Panel Discussion "Current Issues and Future Prospects of Agile MDE"

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Abstract

This panel involved three participants, Avi Shaked (University of Oxford, UK), Yves Wautelet (KU Leuven, Belgium), Joost Noppen (BT Digital, UK), and was chaired by Hessa Alfraihi.

The panel discussed the following topics and questions:

- Can you discuss some strategies for integrating Agile methodologies with Model-Driven Engineering (MDE)?
    - What key elements should we focus on when trying to integrate Agile and MDE?
- Challenges in agile MDE adoption:
    - What are some of the most common challenges organizations face when adopting agile MDE?
    - How can organizations overcome these challenges?
- Impact of agile MDE on project success:
    - How does an agile MDE approach contribute to the success of a software project?
    - Can you share an example of a project where an agile MDE approach played a significant role in its success?
    - Does the application of agile MDE contribute to better project timelines and budget control?
- Tools and technologies for agile MDE:
    - Are there any specific technologies that you believe are essential for successful agile MDE implementation?
    - Can you share some tips or strategies for selecting the right tools and technologies for agile MDE?
- Future trends for agile MDE:
    - How do you see agile MDE evolving in the next five years?

- Are there any upcoming trends in agile MDE that you're particularly excited about?
- How can advancements in artificial intelligence and machine learning influence agile MDE practices?
- How can we prepare for the future trends in agile MDE? Are there any particular skills or knowledge areas to focus on?

1. Discussion Summary

The workshop panel discussion centered on the fusion of Agile methodologies and Model-Driven Engineering (MDE), the adoption challenges, impacts on project success, and the indispensable tools and technologies for agile MDE implementation. Additionally, the panelists provided insights into the future trends of agile MDE, with emphasis on the role of AI and ML in its evolution.

1.1. Integration of Agile and Model-Driven Engineering

Panelists stressed that the integration of Agile and MDE involves a blend of management and technical processes. Successful integration demands a focus on change management within organizations and a firm grasp of Agile's principles before introducing MDE. They highlighted that the Agile approach's flexibility complements the precision of MDE, leading to efficient development cycles and high-quality software solutions.

1.2. Challenges in Agile MDE Adoption

The adoption of agile MDE presents challenges, primarily stemming from organizational culture and existing systems. Panelists emphasized that organizations need to ensure the proper employment of Agile methodologies before layering in MDE. Establishing strong change management frameworks can help to overcome these challenges.

1.3. Impact of Agile MDE on Project Success

The panelists agreed that MDE significantly contributes to project success by improving communication, enhancing adaptability, and ensuring a higher degree of precision in design and development [2, 8]. These MDE advantages can be all the more in Agile development scenarios, supporting efficient interpersonal collaboration and team communication and allowing for functional software where documentation is sparse. The panelists discussed the application of MDE in the financial domain and academia, with examples of projects where an agile approach to MDE played a pivotal role in achieving objectives within timelines and budgets [1, 7].

1.4. Tools and Technologies for Agile MDE

Better tool support was cited as a critical need for successful agile MDE implementation. The panelists did not point to any specific technology but rather emphasized the importance of selecting tools that best fit an organization's needs and objectives. Computer Aided Software Engineering (CASE) tools combining Agile life cycle management with MDE support would be valuable. These would support an interface showing how instanciated models (diagrams) could be partially implemented in sprints, or interfaces combining a user story view for backlog management traceable within model elements [4]. There was also a perceived need for better web-based MDE tools, in contrast to traditional desktop IDE support for MDE. The panelists encouraged openness to emerging technologies and continuous toolset evolution to keep pace with changing requirements and advancements.

1.5. Future Trends for Agile MDE

The future of agile MDE, according to the panelists, holds a lot of promise. They expect advancements in artificial intelligence and machine learning to influence agile MDE practices significantly. The panelists were particularly excited about these trends, highlighting that embracing them will lead to improved automation, efficiency, and software quality. They urged organizations to focus on expanding their knowledge and skills in these areas to leverage future opportunities.

Regarding the potential of large language model (LLM) tools such as ChatGPT [9] in agile MDE, the panelists agreed that this AI technology could play a significant role in the future [3]. LLM tools could facilitate real-time communication, provide instant feedback, and ensure 24/7 support, leading to improved Agile practices. They can automate various tasks, such as backlog management, sprint planning, daily stand-ups, and even retrospectives, leading to increased efficiency and productivity.

In terms of Model-Driven Engineering (MDE), LLMs and similar technologies can be programmed to understand and process modelling languages, provide suggestions for model optimizations, or even generate code from models [5, 6]. The potential for automated error detection and correction in models is another exciting prospect, which could significantly reduce the time spent on debugging and improve the quality of the software.

However, the panelists also warned of the challenges of integrating such AI systems into agile MDE, especially in terms of data privacy, security, and the need for significant training data. Despite these potential obstacles, the consensus was that AI and machine learning, including technologies like LLMs, represent a promising future trend in agile MDE practices.

2. Conclusions

The overall view from the panel was that agile MDE as an integration of MDE in Agile is an industry trend, because some domains having a considerable complexity de facto do require modeling when developed in an agile fashion. Combining Agile and MDE methods has also been shown to be feasible and beneficial in terms of project success and reducing development time and costs, however there are challenges both technical and managerial in the integration of Agile and MDE. Effective implementation of Agile principles and change management is a necessary preliminary to the adoption of agile MDE. Appropriate supporting tools are also of high importance. There are promising future prospects for increased software development automation via AI and ML, which could be particularly relevant for reducing effort and timescales for agile MDE projects.

References

[1] H. Alfraihi and K. Lano, *The integration of agile development and model driven development: A systematic literature review*, 5th International Conference on Model-Driven Engineering and Software Development, 2017.

[2] H. Alfraihi and K. Lano, *Trends and Insights into the use of Model-driven engineering: a survey*, SAM/MODELS, 2023.

[3] Palash Bera, Yves Wautelet, Geert Poels, *On the Use of ChatGPT to Support Agile Software Development*, In Proceedings of the Agile Information Systems Engineering Workshop at the 35th International Conference on Advanced Information Systems Engineering (Agil-ISE@CAiSE 2023), 2023, pp. 1–9.

[4] Maxim Bragilovski, Fabiano Dalpiaz, Arnon Sturm, *Guided Derivation of Conceptual Models from User Stories: A Controlled Experiment*, In Proceedings of the 28th International Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ 2022), 2022, pp. 131–147.

[5] J. Camara, J. Troya, L. Burgueno, A. Vallecillo, *On the assessment of generative AI in modeling tasks*, SoSyM vol. 22, 2023.

[6] Abhimanyu Gupta, Geert Poels, Palash Bera, *Generating Multiple Conceptual Models from Behavior-Driven Development Scenarios*, Data & Knowledge Engineering, vol. 145, 2023, article no. 102141.

[7] Sara Shafiee, Yves Wautelet, Lars Hvam, Enrico Sandrin, Cipriano Forza, *Scrum versus Rational Unified Process in facing the main challenges of product configuration systems development*, Journal of Systems and Software, vol. 170, 2020, article no. 110732.

[8] Monique Snoeck, Yves Wautelet, *Agile MERODE: A Model-Driven Software Engineering Method for User-Centric and Value-Based Development*, Software and Systems Modeling, vol. 21, no. 4, 2022, pp. 1469–1494.

[9] W. Zhao et al., *A survey of large language models*, arXiv:2303.18223v10, 2023.