5-2-2010

Strategic ICT alignment in emergency management

Marcus Vogt
Bond University, Marcus_Vogt@bond.edu.au

Kieth Hales
Bond University, kieth_hales@bond.edu.au

Dieter Hertweck
Heilbronn University

Gavin Finnie
Bond University, Gavin_Finnie@bond.edu.au

Strategic ICT Alignment in Emergency Management

Marcus Vogt
Bond University
mavogt@bond.edu.au

Kieth Hales
Bond University
kihales@bond.edu.au

Dieter Hertweck
Heilbronn University
hertweck@hs-heilbronn.de

Gavin Finnie
Bond University
gfinnie@bond.edu.au

ABSTRACT

This paper shows preliminary results of an ongoing research project on the benefits of Strategic ICT Alignment in the domain of disaster management. The research is based on current literature in that area, an observation of a multi-organizational pandemic exercise in a large German municipality and interviews with stakeholders of different emergency management organizations in Germany and Australia. The preliminary results show that emergency managers can feel overwhelmed by the complexity of ICT and are unable to estimate the value and impact of ICT on their processes. Consequently, the paper identifies a research gap in the area of ICT Governance and Emergency Management, which will guide the coming research stages in order to develop a Strategic ICT Alignment framework for emergency management organizations.

Keywords

Strategic ICT Alignment, ICT Governance, ICT Value, ITSM, ITIL, COBIT, Val-IT,, Disaster Management.

INTRODUCTION

Starting point of this research was a study on ICT value in public organizations (Vogt & Hales 2010). This research showed that the benefits of ICT are hard to determine in non-for-profit organizations, so the strategic alignment of ICT investments were suboptimal. During that research project it became evident, that the strategic alignment process in emergency management (EM) organizations is extremely complex and warrants closer examination. Literature about ICT Governance and emergency management is scarce since only a few researchers have analyzed the effects between the two research areas (Van Den Eede & Van Der Walle 2005, Marich et al. 2007, Weyns & Höst 2009). Their previous findings and the conclusions from the research study were leading to the question: to what level is the principle of Strategic ICT Alignment established in emergency management organizations and what are their primary issues of concern?

ICT Governance & Strategic Alignment

According to Porter (1998), all actions taken in an organization must add value or they are just wasting money, time and resources. Many commercially driven organizations have adopted ICT Governance principles and frameworks in order to get more value out of their ICT investments and projects. (Weil & Ross 2004, Van Grembergen et al 2004).According to Luftman and Kempaiha (2007) ICT Governance and its related frameworks and methods are enablers of Strategic ICT Alignment. Their goal is to enable the transition from a strategic to an operational level without losing the focus on business objectives. Thus, IT Governance combines ICT strategy and ICT management, where as the strategy is made on board level and ICT management is focusing on technological solutions.

Reviewing Statement: This paper represents work in progress, an issue for discussion, a case study, best practice or other matters of interest and has been reviewed for clarity, relevance and significance.

A critical factor for an organization's success is to obtain a competitive advantage. If ICT is aligned with the business goals, it can deliver important strategic advantages to support organizations to become more efficient (Weill & Ross 2004). Even though organizations within the domain of disaster management have no need to gain competitive advantage, they have a responsibility towards the society to do their best to save lives and critical infrastructures. Thus, they have to react faster and make better decisions. ICT can help to gain that edge. Information Systems have the capability to assist disaster management teams before, during and after an emergency. However, they need to be managed to provide reliable, secure and appropriate services (Weyns & Höst 2009). Improper ICT investments, unawareness of technological opportunities, unreliable information systems can be the cause of casualties and large scale destruction (Rao et al. 2007; Dilmaghani & Rao 2009).

Emergency managers might not understand Information Systems or see the bigger picture of a technology. Values, benefits and risks must be explained in a way that can be understood. They need to realize how ICT can drive their efforts. Therefore, it is important that ICT is strictly aligned with strategic goals of emergency management organizations. It can be said that in our case the strategic goal is to avoid and mitigate catastrophic impacts of different scenarios as fast and as efficiently as possible.

Previous research projects have shown that ICT Governance tools can contribute to support public organization in their daily work if they are adapted towards their "non-for-profit" goals (Di Maio 2003, Sethibe et al. 2007, Vogt & Hales 2010). Thus, we state that future research will have to find ways how ICT Governance tools need to be adapted and applied to the domain of disaster management.

RESEARCH METHODOLOGY

In order to find ways how we can adapt existing ICT Governance tools we have established co-operations with several German and Australian organizations and conducted initial interviews as well as an observation of a pandemic drill. Findings from the interviews and observations were compared to existing literature from multiple disciplines to find similarities and identify the research gap and plan future research steps.

To cope with the different information resources from literature, interviews and observations, we decided to utilize Mayring's method of Qualitative Content Analysis (Mayring 2000). The interviews were conducted narrative and semi-structured to leave space for new insights, which are not covered by the initial questions. In Addition, we started to review organizational diagrams and process maps to identify weaknesses as well as similarities or differences between the organizations. The principles of hermeneutics were always used as the research guideline throughout this project phase. As an analysis tool for the different resources we were using NVIVO 8.

Data sources analyzed by this research methodology are:

- Current Literature and secondary sources
- Observation of a pandemic drill in a large German municipality
- Interviews with different EM organizations and stakeholders
- Organizational diagrams and process maps

The research project does not only focus on one case study but rather incorporates the different views of organizations from Europe and Australia. The intent behind this research strategy is firstly to identify similar issues in these organizations, even though they are in different political and organizational structures, and secondly to build a universally applicable framework of Strategic ICT Alignment for those organizations.

PRELIMINARY RESULTS

As a starting point for our research we were searching for appropriate life-cycle stages were ICT Governance tools would work best. The life-cycle of a disaster can be categorized in different ways, for our purpose we use four known categories: prevention, preparation, response and recovery. We came to the conclusion that we should limit our research project to the prevention and preparation phase (see figure 1). Both phases seem to be the most promising stages to apply a new alignment method since most of their goals have strategic and architectural character. Apposite to these stages in figure 1 we added the corresponding ICT Goals and existing ICT frameworks, which we think are most promising to achieve Strategic ICT Alignment. However, as a result from the experience of a former ICT Governance research project (Vogt & Hales 2010), we know that such complex frameworks need to be adapted to an organization's individual needs.
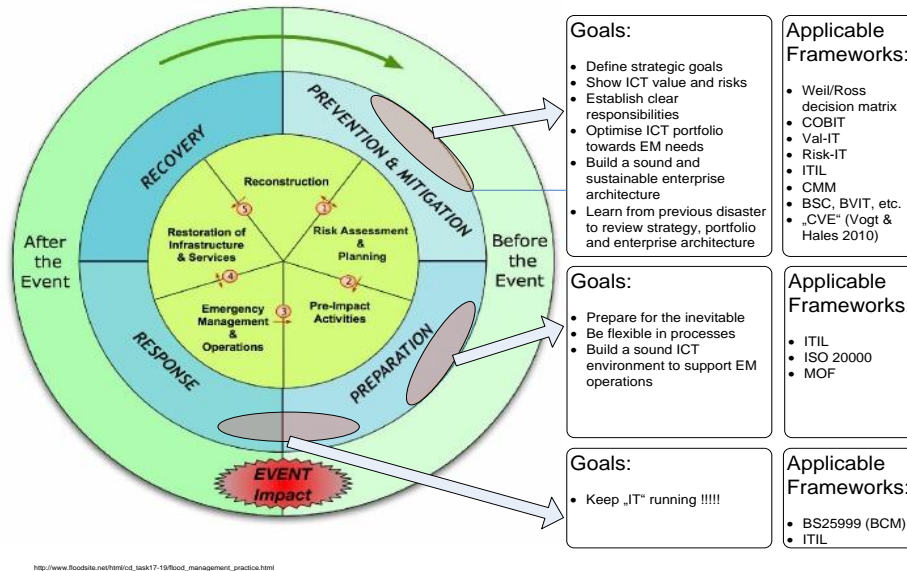
Figure 1: Disaster phases and related frameworks (SFR 2009)

Such an adaption is particularly difficult since the domain of disaster management has very unique rules and demands due to its unpredictable nature, inter organizational collaboration and ad-hoc teambuilding. Consequently, we generated a basic model (figure 2) of the differences between "classic organizations" and "disaster management organization" in relation to Strategic ICT Alignment. This view was driven by Iannella et al. (2007 p.1) assumptions that *"... emergency management is not a discipline that follows well behaved rules and allows itself to be modelled sufficiently well that all contingencies can be catered for a priori"*. We also believe that information management strategies diverge depending from the phase, severity and kind of disaster (Iannella & Henricksen 2007; Wang & Belardo 2005). Furthermore, we integrated findings from other researchers, which show that emergency management enterprises need an overlaying governance component to accommodate the diverse stakeholders and inter-organizational needs as well as a flexibility component to cope with uncertainties caused by disasters (Marich et al. 2008, Dwarkanath & Daconta's 2006).
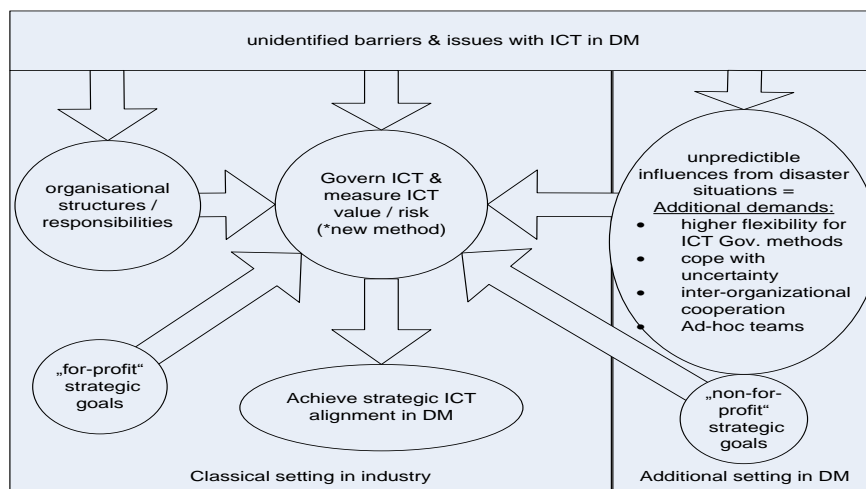

Figure 2: Additional ICT Alignment Influences

Certainly the model shown in figure 2 is in an early stage and thus it has to be refined during the coming research steps. However, when the model is complete it will help us to identify where existing ICT Governance frameworks have their limits and where we should improve them towards the needs of emergency management.

Figure 1and figure 2 in addition with existing ICT frameworks and results from recent research papers gave us a guideline on the semi-structured interviews and the observed pandemic drill. Primary goal of the interviews and the

observation of the pandemic drill were to identify the main barriers and issues with ICT of different stake holders in emergency management. The semi-structured nature of the interviews left space for the interviewees to add comments and thoughts about their ICT issues, which were not covered by the initial questions. Thus, we had to analyze the transcribed interviews with a method that can cope with rather unstructured data. Mayring's (2000) approach seemed to be the most suitable for our purpose.

We analyzed different sources from six different organizations in regards to their main ICT management issues and summarized the findings of the analyzed data in table 1. The table shows the top 10 issues identified from the data. We used a semi-structured questionnaire containing 22 questions divided into four primary sections:

1. Demographic Data
2. Organization
3. Operations
4. ICT Alignment

Since the data was semi-structured and the examples the interviewees gave were quite diverse, we had to define "meta-issues" shown in the "nodes" column of table 1. Analysis, coding and node extraction were done with NVIVO 8, strictly following our qualitative analysis method.

Rank	Node	Sources	References
1	Lack of interoperability of systems	6	52
2	Lack of responsibility for ICT	6	48
3	Lack of ICT alignment & ICT value methods	6	42
4	Lack of appropriate IT service management	6	41
5	Un-improved processes	5	39
6	Fuzzy (or non) service levels	6	38
7	Lack of importance of IT to EMs	5	32
8	Lack of transparency of ICT to EMs	4	30
9	Lack of flexibility of systems	5	28
10	Lack of reliability of systems	6	27

Table 1: Primary Issues

Leaving aside the technical issues of interoperability (1), unimproved processes (5), inflexible (9) and unreliable systems (10), the remaining issues are directly related to ICT Governance and it could even be said that that ICT Governance has a strong influence on the technical issues. It is remarkable that all six organizations mention "Lack of ICT alignment & ICT value methods" as one of their top yet unsolved issues. It is also interesting to note that these issues are recognized as priorities in both German and Australian organizations. Considering the fact that "lack of responsibility for ICT" can be a subset of ICT alignment or ICT Governance (see RACI-Chart (responsibility, accountability, consulted and informed) from the COBIT framework), the issue of "Lack of ICT alignment & ICT value methods" becomes even more weight for the organizations.

Our findings from Australian and German organizations are in line with results from the United States Federal Emergency Management Agency (FEMA) (Rao et al. 2007) as well as a more recent research in Swedish municipalities (Weyns & Höst 2009). Both studies have identified ICT Management issues and lack of understanding of ICT values and risks. Thus, one can say that ICT Management and ICT Alignment issues are of concern to most emergency management organizations and not just issues of the analyzed organizations in Germany and Australia.

CONCLUSION

ICT alignment and ICT value creation are most important for the successful implementation and utilization of new technologies. Commercially driven organizations utilize ICT Governance methods and tools to manage information and technologies quite successfully.

The reviewed literature and our own preliminary findings show that there are still ICT Management issues in emergency management organization. Particularly the contribution of ICT alignment and value creation towards avoiding or mitigating the effects of unpredictable situations, such as disasters, is yet unsolved. Thus, ICT Governance methods are barely used or unknown to decision makers within the domain of disaster management. However, ICT has been identified as one of the most promising success factors to improve emergency management processes but its value and contribution is often unclear to emergency mangers. Even though, there are existing ICT Governance frameworks such as COBIT and ITIL, the domain of disaster management demands different

approaches because each emergency or disaster is unique. Most countermeasures and teams will differ from case to case. Therefore, information channels and the information requirements change according to the scenario. Thus, emergency managers demand solutions that are flexible and reliable.

We propose that future research should foster new ICT Governance methods in emergency management organizations. These new methods should be able to improve and support their efforts and enable them to realize value and benefits of their ICT investments and therefore utilize these technologies more effectively and efficiently. The challenge of this future research will be to develop new models and methods, which are able to cope with the unpredictable nature of disasters and address their unique needs such as increased flexibility and inter-organizational cooperation.

REFERENCES

1. Dilmaghani, R. B., & Rao, R. R. (2009). A Systematic Approach to Improve Communication for Emergency Response, Proceedings of the 42nd Hawaii International Conference on System Sciences (HICSS), HI, USA

2. Di Maio, A. (2003). Value for money is not enough in public sector IT projects, Gartner Research, ID-Number: DF-19-8950

3. Dwarkanath, S., & Dakonta, M. (2006). Emergency Services Enterprise Framework: A Service-Oriented Approach, Proceedings of the 3rd International ISCRAM Conference, Newark, USA.

4. Iannella, R., Robinson, K., & Rinta-Koski, O.-P. (2007). Towards a Framework for Crisis Information Management Systems, 14th Annual Conference of The International Emergency Management Society (TIEMS). Trogir, Croatia.

5. Iannellla, R. & Henricksen, K. (2007). Managing Information in the Disaster Coordination Centre: Lessons and Opportunities, Proceedings of the 4th International ISCRAM Conference,Delft, Netherlands

6. Luftman, J. & Kempaiah, R. (2007). An Update on Business-IT Alignment: "A Line" Has Been Drawn", MIS Quarterly Executive (MISQE), Vol. 6, No. 3

7. Marich, M. J., Horan, T. A., & Schooley, B. L. (2008). Understanding IT Governance within the San Mateo County Emergency Medical Service Agency, Proceedings of the 5th International ISCRAM Conference, Washington, USA.

8. Mayring, P. (2000). Qualitative Inhaltsanalyse. Grundfragen und Techniken. Weinheim, Germany: Deutscher Studien Verlag.

9. Porter, M. (1998). On Competition, Boston, Harvard Business School Press

10. Rao, R. R., Eisenberg, J., & Schmitt, T. (2007). Improving Disaster Management : The Role of IT in Mitigation, Preparedness, Response, and Recovery. Washington, DC, USA: National Academies Press.

11. Sethibe, T., Campbell, J., McDonald C. (2007), "IT Governance in Public and Private Sector Organisations: Examining the Differences and Defining Future Research Directions", University of Canberra, 18th Australasian Conference on Information Systems, Toowoomba, Australia

12. Van Den Eede, G, Van De Walle, B. (2005). Operational Risk in Incident Management: a Crossfertilisation between ISCRAM and IT Governance. Proceedings of the 2nd International ISCRAM Conference, Brussels, Belgium

13. Van Grembergen, W., De Haes, S., Guldentrops, E. (2004). Structures, Processes and Relational Mechanisms for IT Governance, In: Van Grembergen, W. (2004), Strategies for Information Technology Governance, IDEA Group Publishing

14. Vogt, M., Hales, K. (2010), "Strategic Alignment of ICT Projects with Community Values in Local Government", Proceedings of the 43th Hawaii International Conference on System Sciences (HICSS), HI, USA

15. Wang, W.-T., & Belardo, S. (2005). Strategic Integration: A Knowledge Management Approach to Crisis Management, Proceedings of the 38th Hawaii International Conference on System Sciences (HICSS), HI, USA

16. Weill, P., Ross, J. W. (2004), "IT Governance – How top performers manage IT decision rights for superior results", Harvard Business School Press

17. Weyns, K., Höst, M. (2009). Dependability of IT Systems in Municipal Emergency Management, Proceedings of the 6th International ISCRAM Conference, Gothenburg, Sweden