A Mixed Methods Investigation of Ethnic Diversity and Productivity in Software Development Teams

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ABSTRACT

Software has become pervasive across all aspects of society in the developed world and as a result, society has become highly dependent on new software being created for any modern advancement. Much research has focused on reducing the cost to develop software, including understanding what makes software teams more productive. Software teams are increasingly ethnically diverse due to the growth in distributed software development and a globally mobile labour force. Team composition has been found to be a major influence of team performance and ethnic diversity in teams can improve innovation and problem solving. As software development relies on effective teams and often involves solving complex problems, this raises the question of how ethnic diversity within software development teams affects the performance, and therefore productivity of those teams. This research seeks to understand how ethnic diversity in software development teams influences the productivity that those teams achieve. This is important as software related costs represent a significant component of business costs. Furthermore, the cost effective development of new or changed software is critical to support advances in today's technology-dependent society.

A mixed methods research approach has been used in this study with an emphasis on qualitative data. This is the first mixed methods study of productivity in New Zealand software development projects and represents a unique examination of the sociological effects of ethnic diversity in software projects. Using a conceptual model of software development as a socio-technical system, project documents and interviews with project managers were analysed. A detailed analysis reveals themes and patterns regarding the influence of ethnic diversity in software development productivity. The qualitative data has been complemented with quantitative analysis of the project data using the productivity model embodied in the software development cost estimation model COCOMO II combined with indices measuring ethnic diversity. Ethnic diversity improved team problem solving and

innovation on complex software projects but hindered some aspects of communications which negatively influenced productivity, particularly on large projects. Ethnic diversity could either enhance or impair team cohesion, depending on whether the project manager took steps to build relationships and trust within their team.

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