Evaluation of a Maturity Model for IT Dependability in Emergency Management

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ABSTRACT

The IDEM3 maturity model is a process improvement framework that can be used by an organisation to assess and improve their IT dependability management processes. The framework focuses on the coordination of IT management and safety management within an organisation. In this paper, an evaluation plan for the maturity model is presented to evaluate its applicability, assessment accuracy, and practical value. Based on this plan, two evaluations were carried out in two case studies at two Swedish hospitals. The evaluations indicate that the IDEM3 maturity model can be a valuable tool for an organisation to quickly identify the main strengths and weaknesses of the organisation in the field of IT dependability management. Therefore, this study provides a strong argument for a further evaluation based on the developed evaluation plan.

Keywords: Dependability, Emergency Management, Evaluation, Healthcare, IT Management, Maturity Model, Process Improvement

INTRODUCTION

IT systems are a critical resource in most governmental organisations’ everyday communication and administration. Just as for their everyday tasks, governmental actors depend on all kinds of IT systems for their responsibilities in crisis situations (Santos, Borges, Gomes, & Canós, 2008). These systems include not only specially built systems for emergency situations but also the everyday communication and administration systems. The latter category of systems is of special interest. Under normal conditions an occasional unavailability of these IT systems is fully acceptable, but in emergency situations, when time is a critical factor, any unexpected unavailability can have disastrous consequences (Zimmerman & Restrepo, 2006; Fleming, 2001). Therefore it is important that these IT systems are an integral part of all major risk and vulnerability analyses conducted. This way information about the dependability of the different IT systems can be combined with information about how critical the systems are in different situations (SEMA, 2003).

IT dependability management for organisations with a critical role in society is a complex process and the frequent occurrence of critical
IT incidents shows that there is a lot of room for improvement. Earlier research (Weyns & Höst, 2009) has shown that there is a need for a simple but effective framework to help organisations to address these issues in a structured way.

IT dependability management combines important elements of IT management and safety management in three different ways. First of all, the failure of critical IT systems can be a safety risk by itself, causing an emergency situation when the failure was unanticipated and no backup systems or manual routines are available. Secondly, in the case of an emergency in an organisation many IT-systems constitute an important resource in resolving the crisis, for example internal communication systems and medical information systems. Finally, IT systems also play a crucial role in the communication with the general public in the event of a crisis. This last category contains IT systems used by the traditional media as well as internet news sources and social media.

IT management and emergency management or safety management are different activities within an organisation often involving different parts of the organisation. Therefore there is a need for explicit coordination between these processes to make sure that IT dependability management issues are given the necessary attention (Weyns & Höst, 2009).

This paper presents an evaluation plan and the first results of the practical evaluation of the IT Dependability in Emergency Management Maturity Model (IDEM3) for the coordination of emergency management and IT management (Weyns, Höst, & Li Helgesson, 2010). The purpose of this maturity model is to help organisations to identify, evaluate and improve their IT dependability processes. The main focus of this framework is on the cooperation between emergency managers and IT personnel.

The IDEM3 maturity model has, in this study, been used for the assessment of the IT dependability management processes in two Swedish hospitals. In this way the applicability of the framework and the value of this assessment for the organisation are evaluated based on two case studies.

In this paper first some related work is presented, both to the IDEM3 maturity model and to the evaluation of maturity models in general. Secondly, the IDEM3 maturity model is summarized and the main elements of the framework are presented. Next, a practical evaluation plan for the maturity model is presented. Finally, two case studies based on this evaluation plan are presented in detail.

RELATED WORK

A number of process improvement frameworks have previously been published, both in the fields of emergency management and IT management. Emergency management is often coordinated on a national level and most countries have a special governmental agency such as the United States Federal Emergency Management Agency (FEMA), Emergency Management Australia (EMA), Public Safety Canada or the Russian Ministry of Extraordinary Situations (EMERCOM).

In the field of IT management a number of international standards and best practice frameworks have been published internationally, among those ITIL (Office of Government Commerce, 2007), COBIT (ISACA, 2000) and ISO/IEC 17799 (International Organization for Standardization, 2005). These frameworks are more suited to be used by large corporations with very large IT resources and are less suited for smaller organisations and often do not take into account the special needs for organisations with an operative role in crisis relief. Vogt et al. (2011) have specifically investigated the use of ICT alignment frameworks in emergency management organisations and found that these frameworks are not well-suited for these types of organisations, mostly because they are not flexible enough. Of these models, COBIT (ISACA, 2000) also makes extensive use of a maturity model.

The maturity model evaluated in this paper is based on a number of maturity models from related fields. The first successful maturity models were developed by the Carnegie Mellon
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