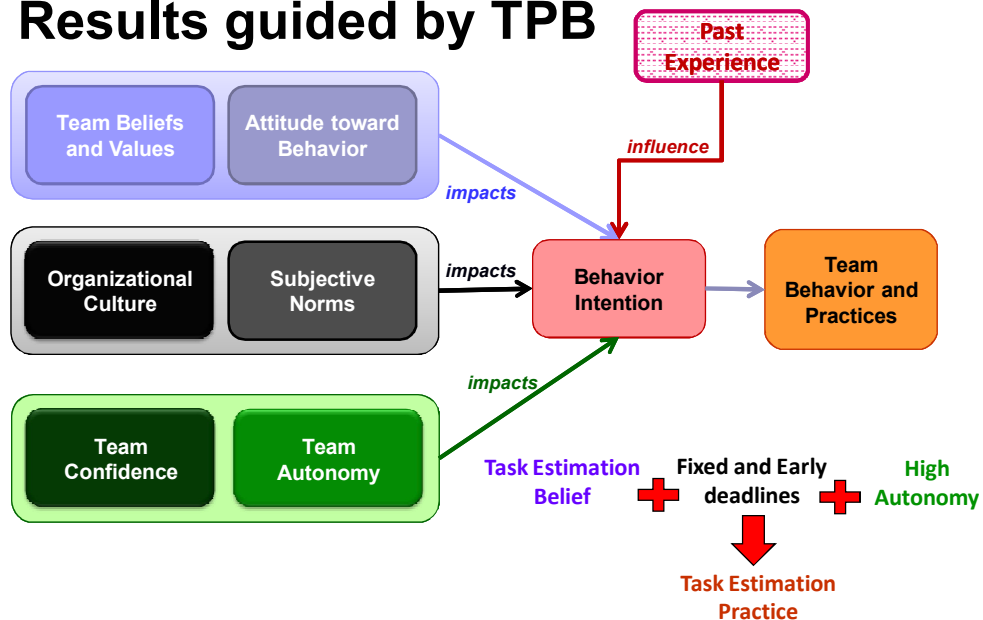
Software Practitioners			
Company	Project	Roles	Experience
1	STF	Development Center Manager	> 10 years
1	STF	Coding Leader	> 03 years
1	STF	Technical Leader	> 03 years
2	FD	Scrum Master	> 03 years
2	FD	Developer	02 years
2	FD	Developer	01 year
3	SIG	Project Manager	> 03 years
3	SIGEP	Project Manager	> 03 years
3	DO	Quality Manager	01 year

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Main Results – Salient Beliefs

Belief Class	Belief	Attitude	Organizational Culture	Perc. Behav. Control	Impact	Impact Type
Process	Project management using SCRUM Methodology.	Toward agile software process	IT market and competition	High confidence	Productivity Quality Effectiveness	+
Task Estimation	Project management using SE metrics supported by tools.	Toward precise task estimation practice	Motivated by fixed and early deadlines	High autonomy	Response Time Prj. Monitoring	+
Project Mgmt	Bad project management increases the chance of failure in software projects.	Toward task delivery	High deadline pressure	Low autonomy Low confidence	Quality Rework Scope and cost	-
Knowledge Mgmt	Knowledge sharing practice through software documentation and planning increases the chance of success in software projects.	Toward project information sharing	CMMI certification program	High confidence	Quality Productivity Response Time	+

Results guided by TPB



Conclusions and Further Work

- **TPB** fits well in the context of SE practices and serves as a **good theoretical framework** in mapping software project teams' **behavior**.
 - **Beliefs** and **attitude** emerge and evolve from **past experiences**.
 - The **organizational culture** can reinforce the strength of the **team beliefs**.
 - High **team confidence** can lead to **positive** impact on **team effectiveness**.
- **Next Step** → to finish the **last research** cycle, reflect on the **data collected** and then **evolve** into a journal paper and my PhD thesis.

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THANK YOU !!!

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