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

Planning and Risk Identification for MSc Computing Project

Tobias Zeier, 12696372, the 5th of February 2026
University of Essex Online

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1 Major Project Steps and Time Estimates

#	Step	Description	Estimated Time
1	Project initiation and proposal	Define project scope, research objectives, and complete the research proposal and ethical approval process.	6 weeks
2	Literature review and gap analysis	Critically review technical debt, service management, and operational resilience literature and identify the research gap.	4 weeks
3	Research design and data strategy	Define research philosophy, methodology, case study design, and data collection strategy.	3 weeks
4	Framework design	Identify service-level technical debt indicators and design and validate a multi-criteria decision-making framework (e.g. TOPSIS) to compute a quantitative technical debt score.	5 weeks
5	Data preparation and analysis design	Extract and prepare anonymised data and define the analytical and validation approach.	3 weeks
6	Artefact implementation	Implement the TOPSIS-based technical debt scoring model as a prototype artefact (with an optional Monte Carlo simulation component for limited predictive analysis).	3 weeks
7	Empirical evaluation	Apply the artefact to the case study data, analyse the resulting technical debt scores and rankings, and examine their relationship with historical	1 week

		service management metrics (e.g. incidents, MTTR, change failure rate).	
8	Writing and submission	Integrate findings, finalise the dissertation, and submit.	3 weeks
9	Presentation and defence	Prepare presentation materials and complete the oral defence	2 weeks

Table 1: Project Plan for MSc Project (Zeier, 2026)

2 Time Constraints

While the university recommends an estimated time commitment of 600 hours for this project, the student can realistically invest 500 hours. This adjustment accounts for the demands of full-time employment and personal obligations, resulting in a weekly commitment of approximately sixteen to seventeen hours. To ensure the work remains thorough and achievable, the project scope has been adjusted to fit within this timeframe without compromising the quality of the final submission.

3 Gantt Chart

To ensure the primary text remains concise and to facilitate optimal readability, the Gantt Chart detailing the project timeline has been included as an appendix. This visual representation of the project schedule can be accessed via my e-Portfolio at the following URL:
https://github.com/TobiZeier/UoEO_MSc_EIM/blob/main/Module8_MSc_Computing_Project/Unit2-GanttChartMScProject.pdf

4 Key Project Risks and Mitigation Measures

Risk	Potential Impact	Mitigation Strategy
Limited data availability or quality	Weak empirical evaluation and reduced validity	Use multiple indicators, clearly document assumptions, and acknowledge limitations.
Scope creep	Delays and incomplete artefact	Strictly limit the framework to service level indicators and prioritisation.

Over complexity of the framework	Reduced clarity and examiner criticism	Prioritise interpretability over sophistication by focusing on a single primary MCDM model (TOPSIS) with only minimal, clearly scoped Monte Carlo extension.
Time constraints due to full time employment	Delayed milestones	Follow a structured weekly plan, freeze artefact scope early (one core MCDM model), and plan the project around an available capacity of approximately 500 hours.
Weak alignment between research question and analysis	Loss of academic coherence	Continuously map methods and results back to research objectives.
Ethical or confidentiality constraints	Restrictions on data use	Use anonymised and aggregated data only.

Table 2: Risk Identification and Mitigation Strategies for MSc Project (Zeier, 2026)

Word Count: 500

References:

Zeier, T. (2026) A Quantitative Framework for Measuring and Prioritising Technical Debt in Mission Critical Trading Information Technology Services. *CSPROJ: MSc Computing Project January 2026*. Essay submitted to the University of Essex Online.