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**The Agile Methods: An Analytical Comparison of Five Agile Methods and
an Investigation of Their Target Environment**

A thesis presented in partial fulfillment of the requirements for the degree of

Master of Information Sciences

in

Information Systems

at Massey University, Palmerston North, New Zealand

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2005

Abstract

This study defines the systems development methodologies named agile methods and investigates the environmental conditions where agile methods are most suitable.

A definition of agile methods was developed using an analytical comparative framework to investigate five of the earliest published agile methods; Dynamic Systems Development Method, Extreme Programming, Scrum, Adaptive Software Development, and Crystal Methods. The framework decomposed each method into its component parts; philosophy, models, techniques, tools, scope, outputs, practice, and the extent to which the method may be adapted to a situation. Based on this analysis and a literature review, a theoretical model of the target environment for agile methods was developed. This theoretical model is a proposed set of organisation, people, project, technology, and domain factors that relate to the successful use of an agile method.

A mixed method research methodology was used. A qualitative design, consisting of positivist case studies, was used to test the theoretical model. Data was gathered from nine software development projects, both agile and non-agile, using questionnaires and interviews of project leaders. Then cross-case analysis was carried out on each project factor in the theoretical model. The relationship between environmental factors and agile method usage was investigated using non-parametric quantitative data analysis. This led to a revised model of the target environment for agile methods. The empirical data showed that specific organisational culture factors correlate with effective use of an agile method. These include the organisational characteristics of feedback and learning, teamwork, empowerment of people, collaboration, leadership, loyalty, and a results-oriented culture that values entrepreneurship, innovation and risk taking.

This research is significant for method users, those carrying out empirical research into agile methods, and those carrying out studies of systems development methodologies.

Acknowledgements

Many people helped me with this study. I would particularly like to thank the participants, who gave their time to complete a detailed and taxing questionnaire and interview. Their interest and supportive comments helped me to maintain my own interest and to see that this is a study worth undertaking.

I would also like to thank these people from the Massey University Department of Information Systems for their assistance and support: my supervisor Alexei Tretiakov, Lecturer, for guidance and help in finding resources whenever they were needed, my co-supervisor, Roland Kushak, Associate Professor, for targeted critique of the research design, Barbara Crump, Senior Lecturer, for assistance in qualitative research methods and voicing such a positive attitude to the goals and design of this study, and Errol Thompson, Lecturer, for assistance with the pilot study. I am grateful to Erkki Sutinen, Professor of Computer Science at the University of Joensuu, Finland for his suggested improvements.

The following people at Whitireia Community Polytechnic, Faculty of Business and Information Technology provided invaluable help. Pippa Coard, Lecturer, for providing pragmatic, focused and detailed assistance in critiquing the questionnaire, along with positive encouragement and support, Sue Chard and Brenda Lloyd, Senior Lecturers, for helping to locate software developers and with the statistical analysis, and Trish Brimblecombe, Associate Dean, for providing the opportunity, financial support, and the time to devote to this thesis, and assisting to locate software developers. I would also like to thank my colleagues and the senior students, who provided feedback on aspects of this thesis.

My thanks also go to Shane Hastie of Software Education Group, Wellington, for assistance in finding agile method projects.

I would also like to thank Chris Brosnahan for assisting with developing the instrumentation and for his patience.

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