I divide my evaluation report into several sections, addressing the specific key achievements of the thesis:

**The importance of the thesis outcomes and applicability to other areas**

The thesis covers a significant amount of originality and addresses a very important problem of managing complex software evolution processes. It proposes a comprehensive model to systematically capture evolution of complex applications in various domains. The problem of managing application evolution efficiently is a major and very costly issue in the current enterprises as applications tend to grow and evolve across time.

The thesis outlines a horizontal five-layer application models from the: Extensional model, Operational model, Schema model, PSM (Platform Specific Model), and PIM (Platform Independent Model). These layers show the incremental generalisation of the model. The main contributions of the thesis cover four major domains of the models, including XML systems (XML data), Storage systems (XML or Relational data), Processing (Business Processes), and Resources (REST for web services).

The thesis has demonstrated that the proposed MDA based model is effective for deployment in the four major domains above. These four major domains essentially represent most of the current software system and business processes in commercial applications. This has ultimately demonstrated the applicability of the proposed model in various areas.
Novelty of the work and comparative evaluation

The thesis covers a number of important contributions: definition of new platform-specific models and their operations, the evolution and transformation model, and the prototyping of the framework in DaemonX. Each of the new model definitions is supported by a comprehensive comparison with related work, which further underpins the proposed solution.

The model implementation framework DaemonX has a very interesting plug-in capability that enables different data models to be supported. The proposal in the thesis also extends the model with a schema mapping/integration technique to resolve the issues of multiple schemas within a system. The thesis has also proposed an undo/redo algorithm, which is very critical in any evolution management model to maintain system integrity and to ensure that interconnected changes and inter-dependencies are preserved.

The comparison of DaemonX features with other tools available in the market provides further evident of the novelty of the proposed model. It is clear that both theoretical underpinning as well as practicability aspects have been addressed by the proposal.

Validation and proof-of-concept

The final chapter of the thesis demonstrates a suite of carefully selected experiments on a real world framework. The experimentations validate the effectiveness of the evolution management and propagation algorithms. The chapter also covers some very important non-functional analysis which include complexity and change impact analysis.

General recommendation and points for consideration

Overall, the thesis has addressed the limitations of earlier work in dealing with the complexities of system evolution, particularly in terms of the coverage of the different models (‘breadth’) as well as the detail layers of changes (‘depth’). The thesis is also very well written, with very useful diagrams and illustrations (eg. Figures 1.3 and 1.4).

One suggestion, which may be considered for future improvement, is to perform a cost analysis of managing the software evolution process by comparing the proposed model with the existing practices in software changes management. A demonstration of how the proposed model
manages more efficiently (ie with lower cost) the complexity of identifying side effects or chain of reactions following each particular change, would have a significant commercial benefit to the software system industry.

In conclusion, the thesis has demonstrated the author’s ability to:

(i) identify an important research problem in the evolution management area, and

(ii) propose a solid methodology, framework and proof of concept that contribute to the core area of complex software maintenance.

I believe the thesis has satisfied the requirement of a Doctoral Thesis.

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