

# Action Research Supported Implementation of a Crisis Competence Centre.

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## ABSTRACT

The purpose of this paper is to describe the development of a regional crisis competence centre in Sweden. The overall research approach utilizes action research methodology to support the development process. The overall development process is divided into three steps; early need finding, the organizational platform, and business development. This paper is devoted to the first phase – early need finding – which deals with the specific needs and demand of four municipality organizations and how these requirements can be converged into a organizational setting that correspond to national crisis management strategies as well as regional responsibilities in crisis management. The research approach is action based and the theoretical considerations to support progress in development activities are from the Actor Network Theory (ANT). The main conclusion from the research is that the formation of a crisis competence centre revolves around sharing competences, and compromising between internal and external objectives in the progress towards a common goal.

## Keywords

Crisis management, regional crisis competence centre, action research, actor network theory, emergency Web-portal.

## INTRODUCTION

The purpose of this paper is to describe the collaborative work between researchers and practitioners to develop a crisis competence centre with the aim to increase the regional capability of handling emergencies and crisis. The driving force for this collaborative effort is the vulnerability in society for disasters, which necessitates increased awareness and knowledge development of how to prepare for action in emergency and crisis situations. Looking back, recent incidents such as 9/11, the tsunami in Thailand, wild fires in nearby populated areas have challenged the ability in society to manage severe emergencies. Contemporary threats and risks are often complex and may bring devastating consequences to many sectors of societal administration. Threats may also be more or less predictable and crossing national borders. Therefore, it is crucial to prepare for what is unexpected (Swedish Government Proposition, 2007/08:92). Accordingly, a regional initiative is taken in northern Sweden to facilitate the distribution of crisis management capability to a variety of societal actors. The objective of the crisis competence centre is to package, mediate, and distribute knowledge in the form of education and training courses, by connecting supplier and customers dealing with crisis management. The research problem addressed in this paper is to identify issues in the context of developing crisis competence centers, and thereby assisting in the implementation of a regional crisis competence centre in northern Sweden.

The paper is organized as follow. First, we review the literature of organization development. Second, our choice of theoretical frame of reference that was utilized during research interventions is discussed. Third, in the first out of three planned action research loops we present the progress of the development project. Fourth, two types of implications for the progress of the development project is discussed. Finally, conclusions and future research activities are presented.

## RELATED WORK

Organization development can be reviewed from a number of perspectives. For example, a competitive strategic outlook entails the forming of the organization as prospectors, defenders, or analyzers (Miles and Snow, 1978). The role of the prospector is to be “first-on-the-market” with a new product or service to differentiate themselves from competitors. Defenders offer a limited, stable product/service line. Analyzers compete by imitating their competitors’ offers by rationalizing the design and methods of production. In contemporary organization development the prospector-defender-analyzer typology is challenged by the network orientation to organize work. However, the case of being a broker organization in a network of businesses still may be organized according to, for example, the prospector strategy. As noticed by Chesbrough (2003), companies in various sectors are shifting towards a paradigm of open innovation, resorting to the external network in order to enhance the potential of corporate investments in service and technology development and commercialization. One important issue in the network environment is to build alliance capability. The management of strategic alliances involves significant challenges, since codified procedures are not readily available, nor can the contingencies of a strategic alliance be outlined in advance (Anand and Khanna 2000). As follows, the capability to manage a strategic alliance represents a source of competitive advantage, allowing anticipation, and proactively responds to unforeseen occurrences.

The development of an organization may also be considered from a competence acquisition perspective. Tidd and Trewhella (1997) argue that while all strategic competence can be retained internally, the organization must be prepared to access enabling competence externally. Accordingly, Tidd et al., (2001) ascertain that organizations should develop external relationships in order to access complementary competencies. According to Simonin (1999:595) corporate partnering constitutes the most adequate vehicle to internalize the other’s competence. In this regard, working together with corporate partners might bring along the transfer of implicit knowledge, by means of a process of absorptive learning (Lane and Lubatkin 1998). Yet another view on competence is how to transfer knowledge among partnering organizations. Prévot (2004) discusses inter-organizational transfer of competence and presents a model for its analysis. Prévot’s model is based on three main groups of constructs: transfer level and state of the knowledge transferred, objectives of the transfer, and transfer mechanisms. Furthermore, by viewing the transfer of knowledge in a network setting as information system, means that organizational contexts are influenced by different information systems technologies that are used for fulfilment of work tasks (Lamb, 1999). A particular instance of such system is collaborating working environments (CWE), which is a socio-technical configuration of human and technology mediated actions. According to Avgerou et al. (2004), the technical system is concerned with the processes, tasks and the technology needed to transform inputs to outputs. The social system is concerned with the attributes of people (e.g. attitudes, skills, values). Thus, any design or redesign of a work system must deal with both systems in an integrated procedure.

Notable from the literature review is that organizations cannot entirely rely on internal capabilities for prosperity in business activities. The literature emphasizes knowledge exchange, by creating a social context conducive to knowledge creation and innovation development of new services and products. Although underlying the relevance of individual interaction, the literature provides little guidance how to overcome barriers in the process of striving towards a common goal. This may be the case, since research has generally favoured an organization perspective, neglecting the communication patterns whereby individuals integrate knowledge, and can detect added value to regular work routines.

## THEORETICAL FRAME OF REFERENCE

One view of people working together towards a common goal suggests that organizational/competence development is primarily based on its perceptions of the properties of organization or team concerned (Grefen et al., 2000). Many approaches are based on how elements of processes and workflow increase performance. In general, these approaches would define a set of requirements that constitute the activity context. Once the setting is defined it often become a static policy or routine description with low support over time to actors. For example, the organization development approach would often conclude with a formal view of strategies, processes, actors, and goals for the organization (McKendall, 1993). We contend that while there may be validity in such approaches, it is unlikely to provide complete explanation, as it would miss influences such as the dynamics of individual perception of goals.

We argue that Actor Network Theory (ANT) has much to offer as a theoretical body in design of crisis organizations. ANT is especially useful in establishing a common view and understanding of crisis management between stakeholders at all levels during the early stages of a project. Researchers using this approach would concentrate on issues such as: how is the relationship formed between two or more stakeholders, what are the human (stakeholders) and non-human (information technology) actors, and investigating the network, and its strength. Researchers would also study the translation process of entering a network of crisis management actors and what may deter them from doing so.

The key characteristics of the ANT view of translation are outlined by Callon (1986b):

1. **Problematisation:** in which an actor attempts to define the nature of the problem and the roles of other actors to fit the proposed problem.
2. **Interessement:** is a series of processes that attempt to impose identities and roles, defined in the problematisation, on the other actors.
3. **Enrolment:** how will the follow lead to the establishment of a stable network of alliances.
4. **Mobilisation:** occurs as the proposed solution gains wider acceptance through some actors acting as spokespersons for others.

It can be argued that ANT is not a very practical lens to study development of crisis competence organizations. Critique raised against ANT is concerned with how ANT is goal oriented, looks for stabilisation, black-boxing and control (Radder, 1992). However, we argue that these are characteristics that are appropriate in goal focused tasks such as the development and implementation of crisis organizations. Also, as it is an account for social as well as technical strands, it is a foundation from which technology, process, and inter-personal interactions can be researched. Within the context of crisis management, joining a network of actors typically mean that the actual work of developing a crisis competence centre is divided into a number of phases in which technology matters as well as non-technical interactions and interventions will be discussed and evaluated in order to form desired outcomes. The design of the crisis competence centre is divided into three overall steps; early need finding, the organizational platform, and business development. In the first step, we choose actor network theory as the rhetoric vehicle for analysis and input during the early need finding step but at the same time we are aware that other theoretical bodies are appropriate during this loop and the following two loops.

#### EARLY NEED FINDING– ACTION RESEARCH LOOP 1

The research methodology used in the initiative to develop crisis competence on the regional level was action research approach. The action research approach consist of four steps, diagnosing, planning action, taking action, and evaluating action in relation to a certain context and with a specific purpose (Coughlan, 2004). According to Lindgren et al., (2004) diagnosing refers to the joint (researcher and practitioner) identification of situated problems and their underlying causes. Action planning is the process of specifying the actions that can improve the problem situation. Action taking refers to the implementation of the intervention specified in the action planning phase. Evaluating entails the joint assessment of the intervention by practitioners and researchers. As researchers we organized the interventions according to the ANT phase structure and nurtured the project meetings with our suggestion to further actions in the development of the crisis competence centre. The project team had regular meetings and the meeting location circulated among the stakeholders in order to reduce the risk of favouring particular organizations.

During *the diagnosing phase* researchers provide input regarding *problematisation* as support to practitioners to identify and formulate the needs and demands from four municipalities. The activity was carried out during two month in late 2007. We held interviews with managers and security coordinators at one occasion and then the informants had the possibility to confirm our interpretation of the interviews. The interviews were divided in three themes, need for education, need for training, and need for RTD (research and technology development) within each organization. Themes were selected through discussions with the County Administrative Board, and also based on a national survey (Den Röda Tråden, 2006) prior to our in-depth regional study. Table 1, show the variety of needs in what still is a relatively homogenous region in terms of crisis management responsibility.

Organization/Focus	Education	Emergency training	RTD
<b>municipality A</b>	Crisis communication. Decision support.	training practices with theoretical features.	Societal impact.
<b>municipality B</b>	Off shelf packages.	Collaboration practices.	Crisis methodology.
<b>municipality C</b>	Off shelf packages.	Utilization of external experts.	Common ground applications.
<b>municipality D</b>	Off shelf packages.	Flight incidents. Survival in cold climate.	Evaluation of virtual environments.

Table 1. Initial needs among municipalities

### Education

The municipalities utilize The Swedish Emergency Management Agency and their off-shelf standard education products as it is a sort of organizational procurement guarantee for best education. In addition, one of the Municipalities demand for more tailored education and training in addition to the available standard courses, and to further educate staff for the difficult task to communicate crisis handling to different societal audiences.

### Emergency training

In terms of municipality located emergency training we detect that municipalities are devoted to arrange training activities that aligns to local configurations of crisis strategies. For example, one of the municipalities has a strategy to position itself as a sub-arctic emergency training facility to allow training in cold climate while at the same time experience darkness. In general, emergency training is something that all municipalities expect to have strong local connection due to the responsibility to have local rescue teams.

### RTD

The need for RTD activities that municipalities can benefit and participate in is also more diversified than the need for education. RTD is one area that allows speculation since none of the municipalities have on-going RTD activities, nor have previous experience from RTD. Some initial thoughts expressed by the municipalities are the need to consider what happens to a society after severe disasters? What kind of methodologies is appropriate for managing crisis? How can all stakeholders maintain a common ground understanding during the events of emergencies? How might IT support the organizational strategies for crisis management?

The needs and demand for effective crisis management that were considered among stakeholders can be summarized as follow:

- Lack of collaboration between stakeholders
- Focus on systematic rather than systemic of actions during incidents
- Lack of supportive information technology
- Lack of common ground applications on the strategic, tactic, and operative levels
- More focus on action than on individual affects from crisis
- Lack of knowledge for methodology in crisis management.

### Action planning phase

The work with raising the interestment for the design of the centre revolved around the fact that the needs and demand from municipalities must be the driving force throughout the whole process. The internal needs of each municipality have been constantly discussed during meetings and e-mail discussions within the group of stakeholders. The planning phase was interrupted several times when financing issues challenged the spirit in the group. The stakeholders understand perfectly the need for funding if the centre could ever be realized. Also, in

in the planning phase it was obvious that all municipalities had reached different levels of maturity and therefore needs were quite differentiated among these stakeholders. Taken this into account, the work progressed slowly towards the overall goal to implement a crisis competence centre through a number of discussions of how to design the centre. All stakeholders were invited to discussions and the group of stakeholders remained constant during this phase. One major issue, which was crucial, was the ownership and location of the centre. Some voices advocate for academic ownership and others for a joint ownership between the County Administrative Board and municipalities. In essence, this was an issue of trustworthiness; who would best manage the centre? It wasn't until the academic partner could demonstrate an environment into which the forthcoming centre could be integrated that the final decision could be made. This took actually several months to decide and meanwhile the planning phase concentrated around maintaining the interest for the design of the centre, and also the formulation of vision, business strategy and goals for the centre. In addition to organizational planning, one of the municipalities, as a response to the identification of the lack of supportive technology among municipalities suggested that an IT based emergency portal should be developed. The idea was that a Web portal that provide a single point of entrance for any stakeholder would facilitate the information sharing to citizens as well as between emergency agencies. As researchers, we supported the idea of a web portal as it would provide a collaborative working environment (CWE) to stakeholders during emergencies. CWE's are technology applications and human activities that combined enable collaboration between teams or organizations (Harnesk and Nilsson, 2008).

#### *Taking action phase*

The enrolment of actors is an important step in the design of an organization. In the case of crisis competence centre the researchers emphasized and suggested steps to take in order to make an alliance of stakeholders. Baum et al. 2000 suggest that alliances are likely to enhance the public credibility and perceived image of a start-up organization, by providing the possibility to receive status transfer from prominent partners. For the ongoing design of the centre there are two levels of specific interest in receiving status from others. First, the local and regional decision makers and politicians were identified as key persons to enrol to the network. Second, the national level with authorities such as The Swedish Emergency Management Agency was identified as an important collaboration partner. Having bonds established with actors on both these levels would leverage strategic intentions of the centre to become a renowned organization in crisis management. Beside the two levels of legitimacy providers for the form and ambition with the centre, the development process also contained continuous content related discussions. The content of the centre also needed status framing, and therefore all the stakeholders involved in design and start-up of the centre were asked to formulate their specific contribution in terms of competences. One of the municipalities began to plan for the development of the emergency Web portal and the researchers suggested that the ANT translation process could function as a guidance to organize the local stakeholders in the municipality to participate and contribute with content information to the Web portal. Other contributions ranged from academic research programs to utilization of private business excellence in the organizational development of the centre. Eventually, the decision to form the centre as a broker organization was taken. This means that the centre could play a lead role and sub-contract for services and keep internal costs down.

#### *Evaluation*

The role of evaluations is to make sure that a sound understanding of needs occur throughout the whole design process. Specifically, evaluation is something that follows something that is designed, and any design is evaluated with respect to the utility provided in solving any problem with the design (Hevner et al., 2004). In design activities of the centre the issues of ownership and funding was subject for problems. When this was solved the first evaluation show that the work with designing the centre was in compliance with early drawings and latter decisions regarding form and content of the centre. The design process has been lead by one person who has been involved from the point when the centre was no more than an idea. This has been fruitful for the mobilization of the network since that person could promote the purpose with the centre to a wide range of societal actors in crisis management. The group of stakeholders involved in the design has been monitored and steered by this one spokes person for the group. All along the design process this has helped the group to converge to common goals.

### **STAGE ONE OF THE CRISIS COMPETENCE CENTRE**

The factual result from action loop one is the formulation of the vision, goals, strategy, and a plan for staffing the crisis competence centre.

The vision posits that by year 2013, the crisis competence centre is a key player on the European arena for crisis management. The outlined roadmap envisage leading RTD/education capability by providing a platform for sharing knowledge between private and public bodies that increase crisis management capabilities among bene-

ficiaries. The centre is particularly renowned for its ability to provide tailored training courses and practise in crisis and emergency management.

The overall goal for the centre is twofold:

- To increase the crisis readiness in the region through tailored competence development.
- To stimulate economic growth by promoting spin-offs from universities and supporting SME participation in delivery of education and training activities.

The strategy to fulfil the purpose so far is defined as follow:

- The crisis competence centre should have a close link to academic research programs.
- The crisis competence centre should empower the local market for crisis preparedness.
- The crisis competence centre should provide tailored education and training services in crisis management.
- The crisis competence centre revolves around societal and human aspects of a crises as well as incident handling of emergencies.

The centre is currently staffed with one person coordinating work task and ensuring that daily operations are coherent with the start-up activities that were defined during *the taking action phase*. Initially this includes:

- Education and training to offer both tailored and standard education by acting as a broker between customers and suppliers of crisis/emergency related courses. The purpose is to meet to societal demands by providing “best practice” packages “
- Tests, services and methodology development: to offer commercial services to stakeholders interested in crisis/emergency test environments. Through development of methodologies increase the crisis/emergency readiness in organizations to gain high quality in crisis/emergency management.
- Monitoring the development progress of the emergency Web portal as a single point of entrance to crisis information in the case of local emergencies.

The centre is expected to be in full operation when the stage of business development is completed, i.e., what would be action loop No. 3. Business development focuses on delivery of commercialized products and services that are offered to any organization interested in crisis management and handling of emergencies

### **IMPLICATIONS FOR CRISIS MANAGEMENT CAPABILITY**

Two issues that action loop 1 clearly demonstrates are the municipalities uncertainty of how they could benefit from the offers by the centre and also in what way they possibly could contribute with their specific competence. The second implication is the difference in interest for participation that derives from internally built up procedures in crisis management. One effect for the centre is that such internal focus might be an obstacle for collaboration at the regional level.

#### **Uncertainty of benefit/contribution**

Keeping in mind that the realization of the crisis competence centre is a regional initiative also means that it is a top-down approach in first place. It is a regional authority that promotes the idea of a crisis competence centre to a number of municipalities. The top-down approach cause effects on the interest for the subject among lower levels of stakeholders. According to McKendall (1993) organizational development processes based on top-down approach creates uncertainty and reinforces the position of management regardless if the goals of the development intervention were achieved. Two major concerns among stakeholders of the crisis competence centre were the financial and ownership matters. These two aspects could easily have hindered the establishment of the centre because the uncertainty of how much funding was required from stakeholders was obvious. Also, the concern for whom to execute ownership of the centre was a delicate issue. Thus, it was crucial to devote sufficient time during the development process to these questions to be solved in order to gain as much confidence among the stakeholders as possible. The relation between benefit and contribution is a tricky issue in itself as the stakeholders were expected both to contribute to the content of the services offered by the centre and also at time be customers ordering, for example, a tailored training course. In fact, such double role for the stakeholders' nurtured uncertainty during the process since it could impose unexpected costs to already re-strained organizational budgets.

### Differentiation of interests

Each municipality has its own agenda for developing internal crisis management competence, while at same time being obliged to support other municipalities in emergency handling when resources are limited. This situation is common to each stakeholder and subsequently also what they bring as initial value to the meetings and discussions of the design of the centre. In line with the reasoning of Englehardt & Simmons (2002) the researchers helped the stakeholders to create a knowledge transfer process across organizational boundaries that would facilitate idea generation and enabling the creation of a common view of the actual work. According to Walsham (2001) there may be incommensurability between groups of individuals working together as they promote its own culture, language and worldview. In the case of crisis competence stakeholders the potential bias is based on separate view of benefit and contribution related issues between the stakeholders. Therefore, creating understanding of the specific context as a commonality to each stakeholder is crucial for the development process. Cordelia and Shaikh (2006) affirm that this kind of subjectivity is what gives meaning to the shared context that arises from social interaction. During the action research interventions we addressed the interest and enrolment issues through continuous inspiring meetings with the stakeholders. The ambition and hope was that they would consider the potential value for their own organizations and enter the network instead of deter from the network.

### CONCLUSIONS AND NEXT STEP

The purpose of this paper was to describe the collaborative work between researchers and practitioners to develop a crisis competence centre with the aim to increase the regional capability of handling emergencies and crisis.

The theory of ANT has provided useful support to stakeholders undertaking a process of translating ambition with a crisis competence centre to workable configuration in terms of form and content of the centre. The value that the stakeholders perceive is based on the availability of a body that takes the responsibility to coordinate existing competences among public and private organizations.

In each one of the action research instances during the process, the ANT approach offers an explanation that addressing different levels of analysis is crucial for the durability of the organization. If an organization strategy to mobilize the collaboration environment would have been chosen, the translation process would have looked for the uptake of competitive advantage characteristics in each phase. On the other hand, if we have utilized an organizational network approach we would have focused on the structure, roles, and collaboration activities of the group of organizations. In the lens of a translation process, we see that the specific environment for a crisis competence centre has more to do with interaction between human actors sharing competences, and compromising between internal and external objectives in the progress towards a common goal. During the efforts to converge to a commonly accepted solution for the centre consensus was desirable in order to deal with the implication matters uncertainty and differences of interest.

As mentioned, this research concerns the first step out of three in developing a crisis competence centre. The implications for the crisis management capability identified are something that will constitute research premises for the next step of research intervention in the development process of establishing the centre.

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### REFERENCES

- Anand, B. N., & Khanna, T. (2000). Do firms learn to create value? The case of alliances. *Strategic Management Journal*, 21(3) Special Issue: Strategic Networks, 295-315.
- Avgerou, C., Ciborra, C., & Land, F.F., editors, (2004). *The Social Study of Information and Communications Technology: Innovation, Actors and Context*, Oxford, OUP
- Baum, J. A. C., Calabrese, T., & Silverman, B. S. (2000). Don't go it alone: Alliance network composition and startups' performance in Canadian biotechnology. *Strategic Management Journal*, 21 (3) Special Issue: Strategic Networks, 267-294.
- Callon, M. (1986b). Some elements of a sociology in translation: Domestication of the scallops and the fisherman of St Briec Bay. In Law J. (Ed.), *Power, action & belief. A new sociology of knowledge?*, 196 – 229. London: Routledge & Keagan Paul.

- Chesbrough, H.W. (2003). The era of open innovation. *Sloan Management Review*, 44: 35-41
- Cordella, A., and Shaikh, M. (2006), 'From epistemology to Ontology: Challenging the Constructed "truth" of ANT,' Working Paper Series, 143, Department of Information Systems, London School of Economics.
- Englehardt, C., and Simmons, P. (2002). Creating an organisational space for learning. *The Learning Organisation* 9 (1):39-47.
- Grefen, P., Aberer, K., Hoffner, Y., Ludwig, H. (2000). Crossflow: cross-organizational workflow management in dynamic virtual enterprises. *Int. J. Comput. Syst. Sci. Eng.* 15 5, pp. 227–290.
- Harnesk, D., and Nilsson, J. (2008), Collaboration Working Environment: A single point of entrance into networks of knowledge. *Proceedings of eChallenges2008*, Stockholm Sweden.
- Hevner, A.R., Salvatore T. March Jinsoo Park Sudha Ram (2004) Design Science in Information Systems Research, *MIS Quarterly*, 28(1), 75-105.
- Lamb, R. (1999). Using Intranets: Preliminary Results from a Socio-technical Field Study. *Proceedings of the 32nd Hawaii International Conference on System Sciences*.
- Lane, P. J., & Lubatkin, M. (1998). Relative absorptive capacity and interorganizational learning. *Strategic Management Journal*, 19(5), 461-477.
- Lindgren, R., Henfridsson, O., & Schultze, U. (2004, September). Design Principles for Competence Management Systems: A Synthesis of an Action Research Study. *MIS Quarterly*, 28(3), 435-472
- McKendall, M. (1993). The tyranny of change: Organizational Development revisited, *Journal of Business Ethics*, 12, 12, 93-104.
- Miles, R.E., and Snow, C.C. (1978). *Organizational Strategy, Structure and Process*. West Publishing Company, New York.
- Prévot, F. (2004) Managing inter-organizational transfer of competence: A case study, *Advances in Applied Business Strategy*, No. 8, pp165-186.
- Radder, H. (1992). "Normative reflexions on constructivist approach to science and technology," *Social Studies of Science*, 22(1), 141-173.
- Simonin, B. L. (1999). Ambiguity and the process of knowledge transfer in strategic alliances. *Strategic Management Journal*, 20(7), 595-623.
- Swedish Government Proposition, (2007). stärkt krisberededskap – för säkerhets skull, 08/92.
- Tidd, J., Trehwella, M.J. (1997). Organizational and technological antecedents for knowledge acquisition and learning. *R&D Management*. Vol. 27. No. 4, pp. 359-375.
- Tidd, J., Bessant, J., Pavitt, K. (2001). *Managing Innovation Integrating Technological, Market, and Organizational Change*. Chichester, Wiley.
- Walsham, G. (2001). Knowledge Management: The Benefits and Limitations of Computer Systems. *European Management Journal* 19 (6):599-608.