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**Crisis management systems: the comparison of their
effectivity and its implications**

Master's thesis

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Declaration

1. I hereby declare that I have compiled this thesis using the listed literature and resources only.
2. I hereby declare that my thesis has not been used to gain any other academic title.
3. I fully agree to my work being used for study and scientific purposes.

In Prague on 31st of July 2020

Anežka Amlerová

References

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Abstract

This diploma thesis deals with the efficiency of crisis management systems in Denmark and the Czech Republic. The first part of the thesis consists of a literature search, which deals with the current direction of research in the field of crisis and disaster management, it also contains a section devoted to relevant terminology and description of crisis management systems of Denmark and the Czech Republic. The analytical part of the work consists of two case studies that are examined in both target countries. The cases are the COVID-19 pandemic and the floods in 2006 in the case of Denmark and 2013 in the case of the Czech Republic. Through the theory resilience, each case is analysed, and the main factors that affect the investigated variables of resilience, efficiency and entropy are identified. The results are then reflected upon in a discussion part of the thesis with the help of the RDIC model. The findings of the analysis are that the main factors reducing the functionality of the system are excessive homogeneity of the system and ineffective communication and cooperation between actors, which is caused by different goals, expectations and perceptions of each other. In conclusion, it is recommended to gradually eliminate these individual shortcomings and apply the principles of the horizontal system to increase the heterogeneity of the system and thus its resilience.

Abstrakt

Tato diplomová práce se zabývá efektivitou systémů krizového řízení Dánska a České republiky. První část práce tvoří literární rešerše, která se zabývá aktuálním směřováním výzkumu v oblasti krizového a nouzového managementu, dále obsahuje část věnující se relevantní terminologii a popis systémů krizového řízení Dánska a České republiky. Analytická část práce se věnuje dvěma případovým studiím, které jsou zkoumány v rámci obou cílových zemí, a to pandemií COVID-19 a povodním v roce 2006 v případě Dánska a 2013 v případě České republiky. Prostřednictvím teorie odolnosti systému je analyzován každý případ a identifikovány hlavní faktory, které ovlivňují zkoumané veličiny odolnost, efektivitu a entropii. Výsledky jsou následně komentovány v diskuzi společně s využitím RDIC modelu. Zjištěním práce je, že hlavními faktory, které snižují funkčnost systému jsou přílišná homogenita systému a dále neefektivní komunikace a kooperace mezi aktéry, která je způsobena rozdílnými cíli, očekáváními a vnímáním jeden druhého. Závěrem je

doporučeno tyto jednotlivé nedostatky postupně odstraňovat a aplikovat principy horizontálního systému pro zvýšení heterogenity systému a tím i jeho odolnosti.

Keywords

Crisis management, disaster management, resilience theory, Czech Republic, Denmark, COVID-19, floods

Klíčová slova

Krizový management, nouzový management, teorie odolnosti systémů, Česká republika, Dánsko, COVID-19, povodně

Title

Crisis management systems: the comparison of their effectivity and its implications

Název práce

Systemy krizového řízení: srovnání jejich efektivity a jeho implikace

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Introduction

Between the years 1990 and 2012, 2202 disasters and emergencies has struck the WHO European region resulting in more than a hundred and ninety thousand deaths and almost forty-eight millions of people affected (WHO, 2013). In the last decade numerous other relatively new or unexpected types disasters have hit in Europe – terrorist attacks, cyber-attacks on government agencies and recently the coronavirus pandemic.

These events show the growing need of correctly functioning national and international crisis management systems. However, much attention is paid to the development of the crises and how each state handled them, but not so much attention is paid to the systems. Nevertheless, if the system is set up correctly for local conditions, it is possible to observe an increase of functionality and shorter response time (Zhao, Peng and Li, 2013).

With so many new types of crisis, the question is whether the systems are set up correctly to tackle them efficiently and if not, what are the main issues that decrease the efficiency of the system. Crisis mercilessly reveals the problems and the weak spots in the crisis management systems, so this thesis uses two cases in two different European countries to assess the response of the system during the crisis and to reveal shared flaws culpable of decreased functionality.

Aside from the case studies, the original research proposal for this thesis also included interviews with relevant officials from both Denmark and Czech Republic to map their perception of flaws in the system and mistakes made during the cases. Unfortunately, due to the coronavirus pandemic, the interviews were never conducted, and the analytical part of the thesis was curtailed to the case studies alone. However, the coronavirus pandemic also brought the unique opportunity to analyse the crisis management systems on the same crisis, with similar timeline and conditions and was therefore included in the thesis.

The second case study is focused on floods in both countries, specifically the floods in 2013 for the Czech Republic and floods in 2006 for Denmark. They were chosen because floods are a relatively typical natural disaster for both countries; however, these specific ones were unusually strong and tested the functioning of crisis management systems.

The analysis will be performed by using resilience theory by Comfort, Siciliano and Okada (2011). The goal of the case studies is to detect the effect of resilience, efficiency and entropy on the performance of the system and identify factors that are influencing them. The

results will be discussed in the final part of this thesis, along with inferring implications of the detected factors.

The overall goal of this thesis is to evaluate the preparedness of selected crisis management systems for both new and traditional types of threats and to ascertain if the detected issues are dependent on the design of the system itself, or if they depend on other factors.

1. Methodology

Since the late 20th and early 21st century, new or enhanced types of the crisis has surfaced. This unexpected development put the world governments to test to swiftly react and adjust the legislation and the crisis management system. However, these changes overshadow the system itself and the possibly outdated system in return hinders the response during the crisis when time is the most crucial aspect.

This thesis thus aims to analyse and compare the current state of crisis management systems of two European countries on two different cases and explore the obstacles that complicate cooperation between the components of the system.

1.1 Literature review

The literature review will be carried out to examine the main theories that concern with the topic of crisis and disaster theories and present ideal features of crisis management systems in order to be able to compare the analysis to this ideal in the discussion.

The approach to the review represents a combination of outcome-oriented review as described by Randolph (2007) because it will focus on findings of other authors about the prevalent problems of crisis management systems and theory-oriented review as it will also explore the preponderant line of research on disaster and crisis management and government strategies.

The literature used for the review was collected by using a snowball sampling method as described by Lecy and Beatty (2012) in order to build a base of relevant literature. This method is excellent for building a robust base of data and can partially fix the bias caused by unstructured search methods. However, since it is a non-probability method, the bias cannot be eliminated. The primary databases used for finding the literature are Google Scholar, EBSCO database, ProQuest Central, Science Direct and government websites.

The search criteria were following:

Figure 1: Search criteria

Main search terms	Crisis management <i>or</i> Disaster management
	National disaster strategy <i>or</i> National crisis strategy
	Crisis management <i>or</i> Disaster management <i>and</i> System analysis
	All of the above <i>and</i> Czech Republic <i>or</i> Denmark

Inclusion criteria	Language: Czech, English, French, Danish
	Official documents or reports from governmental or international organisations, articles from peer reviewed journals, published books, media articles directly related to analysed cases
	Publication date: after the year 2000 (with exceptions for legislation and documents providing historical context)

Source: Author

1.2 Analytical part

The analysis of this thesis will consist of a comparison of selected crisis management systems in Europe. For this purpose, the comparative case study will be used as a primary research method. The case study method is the most suitable method for this thesis as it allows a holistic approach to each case while permitting an examination of relations between different its aspects and observations. It also allows using pre-existing theories and testing them on new cases, which is very useful while exploring less-frequent topics (Meyer, 2001). Subsequent comparative analysis of the cases allows for highlighting similarities and differences, and it also permits to understand the explanatory relevance of the environment surrounding the system itself (Esser and Vliegthart, 2017). In order to achieve that, the analytical part will be divided into four sections, as recommended by Esser and Vliegthart (2017).

The first section will focus on providing a description of each case to gain an objective, accurate picture of the case. The second section will concentrate on analysing the case while using the theory to direct the analysis. The theory in question is the theory of resilience as presented by Comfort, Siciliano and Okada (2011).

The theory of resilience claims, that in order to achieve resilience, which is defined by Comfort, Oh and Ertan (2009, p.3) as a “capacity for collective action in response to extreme events” it is necessary to balance the resilience along with contradicting factors of efficiency and entropy. The interest of government is to build resilience as much as possible through raising awareness, facilitate self-help options inside communities, municipalities and of course, leading and participating in the crisis response. Resilience is strong at the

beginning of a crisis with organisations, both public and private, responding together to the crisis in order to reduce the damage.

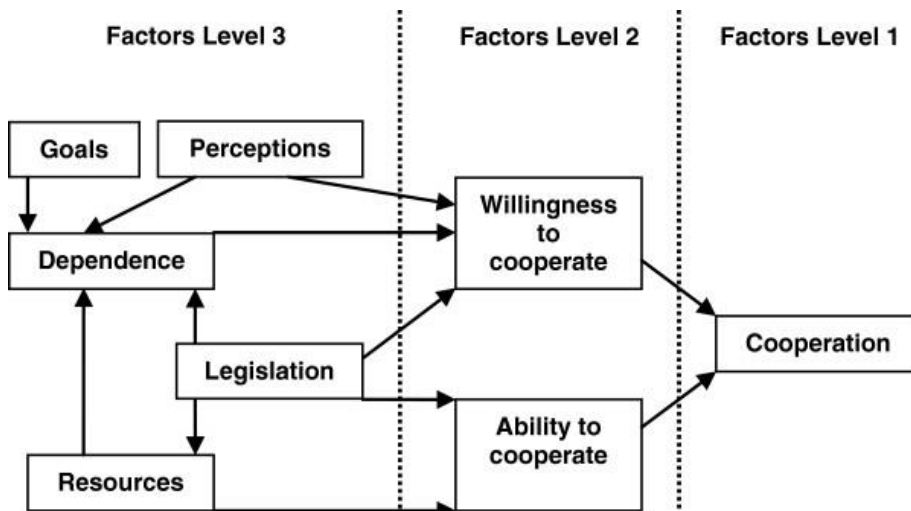
However, at some point in time after the immediate crisis passes, the attention starts to decline since the organisations and the whole community is preoccupied with everyday problems – as explained by the concept of entropy. In order to balance the entropy and retain a suitable level of resilience, the third factor needs to be introduced - the factor of efficiency. Efficiency can be described as how much communication is happening between the organisations involved in the emergency response and recovery. This factor is central for this thesis since communication is the crucial element of crisis management and its deficit or unsuitable course can influence the crisis resolution dramatically.

The final part of the analysis will be dedicated to comparing the results of the preceding analysis and discussing the results and its implications on the functioning of crisis management systems, using the Resource dependence institutional cooperation model (RDIC). De Rijk along with van Raak and van der Made (2007) developed RDIC, for analysing cooperation between organisations in public healthcare, however, it can be applied to a wide range of situations like work legislation (Hoefsmit, Rijk and Houkes, 2013) or disaster management (Henrotte, 2017).

The model can be seen in Figure 2 and is divided into three basic levels. The first level is the cooperation itself, which is influenced by the factors on the second level – the willingness and ability to cooperate of involved organisations. These factors are fundamental for successful and efficient cooperation which in turn creates efficient crisis management systems. The third level is composed of the factors like national legislation, available resources and goals of each organisation.

The sources used for this part of the thesis are mainly secondary sources – journal articles, relevant government documentation and books but also using several primary sources such as legislation and videos from the events.

Figure 2 Resource dependence institutional cooperation model



Source: de Rijk, van Raak and van der Made (2007)

1.1.1 Case selection

The crisis management systems of the Czech Republic and the Kingdom of Denmark were chosen to be the most suitable comparative pair for the thesis. Both systems will be analysed on two similar crises – COVID-19 pandemic for both countries and floods, specifically for the Czech Republic spring floods 2013 and for Denmark coastal floods 2006. The countries are both parliamentary democracies, members of the European Union with similar administrative systems and both of them wholly reformed their crisis management systems since 2000.

The crisis management systems of both countries are partially decentralised with transferred responsibility to both regional and municipal governments. Therefore, they are similar enough to make a comparison but have a different range of experienced crisis and because of that, have different orientation and organisation. The choice of the crises was made regarding two main conditions – comparability and frequency of occurrence. Coronavirus pandemic is a global issue, and since the conditions are very similar for all countries, the comparison of approaches to the crisis will have better validity. The case of floods was chosen due to the more conventional nature of the crisis – in both countries, floods are relatively usual natural disaster governments have to manage, which allows them to be more prepared, and the systems should theoretically work the best while dealing with this type of crises.

1.1.2 Research question and hypothesis

The thesis wishes to provide answers to the following question:

RQ: What factors have impact on the resilience, entropy and efficiency of the system during and after the crisis?

Based on the question, the following hypothesis is tested throughout:

H: The system is mainly influenced by the level of communication between individual organizations, which decreases over time and by that it become less efficient and resilient. Improving the communication and factors directly affecting it could help reduce the effect and build more efficient crisis management systems.

1.1.3 Addressing possible biases

This thesis, same as all research is prone to bias. To decrease the effect of possible biases, this part describes steps taken to ensure that the primary sources of bias in qualitative research (external and internal validity, generalizability, reliability and construct validity) are taken into account (Parveen and Showkat, 2017).

Initially, the thesis was going to include a third country in order to increase external validity and generalizability, though, due to the limited access to information because of the COVID-19 pandemic the cases needed to be left out. That, while admittedly decreasing confidence in the findings, allows for more in-depth analysis of remaining cases.

Internal validity is addressed by applying two specific theories on said cases and careful and logical explanation of examined phenomena.

To ensure a construct validity of the study, multiple sources for each study were used, and since the thesis is using two cases, it is possible to strengthen and confirm the argument from one case on the other one.

The reliability of the findings is the primary concern of this thesis. While using qualitative methods, the replicability is jeopardised by the personal bias of the researcher, and they want to confirm their ideas (Meyer, 2001; Mareš, 2015). This bias cannot be eliminated, but it is addressed by carefully describing used methods, search strategy and source citing.

2. Literature review and conceptual anchoring: from crisis to crisis management

The following review is an outcomes-oriented review aiming to explain the preponderant line of argument on crisis management and its position in national crisis plans. This chapter will also define central theories used to analyse and explain position of crisis management in national and international system and analyse existing research on the topic of national crisis management strategies.

First part will reflect on the vital concept of crisis and closely connected concepts of disaster and emergency since the interchangeability of these terms (and the concepts as well) is widespread in media but sometimes also in academic research. The second part will focus on existing research on crisis management, mainly on national but also on an international level.

This part of the thesis is crucial for the analytical part since it presents the theoretical ideal, which is later compared to real cases.

2.1 Concepts of crisis, disaster and emergency

One of the aims of this thesis is to analyse crisis management systems from a systematic standpoint. However, in order to do so and also for the sake of comprehensibility, it is necessary to clarify and briefly explain the main concepts that are used in it very frequently—i.e. crisis, disaster and emergency.

While the importance of these concepts and their meaning is well-known in the academic and political community alike, the terms can be and often are used interchangeably in official state documents and academic articles alike, yet, they are not the same and should be distinguished.

Furthermore, even though the theoretical definition is admittedly inferior to the practical use, Quarantelli, Lagadec and Boin (2007) noted that in order to understand the conditions and consequences, it is needful to know at least the main characteristics of said problem.

2.1.1 Crisis

Numerous attempts have been made on the topic of distinguishing between the term crisis, disaster and emergency but no universally acknowledged distinction exists, so this part presents several viewpoints, starting with the term crisis. Cambridge English Dictionary

(2020) generally describes the crisis as “an extremely difficult or dangerous point in a situation”. That is the original meaning of the word.

If focused more on the topic of crisis management, a crisis can be described as an unusual, high-risk situation that can get out of control if not appropriately managed by the business (Shaluf and Said, 2003). A similar idea is also presented by Pearson (2002), who notes that crisis threatens the organisation and if not managed properly can lead to termination of activity of a said organisation. The commonality between these definitions is the negative interpretation of the word crisis, and this outlook seems to be the most common in the community. However, according to Shaluf and Said (2003), it is possible to find positive interpretation: to see a crisis as an opportunity and the turning point. This outlook is used mainly in the business world, and that is where the word crisis is replaced by milder term issue, possibly in order to eliminate the negativity that can cause lower productivity in the company.

Based on these definitions and others, the research by Al-Dahash, Thayaparan and Kulatunga (2016) shows that the word crisis and the definitions thereof are most often associated with being threatening for the whole system or organisation, happening suddenly and unexpectedly, causing damage and finally its uniqueness, forcing the decision-making party to react differently than before.

For the sake of clarity, an outlook on the problem from the perspective of international relations is needed. From the perspective of IR and political science, the word crisis refers to “a necessary phase of disorder in a nation’s march against democracy” (Boin, Hart and Kuipers, 2017, p.26). However, the meaning is merging more and more with the above-presented meaning of the word crisis. Today, if political scientists talk about a crisis, both options above are possible, and both currents of research exist separately.

2.1.2 Disaster

The second analysed concept is a disaster. Disaster again has many different definitions but can be for example defined as “an occurrence disrupting the normal conditions of existence and causing a level of suffering that exceeds the capacity of adjustment of the affected community “(WHO/EHA, 2002, p.3). The United Nations Office for Disaster Risk Reduction (UNODRR) (2009) describes the term quite similarly, agreeing with the disruptive nature of the event that exceeds the capacities and abilities of the community to cope with it. According to UNODRR, the disaster comes as a result of three conditions: the

presence of a threatening factor, the vulnerability of the community and lack of tools to deal with such an event. Lindell (2013) adds to that with a condition of time and space concentration in order to be able to distinguish one disaster from another.

Generally, the definitions of the term disaster include the factor of abruptness and uniqueness of the situation, substantial damage and the extent of capacities of the affected community. If compared to the above-mentioned definition of crisis, quite a few similarities can be found. The shared features are the uniqueness of the situation, its sudden nature, the effect on the whole community and considerable damage (Al-Dahash, Thayaparan and Kulatunga, 2016). Nevertheless, the terms are not the same and should not be treated that way; there are, though, several outlooks on their connexion.

The first possible distinction is that disaster is a subject term to a crisis. This claim is presented by Stallings (1988) as a part of his theory that distinguishes two types of crises – the consensus crisis and the conflict crisis. Stallings claims that during natural disasters and other similar events, the usual conflicts between people occur less, and their probability diminish. The reasoning behind it is that the cultural norms change in the light of the situation in favour of consensus, and that decreases the possibility of conflicts. However, this argument holds only in the case of natural and technological disasters, which are (according to Stallings) called consensus crises. On the other hand, if the crisis is human-made, such as terrorist attacks or riots (in general called conflict crises), the possibility of conflicts increases, because terrorists or rioters want to prolong the period of crisis for as long as possible.

Quarantelli, Lagadec and Boin (2007) suggest a behavioural distinction between the term crisis and disaster. According to them, there is a difference in the probability of looting happening, the hospital activities and even mass media coverage depending on whether the situation is conflict or consensus crisis. They point out the situation during the 9/11 Trade Centre attacks when the operational level team was split on the strategy of dealing with rescuing victims and preserving the crime scene. This rift happened based on the perception of the situation along the crisis/consensus line and therefore supports the position of this theory.

Boin, Hart and Kuipers (2017) also propose a different theory stating, that disaster is not a type of crisis but rather one of its possible outcomes. The condition of crisis transforming to disaster is devastating consequences of the situation. Thanks to this outlook

it is possible to study the concepts of crisis and disaster together, and that means a broader range of events to study, and that is why it will be used as the base concept in this thesis.

2.1.3 Emergency

The last concept is the concept of emergency. In contrast to both previous concepts, the definition of an emergency is commonly settled. An emergency can be defined as “a state, in which normal procedures are suspended, and extraordinary measures are taken in order to avert a disaster” (WHO/EHA, 2002, p.10). Alexander’s (2005) definition mostly overlaps with the definition by WHO, but he adds the aspect of an imminent threat to people, environment and property. Thus, emergency definitions usually cover the fact, that it concerns an imminent or existing threat, great urgency of the situation and the need for prompt action in order to refrain from the threat.

Even though the definitions of the term are mostly in accord, the issue again begins with relation to other concepts. WHO/EHA’s definition sees emergency as a state before a disaster, denoting it more as a legislative step in order to implement procedures needed. However, Alexander (2005) claims that emergency is the superior concept which encompasses disaster, catastrophe and other similar smaller events. According to the United Nations Office for Disaster Risk Reduction (2009), an emergency is a synonym for a crisis that can escalate into a disaster if not tackled on time.

From the overview of existing research above on the topic of concepts of crisis, disaster and emergency, it is clear that general agreement is lacking. Even though some authors concur to some extent in the meaning, the relation between these terms is not agreed on. For the purpose of this thesis and its easier understandability, the terms will be used in accord with Czech legislation. Therefore, practically following Sterling’s idea, where the concept of crisis is the superior one that encompasses all natural and anthropogenic (human-made) disasters and emergency is the term denoting the situation before the disaster (and so before the crisis) but with already existing imminent thread which requires prompt action. The mechanism of the Czech legal system concerning crisis management will be described later in the thesis.

2.2 Crisis and disaster management

The lack of consensus concerning the terminology reoccurs with the directly linked topic of crisis, disaster and emergency management. The terms are again used interchangeably, and

official documents and strategies of different states use a different combination of these terms and the strategies considerably overlap. While the difference between the previously presented terms is more distinct, the difference between crisis and disaster management is rather vague. For example, Carter (2008, p.XIX) defines disaster management as “a process of analysis of preventing, preparing and mitigating the disaster before it happens and also implementing response and recovery after”. Pearson and Mitroff (1993) pursue the topic of crisis management, and the stages of the process are very similar to Carter’s definition – detection of the crisis, prevention and preparation, containment and recovery. All four stages are also agreed by Davies and Walters (1998) both for disaster and crisis management.

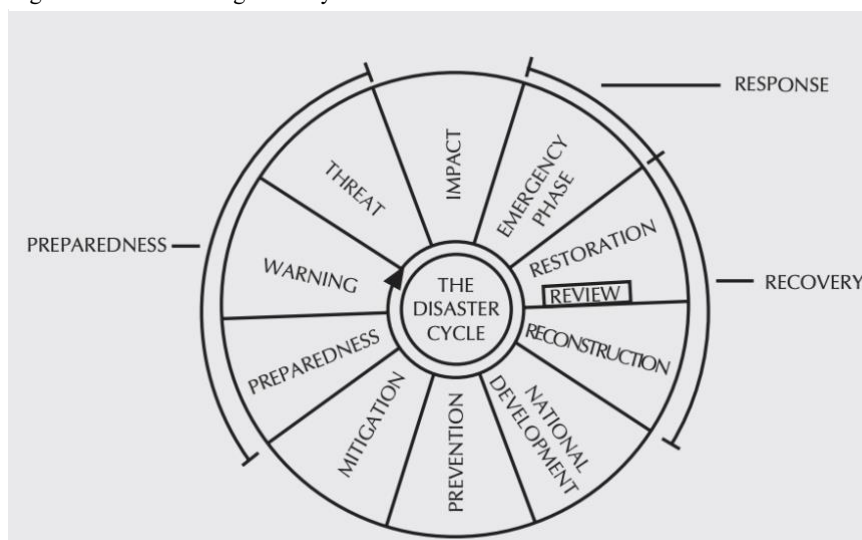
Even though numerous authors suggest that the terms crisis management and disaster management in the sense of governmental response follow the same stages, this thesis will use the term crisis management exclusively for clarity reasons.

As already said above, the primary purpose of crisis management is to handle the whole process of crisis handling from prevention and identification of the crisis, planning and preparing for the response and finally response and recovery. This sequence of steps is called disaster (or sometimes crisis) management cycle.

2.2.1 Disaster management cycle

Disaster management cycle is a graphic representation of steps taken before, during and after the disaster or more generally, crisis. Figure 3 shows one of the interpretations of the cycle. The circular shape represents an everlasting succession of the steps, and it is important to note,

Figure 3 Disaster management cycle



Source: Carter (2008)

that even though the steps are portrayed as equal-sized, the reality is that the size of each sector is different depending on the specific crisis it depicts (Carter, 2008). Having said that, the depicted steps are common for all types of crises and according to Carter (2008) can be divided into two main categories pre-crisis activities and post-crisis activities.

Pre-crisis activities include prevention, mitigation and preparedness. Prevention is a set of measures taken to prevent loss both of property and also of human lives (Khan, Vasilescu and Khan, 2008). An example of a prevention measure is the building of anti-flood barriers or levees in order to prevent floods. Preventive measures are projected in a whole array of strategic documents such as national development plans, disaster legislation and crisis management strategies (Carter, 2008).

Mitigation measures go one step further than prevention, and their objective is to diminish the consequences of the crisis. Mitigation should also be included in national crisis management strategies, and the key is to include the measures on all governmental levels and also to incorporate them in both current and future plans. To stay on the example of floods, mitigating the risk for existing structures can include reinforcement of buildings in order to enhance their resilience. Mitigation for future structures includes enacting mandatory precautions against floods (Davis, 2014).

Last part of pre-crisis activities is preparedness. Preparedness is the most immediate step before the crisis itself; therefore, it is considered extremely important. These procedures permit the government and other institutions to react to a said crisis adequately. Practical preparatory measures are usually more developed on regional and municipal level rather than on government level, and it can include personnel training, management of equipment and operational facilities. On the other hand, the government usually handles tasks such as raising public awareness and preparation of financing (Carter, 2008).

A crisis itself, while pivotal cannot be described uniformly because of its variable nature though it is possible to describe the immediate actions during and post-crisis. First part is the emergency phase - response. The response is a set of immediate actions taken during and after the crisis in order to save lives and meet provisions of the victims (Khan, Vasilescu and Khan, 2008). These actions are often performed under very challenging conditions; therefore, precise and thorough preparation, coordination and training are needed to provide the most efficient and rapid response (Carter, 2008).

The last sector of the disaster management cycle is recovery. Recovery aims to return society to its initial position pre-crisis. Recovery is often the longest stage of the whole disaster management cycle and can last from months to years in the case of serious natural disasters (Davis, 2014). This stage can include many different activities from cleaning up debris, construction of new buildings, psychological and medical aid for the victims or financial grants in order to build up the community again.

The disaster management cycle is a theoretical concept, but it serves as a core idea for both national and international plans and structures of crisis management. All plans and strategies should encompass the whole cycle to provide a complex approach.

2.3 National and international plans of crisis management

Crises can have a significant effect on the state and its function. It is, therefore, of the utmost importance for countries to establish and enact a plan that addresses all the aspects of the crisis. The plan should be present on the governmental, regional and municipal level to ensure in order for the response to be as efficient as possible. Inadequate preparation of said plans leads to inefficiency when the resources do not match the needs of the crisis, and that proves fatal during the crisis (Alexander, 2005).

The efficient and correctly configured plan serves as a foundation for crisis legislation or other legal documents, allocation of responsibilities for organisations and overall puts the country (region, municipality) in the better position both in the eyes of the public and in the international community. Several aspects need to be taken into account in order to create an effective policy and are common for all three levels of crisis planning.

First, the list of potential crises and its possible effects should be created in order to prioritise the more imminent and potentially more destructive crises.

Second, the whole array of resources should be considered since, without sufficient resources, the whole crisis plan is futile. Both readily available resources at the time of the crisis and presumable ones obtained either from the national level or from international founts should be reckoned with.

The last aspect is the structure of institutions involved in the crisis plan. All of the levels should be incorporated in such a structure to ensure cooperation and allocation of resources. Usually, the crisis organisational arrangements are the same as in the pre-crisis times, only specialised sections or organisations are activated during these times (Carter, 2008).

While all levels of crisis management planning share these aspects, there are considerable differences between them based on the size of the territory maintained, range of possible crises and the available budget. They will be therefore described separately in order to reflect these differences.

2.3.1 Governmental level of crisis management

The role of the national government is the most crucial while handling crisis since it holds the most power – both resource and decision-making wise. Understandably, the process of governing the whole country with its diverse topography, population density and probability of different types of crisis can be challenging. However, the consequent intricacy of the system with different levels, institutions and sectors of government involved can often lead to inefficiency and undesirable delays. This topic will be further investigated in the empirical part of this thesis; this chapter aims to introduce the aspects each government should consider when creating a national crisis management plan.

A crisis management plan should be seen as a continuous process, preferably following the stages of the disaster cycle. The first aspect to consider is what elements of the disaster cycle to include and how. The optimal solution would be to include every stage of disaster cycle - prevention, mitigation, preparedness, response, recovery and development. However, Carter (2008) notes that while preparedness, response and recovery are integral parts of any crisis management plan, the other three stages could be omitted. Even though it is not an optimal solution, the omission can facilitate the creation of the policy, especially in countries with a limited financial budget.

The second aspect is the arrangement of government structures for the crisis management, or more precisely incorporation of new crisis management-oriented institutions into the already existing structure. This will considerably influence the efficiency of future coordination during the crisis. Davis (2014) suggests three possible scenarios for incorporating a focal agency responsible for crisis management.

The most direct option is placing the agency right under the executive – usually, prime minister and government or in some cases the president and the agency are otherwise integrated into the existing system very loosely. This option, while preferred due to the neutrality and political unbiasedness, is tough to achieve due to the loose integration resulting in difficulties with coordination of other organisations. The more integrated option is to put the focal agency on the same level as other ministries. This model can be

problematic during coordination and information sharing with other ministries. Last and most frequent option is to develop the focal agency from a pre-existing structure. This option is the easiest one, but it also has some flaws, the biggest one being the risk of bias. This idea suggests that when an agency initially focused on fire management is given responsibility for whole crisis management planning; they may still prioritise their original focus over the new one (Davis, 2014).

To add a little bit of context, in European countries, great diversity in the national crisis management systems is present. Kuipers et al. (2015) argue that it is possible to split the countries into two main categories based on the centralisation of the systems. There are still some systems heavily relying on central, national coordination like France or Latvia, but overall the systems tend to be more decentralised, and the big part of responsibility often lays on the local level. It is interesting to compare this study with the study mentioned above by Davis (2014). They primarily focus on countries in Asia and Pacific and promotes good governance, an organisation on the national level and creating a focal agency that will assist local authorities but delegating in a traditional top-down chain.

2.3.2 Regional and municipal level of crisis management

Many crises such as industrial disasters, landslides or floods happen or start mainly on the local level and should also be resolved there as quickly as possible. Shaw (2012), therefore promotes the idea that local (meaning regional and municipal) level of crisis management should be seen as a core of disaster management. This idea is shared by the United Nations Office for Disaster Risk Reduction (2019), promoting cooperation of both local and national levels in order to streamline the response.

Local crisis management cannot be completely independent of the national level. The local government is still part of a bigger structure and depends on it budget-wise and of course legislation-wise. The multi-perspective discussions are therefore needed in order to clarify the responsibilities. However, there are numerous considerable advantages to transferring part of the responsibility to local government. First, with local and community level response it is possible to utilise and involve all local organisations, and often each municipality or region have some specifics in their crisis plans that are unique but primarily benefit the region. Moreover, second, it raises the sense of participation of local communities on governmental issues which is favourable for the government.

The local communities cannot handle the crises themselves, mainly because of the lack of capacities, budget and labour force. But they can handle the prevention and preparation, and during the crisis, they can provide housing, first-aid and other resources (Davis, 2014).

2.3.3 International level of crisis management

Final and most broad level of crisis management is the international one. Crises, mainly natural disasters, cannot be contained to the state borders; therefore, the need for international cooperation. The international cooperation can take numerous forms from local cross-border cooperation, formal agreements between neighbouring countries, international assistance and regional institutions.

The international cooperation can be functioning in all stages of the disaster cycle in the form of monitoring, post-crisis aid and assessment of the crisis but the most common is the provision of aid during the crisis itself by providing equipment, rescue workers and other supplies (Carter, 2008). However, to provide the aid can prove administratively and politically challenging. That is why international organisations like NATO, EU and UN create numerous institutions and mechanisms, to simplify the process.

European Union (EU) is functioning as a source of supranational legislation and guidelines, that apply to all member countries. It also facilitates communication between the countries and thereby promotes vertical transboundary coordination (Kuipers et al., 2015). By that, it helps to tide over the political and procedural differences that could prove insurmountable if not for the presence of the EU. However, as Boin, Ekengren and Rhinard (2013) note there is a lack of vertical coordination (between the EU and the states) since EU does not have binding authority in the case of crisis management. Since the outlooks on crisis management differ vastly from country to country, it is challenging to create authority or policies acceptable for all member countries. This results in the vague allocation of responsibilities and rights between the EU and member states.

3. The crisis management systems of the Czech Republic and Denmark

This chapter, while brief is a necessary part of this thesis. It describes the systems of crisis management in the Czech Republic and Denmark. Without the knowledge of the systems, it is not possible to fully evaluate their functionality during crises, and the case studies would appear unclear due to different terminology and mechanisms. The knowledge from this chapter will also be used in the discussion part when discussing the differences between the ideal concept of a crisis management system and reality.

To address the crisis management structure by (Davis, 2014), both core crisis management agencies belong to the category of agency directly inferior to the government. This should bring a positive effect of political neutrality and unbiased, however, as seen later in the thesis, it is not necessarily true. The difference is, that Davis (2014) assumes the loose connection of the institution to the government, however in these cases, the institutions are embedded in the system. The systems also follow stages of the disaster management cycle in their national strategies, which was also an aspect in their choosing.

3.1 The crisis management system of the Czech Republic

The crisis management system of the Czech Republic is a partially decentralised system with much responsibility transposed from the national government to the regional ones. With that said, the central government and associated institutions still have a lot of power and responsibilities. The institutions within the system can be divided into two categories – the permanent institutions and the situational institutions that are activated only during a crisis.

Crisis, or crisis situation in the Czech Republic is defined as “an emergency event according to the Integrated Rescue System Act 2, disruption of critical infrastructure or another threat when the state of danger, the emergency state or the state of State menace is declared (hereinafter “crisis state”)” (the Czech Republic, 2000, § 2). The state of danger is the first stage used when a small part of territory experiences crises, and it is declared by the regional commissioners. The emergency state is applied to the whole country and is declared by the government, and the state of State menace is declared by the parliament. There also exists a fourth stage – state of war, also declared by the parliament. Its cause is self-explanatory. During these four states, the government can use financial means from emergency funding and also gains infinite powers allowing it to partially restrict rights and

freedom of citizens and businesses in order to protect the country (the Czech Republic, 2000).

The national level of crisis management is represented by the national government, which is in charge of assigning tasks to other organisations and control their fulfilment. It is also responsible for convoking the main coordinating body - Central Crisis Staff. Other organisations belonging to the top level of the crisis management system are all ministries and Czech national bank. Fourteen administrative regions occupy the regional level. Finally, the municipal level is formed by municipalities with extended powers and regular municipalities (the Czech Republic, 2000).

These organisations are the executive ones; however, part of the system is also formed by advisory and coordinating bodies divided into three levels corresponding to the institutions of crisis management.

The coordinating body for governmental level is the National Security Council (NSC) that analyses the situation in the Czech Republic, creates a framework of security policies, coordinates activities of emergency services and prepares proposals to the government adjusting the national security strategy. The members of the NSC are the prime minister of the country along with other members of the government.

The second body is the Central Crisis Staff which is the central coordinating institution, and it is only convoked during the state of emergency, state of peril to the country or state of war. The task of the Central Crisis Staff is to coordinate the international help during the crisis and observe, evaluate and coordinate the measures suggested by various state institutions. Based on that, it also prepares suggestions on how to proceed in the situation for the NSC (Government of the Czech Republic, 2020c).

The regional level is also equipped with regional security councils and regional tasks forces. The members are selected members of the regional government as well as senior representatives of regional emergency services. In parallel, the regional commissioner convokes the regional crisis staff in case of a state of danger or higher to coordinate the crisis in the.

Lastly, the municipalities with extended powers also have the security council and crisis staff and regular municipalities only have the security council. However, their function stays the same across all levels (the Czech Republic, 2000).

3.2 The crisis management system of Denmark

The crisis management system in Denmark is similar in numerous aspects to the one of the Czech Republic. Again, the system is partially decentralised, and some responsibilities are distributed to regional and local authorities. However, the main difference is the organisational distribution on the national level.

The national level includes the Governmental Security Committee (GSC), which is the highest-ranking organisation in crisis management in Denmark. It has four members - the prime minister and ministers of justice, defence and foreign affairs. The minister of defence himself is the responsible party for coordination and implementation of crisis preparedness plans (Linde-Frech,2016).

Directly below the GSC is the Senior officials' security committee which includes the four above mentioned members and also the senior officials of both foreign and national Danish intelligence agencies PET and DDIS. Both of these committees serve mainly a political, long term purpose, which means tasks such as designing new legislation, preparation and planning of financing. Operational coordination is passed down to the organisations belonging under the National operational staff (European Commission, 2019).

The National Operational Staff (NOS) is a term containing numerous agencies such as Danish national police, Danish health authority, both intelligence agencies and number of other organisations, depending on the current situation at hand, different organisations would be present during the terroristic attack, during a health crisis or natural disaster.

Arguably the most important member is the Danish Emergency Management Agency (DEMA) which is responsible for the operational functioning of the system. The main tasks include coordination and consultancy of regional and local authorities, coordination of crisis preparedness planning, propositions it to the government, risk assessment, training of emergency services and many more (Ministry of Defence of Denmark, 2009, Stone Wyman, 2008). During a crisis, it also provides help to the local and regional organisations. It, therefore, makes sense that the National operational staff and DEMA are the one in command of regional and local operational staffs and authorities as described above and it also is the coordinating actor during national crises.

In the case of a nation-wide crisis, it is possible to convoke the Danish National Emergency Management Organisation that can help with organisation and decision-making. Also, in the case of a crisis in foreign countries with Danish citizens in peril or when requested aid, the International operational staff will take the reins (Stone Wyman, 2008).

4. The pandemic of COVID-19 in the Czech Republic and Denmark

This part of the thesis is dedicated to the study of coronavirus disease in 2019 in the Czech Republic and Denmark. The pandemic of coronavirus disease 2019 (COVID-19) is a global crisis caused by respiratory disease coronavirus SARS-CoV-2. The pandemic is still ongoing at the time of the thesis (July 2020) in most of the affected countries, and Europe is not an exception. The first cases can be traced to Huben, China, to November of 2019, and the pandemic spread to Europe and North America in early 2020 (Ma, 2020). The part first briefly describes the situation development in selected countries. Second, it provides analysis using the theory of resilience by Comfort, Siciliano and Okada (2011) and finally, it compares the two by using the RDIC method by de Rijk, van Raak and van der Made (2007).

4.1 Situation in the Czech Republic during the pandemic

The conversation about the infection in the Czech Republic started in mid-February when the number of cases started to increase in Italy rapidly. On the 24th of February, Central Epidemiological Commission of the Czech Republic met for the first time to discuss possible protective measures against the virus. The first three cases appeared on the 1st of March; all three people recently visited regions in Italy with confirmed outbreaks. From this moment, numerous politicians across the political spectrum called for summoning the Central Crisis Staff (as described in the previous chapter) is a working body of National Security Council (NSC) and it is responsible for analysing crises and finding and coordinating solutions for them (Government of the Czech Republic, 2018; Schmarcz, 2020). The prime minister dismissed these demands as unsubstantiated.

Two weeks later, on 12th of March, WHO's European regional office announced, that the COVID-19 outbreak is a pandemic with more than 20 000 confirmed cases in the region (WHO, 2020b). On the same day, the national state of emergency was declared for 30 days. This measure allowed the government and NSC to employ actions and policies otherwise not possible to use. By declaring the state of emergency, the crisis management system on the national level could begin to operate. However, the Central Crisis Staff was summoned only on 15th of March, along with the issue of nation-wide quarantine and four days later, the mandatory wearing of facemasks in public was also declared (Government of the Czech Republic, 2020e).

As described in the literature review, the Czech crisis management system can fully utilise particular measures only during the state of emergency. It is therefore surprising that this option was not used until two weeks after the first confirmed cases appeared. Potential explanations behind the delay are the political tensions between the preponderant political party ANO 2011 and the opposition or simply underestimation of gravity of the situation. No matter the reasoning, the delay along with the mandatory facemasks wearing declared on 18th of March made it possible to observe an exemplary case of civilian resilience. The shortage of facemasks and other personal protective equipment for healthcare professionals, emergency service workers and of course, for regular citizens caused a substantial level of solidarity between Czech citizens (Kottová, 2020).

Volunteers sew facemasks and distributed them to many facilities with high-risk such as hospitals, retirement homes, emergency service workers. The shortage was partly solved after the delivery of facemasks and respirators from China which was hastily bought for more than a billion of Czech crowns and was delivered on 21st of March, three days after the declaration and only for medical personnel and other essential workers (Koutník, 2020).

The situation lowered the trust of the public in the government due to inaptitude to supply the masks. The dissatisfaction was further enhanced by media articles concerning with the unpreparedness of the Czech Republic for the epidemic represented by severely insufficient supplies of masks and respirators handled by the Administration of State Material Reserves (Pšenička, 2020).

With the first deaths connected to the COVID-19 infection and rising fear of Czech citizens towards the end of March 2020, the project of smart quarantine was introduced by the government in order to regain control both politically and practically. Smart quarantine was designed to confine the further spread of coronavirus by calling the infected person and gaining information about people they met in the last five days and putting them in precautionary quarantine (MZČR, 2020). This measure was supported by several phone apps designed to track the movement of people and store information about people who met with the same app. However, while the phone call method was used, the apps were met with negative stance due to the access to personal data and also due to low ratio of infected vs healthy population, which in turn did not allure enough users of the app making it less effective and useful (Novotná, 2020).

Along with the testing of smart quarantine, numerous measures were implemented in order to prevent the spread of disease. The most important ones being in a short period

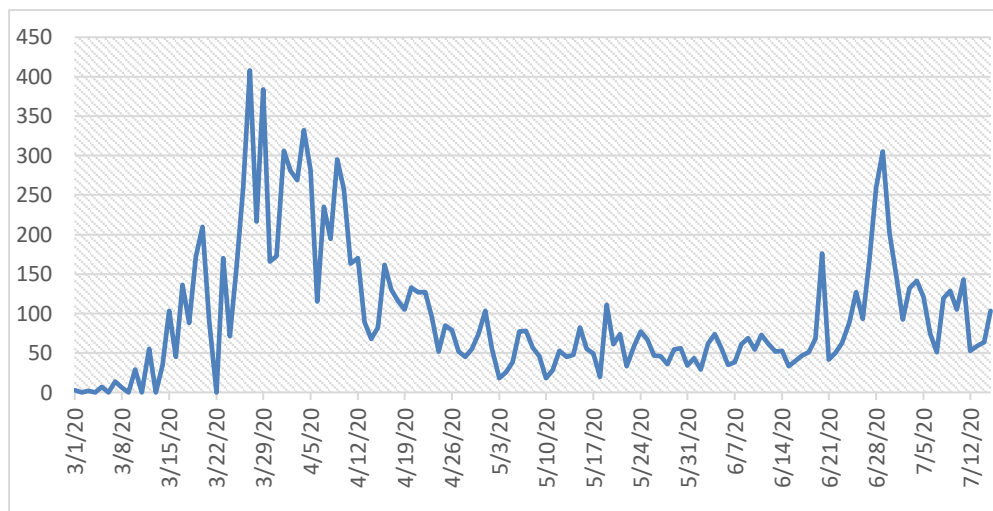
from 10th to 18th of March: the closure of all schools (including universities), closure of all retail stores and services (an exception being a take-away window), national curfew limiting movement in public to the minimum, obligatory use of facemasks and travel ban outside of the Czech Republic (Government of the Czech Republic, 2020b).

The number of new cases in the Czech Republic culminated on the 27th of March, a number of deaths peaked two weeks later, on the 15th of April. In the second week in April with the slow decline of new cases, the restrictions were being partially lifted even though Czech government asked for the prolongation of the state of emergency until the 30th of April (Government of the Czech Republic, 2020d).

The plan for lifting the restrictions was divided into five main steps from 20th of April until 8th of June, but in reality, the process was sped up and the last step was implemented on 25th of May (Government of the Czech Republic, 2020a). On the 6th of May, the Ministry of Health shared results of the cross-sectional study showing that the prevalence of COVID-19 in the population is less than 0,6 % even in the most affected areas (ČTK, 2020d). This study contributed to the decision that the state of emergency will end on the 17th of May (ČTK, 2020b).

As mentioned above, some of the measures were extended until the 25th of May; nevertheless, the situation for citizens return to normal with very few exceptions. With the end of the state of emergency, the situation ended from the legislative point of view; yet, the spread of COVID-19 is still ongoing, and the number of cases is rising again, as seen in Figure 5 with the most recent data from July 2020. Data suggest that there is a possibility of the second wave, though it was dismissed by the government.

Figure 4 Number of new cases of COVID-19 in the Czech Republic



Source: Author, with data from Statista (2020)

For this thesis, the development from June 2020 will not be further included due to the end of the state of emergency on 17th of May which makes it a closed incident and also lack of information about the crisis management functioning. However, the analysis of future development would make for an intriguing possible topic for future research.

4.2. Analysis of the response in the Czech Republic

As described in the methodology, resilience is a capability of reaction to the crisis as a whole community, which includes the international organisations, governmental organisations, private and non-profit organisations and the general public. Given the fact that coronavirus pandemic was a worldwide crisis, the response was mostly on the national level, though some international help was received in the form of medical supplies from Japan and Taiwan (ČT, 2020).

The governmental organisations were, of course, substantially involved; however, there was also an overwhelming response by non-profit organisations and the general public. According to OSF (2020), at least 57 non-profit and private organisations offered some kind of help along with offers of various help from citizens. This is an indication of a suitable resilience of the community. On the other hand, such a diverse group of actors while increasing resilience decreases the efficiency of the system. However, one of the conditions of good resilience is the coordination of the response, which was a central issue during the crisis.

The governmental response was at the beginning quite chaotic and unorganised, which was manifested by numerous contradictory measures taken in a short period—for example, the time reserved for shopping of seniors. On 18th of March, the time was set on 10:00-12:00, on 20th of March, it was shifted to 9:00-11:00, and finally, on 23rd of March, it was shifted again to 8:00-10:00 (ČTK, 2020a).

This is just a small and seemingly trivial example, but similar inconsistency was present with the approval of caregiver's allowance, rules for cross-border commuters, travelling ban and others. Besides, it should not have even been possible, since the coordination of all suggested measures should be by the Central Crisis Staff (CCS). These first mistakes could, therefore, be theoretically ascribed to the late establishment of CCS. However, as described above, CCS was established on the 15th of March, and most of the confusing statements were given after that.

The other and more prominent reason is the fragmentation of the response team. As given by Resolution No. 33 of 11 January 1999, Article 2, CCS “is responsible for the operative coordination of measures implemented by administrative authorities and local and regional government bodies” (Government of the Czech Republic, 1999). However, during the coronavirus pandemic, three other teams were functioning: the Central Managing Team for COVID-19 that was assigned to manage the medical aspect of the crisis, group established by the Ministry of Health managing the quarantine measures and the National Economic Council, that was re-established in order to assess and manage the impact of COVID-19 pandemic on the economy of the Czech Republic. Just the sole focus of each organisation suggests opposite approaches to the situation, which in return cannot foster good coordination.

Without the CCS functioning as a central coordinating actor, the cooperation of public and private sector was lacking. The network of cooperation was decentralised, and many organisations were operating without any connection to the national or regional administration. The lack of cooperation caused by absent coordination, therefore further decreased the resilience of the community.

However, even if the lack of coordination is deliberately ignored for the sake of this argument, as noted by Comfort, Siciliano and Okada (2011) in order for the system to keep working at the same pace, it needs to be provided with “energy” in the form of new information, and supplies for the actors to be able to make timely and well-calculated decisions. While at the beginning of the crisis there were many volunteers and organisations interested in aiding in various ways and citizens were following media for new information, the attention decreased only a few weeks after the beginning of the crisis since the community gets accustomed to the new situation and gets distracted by the everyday problems.

The decrease in attention is a phenomenon called social entropy, and it is widely recognised in crisis management. However, the government has to counter with negative entropy – the new information and supplies to keep the system going. In the case of coronavirus crisis, public organisations were active in the response system few weeks before the actual declaration of a state of emergency, which is a sign of proper information management and awareness and it was maintained all through the crisis. With private and non-profit organisations, the situation was different. Figure 6 shows that after day 11 (after the declaration of the state of emergency), the influx of new organisations was declining.

This can be ascribed to the fact that the need for the facemasks (the main commodity) was satiated and as the demand declined, so did the number of new organisations. If the governmental organisations kept citizens and by that also private and non-profit organisations informed, the cooperation would be much more manageable and could potentially last longer.

This realisation points to the last factor - efficiency. According to Brede and de Vries (2009), the efficiency of the system can be determined mainly by the efficiency of the communication between individual actors in the system. They also note that the most efficient systems are the ones with a central coordinating actor who can communicate with all major actors in the system. As described above, the communication of the governmental level to not only the public but also to regional and municipal governments was confusing and often imprecise. Furthermore, while in theory and prepared strategies, there is always a central coordinating actor, therefore the system should work as efficiently as possible, the communication is not going through these official canals. As seen on the example of opening hours of grocery stores for senior citizens, the communication failed.

The decisions from different teams were not critically assessed, or alternatives were not considered. Since there was a central coordinating actor – the CCS, the question is why these mishaps kept happening. The political situation in the state should be considered as one of the possible factors. The ongoing political tensions between prime minister Andrej Babiš with his political party ANO 2011 and other parties, including Czech Social Democratic Party and its leader Jan Hamáček, who is a Minister of the Interior can be seen as one of the reasons why he repeatedly declined to convoke the CCS earlier (since Minister of Interior is the leader of CCS). However, this decision impaired communication right from the beginning.

The second factor to consider is the tendency of Czech people to over-improvise. While the crisis management system offers numerous ways for communication and action during the crisis, especially on the regional and municipal level, it can be simpler and more convenient to informally call an acquaintance, rather than use the often slow and rigid forms of communication. This approach though convenient defies the purpose of the CCS. As mentioned above all communication should be funnelled through CCS for them to be able to make informed decisions with all alternatives taken into consideration.

An example of this is the court verdict invalidating numerous restrictions regarding the coronavirus crisis since they were not adopted under the Crisis Act but under the

Protection of Public Health Act and they are also defying the Pandemic strategy. Court gave the Government three days to review and adjust the restrictions. However, it shows the deliberate defying of valid legislation in order to maintain power on the ministry or choice of the more comfortable way to do things, since these measures should be adopted only by the government under the supervision of Chamber of Deputies.

Due to these problems in conjunction with heterogeneity of involved actors and therefore a growth of entropy, efficiency of the system decreased.

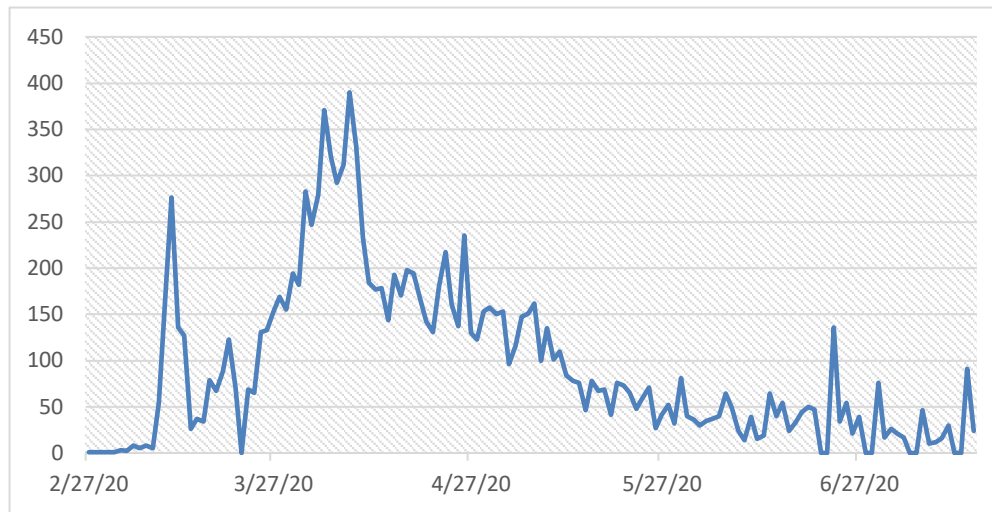
4.3. Situation in Denmark during the coronavirus pandemic

The coronavirus crisis emerged in Denmark on the 27th of February with the first confirmed case, concerning a man who recently visited Northern Italy (Marin, 2020). The number of cases started to grow quite rapidly, with 514 confirmed cases on 11th of March (Klinker Stephensen and Stærmosé Hansen, 2020) and first death being confirmed on the same day (Marin, 2020). Until then, the situation was handled mainly by putting potentially infected people into home quarantine.

However, with 252 cases confirmed on 11th of the March alone, therefore doubling the number of existing cases in just one day, the government decided to implement lockdown measures some starting as early as on 13th and most of them on 16th of March. These measures included the closure of schools, day-care facilities, non-essential stores and all leisure facilities, mandatory work from home for non-essential public employees, banning assembly of more than 100 people, limiting the use of public transport and constituting travel ban for non-residents (Klinker Stephensen and Stærmosé Hansen, 2020). The second wave of measures was carried out on 18th of March with a ban of a gathering of more than ten people, closure of shopping centres and restaurants (except for take-away). All these restrictions were mandatory, and their breach was penalised with a fine of 1500 DKK (Tofte, 2020). It is important to note that these actions were taken a few days earlier than in most European countries.

As seen in Figure 7, the number of new cases quickly decreased to only 26 new cases on the 14th of March and 37 days later only to rise again and reach a peak on 4th of April. Two days later, while the number of cases still fluctuated and was not yet on a steady decline, the government announced the plan to start easing restrictions (Marin, 2020).

Figure 5 Number of new cases of COVID-19 in the Czech Republic



Source: Author, with data from Statista (2020)

The first phase of this plan was performed on the 15th of April with the opening of kindergartens and day-cares along with elementary schools. When the number of infected has not significantly risen, the second phase was carried out on the 20th of April with reopening non-essential stores and other businesses. At the same time, the decision to start mass testing among the population was declared. The strategy of mass testing was proven to be very useful in South Korea and was therefore chosen to be applied in Denmark as well (McCurry, 2020).

From that point, almost all restrictions were eased on the 10th of May, when schools and all businesses were open. While some restrictions still applied (such as smaller groups of children in classes, keeping a distance of two meters) the life returned to the pre-COVID state. The number of cases was still declining after the complete release, so the Danish Prime minister marked the operation as successful (Buttler, 2020).

That was not the end since, along with the termination of all measures, the new strategy was implemented, introducing the offensive testing strategy. The new strategy focused on the contact tracing with the establishment of new hotline designated to help infected people identify people who have been in close contact to the person in the last few days but the ultimate responsibility of contacting these persons laid on the infected (Ministry of Justice of Denmark, 2020). Along with that, an entirely new governmental agency dedicated to the coordination of coronavirus response was established. While the agency's focus will be to coordinate the communication between governmental organisations, testing

sites and logistics of supplies, it will also serve as a disease prevention agency in the future (Outzen and Qvirin Holst, 2020).

4.4. Analysis of the response in Denmark

The response in Denmark was speedy, Denmark was one of the first countries to adopt lockdown of the country and other quite radical protective measures. The quickness was given by the almost sole involvement of national, regional and municipal governments, meaning that not many private or non-profit organisations took part in response to the crisis. The role of regional governments is traditionally strong due to the high level of autonomy of regions. However, during the pandemic, regional governments were side-lined in favour of national government by amendments to the Danish Epidemic Act on 12th of March. These amendments temporarily transferred the competences from regional governments to the national one.

On 27th of February COVID-19 was added as a contagious disease to the list that is covered by the legislation (Hofverberg, 2020). This step allowed the government to act quickly and serve as a central coordinating actor, thus increasing the resilience of the system, and it also proves situation awareness and preparation.

On the other hand, the homogeneity of the system – only featuring governmental organisations while increasing efficiency, lowers the resilience since the lack of involvement of private and non-profit sector decreases the diversity and also the scope of possible aid. Also, the transfer of power essentially meant the transfer of competences from regional Epidemic Commissions to the Minister of Health. The issue that can be recognised with this kind of transfer is that the Epidemic Commission is cast by professionals such as local health authorities, regional council members, veterinarian and representatives of the police, local hospitals. In other words, the roles are taken by experts in their field and also, people well knowing their region. The receiver of the competences is Minister of Health, who is more of a political figure. However, if judged only by the level of resilience, it was a step in the right direction to increase resilience (Cedervall Lauta, 2020).

The response of the system was very swift and consistent. Due to the complete control of the government and its system of aid, the involvement of private and non-profit organisations was not needed; therefore, the entropy cannot be measured in this case. The balance of entropy and resilience, therefore wholly shifts to the side of resilience.

While such a high resilience is excellent for the state since it means that the state is ready to face the crisis and react to it swiftly, the efficiency of the system is a separate issue. The government handled the communication in Denmark during the coronavirus pandemic, but that is not the case for the actual decision-making. According to the Epidemics Act, the decision-making is given to the Epidemic Commissions in each region, and they communicate with each other and with the government to coordinate their steps. Since the 27th of February, when the disease was added to the Epidemics Act, the system worked as it should – with Epidemic Commissions in charge. However, on the 12th of March, the Danish government decided to centralise all decision-making to the Ministry of Health (Marin, 2020).

Several reasons could have induced this decision. It could be disapproval of the government with the chosen approach, lack of manoeuvring space or discontent with the slow progress of chosen measures (Cedervall Lauta, 2020). Whatever the reasoning, the decision was exceedingly quickly adopted by the parliament with an expiration date on 31st of March 2021. The step, while not unconstitutional, is quite unusual in the history of Denmark and evokes a question about the price of system efficiency.

As noted by Cedervall Lauta (2020), Danish legislation does not concern with emergency derogations of responsibilities, so the transfer of power was based on an unwritten presumption of necessity during the emergency. It should be stressed that there is no doubt that the timely measures were the essence of successful COVID-19 strategy. The communication centralised in one place is pointing to the efficiency of the system overall. Nevertheless, several factors are indicating that letting the standard system work without these encroachments would arguably provide similar results.

First, Danes are known for high trust in their government (during the pandemic, the trust in the government even rose (Voxmeter, 2020)), the obedience of the law and social responsibility for the whole community. Second, the traditional Danish customs do not endorse physical contact with people outside of their own family and keeping a respectful distance is a social norm. Physical contact is known as one of the main risk factors of COVID-19 transmission, so limiting it through social distancing is a standard precautionary measure (WHO, 2020a).

These behavioural patterns are embedded into the Danish culture. Along with the fact, that regional Epidemic Commissions are managed by health professionals along with crisis management and emergency service specialists with a good knowledge of the region.

It is possible to assume that thanks to these facts, the management of the situation would be similar and without the severe interference to the current crisis management system that hinders the possibility to evaluate the functioning of the system itself (Olagnier and Mogensen, 2020).

4.5. Comparison of the cases

Both the Czech Republic and Denmark arguably belong in the group of the more victorious states of handling the coronavirus. The Czech Republic registered as of 21st of July 14 098 cases of coronavirus with 359 deaths while Denmark registered 13 056 cases with 611 deaths (Statista, 2020a, 2020b).

Both countries had a similar course of the pandemic, and both used similar measures to stop the spreading. The most significant difference is the length of the crisis. In the Czech Republic, the length of the crisis was 122 days, starting the day the first case appeared until the release of all restrictions. In Denmark, the length of the crisis from the first case appeared to the last release of all restrictions was 74 days (Marin, 2020; ČTK, 2020c).

It can be seen that Denmark was able to handle the crisis much faster than the Czech Republic while using less drastic measures, even with a more substantial daily increase of cases. There are several reasons for it.

First, the already mentioned traditions and behavioural patterns of each country. While in Denmark, people are known to respect political authorities, generally have a strong feeling of responsibility and their trust in the current government rose by two per cent during the crisis (Voxmeter, 2020). In the Czech Republic, the trust in political institutions is not very high, and in June, it has hit the lowest point since February 2020 (Červenka, 2020). This, along with less responsible attitude, caused the repeated tightening up of preventive measures and therefore retarded effect of these measures at the beginning of the crisis.

From the systematic standpoint, Denmark was able to eliminate the factor of entropy during this crisis, thanks to the strictly centralised coordination point. This, however, came with the price of altering the existing system to unprecedented form. While during a crisis, it is anticipated that sudden and previously unforeseen actions will be taken, the change of the system itself is not desirable. That is due to possible complications connected to prepared communication channels, procedures and regional or local differences that could affect the process (Cedervall Lauta, 2020).

On the other hand, entropy in the case of the Czech Republic emerged as a result of issues with the unclear division of duties and caused numerous confusions among the general public, but also private and non-governmental organisations. The issues were due to violation of Crisis Act and shifting the decision-making power to the Ministry of Health.

These breaches in both countries were intended to keep the political and executive power at one place. The question is whether the motives were just a genuine effort to resolve the crisis faster or there were ulterior political motives to gain more future voters or to keep more manoeuvring capacity.

Both resilience and entropy have an impact on the balance, along with the efficiency of the system. Both countries decided to use the central coordinating agency to funnel all communication through. In the case of Czech Republic, the role was the first cast by Ministry of Health and only two weeks after the first COVID-19 case it was transferred to CCS (Government of the Czech Republic, 2020e) which made the continuity of communication very difficult. In the case of Denmark, the coordinating power was given to the government, which worked great, but as mentioned, defied the purpose of the crisis management system in place.

Lastly, the assessment of efficiency on the overall performance of the systems during the coronavirus pandemic. In both countries, the coronavirus crisis caught the crisis management off guard. Both countries, therefore, breached their pandemic plans and crisis strategies in order to accommodate the unanticipated events. The performance of the system in the Czech Republic was impaired by the unfamiliarity with the plans and political motives, that prevented the system from working fully and on time. In the case of Denmark, the dynamics of the system itself were changed right at the beginning with the unprecedented transfer of power. The system, therefore, could not perform on its standard level, leaving the Epidemic Commissions out of the loop.

5. Floods in the Czech Republic and Denmark

The second case study focuses on the cases of floods in 2006 and 2013. Both cases, while more different from each other than the coronavirus, presented a big challenge for the governments, since in both of them in some parts of the country the water reached its 100-year return period. This allows for the analysis of unusual scope situation for both countries, while still tackling a type of crisis that is familiar and the state is well prepared for it.

5.1 Situation in the Czech Republic during floods in 2013

This particular case of floods in the Czech Republic was a part of extreme flooding in Central Europe in the spring of 2013. Unusually heavy rains hit Central Europe throughout May and especially during the last ten days of it. This was acknowledged as early as on the 20th of May by monitoring stations all along the Vltava basin and countered by regulating water levels to accommodate increased flow (HZS ČR, 2013). The situation can be divided into three separate events as per three flood waves that occurred during the disaster.

On the 28th of May, the Czech Hydrometeorological Institute (CHMI) issued a warning against hailstorms and heavy rain for the next two days. The situation climaxed for the first time on 30th of May to 1st of June, when many Czech rivers reached the first or level of flood activity in a short period, many regions reaching the third and final level in the afternoon (Daňhelka et al., 2014).

In reaction to that, on 2nd of June Czech minister of the environment called a meeting of the Central Crisis Staff (CCS) and Flood Central Staff (FCS) to discuss the current situation. However, since flooding is a mainly regional problem, the main decisive power was held by the regional commissioners of each affected region. Two regions (Prague and South Bohemian region) therefore decided to declare a state of danger in order to gain more manoeuvring space (ČTK, 2013a). Subsequently, the government on the same day declared the state of emergency for seven regions, including the two mentioned above.

Every day after that, the meeting of both staffs ensued in order to discuss and coordinate possible measures for affected regions. However, as mentioned above the measures were mainly taken by regional and local floods and crisis staffs as the situation differed majorly from municipality to municipality (ČTK, 2013b). The main measures were warning, evacuation and accommodation of citizens, the building of anti-flood barriers and launching cooperation with businesses from the preparation phase network to gain the agreed supplies.

At the time of the first flood wave, the most heavily affected river was the Vltava, specifically the Vltava cascade which is a series of nine waterworks leading to Prague. They were initially designed for the production of hydro energy but can also be used to regulate the flow of the river in case of an impending disaster. This option was utilised in the first days of the floods to gain more time for building anti-flood barriers in the capital and evacuating citizens from risk areas (ČTK, 2013a). Numerous mayors, however, complained about the regulations of flow being insufficient and causing aggravation of the situation for these municipalities (Těšínská, 2013).

While the government claimed that the situation was handled well and the regulations commenced five days before the water reached the capital, the data from the dams show, that the flow was further regulated only on 30th of May (Brož and Novotný, 2013). This could be an indication of poor communication between the central and local staffs.

Water culminated in all affected regions on 4th of June, allowing the dams of Vltava cascade to decrease the flow and the regions to assess the damage, evacuate remaining citizens and prepare for the possible second wave. During the first wave, the regions were able to cope with the situation by their means, using the network set up in a preparation phase (General Directorate of the Fire and Rescue Service of the Czech Republic, 2013).

More heavy precipitations were expected on the 8th and 9th of June lasting until the 15th of June. While this period is marked as the second wave since the rainfall again raised the water levels in few places, it was minimal as opposed to the first wave, reaching only five-year floods in maximum and not inflicting significant damages on property or lives. The rainfall ceased after the second wave and the next week was average in precipitation amount.

The third and last wave of floods came on the 23rd of June. Since in the meantime, the water levels dropped down, and the municipalities had more time to prepare, the after-effects were not as severe as during the first wave, however in some areas the flow reached the mark of the twenty-year return period (Daňhelka et al., 2014).

Due to the nature of the second wave, the state of emergency was ended in four of seven regions after the second wave (12th and 19th of June) due to its light development (Chalupa, 2013). In the other three regions, the state was ended on the 29th of June, after the third wave.

Even though the crisis was relatively short, since only the first wave inflicted significant damages, the aftermaths were long-lasting. The floods of 2013 are responsible

for fifteen lives, more than 26 000 evacuated citizens and 15,3 billion of Czech crowns in damages. It took more than four years to repair damages caused by public properties entirely. It is worthy to note, that while the situation is rated as one of the worst floods in the Czech history, the damages on the property were only on one-fourth of the ones of the floods in 2002 which was the worst flood in the Czech history and based on it, the anti-flood measures were built (ČTK, 2017).

5.1.1. Analysis of the response to the floods in the Czech Republic

The situation lasted slightly less than a month, for this thesis, it will be determined by the length of the state of emergency - 27 days (Chalupa, 2013). During the crisis, the responsibility laid mainly on regional and local governments since the situation during floods changes quickly and had to be managed immediately. However, the national government had an irreplaceable role in crisis management that should be acknowledged.

As described above, the extent of the crisis differs based on the specific region. Therefore, both central staffs served mainly as a central informational medium and manager of the coordination of emergency services (Daňhelka et al., 2014). The CCS and FCS met the second day after the deterioration of the situation and declared the state of emergency the same day, allowing usage of emergency funding. The measures advised the Czech government were mainly focused on financial and material aid to municipalities and also preventive health measures for the citizens. However, generally, there were only very few nationwide measures taken in comparison to other crises and national level served mainly as a source of information and also a source of financial and material resources.

Regional governments and mainly the regional flood and crisis staff were the most prominent ones in this crisis. They coordinated response of the Integrated Rescue System, providing information about current water levels to the mayors and also provided anti-flood barriers, floor dryers, water pumps and also coordinated the evacuation of citizens in the area. They also served as an interlink between the national government and the municipalities with extended powers.

Finally, the municipalities with extended powers served as an interlink for municipalities and the regional staffs. They had the same obligations as the region only on a smaller scale. However, the crisis revealed a relatively weak position of this level since municipalities tended to instead contact the regional staff for help rather than the municipalities (Daňhelka et al., 2014).

When evaluating the response, it is important to note, that these floods were the third-worst in the history of Czechia and also the rapid commencement and subsequently also quick deterioration of the situation that made the response harder to perform. On the other hand, floods are the most frequent natural disaster in the Czech Republic happening every year, so the preparation should be thorough.

The early warnings made by the CHMI helped to manage the situation quite early on allowing the national government to also declare the state of emergency early in the crisis. The same can be said for regional commissioners of individual regions, that declared the state of danger and cooperated with its municipalities which indicate high resilience. What proved to be a problem was the communication between different levels of the crisis management system. Mayors of municipalities tended to either not inform the municipality with extended powers and turn directly to the regional commissioners of their regions which caused delays with supplies, late or insufficient warning of citizens and overall haziness of the measures taken and also the reality of the situation in that specific place.

The chaotic communication without following the chain of command decreased the efficiency of the system. Further, while it is understandable that the crisis and flood staff were in a new and challenging position, the decision-making process was hindered by insufficient preparation. The key document – the flood strategy for each municipality was often outdated. That means containing old phone contacts, missing data about flood levels and when to declare the levels of flood activity (Daňhelka et al., 2014). In this situation, the mayors counted on their knowledge of possibilities in their area and different acquaintanceships instead of using a prepared strategy. These actions contributed to the overall chaotic nature and therefore, further decreased the efficiency of the system.

To address the last factor – entropy, it did not manifest per se. Its absence could be ascribed to the short nature of the crisis and the homogeneity of actors in the situation. However, it is possible to monitor media peaks in informing about the crisis which represents the interest of media and therefore, the interest of citizens and businesses. There were in general three media peaks – on the 3rd of June, 7th of June and 25th of June. This roughly corresponds to the waves of the crisis (Daňhelka et al., 2014). However, after that the attention of media suddenly dropped, indicating the manifestation of entropy. While the crisis was over, the aftermaths were severe, and it took several years to return everything to the original state.

Finally, to assess the resilience of the community. Since the floods are a common natural disaster in the Czech Republic, the preparation on all levels of crisis management is expected. Citizens were aware of the risk, its possible effects and knew what to do in such a situation which indicates good resilience. However, what reduces it is the inability to exchange information between the actors, specifically between the lower levels of the crisis management system and their insufficient preparation due to relying too much on informal relations.

5.2 Situation in Denmark during floods in 2006

In Denmark, there is only a small number of rivers or lakes; therefore, the riverine type of floods is not prevalent. However, since Denmark is located on Jutland peninsula and 443 islands, the estuarine and coastal type is more common, usually caused by a storm surge (Piontkowitz and Sørensen, 2008).

The case chosen for this thesis is the 2006 floods lasting from the 31st of October to 2nd of November caused an extreme surge of water level on the coast lines by 1,85 meters in just twelve hours. The surge was in some places on the most extreme level in the last hundred years (Woge Nielsen and Huess, 2008).

Floods were caused by a storm Britta. Britta was a low-pressure system that reached the coast of Denmark in the evening of 31st of October and culminating in the night of 1st of November. The autumn and winter storms are regular in Northern sea; therefore, meteorologists predicted the system of low-pressure reaching the coasts of Denmark. Because of that, the storm surge warning system was able to be used. Denmark has an elaborate system of dikes and sand dunes, however, in the past, they failed, and the storm surge system was therefore established (Kettle, 2018).

While the low-pressure system was monitored for a while, it started to approach the Danish coast early in the morning of the 31st of October. On the same day, the Danish Coastal Authority issued an official warning about the incoming storm, so the preparations for the storm could begin. The situation was mainly in the hands of municipalities and regions since the forecast predicted different intensity of the storm along the coast. Evacuation from many municipalities was ordered as well as the building of preventive measures against flooding and increased monitoring by the Coastal Authority and municipal police.

On the national level, due to the state-wide nature of the crisis, the National Operational Staff took over the organisation. Specifically, the Danish Emergency Management Agency

(DEMA) closely monitored the situation and based on the warning from the Danish Coastal Authority activated four of its six regional centres. Thanks to that, DEMA was able to provide support to local fire departments and the police and also to reach any affected location within one hour. It also activated the DEMA Volunteer Centre to be ready to assist the municipalities. During the crisis, DEMA mainly helped with water pumping and dike strengthening and repairing (Piontkowitz and Sørensen, 2008; DEMA, 2011).

The storm first hit the north-eastern coast at Kattegat strait on the 31st of October with the maximum water level (two-meter surge) reached around noon the next day. Thanks to functional sea walls and dikes, Copenhagen was safe from the water. However, smaller municipalities located directly along the coast were affected profoundly. The storm moved to the south with culmination at 6 p.m. and finally around midnight from 1st of November to 2nd of November Britta peaked at the Great Belt strait which connects the North Sea to the Baltic Sea. The overall surge was extreme compared to regular storms, reaching the peak value within 12 hours with water level above two meters in some areas, indicating 120 year return period (Beredskabsstyrelsen, 2007; Centre for Climate Adaption, 2016).

Result of the situation was coastal flooding in most of the areas mentioned above. The floods were partially slowed down thanks to dykes, sea walls and coastal cliffs giving municipalities enough time to warn their citizens and execute an extensive evacuation. Thanks to this preliminary action, no casualties or serious injuries were reported. However, the overall property damage was extensive, with more than 4 000 damage cases after the crisis.

The water returned to its normal levels in the early afternoon of 2nd of November. The restoration and reconstruction after the crisis were accelerated by the resolution of the Danish Storm Council, which is an independent council appointed by the Danish Minister for Business and Growth. The resolution acknowledged that the past event was indeed a storm surge. Therefore, citizens and businesses are eligible for financial compensation (Woge Nielsen and Huess, 2008; Danish Storm Council, 2020).

5.2.1 Analysis of the response to the floods in Denmark

The storm Britta and the subsequent floods were a short-term event without any casualties. However, the situation exposed some issues within the crisis management that influenced the overall resilience and efficiency of the system.

The overall preparedness for the storm surges and water level rise is in the hands of the national government, and since 80 % of Danish population lives in an area connected to the coast, the protection against these situations is thorough (Centre for Climate Adaption, 2016). Thanks to that the coordination from the governmental level down the chain was swift and the coordinated response by the DEMA supported the municipal management and raised the resilience of the system significantly (Beredskabsstyrelsen, 2007; DEMA, 2011)

However, due to the nature of the crisis management system makes the municipalities responsible for local planning and the preparation for the storm surge was low. While it is understandable that it is challenging to prepare for an event with such a different intensity, the mistakes made by the municipalities underestimated the preparedness for water level surge in general. The lack of preparedness was manifested by neglected artificial dikes, and outdated warning systems arguably decreased the resilience of the system.

The sizeable volume of property damages was, of course primarily caused by the unexpectedly strong storm, but the unpreparedness was an influence too. Numerous municipalities underestimated the situation not during the crisis but long before. The warning systems were uncoordinated or non-functioning. Moreover, overall, the risk was underplayed by the local leaders due to its implausibility. In one case in a municipality of the Funen island, the protective artificial dike – the fundamental element of protection against storm surges was dug through to make a parking lot for tourists (Piontkowitz and Sørensen, 2008).

While this case is not representative of all other municipalities, and it should not be set as a precedent, it shows a possible trend in the thinking process. The probability of storm surges was relatively low in the past, and therefore the local politicians decided to prioritise other needs of their municipality. This shows lack of foretaught about the possible risks, it also, however, indicates the level of communication and supervision from the national level down the chain. It can also be seen as an indication of the reduced efficiency of the system.

The final factor of resilience theory, the entropy has not manifested in this case too much. The crisis was short-lasting, which only allowed the reaction of the public crisis management system. The subsequent coverage of damages by the Danish Storm Council also eliminated the need for help from businesses or non-governmental organisations.

5.3 Comparison of the cases

Both cases of floods were an example of an extreme scenario for the country, and the conditions were relatively similar: the crisis hit a sizeable territory, and it happened with unexpected strength and speed. What is more, it also exposed the same weakness: the unpreparedness of the municipalities. While the situations were overall handled well, and the damages were low in comparison to the extent of the situation, the reaction of municipalities cannot be overlooked.

The municipal councils showed lack of foresight and contributed to the chaotic nature of the situation. The reasoning for that can be the lack of training, materials and overall oversight from the regional and national government that allowed the mayors to neglect the flood planning. On the other hand, crisis planning needs to be a priority for all levels of administration. Therefore, it is not in the power of the regional and national organisations to thoroughly check all municipalities in detail.

Another commonality between the crises is that both systems showed relatively high resilience and low efficiency. As per (Brede and de Vries, 2009) the efficient networks are characterised by the presence of secure central coordinating unit, while resilient networks are based on very dense networks of communication without the central coordinating factors. Based on the analysis of this case, it seems that both systems tended to use a direct communication canal instead then the most efficient one. This can be an effect of the severity of the situation and precepted need for immediate attention or again the result of behavioural patterns of each nation.

The final commonality is the surprising lack of immediate entropy. This is pointing to the still present central position of the state when reacting to the crisis. While it is not necessarily a bad factor, since the entropy substantially decreases the effectivity of rescue efforts, it points to the homogeneity of these crisis management systems. This homogeneity, however, can paradoxically decrease the resilience of the system, since it only relies on one type of response to the crisis.

6. Discussion

The analytical part of this thesis discussed two events, the coronavirus pandemic and the floods in both Denmark and the Czech Republic. The cases were completely different. Coronavirus pandemic was a nation-wide event with many warnings, slow onset (the first information about possible spread to Europe were available as early as three months prior) and then long-term duration. On the other hand, the cases of floods were both focused on the regional and municipal response, with short preparation time and rapid onset and progression. The same can be said for the aftermaths of the events, the damages resulted from the floods were mostly on buildings and other material possessions and could be fixed, with both countries offering to fund for this exact purpose.

On the other hand, the results from the coronavirus pandemic are the ones of economic nature. While the pandemic is still ongoing at the time of this thesis, it is already clear, that the aftermaths of international travel bans, temporary closure of many businesses and expenditures of states to handle the pandemic will result in inevitable economic recession indicating long term effects of the crisis. For reference, the Czech economy dipped by eight per cent in Q2 (ČTK, 2020a).

The cases were analysed on the countries with very similar crisis management systems, based on the decentralised division of duties with three main levels of management. Thanks to the similar nature of the systems and similar nature of the cases as well, the analytical part aimed to evaluate the crisis management systems of both countries using the resilience theory while measuring resilience, efficiency and entropy of the system during and after the crisis.

This part of the thesis aims to discuss the findings and also infer what factors influence them and how. The reason for choosing such similar countries and cases was easier identification of the influencing factors of the system since many other factors are influencing the specific situation but not directly influencing the systems or the analysed variable such as the economic situation and development of the country, technical resources and behaviour patterns.

Let us first focus on the least discussed variable – entropy. Entropy during the crisis only manifested during the coronavirus pandemic in the Czech Republic and partially in Denmark. While Comfort, Siciliano and Okada (2011) presented a strong presence of entropy in their research of Haitian and US crises, in this analysis, it was not as prominent.

The primary influence on the entropy or rather a lack of it is the homogeneity of the crisis management systems. While the systems are partially decentralised, the strong presence of the national government eliminated a more noticeable presence of non-governmental and business actors.

However, it is possible to observe the second type of entropy, the long-term one. It is noticeable on the case of the floods. The Czech Republic experienced the worst case of floods in its history in 2002. The crisis in question happened more than eleven years later. Moreover, while in the meantime, the state created new flood strategies, new funding and new operational plans, it still failed was not functioning correctly on the local level. The manifestations point to the effect of entropy since the recollection of the events from 2002 have not stayed with the municipal councils, and that allowed them to neglect their responsibilities. A similar case could be built around the situation with the parking lot and protective dyke in Denmark, though admittedly the argument would be weaker.

The second analysed factor was the efficiency of the system. The efficiency of the system was in the analysis measured as the efficiency of the communication during the crisis. This proved to be the core problem of all four cases. While government and its institutions still hold a strong position in both of the systems to not allow to enter to more actors, it also is conveniently neglected if needed. This was most prominent in the case of coronavirus crisis in the Czech Republic when the CCS was not only neglected; it was entirely left out for the first two weeks of the crisis. This is anomalous behaviour that is paralysing for the crisis management system from the perspective of communication. Furthermore, since the efficiency of the communication is for this thesis considered the main factor of the overall efficiency of the system, the system essentially became inefficient.

On the other hand, in the case of Denmark, the central actor was strongly present. This, along with other factors, arguably contributed to the successful overcoming of the first wave of coronavirus crisis. However, in the case of Denmark, the situation was on the other side of the spectrum. While in the Czech Republic, the government was unwilling to create the central coordinating actor despite its system, in Denmark, it was created despite the system. The power was taken away entirely from the regional epidemiologic commissions and handed to the Ministry of Health which, while capable, is also detached from the situation in specific regions.

Third, let us address the last factor from the resilience theory, the resilience itself. As mentioned by Brede and de Vries, (2009) and Comfort, Siciliano and Okada, (2011), there

is an interesting trade-off between efficiency and resilience of the system. While efficient systems communicate in the star-shaped network with the central actor in the middle, the resilient ones create a dense network of contacts without any intermediate links. The ideal system is in the middle of these two systems. Resilient enough to include many different actors to diversify the aid and to be able to reach any actor easily and efficient enough to gather all relevant information at one place in order to appear united to the citizens.

While both states in theory and their legislation have designed the ideal system, Denmark based on the case studies is leaning more towards the efficient system form, while the Czech Republic is the more resilient one. To attain the balance, both countries need to ensure better cooperation and communication between its actors since lack of coordination and communication was the key factor identified in all four cases.

To address why the coordination, especially with the municipalities, is not working as it should, let us use the resource dependence institutional cooperation model by de Rijk, van Raak and van der Made (2007). According to the model, the two crucial factors is the ability to cooperate and the willingness to do so. While ability is ensured in both countries legislation wise, system-wise and resource-wise, the willingness is more complicated.

The willingness is influenced by four main variables – legislation, the goals of the actor, dependence and perceptions. The legislation will not be further discussed, since it was presented in the third chapter of this thesis and by itself fosters efficient coordination.

The second variable, the goals of the actor, are quite impressive. Since the crisis of enormous scope happens only once in a while, the goals of the municipalities are oriented more towards short-term goals, such as higher income from tourism or new infrastructure. In the case of the government or regional commissioner, the goals could be more focused on next elections and therefore staying in favour of its voters. The idea of a possible distant crisis is not as crucial for them.

The third factor, the dependence is also well established in both countries, since municipalities depend entirely on regions and the state for funding, resources and help with the situation.

Finally, the perception, in this case, that means what the actors think about each other. The perception, while not studied in this thesis in detail, is vital in this case and circles back to the behavioural patterns of each country. While Danes are known for their respect of institutions, therefore the perception should theoretically be functional. Czechs, on the other hand, do not have much trust in institutions and also like to improvise, therefore the

perception of their superior – should it be the municipality with extended powers, the regional council or the legislation itself – is not likely to be that high.

From this quick analysis, it seems that Denmark fulfils almost all the factors with minor issues with the goals. This means that the system is almost fully developed, and communication and coordination are working relatively well. The Czech Republic struggles mainly with the goals but also with the perception variable, which shows a less developed system in comparison to Denmark.

To summarise, both countries showed similar issues during the analysis that influenced resilience, entropy and efficiency. Entropy was most influenced by the homogeneity of actors involved in the response. Without the influx of new actors and also without effective communication within the system, the short-term entropy was not present but manifested itself firmly in the long-term. The efficiency of the system was affected by the unsuitable type of communication, which took too long to process and therefore, negatively impacted the performance.

Finally, the resilience, the resilience was good at the beginning of the crises, the systems were able to react to the situation quickly, and all four cases and their resolution can be considered as successful. However, as per Comfort, Siciliano and Okada, (2011), the upkeep of resilience requires continuous work, raising awareness of the possible risks among citizens, inventing flexible options and sharing knowledge. Furthermore, since the main issue among the systems was communication, fostering of resilience is more complicated than it had to be.

The possible solution is to trace back the problem to its roots and remedy it from there. For this case, it means to align the goals of actors on all levels of crisis management. This should improve the willingness to cooperate and communicate and therefore increase the efficiency of the system.

Another suggestion is to introduce a more horizontal approach to the crisis management system. Crisis management systems in all of Europe are mainly vertical. However, when facing the new types of crises such as global pandemics or terroristic attacks, the introduction of the horizontal system could provide the government with an opportunity to manage the regional and local level still, while letting businesses and non-governmental organisations to participate more on the system.

Conclusion

In today's world, states face many new challenges in the form of new crises. Terrorist attacks, pandemics, cyberattacks and many more put a strain on the crisis management systems and now more than ever, the systems need to work flawlessly and as efficiently as possible. This thesis aimed to focus on two of crisis management systems and evaluate their performance, or in other words, their efficiency.

First, the thesis aimed to map the main course of research focused on crisis and disaster management; it also presented the relevant terminology and the differences. It also described the current crisis management systems in both target countries – the Czech Republic and Denmark. The second part focused on the analysis of the selected cases, the coronavirus pandemic and the floods of 2006 and 2013. In the form of discussion, the cases mentioned above were compared, and the implications of the level of functioning of the systems were given. Finally, some ideas were presented on how to remedy the issues with the system.

To answer the research question set at the beginning, the primary identified issues were the homogeneity of the system, lack of efficient communication and coordination, which is in turn motivated by the goals of involved actors and their perception of each other. The findings of the study confirm the hypothesis, with the added factor of cooperation, that was not present at the hypothesis.

The theory of resilience was confirmed by the conducted analysis. In fact, that immediate entropy isn't as prominent in the cases, where international help isn't present as in the cases provided by Comfort, Siciliano and Okada, (2011). While this means that the resilience isn't decreased as much in the beginning of the crisis, it is substituted by the type of entropy affecting the system for the long period of time.

For the systems to increase their long-term resilience, which, based on the resilience theory means decreasing entropy and increasing efficiency, efficient and open coordination from all involved parties is necessary. Besides, controlled introduction of more actors into the system could also provide an increase of resilience against the new threats.

Overall, it is essential to note that the crisis management system is not the only aspect leading to the successful resolution of the crisis. Many other factors are included as well, including a requisite amount of improvisation that is inevitably intertwined with every crisis, since every crisis is different. And secondly, both crisis management systems presented can

be considered well-functioning, and the presented ideas are only meant to increase their functionality further, not to be confused with mere criticism.

List of Acronyms

CCS	Central Crisis Staff of the Czech Republic
CHMI	Czech Hydrometeorological Institute
DEMA	Danish Emergency Management Agency
EHA	Emergency and Humanitarian Action
EU	European Union
FCS	Flood Central Staff of the Czech Republic
GSC	Governmental Security committee of Denmark
NATO	North Atlantic Treaty Organisation
NOS	National Operational Staff of Denmark
NSC	National Security Council of the Czech Republic
RDIC	Resource dependence institutional cooperation model
UN	United Nations
UNODRR	United Nations Office for Disaster Risk Reduction
WHO	World Health Organisation

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