

## 2 Formulation of Research Questions

### 2.1 Motivation for this research

Having managed virtual teams for over a decade in the IT sector, the author has experienced all the issues above at first hand. This included management and participation in successful virtual teams and on teams, which failed. This has provided a natural environment, albeit anecdotally for experimenting with processes that Virtual Software Development Teams (VSDT's) need, to perform well. This has led to the formal research presented in this thesis. During this research, the impact of different tools on the performance of virtual teams was investigated, followed by a study of virtual team processes, as processes are more important than software tools (Ebrahim, 2015). In the experience of the author, processes are more important for the success of a team than tools. If a team has problems with project management, then giving this team a project management software will have very little effects on the team performance, as long as the processes are still missing. Working on the processes first and then think about which tool is supporting the processes will cure the problems (Ebrahim, 2015).

Research on tools for virtual team performance improvement led to an EU Leonardo-programme project called S-Cube (O'Byrne et al., 2013), which had the objective to industrialise a 3D-simulator for interpersonal skills development for social enterprises. The team was composed of project-partners from the Plymouth University, the University of Naples, Cork Institute of Technology and GeProS – German Project Solutions GmbH. As a result of the S-Cube-project, it has been confirmed that the impact of tools on team performance is low. If the tool is not robust, then the negative effects are more significant than its benefits.



During the first phase of the research, the focus was still unclear. There were two different approaches to VDST performance improvements considered: a tool-solution or a process-solution. During the first control group experiment, the process-solution was identified as more promising choice. With processes, an improvement path was possible, which was another disadvantage for the tool-focused research.

Background research also pointed to the need for a maturity model for the management of virtual team performance. This was inspired by experience in the development of the OPM3<sup>®</sup> (Organisational Project Management Maturity Model) for Project Management Institute PMI<sup>®</sup> (Schlichter, Friedrich et al., 2003) and the assessment of the IPMA Project Excellence Award using the maturity model PE – Project Excellence, a derivative of the EFQM-model (European Foundation for Quality Management). Hence, the motivation was high to develop a process-based maturity model that could lead to the performance improvement of virtual teams.

## 2.2 Topic of Research

In order to conduct a scientific research the following research questions below have been developed:

*Research question 1: How can teamwork skills such as leadership, cohesion, trust, communication be fostered virtually through pre-defined meta processes to overcome the issues and challenges of virtual teamwork?*

The S-Cube example above shows that there are differences between co-located teams and virtual teams in their behaviour and performance (Minas et al., 2014; Wildman, 2014 and Griffith, 2015). A few differences are the missing body language, the different know-how in media-skills and the hidden cultural impact. Also virtual team leaders and members need additional competences (Bird, 2008; Mendenhall et al., 2008; Push 2009) to be able to work successfully together. These teamwork skills include, amongst others, leadership, trust building and communication.



Teamwork is organised in processes (Marks et al., 2001; LePine et al., 2008) and leading a virtual team should be possible by having the right processes established, as team processes lead to emergent states and team outcomes (Marks et al., 2001; Ilgen et al., 2005, LePine, 2008). Carter et al. (2015) proposes a process model for virtual team leadership without input, methods and outputs parameters. Their model is based on Marks model and extends Marks work into virtual leadership. Also, Carter et al. model has a process model in principle, it is deviating from today's business reality. For example: The organisational reality is that virtual project leaders have to work with the team members they are assigned. Carter et al. argue for a team selection process, which is correct and outside the organisational reality. This is a shortfall of their model. Hence a process model for virtual teams has to be applicable in the current business realities.

*Research question 2: How can a maturity model guide virtual teams in the development of these processes leading to improved performance?*

Based on the process-model for virtual teamwork, teams should be able to identify where their strengths are and how to improve their team performance by developing emergent states. Particular leaders of IT-projects in the field need guidance, as their understanding of team processes is outside their basic qualification. Virtual IT-teams are composed of technicians and perhaps some members from a business background. They are lacking sound skills in organisational psychology and require a model, which can be used as a "cook book". This approach is used in the IT-industry successfully in the form of maturity models such as CMMi, OPM3<sup>®</sup>, SPICE and others (Ahern, 2004).

Therefore, the process-model needs to be extended into a maturity model, allowing for assessments of current team performance, analysis of gaps and planning of performance improvement activities. The virtual team should identify which performance level is required to achieve the tasks or project. Also, the maturity model needs to bring quick results. Traditional maturity models increase organisational performance over years (Jugdev and



Thomas, 2002). This fact is a reason, why maturity models in organisations are quickly abundant after the first results are presented. Unfortunately, there is little research in the area of applications and results through team maturity models in the IT-industry, as there is little research on the application of general maturity models in the IT-industry (Chuah and Wong, 2011). But the topic of maturity models is relevant for organisations (Krivograd and Fettke, 2012).



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