Crisis Response During Payment Disruptions – The Themes of TRAMS

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ABSTRACT

A qualitative analysis of observation protocols and audio recordings from 14 crisis response exercises has been conducted revealing eight themes reoccurring in multi-disciplinary team discussions about crisis response to large disruptions to the card payment system. The themes were: *Coordinate and collaborate*, *Payment options*, *Cash circulation*, *Fuel and transportation*, *Security*, *Inform, communicate and the media*, *Hoarding and rationing*, and *Vulnerable groups*. The analysis suggest that Swedish society is vulnerable to disruptions in the card payment services, largely due to a low diversity in payment options, the lack of prepared back up solutions for payment, and insufficient cash flows to support a cash only scenario. A longer (several days) disruption in the card payment system will demand coordinating mechanisms for information management, available payment options, and preparedness for rapid establishment of cash flows. Today, these mechanisms do not exist. Simulation exercises with stake-holders are an important mean for increasing awareness about these vulnerabilities and the challenges associated with coping with them.

Keywords

Crisis Management, Payment Disruptions, Resilience, Thematic Analysis.

INTRODUCTION

In Sweden, more than 80% of all payments were made using debit or credit cards in 2018. Many shops even refuse to accept cash. Most citizens do not have any precautions or even thoughts about how to manage a breakdown in the card payment system (Berggren, Lundberg, Laere & Johansson, 2019). Likewise, store managers, bank managers, and gas station personnel have very limited contingencies planning for coping with an event like this (Johansson, Jaber, Laere & Berggren, 2018). In addition, the amount of money currently available in ATMs would not be sufficient to support nor cover citizens' expenses in a situation where everything needs to be paid with cash. The research presented in this paper is part of a project investigating the societal consequences of major disruptions in the Swedish card payment system, called Creating Collaborative Resilience Awareness, Analysis and Action for Finance, Food and Fuel Systems in INteractive Games, (CCRAAAFFFTING, see Laere et al., 2017). The method of the CCRAAAFFFTING project is to conduct simulation-based gaming exercises with stakeholders from businesses, organizations, and agencies that would be affected by, or responsible for handling, a major disruption in the payment system in a real-world scenario, food, fuel and finance sectors. Resilience theory is used as an analytical framework to understand how participants in the exercises cope with the disruption in the scenario. In order to assess the resilience of the participating teams, a method based on the Systemic Resilience model (SyRes, Lundberg & Johansson, 2015) has been developed, the Team Resilience Assessment Method for Simulation (TRAMS). The TRAMS method is based on resilience theory, in which strategies about how the teams in the simulation games manage disruption are observed (Johansson, Laere & Berggren, 2018). TRAMS consist of several measurements, such as team-member exchange, workload, and the TRAMS observation protocol etc (Johansson, Laere & Berggren, 2018; Jaber et al., 2019).

The TRAMS method has been applied in 14 different crisis management exercises within the CCRAAAFFFTING project, corresponding to about 30 hours of exercises. During the exercises, a combination of assessment methods

and observation protocols are used. The main component of the TRAMS is the observation protocol in which different strategies developed by the crisis management teams are noted down, coded in relation to different functions of resilience. This can be used for quantification to evaluate what type of resilience strategies the crisis management team develop, providing an assessment of where the participants put the core of their effort, for example in trying to predict what is going to happen (anticipation) or looking for more information (monitoring). However, the quantitative assessment does not reveal anything about what the participants actually find important in the exercise (such as providing information to the public). Therefore, a qualitative analysis of the strategies observed during the crisis management exercises, as well as the audio recordings from the exercises, has been conducted with the purpose of identifying different themes that reoccur in the 14 observed exercises. The research question in this paper is therefore: *What themes can be found in the discussions taking place in the crisis response teams, and how do they relate to the strategies observed when using the TRAMS observation protocol?* This question is investigated by applying thematic analysis to the collected observation protocols.

The paper begins with an overview of the problem domain, resilience in the payment system, and the theoretical basis of the paper, the Systemic Resilience Model. Then, it presents the TRAMS method, the data collection, and the thematic analysis. Finally, implications for crisis management of payment disruptions are discussed.

BACKGROUND: RESILIENCE IN THE PAYMENT SYSTEM

Resilience is a systemic approach to understanding how systems critical to society, such as industry, infrastructure, finance, or ecology, can absorb changes or disturbances and still persist (Holling, 1973; Foster, 1993). The term has been interpreted in many different ways in different domains and may refer to: bouncing back to a previous state, or bouncing forward to a new state, or both; absorbing variety and preserve functioning, or recovering from damage, or both; and being proactive and anticipating, or being reactive (when recovering during and after events), or both (Bergström, van Winsen, & Henriqsen, 2015). In line with the challenges to resilience suggested by Lundberg and Johansson (2015) comes the fact that societal systems, such as the payment system, depends on several different organisations to function properly. The financial system is robust when considered over a longer time-period, but history shows that it is sensitive to local or short-term disruptions which may cause major fluctuations (Helbing, 2012) and cascading effects (Pescaroli & Alexander, 2015). Such effects sometimes leads to effects that shift from micro (local) to macro (global) scale. Hence, resilience must be considered from a system's perspective. Resilience in a system is a wide ability, which means that there are applications of strategies, and that these strategies reduce the risk and consequences of faulty actions, unexpected events and complicated factors (Lundberg & Johansson, 2015). Woods (2006) states that resilience is also about how well a system manages disruptions. It is about to recover better in crisis and disruptions and how society becomes better equipped after a crisis the next time a similar event happens (Swedish Civil Contingencies Agency, 2013). Johansson and Lundberg (2015) have tried to elicit what the core in resilient systems is and applied that in their Systemic Resilience model (SyRes). According to The Swedish Civil Contingencies Agency (2013), there is a need of a common concept of resilience that can be used in different areas of society protection and preparedness, and the SyRes model outlines six functions drawn from both disaster response and resilience engineering in effort to create such a common concept. These six functional dependencies are:

- Anticipation – expect what could possibly happen, which is essential for detecting and coping with events that are not wanted.
- Monitoring – detect the onset of events, and observation in the crucial system's parameters and events, can potentially lead to detection of unwanted events that then can be avoided.
- Response – anticipation and monitoring detect an event but here is the actual execution of actions. Respond to events and take control over them.
- Recovery – damage from unwanted events are unavoidable, which leads to re-establishing damaged functions and operations. Recover from negative events, in short "bouncing back".
- Learning – learning is a must and it also helps to improve the system responses to an event, improve barriers, and procedures for coping with an event. All this to withstand known disturbances.
- Self-monitoring – monitor and adjust all other functions ceaselessly, this to maintain the models' core abilities, and the whole systems intrinsic ability to respond and adapt.

There are also five basic strategies concerning how the execution of resilience functions can be manifested (Lundberg & Johansson, 2015):

- Immunization – make the system resistant to the menace. For example, if a slowly collapsing mine has a city above – move the city elsewhere.

- Avoidance – If there is no time or it is too expensive to eliminate a threat by making it immune, avoidance need to be conducted, such as an evacuation or a Tsunami warning system.
- Control – This strategy is implemented if it is impossible to immunize and avoid the situation, attempt to control for example a water flowing toward a city or control its effects instead needs to be conducted.
- Re-building – When all the above strategies have failed, systems can adapt a re-building strategy to re-taking what has been lost, such as repair damaged buildings.
- Knowledge – Another strategy when the other strategies have failed is knowledge, and by creating knowledge from learning increases the resilience of a system, for example by informing communities about threats and ways of coping with it.

A lack of resilience manifests when there is a lack of strategies corresponding to the core resilience functions. The TRAMS instrument was created to capture the development of such strategies by teams participating in simulated, multi-domain, crisis response scenarios, hence assessing the capability of resilience of the teams (Jaber et al., 2019).

THE TEAM RESILIENCE ASSESSMENT METHOD FOR SIMULATION (TRAMS) AND ITS APPPLICATION

TRAMS is developed to evaluate if teams participating in the simulation games are resilient in the sense that they exhibit behaviors, in the form of strategies, that reflect the core resilience functions anticipating, monitoring, responding, recovering, learning, and self-monitoring. The TRAMS instrument comprises several assessments (Johansson, Laere, & Berggren, 2018), such as observations, workload (Helton, Funke, & Knott, 2014; Funke et al., 2012), team trust (cf. Willems, 2016; Seers, Petty, & Cashman, 1995), and shared understanding (Berggren, Johansson, & Baroutsi, 2017; MacMillan et al., 2005) (see **Figure 1**).

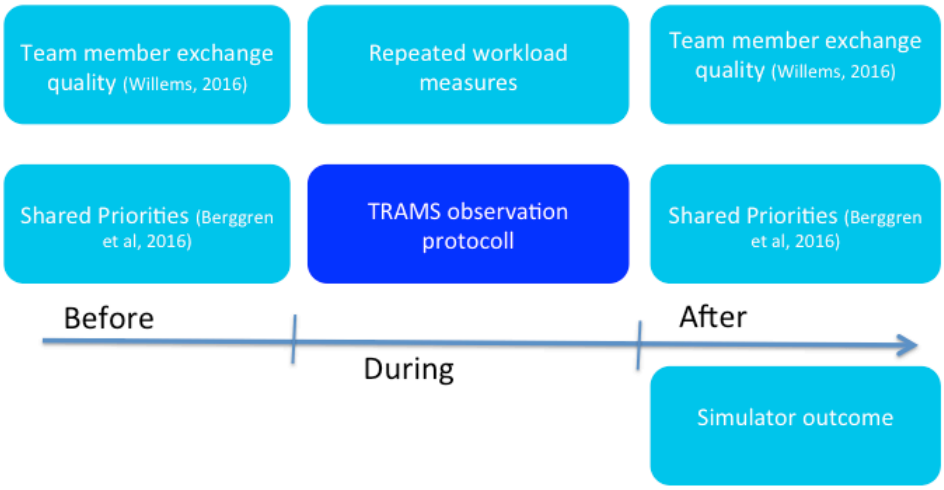

Figure 1. The various assessments of the TRAMS instrument as described in Johansson, Laere, and Berggren (2018). The focus of this paper is the TRAMS observation protocol.

In this paper, we focus on the observations noted using the TRAMS observation protocol. The term structured observation, also called systematic observation, is a method where the researcher can use statements and fixed rules for observation and registration of behaviour (Bryman, 2001). These rules are a description of what the observer should look for and how they should note down what they observed. The rules can be called an observation scheme or an observation template. The purpose with an observation scheme is to ensure that every participants' behaviour is registered in a systematic way, so all behaviours can be compiled into different behaviour categories that the researcher wants to study. The overall purpose of TRAMS is to assess whether participants are able to develop strategies (in line with the SyRes functions) in order to manage various disturbances they may encounter in the simulation game and whether these strategies actually lead to positive outcomes (Johansson, Van Laere, & Berggren, 2018). The TRAMS observation protocol is organised in rows, representing the SyRes functions, and columns that indicate specific points in the simulation exercise as well as support columns where information about for example who coined a specific strategy, what consequences it may have, and whether or not it was successful (see Jaber et al., 2019) for a complete description of the protocol). In this paper, the important part to note is that each observation consists of a statement which reflects the current

discussion of the crisis management team. Typically, one exercise results in between 70-100 such observations.

During the data collection, 14 crisis response exercises were observed. Each participating team was composed of 6-10 participants from representative businesses, authorities and public organizations. A typical team consisted of members from the fuel distribution sector, the food distribution (store managers), the county administration board, bank manager, the money distribution sector, the police, and local media. However, the teams were not identical in their composition of competences, but sufficiently representative of the type of individuals that are likely to be involved in a crisis response during a failure of the credit card system.

During every exercise, three observers equipped with the TRAMS protocol, observed the team of participants and listened in to their discussions. They all sat adjacent to the participants, so they all could see the participants and the simulation engine output, which was presented on a large screen in connection to the participants (see Figure 2) for an example of placement in the room. The observers had no strict guidelines on how to use the protocol, other than the guidelines described in Jaber et al. (2019). The observers tried to utilize as many of the components of the TRAMS protocol as possible during the exercises. The observers compared their notes with each other in terms of the protocol after the games to analyze similarities and find differences between each other, and to discuss how they thought about different strategies and how to categorize the team's discussion.

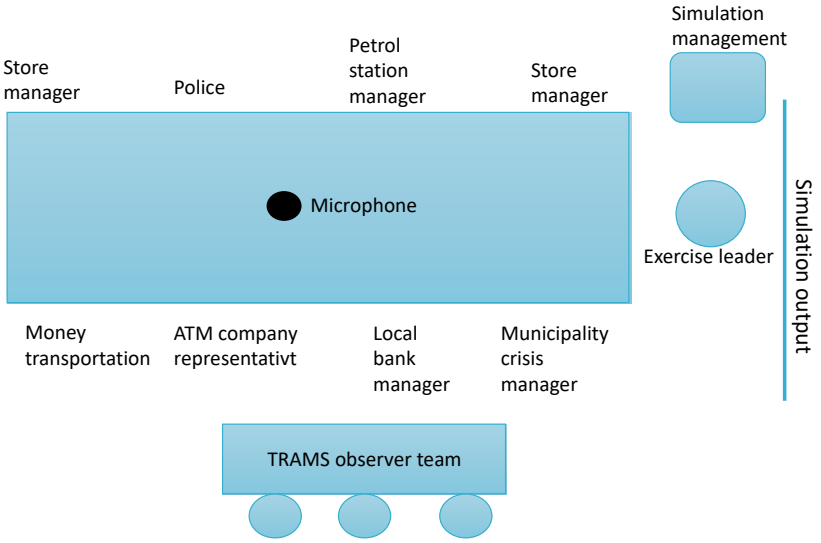

Figure 2 Typical setup of a data collection during a simulation exercise in CCRAAAFFTTING.

THE SIMULATION GAME

The simulation platform AnyLogic™ was used to run the simulation game. The model is an agent-based simulation model of the payment system which simulate the business and consumer consequences when a disruption happens in the payment system for food stores, fuel stations and the bank sector in order to extract resilience. A Geographic Information System (GIS) model is used to visualize the locations of food stores, gas stations and ATMs in southern Sweden. The total population is 440,000 citizens in the simulation and the model creates an architecture of three main components, which is retail market offer, the consumers´ behavior and the payment system. The model is based on the typical shopping behavior from available statistics from SCB Statistics Sweden and the estimates made by the modelling team (Laere et al., 2018). The simulation is from day 0 to day 10 and each simulation runs starts at 06.00 and continue for 9 days.

The scenario of the simulation games is a disruption in the payment system, specifically, a scenario where the card payments function shut down for ten days, while cash withdrawals, internet- and tele- bank and online payments are still working as normal. The simulation is based on a model of southern Sweden which include both large cities and rural areas. The simulation is modeled in terms of stores (ranging from small to mega-stores) and petrol stations (both manned and unmanned), transactions, petrol, flow of goods and payments, customers and the amount of cash available in ATMs etc. The simulation engine will continuously calculate and report development of central variables such as sales, stock in stores, citizen satisfaction, how well the logistics chain works, cash flow in society etc.

METHOD

Apart from applying the TRAMS observation protocol, all discussions taking place in the exercises were recorded. The observations and the recordings were used complementary to gain an understanding of the strategies developed during the exercises. The recorded audio from the data collections was used as a reference when interpreting the notes taken with the TRAMS protocol. From the recordings, selected parts were transcribed in order to gather excerpts that illustrating the various strategies that were identified during the simulation games. They were therefore not randomly chosen. The excerpts that were judged to be representative of the strategies identified during the simulation games were selected and transcribed.

Procedure

All participants filled in a consent form and replied to a set of questions about their professional experience as well as experience from actual crisis response events. Then, the background to the CRRAAAFFTTING project was described, as well as the scenario outline for the simulation. After this, the simulation was started. During the simulation game, two researchers were available at all times, ready to answer any questions the participants had about the progress of the simulation or other concerns. The participants in the simulation game takes on the role as a crisis response council that need to suggest actions to handle the situation on days 1, 3, 6 & 9 in the simulation game. They are free to implement a number of things such as introducing new means for payment, providing information to the public, changing the number of security guards or police officers in stores and society, change opening hours of stores or petrol stations, or even close them, etc. As stated above, a typical team consisted of members from the fuel distribution sector, the food distribution (store managers), the county administration board, bank manager, the money distribution sector, the police, and local media. The teams were not identical in their composition, but sufficiently representative of the type of individuals that are likely to be involved in a crisis response during a disruption in the payment system.

Equipment

The simulation games were audio recorded with Zoom R8 with an Aston Spirit microphone to support note-taking with the TRAMS observation protocol.

Data

Data from 14 crisis management exercises concerning disruptions in the payment system was analyzed. Each exercise typically lasted between 90 – 120 minutes and involved 6-10 participants. Data consisted of observation protocols, audio recordings and selected transcriptions.

Thematic analysis

As mentioned above *thematic analysis* was applied to the data. According to Howitt (2010), thematic analysis is a qualitative data analysis method and is less dependent on theory. It is an analysis for finding major themes in qualitative data. The themes should describe in depth what is going on in the data. The analyst should have an intimate knowledge with the data by for example collecting, transcribing, reading, and re-reading the data oneself. After this process, the coding of the data begins. It is from these codes the analyst develops and identify the themes which describes the major features of the data (Howitt, 2010). In short, the purpose of thematic analysis is to structure and categorize data into different themes. According to Howitt (2010) "thematic analysis is the analysis of what is said rather than how it is said" (p.164).

RESULTS

The distribution of strategies relating to the SyRes functions have partly been reported in previous work (Jaber, Johansson, Bergsten, Laere, & Berggren 2019) and will therefore not be the focus of this paper. Instead, the paper will be devoted to describing what the participants discussed during the simulation games. However, a summary of how these discussions relate to the strategies related to SyRes functions can be in Table 1 below. By analyzing the TRAMS observation protocol and the associated audio recordings, the thematic analysis revealed eight themes:

- Coordinate and collaborate
- Payment options
- Cash circulation
- Fuel and transportation

- Security
- Inform, communicate and the media
- Hoarding and rationing
- Vulnerable groups

The majority of the findings turned out to be from strategies related to the SyRes function *anticipation*. To see the relation between the identified themes and strategies relating to the SyRes functions, see Table 1.

Table 1. The identified themes and their relation to the SyRes function.

Theme	Number of observations	Observation in the total data	In which SyRes strategies
Coordinate and collaborate	110	7%	61% Anticipation 39% Controlling
Payment options	328	21%	67% Anticipation 32% Controlling 1% Self-monitoring
Cash circulation	283	18%	74% Anticipation 2% Monitoring 24% Controlling
Fuel and transportation	239	16%	74% Anticipation 1% Monitoring 25% Controlling
Security	122	8%	70% Anticipation 2% Monitoring 28% Controlling
Inform, communicate and the media	218	14%	63% Anticipation 1% Monitoring 36% Controlling
Hoarding and rationing	136	9%	92% Anticipation 1% Monitoring 4% Controlling 1% Self-monitoring
Vulnerable groups	103	7%	78% Anticipation 1% Monitoring 21% Controlling

An important thing to note before continuing reading the themes is that all the themes presented below are based on the participants' reasoning and concerns. Hence, it is the participants' reasoning that forms the basis of all claims made. Furthermore, it is not certain that the participants' concerns and reasoning are correct.

Theme: Coordinate and collaborate

In a crisis situation, coordination and collaboration are important according to the participants. The participants often discussed that they need to coordinate, both their communication with society to craft a feeling of security, and how they can collaborate among different organizations to create order and structure. The participants

emphasized how important it is to collaborate with key actors involved, such as media or municipality, and that the coordination and collaboration needs to start early in the occurrence of a disruption or crisis situation.

The participants express that it is important to start a dialog between involved actors and try to keep functions working in order to coordinate and communicate between functions. The county administrative board, for example, needs to communicate with the banks, the municipalities need to support and coordinate elderly care, schools and transports. The participants also discussed that a crisis board needs to be established and that an emergency management group or a collaboration conference with important actors should be organized by the municipality and the county administrative board. They can coordinate information to the public, what different actors will do, what resources are available, which resources need to be prioritized, and provide a common operational picture. There will also be internal crisis management teams in different actors' organizations, such as at banks and food stores. The purpose of these crisis management teams is to support each other and help in sharing information, but also determine what actions need to be taken.

Theme: Payment options

In all the exercises, payment options are discussed widely as the lack of payment options is the main challenge in the exercise scenario. Participants discussed several different ways in which payments can be done, such as cash, smartphone based payment, invoice, club card, manual routines, apps, online- and offline-payments, or by bringing other types of pay terminals to the stores (for example smartphone based solutions like Izettle). The participants thought that it is important to show that there are alternative payment options. However, participant discussions suggest that it is difficult to implement such alternatives in practice.

The first option that almost all teams brought up is "Swish", a smartphone-based service that is widely used in Sweden as an payment option. However, there is much discussion if the Swish service can handle the pressure if everyone uses it, since Swish never was intended as the main payment option. In addition, not everyone has a smartphone, or access to the Swish service, especially among the elderly in the population. The participants assumed that elderly people have more cash at home and uses Swish less or not at all, and the younger population probably have less cash and uses Swish more. Not all stores have Swish as an option for receiving payments, and if they have to open up an account for Swish the banks (who has to set up the option for the stores) will be under a lot of pressure. If, or when, the Swish service crashes, there is still cash, online payments and offline payments; but these payment options will most likely create larger queues and a lot of pressure and stress on the personnel and security.

Many stores will also have problems using other payment options than cash, according to many food stores managers who participated in the exercises. Another difficulty is the credit risk associated with a wide use of invoice payment. Most store managers are not prepared to take the risk and not all people can be invoice customers either, since it is hard to perform a credit control with short notice. Another option that was discussed was online payments. People can, for example, buy food via stores' web pages and collect it in the stores, but not all stores have this option and not all people know how to use it, such as elderly people.

There are also differences in the potential of different payment options between the countryside and cities. In the countryside, stores may know their customers and can write down payments that can be paid after the disturbance, but in the city and in bigger stores this is harder, if not impossible, to do.

The suggested payment options mentioned above causes constraints and stress on store staff and managers. The participants thought that new opening hours probably must be established, and that extra personnel are needed, especially if manual routines are implemented.

A desirable idea is that many different payment options should be available, but at present this is not the case according to the participants. The problem in Swedish society today is that there are not many payment solutions, and the solutions that exist create new dilemmas for store managers and banks. The most commonly suggested solution, Swish, will most likely crash and after that the best alternative is cash.

Theme: Cash circulation

When card payments stop working and alternatives like the Swish service crashes, cash payments are considered by the participants to be the next best choice. However, today's society does not have the capacity to handle large amounts of cash, and there is not a supply of cash available either, especially in smaller denomination needed as change. The ATMs will most likely be emptied quickly and money transportation is a slow process. Normally, many ATMs are filled up on a weekly basis, not a daily, which may be required in a scenario like the one used in the exercises. In addition, there are no longer as many money depots as it used to be, according to participants from the money transportation companies.

Circulation of money is thus needed, and assuring enough change in stores is equally important. The participants think that the banks need to increase their opening hours and expect them to be able to handle cash, something that is rare in Sweden today. Most bank offices do no longer have strong rooms, equipment, nor staffing needed to handle cash. Priorities also need to be sorted out, for example which ATMs should be filled up, how much should be filled up, which operation should the money pick-up prioritize, and which bank offices need to open for the public. However, the problem lies in the circulation of money – the money does not get distributed to the ATMs and banks as they stack up in the stores, because the transportation of money cannot keep up. According to the transportation companies, the capacity to deliver large amounts of money does not exist. In addition, stores that do not have a contract with the transportation company cannot use their services and a new contract takes about seven days to seal. An important aspect is to establish a cash flow, presumably locally to avoid congestion on a national level.

A solution suggested by the participants is to introduce limited withdrawal from ATMs. This should be done to prevent ATMs from being emptied and people from hoarding money. Another solution suggested by the participants is to accept other currencies than Swedish Krona, such as euro etc. However, this "new" money still needs to get circulated, which is, as mentioned before, hard to do. In addition, the value of the Swedish krona may drop rapidly in a crisis situation. Another problem associated with increasing the amount of cash in society is that there must be a basic level of security in society – it is not just possible to add a lot of cash without improving the security for handling cash at the same time, according to the participants.

Differences between countryside and city exist. In rural areas, it is easier to arrange local money flows between citizens, something that most likely is difficult to achieve in cities. Therefore, participants speculate that the problem may not be as big in less densely populated areas.

Theme: Security

The need for presence of security guards and police will increase in this situation since people might become frustrated, scared and angry, according to the participants. One problem with this, the participants speculated, is that the number of security guards we have now will probably not be sufficient, which leads to the police and military needing to help out. In addition, there is a dilemma: can more security guards create more security, or will it create an even greater feeling of insecurity? Or is it a necessity to have, for example, police out in the streets to calm people down? Security efforts will have to be focused on stores, banks and petrol stations, since they are vulnerable. Also, security guards, police and military may be needed to support transportation of money, as mentioned before. The participants think that prioritization will be fundamental since there are limited resources in guards, police and military. For example: which stores, ATMs or petrol stations need the most protection? Maybe some stores need to close since the security capacity is not enough. Big stores are probably in bigger need of security than small stores, too. There will also be queues at petrol stations that need to be kept under control. Worth mentioning is that today the Swedish Armed Forces cannot be deployed in Sweden unless war is declared. Hence, Swedish soldiers cannot be used to support police.

Theme: Fuel and transportation

All themes are in a way connected to each other and fuel and transportation is not an exception. As mentioned before, fuel is needed for the transportations of goods and cash and it will be difficult to access this if the payments are disrupted. Fuel is an important driver of societal functions, and the participants argue that a lack of it will lead to disorder.

According to the participants' speculations, prioritization is also needed here. Should everyone be able to refuel or should important societal services, such as ambulances or fire trucks, have priority over everything else? A possible scenario is that cars and trucks will get stuck on the roads, as well as important goods, such as food.

Participants repeatedly suggest that it is important to inform people not to use their cars unnecessarily. A suggestion is that people should stay home and work from home if possible. Carpools are also suggested as an option from the participants. However, fuel-related problems may emerge already on day one in the scenario, as people expect to be able to fill up their cars on the way home from work etc. Once cars get drained from fuel, people will probably hoard or even steal fuel, the participants speculate. People should be encouraged to use other transportation alternatives, such as bikes etc.

A possibility suggested by the participants is to control the fuel tankers and only fill the manned stations with fuel as unmanned stations will not be operational in any case. Or, as an alternative, the unmanned stations could be manned, although it is unclear how this could be solved in practice. This may be necessary in the countryside where there are almost no manned stations. This may work for large companies, but not for smaller ones since they do not have the amount of personnel required, the participants suggest.

One solution suggested by the participants is to mainly use public transportation, such as buses or trains. In addition, let people who cannot pay for the transportation go for free. Increased availability of public transport will however also be difficult to handle.

Theme: Inform, communicate and the media

All participant teams state that information to the public is very important. Traditional media and social media will play a big part in shaping how society will react, the participants speculate. For example, customers need to be informed in the stores, banks need to get out information to their customers, and information about recommended measures must be released and updated frequently. There is also a need of targeted information, for example information in several languages directed towards different ethnic groups with a low proficiency in the Swedish language.

Several teams thought that media would probably denigrate the authorities, which will create worries among the general public. Media will probably exaggerate the severity of the crisis and paint a picture of chaos. The participants suggest that authorities need to inform and show people that there are payment alternatives and solutions. It is thus important to provide coordinated information efforts. However, information and communication should not be too soothing – people will stop trusting information after a while if it is not correct, the participants think.

According to the participants, communication is important both between authorities, and between authorities and media, so that the media can be used as a megaphone. However, the participants also speculate that information from authorities and media may create the opposite effect, leading to a situation where people start hoarding because they are afraid that supplies will be unavailable shortly.

Theme: Hoarding and rationing

According to the participants, people are likely to hoard money, fuel and food. The participants think that information may delay or decrease hoarding, but not get rid of it completely. Several questions arose during the discussions: How can the hoarding problem be solved? Will it slow down when people have filled their pantries? Or is rationing needed?

Participants suggest that stores need to prioritize which goods that are needed. Luxury goods and unnecessary food such as soda, chips, candy etc. should not be prioritized. There is no stock to take care of the increased hoarding and there will be a lack of goods because of logistical problems that results from the difficulties in getting fuel for transports. In addition, there are in store systems for automatic ordering of food will also lead to the stores buying goods nobody wants in a scenario like this. An option suggested by the participants is to change the prices of specific products. In addition, by spreading the goods on shelves so they do not look as empty may in turn create an illusion of availability that may make people less prone to hoarding.

A commonly suggested solution to the hoarding problem is rationing. In addition, assuring that food will be distributed to critical places, such as schools, daycare centers, hospitals and homes for elderly is important. The participants speculate that the payment disruption may create “optional distribution patterns” in the form of a black market created by those who seek to make profit from the situation. However, there will be vulnerable groups that are not able to hoard, get food, and money.

Theme: Vulnerable groups

During a situation like the payment disruption in the CCRRRAAFFTING scenarios, some people or groups in society will be more affected than others. According to the participants, the national board of health and welfare must get involved to help vulnerable people. Some citizens or migrants have no smartphone, digital identification, identity card, nor possibility to pay by invoice or online etc. The most vulnerable groups, according to the teams, are those already living under sparse condition and cannot withdraw larger sums of money. Citizens belonging to such groups are often provided with a temporary debit cards by social welfare services to cover their basic expenses –these cards will not work in the scenario outlined here. The participants think that responsible actors need to set up designated places were vulnerable groups can go to get help. A solution, suggested by the participants, can also be for the state to guarantee payments for people who cannot pay at the moment. Voluntary organizations, such as the Red Cross and churches, need to be activated. Soup kitchens need to open up, as it is likely that more people are vulnerable in a situation like this and the resources are not enough. A speculation made by the participants are that if people do not get help there will be a survival behavior and people will try to solve the shortage of supplies on their own, which is not desired.

Pharmacy and medicine are a very important part that needs to work and has to be prioritized. Pharmacies is a

vulnerable point in society that the state must support.

Another potential problem identified by the participants is the parts of the population with addiction to alcohol, tobacco and other addictive substances. It is an important factor that needs to be considered. If people who are addicted do not get their substance it can create an unwanted behavior which needs to be prevented, by, for example, having more security guards and police out in the streets according to the participants.

DISCUSSION

Results of the thematic analysis identified eight themes in the collected data. The majority of the findings was from the strategies anticipation and controlling. The themes represent what has been said and which actions were implemented during the games. Looking at Table 1, it is clear that some themes were more common than others. However, most themes have been found in almost all the exercises, or have at least been mentioned. Team composition seems to be an important factor shaping what themes that emerge in the different exercises. There are slightly different constellations in the team, where members have different experiences and knowledge about crisis situations and card payments. This will affect the discussion and which direction the team will go in their speculations and reasoning. As can be seen, and also discussed in Jaber et al. (2019), the discussions during the exercises focus mostly on discussing what could happen, rather than what actually is going on, something that is reflected in the distribution of observations over the SyRes functions (see Table 1). Although all teams suggest solutions, the core of the discussions circle around possible developments in the scenario, often shifting between perspectives of the participants. The lack of experience of similar situations seem to trigger this speculative behavior as participants try to frame the situation and, in a sense, re-formulate the problem into something manageable by discussing many different challenges that need to be considered. A somewhat surprising finding is that several teams showed little interest in what was actually going on in the simulation, sometimes even opposing to the presented outcomes or making very strong assumptions about what was happening. “By now, people have started hoarding” is a typical statement from a participant who simply decided that citizens have begun hoarding, without cross checking with the simulation or the exercise leader. Creating a common frame of reference for the development in the scenario, even when it does not fit to the actual development of the simulation nor the outcome, thus seem to be an important part of the learning process for the teams participating in the exercises. It should be noted that the team members were not familiar with each other nor the scenario beforehand, suggesting that team formation is an unavoidable phenomena during the simulation exercises.

As for the content of the themes identified, there is no reason to believe that the participant expectations, suggested measures, or fears are unrealistic. The simulation reflects similar phenomena, apart maybe from “vulnerable groups” which are not modeled or simulated. Most teams emphasized the need for rapid information dissemination about suggested measures as well as invoking alternative payment options and improved cash flows, which normally result in better-than-worst-case outcomes in the simulation. Suggestions for limiting cash withdrawal as well as rationing specific goods may lower the burden on the financial system and perhaps delay social unrest until the card payment system is restored to normal conditions. However, from a societal point of view, it is clear that the limited amount of payment options in combination with a cash flow system that is not dimensioned to provide society in a situation of need is vulnerable. Although some options are available, such as smartphone-based services or invoice payment, these are not available to all citizens and will not be available immediately. The current credit card based payment system is thus vulnerable as many stores, restaurants, petrol stations etc. have no other option to offer.

Preparations for scenarios like the ones used in this study must hence be made. Currently, Swedish society is not prepared to handle a major disruption in the payment system. There is no government agency appointed to manage this type of challenge. There is a clear risk that existing crisis management functions, at the level of municipalities or county administration may fail to recognize a disruption in the payment system as something to respond to until the consequences of the disruptions begin to emerge. Banks or cash register service providers will be expected to handle the situation. Customers will turn to stores for an answer on how they should pay for their goods, but stores do not have prepared strategies to cope with such a situation. Therefore, exercises of the kind conducted in the CCRAAAFFFTING project are highly needed to highlight these vulnerabilities, although a more overarching discussion needs to be initiated to create awareness among agencies, commercial actors, and the public.

CONCLUSION

A qualitative analysis of observation protocols and audio recordings from 14 exercise have been conducted revealing eight themes reoccurring in multi-disciplinary team discussions about crisis response to large disruptions to the card payment system. The themes were: *Coordinate and collaborate*, *Payment options*, *Cash circulation*, *Fuel and transportation*, *Safety*, *Inform, communicate and the media*, *Hoarding and rationing*, and *Vulnerable groups*. The analysis suggest that Swedish society is vulnerable to disruption in the card payment services, largely

due to a low diversity in payment options, the lack of prepared back up solutions for payment, and insufficient cash flows. A longer (several days) disruption in the card payment system will demand coordinating mechanisms for information management, available payment options, and preparedness for rapid establishment of cash flows. Today, these mechanisms do not exist. Simulation exercises with stake-holders is one important mean for increasing awareness about these vulnerabilities and the challenges associated with coping with them.

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