

EDITORIAL PREFACE

Special Issue on Applied Risk Evaluation Factors in Engineering and Health Projects

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INTRODUCTION

In this issue we examine applied risk evaluation factors in engineering and then healthcare projects. We start with some interesting issues regarding how to estimate uncertainty. Next we look at how uncertainty has been quantified as well as how risk has been evaluated through various frameworks, in engineering and healthcare projects. One of the articles uses a group level of analysis to look at the team motivational factors and how they impact risk. Another article takes the social level of analysis to examine how our culture and attitudes impact the risk factors associated with adopting contemporary medical techniques, formerly thought to be taboo, but now proven to be useful to detect early stage cancer. All were well-done articles showing interesting points of view surrounding uncertainty estimation and risk evaluation approaches.

LITERATURE REVIEW

There are many unaddressed topics of risk and contingency management. We are beginning to see an overlap of psychology integrated into this field. For example, I have followed the lead of other scholarly researchers to investigate the link between attitude and risk taking, using the individual level as well as the group levels of analysis. I want to summarize a few key articles that I have published that I selected due to the fact they were published at different journals, with different publishers, but all addressed risk.

Several years ago I began to explore how risk management changed since the 2008 global fiscal crisis. I published a strong article in the Journal of Asset Management to examine the state-of-the-art for risk management methods in the financial industry (Strang, 2012a). I took that

research a bit further by examining how risk management techniques could be applied to a real life project in the mining industry. As a follow up to that project, I examined risk management from a decision making perspective (Strang, 2012b). After reviewing the literature on estimation techniques and multicriteria decision making models for risk management, I created a nonlinear programming model for uncertainty quantification, using data from an energy creation company located in North Carolina, USA (Strang, 2012b). The article contains a useful methodology for developing nonlinear mixed models for uncertainty quantification and risk management decision making. Also it illustrates how to use mixed methods and how to develop a model using a commercial off-the-shelf spreadsheet application.

In a later study published in this journal I demonstrated how a nonlinear programming model could be developed for risk planning, using Hurricane Isaac as an example case study (Strang, 2013). I published as well-cited article in the *European Journal of Operational Research* explaining how a nonlinear waiting line queue model could be developed using simulation software, and I applied that to a mining case study (Strang, 2012c). This work on risk management goes back a long way. Just as another short example, in 2011 I studied how a linear programming model could be developed and applied to reduce risks in the supply chain decision making processes at an Australian coal mine (Strang, 2011). This was published in another well-known *Logistics Research Journal*.

My colleague Dr. Nersesian and I looked into risk prediction for the environmental conservation industry. In 2013 we examined 10 years of oil-gas spill data around the Albany NY area (N = 1005 samples) to develop a non-linear non-parametric model for predicting the likelihood that certain companies would pollute or reoffend (Strang & Nersesian, 2014). We found that some companies were six times more likely to have an oil spill and a subset of those were 40% likely to pollute again.

In one article published in the well-known *International Journal of Sociology and Social Policy* I cited research that government service agencies have called for more risk management research to help plan for natural disasters. In 2012 I surveyed 401 Hurricane Irene survivors from New York State to develop an ordinary least squares regression model that captured 55.4% of variance (Strang, 2014). I used and extended the *Theory of Reasoned Action* with two modifiers: near miss disaster experience and credibility of social message source. The model predicted 43.9% of the evacuation decisions so I asserted this risk planning model could be generalized to Emergency Management agencies to inform social policy.

In another article, I cited other studies that called for more research into risk and contingency management of global terrorism. The increased terrorism in countries we assumed were 'safe' such as Australia, Canada, and the Netherlands, prompted me to conduct a couple of studies into global terrorism and big data analytics as a method to collect the data and visualize the results. My colleague Dr. Sun and I analyzed over 127,000 global terrorist acts from the news using Hadoop big data analytics software. We demonstrated how to apply big data analytics to make sense of global terrorism collected from the news (Strang & Sun, 2015). We developed a statistically significant model using correspondence analysis, which allowed us to then visualize the results; illustrating hidden relationships between terrorist attack methods and their socio-cultural ideologies. We based our research design on a model that we had developed and presented at a peer-reviewed conference in Vietnam (Sun, Strang, Yearwood, 2014).

CONCLUSION

I hope the above articles will stimulate your thinking towards new scholarly research in this field (the URL's are all supplied to view the abstracts and manuscripts). In closing, as usual I want to thank everyone on the IJRCM board since we are all volunteers and we do not receive any money for our hard work on this journal. Furthermore, all the authors who write for this journal do not receive any of the profits from their articles. So please send emails and testimonials to thank your volunteers who make such great efforts to contribute to the scholarly body of knowledge!

Kenneth David Strang
Editor-in-Chief
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