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**Interpersonal and contextual factors in the development of
intelligent social systems
a mixed-methods approach on software development teams
working in a self-organised environment
using agile working methods.**

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Abstract

This report of the research results gives insights into the progress, status, and plans of the dissertation project, which started in October 2019. It consists of two major parts: firstly, the status of the dissertation project in July 2021 will be given, including an overview of the activities done in the second year. Furthermore, an overview of the three conducted studies will be provided. Secondly, this report gives a preview of the planned activities for the third year. The initial title is a working title, and there will be a request for modification at the end to the Committee. It is the case since the focus of this dissertation project shifted in agreement with the supervisors to quantitative measures of the perception of members of software product development teams at work.

Keywords: Work and organisational psychology, organisational development, software product development

1 Introduction

Being innovative is essential when aiming to remain successful and thrive globally (Brand et al., 2021; Brem & Nylund, 2021). Technological innovations positively influence organisations, whereby technology organisations experience high competition (Heinze & Heinze, 2020; Jahanshahi et al., 2020). With increasing changes in modern organisations and their environments, continuous learning and innovations are becoming increasingly important to stay competitive. Furthermore, organisations are dependent on capable individuals and multi-disciplinary teams since teamwork promotes individual participation, the willingness to try, learning motivation, loyalty, and creativity. Those effects are relevant for high performance, change, and innovation and essential for the success of a team and the whole organisation (Brodbeck, Anderson & West, 2000b). Thereby, optimal working conditions benefit employees and organisations alike (Ilies et al., 2017).

Overall, there is an increasing importance of technological solutions, which sets the focus of this dissertation project on members of software product development teams. Furthermore, the influence of disruptive technologies on the innovation climate and the ongoing cultural challenges supports the importance of this target group (Newman et al., 2020; Thorgren & Caiman, 2019). Therefore, this dissertation project aims to examine the perception of members of software product development teams at work. The research is based on three multi-organisation studies in Germany.

This report of the research results and progress contains the current state in 2021, including an overview of the status of the activities, which were started or finished in the second year of the dissertation project. Furthermore, insights will be given into the three conducted studies within the dissertation project. Afterwards, an outlook will be provided on the planned activities for the third and final year and the upcoming focus.

2 Project status 2021

The following chapter will give an overview of the completed activities and the development in 2020 and 2021. Furthermore, insights will be delivered into the status of the three studies of the PhD project.

2.1 Status of activities

In the second year of the PhD program, the following activities are started, respectively completed:

- **Activity 2: Research Seminars II** offered by FOM was attended in 2019 and 2020
- **Activity 3: Review of a relevant scientific article** was presented to the FOM in 2019.
- **Activity 4: Presentation of a communication in a National Congress** was given in 2020 at the 3rd International Conference on Modern Research in Social Sciences (ICMRSS) in Munich, Germany.
- **Activity 5: Presentation of a poster in an International Congress** was given in 2019 at the International Scientific Conference Modern Economy, Smart Development at the University of Sopron, Hungary.
- **Activity 6: Scientific article** is submitted to the International Journal of Innovation and Technology Management with the title "Do you feel it? The Relationship between the Perceived Team Climate for Innovations and the Experience of Flow and Worry". The paper is based on the research results of the first study.
- **Activity 7: Doctoral Workshop** offered by UCAM was attended in 2020.
- **Activity 8: Presentation of own Research Results and the Research Plan** was done in 2020, with this in 2021, and will be continued in 2022.

2.2 Development in 2020 and 2021

The main effort in the second year went into fulfilling the started or missing activities and designing, conducting, and evaluating the second and third studies. The target group is members of software product development teams.

2.3 Study 1 – Is there a relationship between the perceived team climate for innovations and the experience of flow and worry for members of software development teams?

The research interest of the first study was the climate for innovation and the experience of flow and worry of team members of software product development teams during work. Companies strive to create an environment that is conducive to the development of innovations. Numerous studies have already been conducted on the conditions and positive correlations of the climate for innovation - but hardly any connection with the experience of flow and adverse personal effects (Newman, 2020; Brodbeck et al., 2000; Csikszentmihalyi, 1999; Anderson & West, 1998). Due to prior research on flow experience, this study examined whether team size had a moderating effect. The first study data have been cleaned and analysed ($N = 323$), and the according paper is submitted to a journal that fulfils UCAM requirements.

3.2.1 Study 2 – Does the perceived climate for initiative mediate the relationship between transformational leadership and the climate for psychological safety for members of software development teams?

Due to the first study results, the second study focused on the perceived leadership climate and the extent of perceived psychological safety and climate for initiative ($N = 121$). Transformational leadership means leading through intrinsic motivation with vision, encouragement, trust, values, and competence (Carless et al., 2000). Like pretty much all leadership styles, this one is not entirely uncritical (e.g., Siangchokyo et al., 2020; Banks et al., 2016), but it is most suitable for the work context of interest, since in the field of software product development, for example, a lot of leadership is about

vision and delegation. The concept of psychological safety implies that otherness is tolerated, mistakes are not used against anyone, there is a sense of being able to ask for help and take risks, a mutual appreciation of skills and talents, and being able to raise problems and complex issues (Baer & Frese, 2003; Edmondson, 1999). Initiative means, among other things, setting a focus on solutions instead of problems, wanting to achieve goals, or implementing ideas (Baer & Frese, 2003; Frese et al., 1997).

The second study investigated the relationship between perceived leadership and the experienced climate for psychological safety and whether this relationship is mediated by a perceived climate for initiative (Baron & Kenny, 1986).

3.2.2 Study 3 – Is the relationship between the perceived team-centric transformational leadership and individual team members’ learning mediated by teamwork quality for software development teams?

Continuing the findings and needed contribution of the second study, the third study focused on the perception of members of software product development teams on leadership, the quality of teamwork, and individual learning. The results will support the scientific state of research and provide recommendations for action for organisations. Currently, the results are cleaned and analysed ($N =$ approx. 200). Furthermore, this paper contributes to Mathieu et al. (2019) and their theory of teams as complex systems with the approach to examining mediating variables.

3 Outlook for 2021 until 2022

The following chapter will briefly review the planned activities and the development from 2021 until 2022.

3.1 Planned activities

In the third year of the PhD program, the following missing activities are planned, besides the activities that are already started:

- **Activity 1: Research Seminar I** offered by UCAM will be attended in July 2021

3.2 Upcoming focus

The following months will focus on writing and finishing the monography, which is planned to be handed in in March 2022.

4 Conclusion

Until now, the dissertation project is in time and close agreement and contact with the supervisors. Therefore, currently, there is no risk in sight for the dissertation project to be finished in time as planned. Most of the activities are completed, the missing activities are started or planned. The focus of the following months is on putting all written text parts together and writing the monography.

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