Seminar – Winter term 2019
“Current Topics in Risk and Crisis Management”

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Preliminary Kick-Off Meeting
22.10.2019 14:00
Room 103, Hertzstraße 16, Bldg. 06.33, Westhochschule

Final Presentation and Submission of Thesis
End of January (preliminary presentation date: 28.01.2020)

How to apply
Please use the faculty’s online portal for your application.

Preface
Students can work on a variety of risk management aspects in this seminar. The topics are directly integrated into current research projects (https://www.iip.kit.edu/english/3087.php) and the corresponding scientific staff member supervises the thesis. The teaching language is English.

The final grade for the seminar will be based on the written thesis and an oral presentation in front of the class (with discussion).

The following table presents an overview of the topics, while a detailed description follows on the next pages.

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1. **Agile Project Management in Humanitarian Logistics**

The concept of agility is emerging as one of the most popular trends in R&D departments of private companies. The idea is to increase the flexibility in project management structures and to facilitate adaptations quickly. This could also be interesting for organizations working in the field of disaster management since improvising and adapting are the key challenges these organizations need to deal with. However, it remains unclear, if and how the concept of agility can be transformed to the operations context.

The thesis should include the following aspects:
- an overview on the concept of agility and agile project management
- an investigation, if and how organizations working in the disaster environment already use it
- a discussion on the opportunities and challenges of agile project management (in operations management in general and in the humanitarian logistics context).

**Supervisor:**
M.Sc. Florian Diehlmann

**Literature (as a starting point):**


2. **Analysis of the monetization models of attackers**

Cybercrime is becoming more and more of a business. Among other things, IT security measures are neglected because their benefits cannot be quantified satisfactorily without great effort. In contrast, the business models of attackers, such as blackmail Trojans and black market trading with vulnerabilities, are partially very successful. This results in a growing imbalance between victims and attackers. To counteract this, the complex economic interrelationships in IT security must be explored and understood. Thereby your work contributes to the understanding of complex economic aspects through sharpening the understanding of the monetarization models of attackers.

**Supervisor:**
M.Sc. Florian Kaiser

**Literature (as a starting point):**


3. **The impact of cognitive load and usability on cybersecurity**

Humans are frequently considered as the weakest link in cybersecurity. Since people use security solutions, behavioural aspects are very important in cybersecurity and safety. These include psychological questions about usability and cognitive load. This gets especially important when quantifying the benefit of a specific security solution. Thereby security solutions and measures are practically used only when they are economically advantageous. Existing concepts do not take sufficient account of the relationship between benefits and monetary or non-monetary costs. To achieve this, it must be possible to quantify the costs and benefits of IT security solutions and measures, especially the non-monetary costs. Your contribution to this topic is to sharpen the understanding of opportunity costs especially referring to usability and cognitive load of safeguards.
Supervisor:
M.Sc. Florian Kaiser

Literature (as a starting point):


4. Reputational earnings of firms from disaster management

In Germany, the management of crises, may it be caused by natural disasters or terrorist attacks, is in the responsibility of state bodies such as the Bundeswehr or THW. Nevertheless, there are always examples of companies that at first glance appear to be selflessly involved in humanitarian crises and, for example, provide their products free of charge (particularly relevant in the food industry) or share their infrastructure (trucks, distribution centres, etc.) and their knowledge/data with the state. For many companies, a positive external image is then in the focus.

The topic of this seminar work is to analyze the reputation gains of companies, which they can acquire through humanitarian contributions in the event of a crisis.

The thesis should include the following aspects:
- In which respects and in which contexts do companies "cultivate their image"? How does this strategy depend on the industry and the event framework in which the companies are active (e.g. scandals, accidents, disasters, etc.)? At least one approach established in the literature should be presented on how "company image" and "company reputation" can be measured.
- On the basis of cases described in the literature, examples of companies that have been charitable and/or supportive in humanitarian crises in the past will be given, which can be explained (at least in part) by image cultivation.
- An essential part of the seminar work is the conduct of company interviews and interviews of the population (in the form of questionnaires that have to be answered) to validate the hypotheses from the beginning of your seminar.

Knowledge of the German Language is required for this seminar. This seminar topic will be assigned twice.

Supervisor:
M.Sc. Markus Lüttenberg

Literature (as a starting point):

5. **Classification of worldwide Power-Outages**

Again and again we read about smaller and larger power outages all over the world. Germany has also been affected by such outages on several occasions, e.g. in Münsterland in 2006 or parts of Berlin in 2019. Since the energy transformation is potentially exacerbating this risk, a classification of past power outages is to be developed within the framework of this seminar.

In particular, historical power outages will be compared in the following categories:

- What were the triggers of the power outages?
- What was the extent of the blackouts (number of people affected, duration, ...)?
- What damage (medical, technical, economic, ...) did the power failure cause?
- Were measures taken retrospectively to avoid the outages in future or to limit the potential damage?

This seminar topic is embedded in the current research project INCA, a decision support framework for strengthening disaster resilience in cross-border areas.

**Literature (as a starting point):**


**Supervisor:**

M. Sc. Miriam Klein

6. **Intercultural Crisis Management in Germany and France**

Each culture has its own specifics including the background and habits of the people. That is an important aspect to consider in cross-border crisis management since especially in stressful situations, as catastrophes, people refer to these habits and act in – for them – natural ways. So this research topic is to become aware of problems that may arise due to different backgrounds of the persons acting in a cross-border crisis.

In particular, it is to deal with the following aspects:

- In general, which frameworks to study cultures do already exist and how are behavior patterns/habits included in these frameworks?
- Discuss the relevance of culture and behavior patterns in terms of intercultural crisis management. Where are potential (culture-related) problems seen in borderland crisis cooperation?
- What are strategies to address these problems in advance?

This seminar topic is embedded in the current research project INCA, a decision support framework for strengthening disaster resilience in cross-border areas.

**Literature (as a starting point):**


**Supervisor:**

M.Sc. Miriam Klein
7. Importance of waterways for electricity supply

Inland waterway transport is an important mode of transport as it also serves to ship resources that are needed for electricity generation. In addition, waterways serve as a source for cooling water extraction. Due to these and further dependencies, problems in waterways can have an impact on the electricity supply. In this thesis these interrelations and dependencies shall be investigated.

The resulting work should answer the following questions:

- What interdependencies exist between waterways and power generation? How can these interdependencies be described in a qualitative and quantitative way?
- How does a bottleneck due to the found interdependencies affect power generation?
- How susceptible are certain regions in Germany to such complications?

Supervisor:
M.Sc. Rebecca Wehrle

Literature (as a starting point):

- Rinaldi et al. (2001). Identifying, understanding, and analyzing critical infrastructure interdependencies. IEEE Control Syst. 21 (6), pp.11–25. DOI: 10.1109/37.969131.

8. Consideration of reliability of transport infrastructure in location decisions

Since transport infrastructures are heavily used for freight traffic, manufacturing companies are highly dependent on these parameters. An increasing deterioration of transport infrastructures and an increase in the required transport capacities may lead to the fact that supposedly available transport capacities cannot be used sufficiently. If this problem is not just a transient issue but rather occurs on a more and more regular basis, this can result in existing production facilities having to be relocated. For this reason, decision-makers must not only check for infrastructure availability and quality at the time when they decide about the choice of location when opening a facility, but must also continuously monitor the state of the infrastructure.

The resulting work should include the following points:

- Short literature review about Facility Location Planning
- Identification of attempts to include transport infrastructural aspects
- A literature review about attempts to combine the revision of facility location decisions and infrastructural deterioration
- Illustration of one of the models found in the previous step

Supervisor:
M.Sc. Rebecca Wehrle

Literature (as a starting point):

9. Application of Off-the-shelf Artificial Intelligence to risk management data

Advanced data processing tools such as big data and artificial intelligence (AI) have long since found their way into almost all areas of scientific research. At first glance, these methods require in-depth knowledge of data analysis, which can only be provided by highly specialised experts. However, there are more and more "off-the-shelf" tools that make it possible for laypersons to carry out data analyses for their respective areas of expertise. As a result, the potential use of these technologies in all areas of life becomes many times larger.

The thesis should include the following aspects:
- Definitions and descriptions of the concepts big data and artificial intelligence naming two examples of standard applications
- Brief and compact literature account on the current state of the art of AI-applications in the area of risk and crisis management; the most relevant and insightful study should be presented in detail.
- Applying an "off-the-shelf"-tool to a given data set.

Supervisor:
Dr. Marcus Wiens

Literature (as a starting point):