



MANAGING SOFTWARE PROJECT RISKS USING STEPWISE
AND FUZZY REGRESSION ANALYSIS MODELLING
TECHNIQUES

ABDELRAFE M. S. ELZAMLY

DOCTOR OF PHILOSOPHY

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ABDELRAFE M. S. ELZAMLY

**A thesis submitted
in fulfillment of the requirements for the degree of Doctor of Philosophy in
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2016

DECLARATION

I declare that the study entitled "Managing Software Project Risks Using Stepwise and Fuzzy Regression Analysis Modelling Techniques" is the result of my own study except as cited in the references. The study has not been accepted for any degree and is not concurrently submitted in the candidature of any other degree.

Signature:

Name: Abdelrafe M. S. Elzamly

Date:

APPROVAL

I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in terms of scope and quality for the award of Doctor of Philosophy.

Signature:

Name: Prof. Dr. Burairah Bin Hussin

Date:

DEDICATION

I dedicate this humble study to my lovely wife Eman who has supported me throughout the preparation of this study. You have indeed exerted a remarkable effort towards the completion of my study.

I would also like to external my dedication to my beloved mother, late father, my wife Martyr Shaheed, brothers and sisters as well as to my precious kids Nour, Mohammed, Ahmed, Yousef, Sana, Mariam and Adam may Allah bless them.

Special thanks to the Deans of Al-Aqsa University for granting me the scholarship to complete this study.

To my colleagues and friends, who are very helpful in giving me moral support and in particular the Al-Aqsa University, Islamic University – Gaza Team...

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Lastly, a million thanks to all of you for support and guidance that you have rendered towards the successful completion of my study.

ABSTRACT

Despite much research and progress in the area of software project management, many software projects have a very high failure rate. This risk of failure is not always avoidable, but it is controllable. Thus, the aim of this study is to present the stepwise and fuzzy multiple regression analysis modelling, which studies the impact of different risk management techniques and different software risk factors on software development projects. Furthermore, there are 5 main phases in risk management approach such as risk identification, risk analysis and evaluation, risk treatment, risk controlling, risk communication and documentation for software development life cycle. The model incorporates risk management approach and SDLC methodology to mitigate software project failure based on quantitative and intelligent risk techniques. This study provides empirical evidence for the identification of risk factors in model identify and model software risk factors and risk management techniques that effect on successful software projects. Fifty software risk factors and thirty risk management techniques were obtained from the literature to respondents. The results show that all risks in software projects are very important in the perspective of a software project manager, and all risk management techniques are the most commonly used. The study indicates that forty nine software risk factors can be mitigated by risk management techniques according to the stepwise and fuzzy multiple regression analysis modelling techniques. The model's predictive accuracy slightly improves in fuzzy multiple regression rather than stepwise multiple regression technique. The study has been conducted on a group of software project/IT managers in Palestine. This study will guide software managers to apply software risk management practices with the real world of software development organizations. The effectiveness of the new techniques and approaches on a software project has also been verified.

ABSTRAK

Meskipun terdapat banyak penyelidikan dan kemajuan dalam bidang pengurusan projek perisian dilaksanakan, namun kadar kegagalan projek perisian adalah sangat tinggi. Kebiasaannya, risiko kegagalan ini tidak dapat dielakkan tetapi masih boleh dikawal. Justeru itu, tujuan kajian ini adalah untuk membentangkan langkah demi langkah dan kekaburan model analisis regresi berbilang, yang mengkaji kesan terhadap teknik pengurusan risiko yang berbeza dan faktor risiko perisian yang berbeza dalam projek pembangunan perisian. Tambahan pula, terdapat 5 fasa utama dalam pendekatan pengurusan risiko seperti pengenalan risiko, analisis risiko dan penilaian, rawatan risiko, kawalan risiko, komunikasi risiko dan dokumentasi untuk kitaran hayat pembangunan perisian. Model ini menggabungkan pendekatan pengurusan risiko dan kaedah SDLC untuk mengurangkan kegagalan projek perisian menggunakan teknik risiko kuantitatif yang bijak. Kajian ini memberikan bukti empirikal untuk mengenalpasti faktor risiko dalam model pengenalan dan perisian model, dan teknik pengurusan risiko yang memberi kesan terhadap kejayaan projek perisian. Terdapat 50 faktor risiko perisian dan 30 teknik pengurusan risiko yang diperolehi dari tinjauan awal terhadap responden. Keputusan menunjukkan bahawa semua risiko dalam projek perisian adalah sangat penting dari sudut perspektif seorang pengurus projek perisian, dan kesemua teknik pengurusan risiko adalah yang teknik yang biasa digunakan. Kajian ini mendapati bahawa 49 faktor risiko perisian boleh dikurangkan dengan teknik pengurusan risiko dengan menggunakan langkah demi langkah dan teknik kekaburan model analisis regresi berbilang. Ketepatan ramalan model menunjukkan sedikit peningkatan dalam fuzzy regresi berganda berbanding teknik stepwise regresi berganda. Kajian ini telah dijalankan ke atas sekumpulan pengurus perisian projek / IT di Palestin. Kajian ini dapat membantu pengurus perisian untuk melaksanakan amalan pengurusan risiko perisian dengan dunia sebenar organisasi pembangunan perisian. Keberkesanan teknik baru dan pendekatan terhadap projek perisian juga telah disahkan.

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