

A Quantitative Framework for Measuring and Prioritising Technical Debt in Mission Critical Trading Information Technology Services

Defining Project Methode for MSc Computing Project

Tobias Zeier, 12696372, the 8th of February 2026
University of Essex Online

1 Introduction

This document outlines the proposed project management approach and research methodology for the capstone project titled A Quantitative Framework for Measuring and Prioritising Technical Debt in Mission Critical Trading Information Technology Services. As this is a formative submission, the intention is not to present a fully developed methodology, but to demonstrate an informed and appropriate selection of research techniques aligned with the nature of the project. The project is situated within computing and enterprise IT management and addresses a practical organisational problem through artefact development and empirical evaluation.

2 Project Management Approach

The project is managed using a plan driven approach with limited iterative refinement. This choice reflects the fixed submission deadlines, defined assessment criteria, and the requirement for a coherent and traceable academic contribution. A fully agile approach would assume flexible scope and evolving objectives, which is unsuitable for a Master's dissertation where the research aim and deliverables must be stabilised early (Thesing, Feldmann and Burchardt, 2021).

However, iteration is incorporated within specific phases, particularly during framework design and artefact implementation, where insights from literature and data analysis may require refinement. This hybrid approach aligns with traditional engineering project management practices and ensures both control and adaptability. The overall

structure resembles a staged or waterfall model, with clearly defined milestones, dependencies, and a critical path (Pervoukhin *et al.*, 2020).

3 Research Methodology and Data Collection

The project adopts a design science research methodology, which is appropriate for computing focused projects that aim to design and evaluate an artefact addressing a real world problem. Rather than testing theory alone, design science emphasises purposeful artefact creation and evaluation, which aligns with the project's aim.

The research will begin with a structured literature review following the principles outlined in the Research Onion framework, focusing on technical debt, service management, and operational risk. Based on this review, a conceptual framework will be designed and implemented as a prototype artefact.

Data collection will rely on anonymised operational service data from a single organisational case study. Data will be prepared, analysed, and used to evaluate whether the artefact produces meaningful and operationally useful outputs. This approach balances academic rigour with practical relevance and is well suited to an MSc level computing project (Muntean and Militaru, 2022).

Word Count: 358

References:

Muntean, M. and Militaru, F.D. (2022) 'Design Science Research Framework for Performance Analysis Using Machine Learning Techniques', *Electronics*, 11(16), p. 2504. Available at: <https://doi.org/10.3390/electronics11162504>

Pervoukhin, D., Isaev, E., Rytikov, G., Filyugina, E. and Hayrapetyan, D. (2020) 'Theoretical comparative analysis of cascading, iterative, and hybrid approaches to IT project life cycle management', *Business Informatics*, 14(1), pp. 32-40. Available at: <https://doi.org/10.17323/2587-814x.2020.1.32.40>

Thesing, T., Feldmann, C. and Burchardt, M. (2021) 'Agile versus Waterfall Project management: Decision Model for Selecting the Appropriate Approach to a Project', *Procedia Computer Science*, 181(1), pp. 746-756. Available at:
<https://doi.org/10.1016/j.procs.2021.01.227>