

Forces that Support Agile Adoption in the Automotive Domain

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The ability to develop and deploy high-quality software at a high speed gets increasing relevance for the competitiveness of car manufacturers. Agile practices have shown benefits such as faster time to market in several application domains. Therefore, it seems to be promising to carefully adopt agile practices also in the automotive domain. This article presents findings from an interview-based qualitative survey. It aims at understanding perceived forces that support agile adoption. Particularly, it focuses on embedded software development for electronic control units in the automotive domain. The used research method and the selection of participants are described in detail in another article [Ho16] presenting perceived forces that prevent agile adoption.

Perceived Forces on Agile Adoption

We define six categories of forces on agile adoption. The aim of this categorization is to better understand different aspects of the transition process from traditional to agile development practices. We distinguish between "trigger", "push" and "pull" as forces that lead to agile adoption. In contrast, we define "inertia", "anxiety", and "context" as forces that prevent agile adoption (see [Ho16]). The interplay of forces is shown in Figure 1.

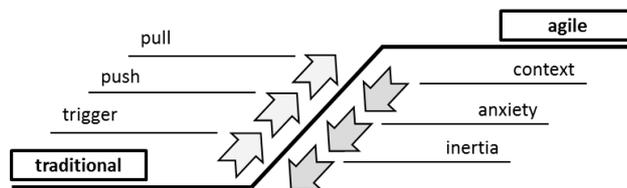


Figure 1: Perceived Forces on Agile Adoption

Trigger forces initiate a change of an individual or an organization towards agile adoption. Push forces drive an individual or an organization towards adopting agile practices based on issues or demands. Pull forces come into effect when individuals or organizations are pulled towards agile adoption based on the attractiveness of a future situation.

Trigger: Most interviewees mention that the market applies pressure on development time. There is an emerging demand to understand and react to customer needs faster.

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Agile software development is seen as a potential solution to keep pace. The study participants mention the necessity to shorten the development time without loss of quality and at a reasonable price.

Push: Forces that push agile adoption are primarily connected to software quality. The interviewed developers expect that an increase of internal releases and incremental builds will improve software quality. They mention that it is easier to detect and remove defects during development than later during integration. Another force that pushes agile adoption is the need to shorten release cycles for new features. The managers see that current release cycles are too long. Features which are implemented in an agile way could be delivered faster to the customer and launched with profit. Furthermore, they state the importance of customer involvement. A fast feedback could, for example, prevent unprofitable development. Several participants consider that agile methods are applicable in situations where mechanical integration and tests are not heavily needed. Therefore interviewed participants employed in software development teams without mechanical integration introduced agile practices already. They were able to integrate and test their software virtually without time consuming endurance tests. Nevertheless, there is a need for better system integration and simulation environments (such as virtual verification environments).

Pull: An important pull force for software developer is the possibility to learn faster from internal and external customer feedback. This is seen as a means to increase the quality of specifications and code. Most of the developers expect that with agile practices they will be able to implement more features in the same time. The participated managers mention that top management considers agile practices as a necessary element of a future-proof organizational structure.

Conclusion

The study deals with perceived forces that support the adoption of agile practices. We distinguish between "trigger", "push" and "pull" as forces that lead to agile adoption. Summarizing, the automotive domain realizes the necessity of agile software development in order to keep pace with the market situation. Based on triggers and pull forces the automotive industry is therefore pushed for a change. However, full adoption of agile practices into current development processes is seen as challenging, e.g., due to the lack of appropriate simulators that support continuous integration. Manual tests and endurance test with a real car are still necessary. Overall, investment in a sound agile transformation of automotive software development is seen as essential for future success.

References:

[HO16] Hohl, P., Münch, J., Schneider, K., and Stupperich, M. 2016. Forces that Prevent Agile Adoption in the Automotive Domain. In *Product-Focused Software Process Improvement*, Eds. 10027. Springer International Publishing, Cham, 468–476.