Executive Summary

Global sourcing and distributed development of software applications have become a business reality in IT industry. Moreover, in order to develop better quality software solutions in lesser time, organizations are blending agile approach with distributed development. It helps the organizations to reap the benefits of both agile and distributed development but pose significant challenges and risks. Comparatively scanty evidence of research on the risks prevailing in distributed agile development has motivated this study. This research work involves a qualitative exploratory study followed by a quantitative descriptive research in order to identify the most significant risk factors impacting distributed agile projects.

The exploratory study was based on in-depth interviews of practitioners and project work document analysis. The research outcome of the explorations was a list of the risk factors that affect distributed agile development (DAD) projects and corresponding risk management techniques that can be used to control them. The qualitative data pertaining to risk factors was analyzed using qualitative data analysis methods to create a ‘Risk Factor Categorization for DAD Projects’. These related risk factors were grouped to form risk areas, which were further grouped to form broad risk categories. The categorization was composed of five broad risk categories, namely, Group Awareness, External Stakeholder Collaboration, Software Development Life Cycle, Project Management and Technology Setup, which further had relevant risk areas. The risk areas were further composed of related risk factors identified through exploration. The risk categories were mapped to the Leavitt’s model of organizational change for facilitating the application of findings in real world. Descriptive study helped us to isolate the risk factors which are most important for DAD projects and the most appropriate risk management methods. It was observed that many risk factors identified in this study have changed in their form and severity from the way these were found in only distributed or agile development environments. Further, the in-depth examination of the risk factors also showed that distributed development has certain inherent properties which are in discordance with the principles and practices which form the foundation of agile development methods. The properties of distributed development include spatial distance, temporal distance, difference in work/development culture, language barrier and large size of projects.
Spatial distance or the extent of physical separation amongst the stakeholders was found to be one of the distributed development dimension, which impacts the distributed agile projects profoundly. This is due to the fact that agile methods rely on frequent and intense communication between the stakeholders, which is very difficult to achieve in case of distributed teams due to geographical separation.

The second property of distributed development to which a major set of risks can be attributed to, after spatial distance, was temporal distance. Temporal distribution may be caused due to geographic separation of the teams over large time zones or due to varying work cadence of the teams or shift work. Temporal distance results in reduction in synchronous interaction between the team members as well. This makes it difficult to realize various agile practices which enhanced communication and leads to a collaborative development environment.

Other distributed software development (DSD) properties like difference in work and development culture, language barrier and large scope of the projects are also responsible for various risks arising in DAD projects, although to a lesser extent. Risk due to difference in work/development culture arises when multiple teams follow different agile practices, engineering practices, tools and standards. Besides work/development culture, difference in spoken language is another aspect of socio-culture distance which hinders communication between the stakeholders. Project size also impacts the success of distributed agile projects because DAD projects usually have large scope, while agile methods primarily support small and medium sized collocated projects. As a result, agile practices need to be supplemented or adjusted so that it supports the projects which are scaled up on the dimension of physical dispersion of stakeholders or scope of the project.

The study also presents the risk management methods which are most frequently used in the industry and hence can be used by the practitioners for reducing the impact of risks in DAD projects. Further, the impact of risk factors on the project constraints like time, cost and quality was also studied. This will help the practitioners to select some specific risk factors from the complete set of risks presented in the risk management framework, which are critical to the
specific constraint relevant to the present project. Besides that, some new risk factors have been experienced by practitioners and need further exploration as their understanding will help the practitioners to act on time.