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**The Role of Interoperability for the Management of the  
Refugee Flow**

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## **The Role of Interoperability for the Management of the Refugee Flow**

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### **Abstract**

The on-going refugee flow is a big challenge for Europe and especially for multiple southern countries and subsequently for target destinations such as Austria and Germany. Many spontaneous volunteers provide help to the huge number of refugees. They organised their work partly intuitively, through social media or similar tools, and often guided by NGOs such as the Red Cross or Caritas. The media has often been full with negative contributions showing us how overstrained our society is with such a challenge. This experience shows that we have to reappraise this on-going challenge and perform research in that area. Exchange of information between different actors is very important for a smooth and successful management of any type of crisis. This applies to the crossing of a state border, for checking the health of the refugees, for supplying food and clothing as well as organising transport means and the provision of shelter. In the frame of the FP7 project EPISECC an expert system was developed to analyse systematically the information exchange between crisis managers. First interviews (using the mentioned expert system) of crisis managers in Austria dealing with the refugee crisis in the period late August to late October 2015 have shown that the exchange of information between mainly tactical and strategic actors was often limited, which is influenced by state as well as by organisational borders and limited harmonisation of processes. Informal channels often helped preparing for the next stage of crisis management. In this contribution a concept for a systematic analysis of processes for information exchange in the management of the refugee crisis will be elaborated. Systematic and quantitative analysis of the data from the interviews will be presented, while ensuring the requirements of data protection.

**Keywords:** Refugee flow, interoperability, information exchange, migration, interoperability indicator

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## Introduction

Managing a crisis requires a smooth exchange of the relevant information between first responders, authorities and other stakeholders. The refugee flow since August 2015 has been called "crisis", or the European migrant or European refugee crisis (CFR 2016). The people came from areas such as Middle East, Western and South Asia, Africa, and the Western Balkans (BBC 2015). According to the United Nations High Commissioner for Refugees, the top three nationalities of the over one million Mediterranean Sea arrivals in 2015 were Syrian with 49%, Afghan with 21% and Iraqi with 8% (ABC 2015, The Guardian 2015, Economist 2015, NYT 2015). Of the refugees and migrants arriving in Europe by sea in 2015, 58% were men, 17% women and 25% were children.

For UNHCR the term "refugees" recognized under the 1951 convention are individuals unable or unwilling to their origin to a well-founded fear of being persecuted for reasons such as religion, nationality or political opinion (UNHCR Convention 1951). "Internally displaced persons" are persons who have been forced to leave their homes or places of habitual residence both by violence or man-made or natural disasters without crossing borders. "Asylum seekers" are individuals who have sought international protection and whose claims for refugee status have not been determined.

According to Eurostat, EU member states received over 1.2 million first time asylum applications in 2015 (EUROSTAT 2015). This number is more than double of the previous year. The four states Germany, Hungary, Sweden, and Austria obtained approximately two-thirds of the EU's asylum applications in 2015. That leads to the fact that Hungary, Sweden, and Austria are the top recipients of asylum applications per capita (UNHCR 2014).

In order to manage both the incoming refugees as well as asylum seekers adequate information exchange between stakeholders' turns out to be imperative. In this context, this paper presents a concept for a systematic analysis of processes for information exchange in the management of the refugee crisis. A systematic and quantitative analysis of the data from the interviews of crisis managers will be presented, while ensuring the requirements of data protection.

A mandatory pre-requirement for the support of decision making processes in disaster, is a profound analysis of past disaster responses with focus on interoperability and efficiency solutions and issues of disaster management. For this purpose an inventory was developed within the FP7 project EPISECC<sup>1</sup>. The inventory is based on a data model, which persists of relevant areas of information, such as tools, processes or data and subordinated fields of information (e.g. process type, process name). The method of finding relevant information for the inventory goes from the data model over identifying relevant questions together with selected stakeholders being active in disaster management, the development of an online questionnaire, up to the final

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<sup>1</sup>Establish a Pan-European Information Space to Enhance seCurity of Citizens, <https://www.episecc.eu/>

interviews of crisis managers with focus on the strategic level in order to identify and analyse relevant information on the management of past disasters.

The emphasis of this paper is the presentation of the methodology. Therefore the background and description of the methodology covers the framework of the inventory, the interface between the data collection / interviews with the tool and the electronic questionnaire, the description of the key indicators for the analysis of the interoperability, and the outcome achieved by application the presented analysis. The chapter results summarises the analysis. It turned out that the analysed migration crisis obtained indicators which are comparable with other crises.

## Methodology

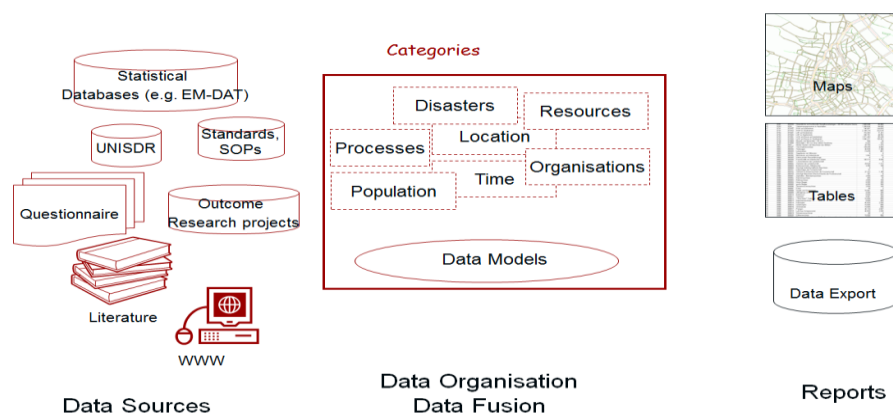
### *The Framework of the Inventory*

In order to realize the inventory, an existing framework of AIT was adapted, which is since many years successfully applied in Austria to analyse emission data (EMIKAT). This framework is allowing the implementation of multiple data-models of different domains (Neubauer et al 2015, Huebner et al 2015). The framework allows consistent inclusion of heterogeneous data such as tables from databases or manual entry of surveys. The development of a specific electronic questionnaire to analyse crisis management data was the main adaptation. (see

Figure 1).

Experts using the framework can make their own logical combination of available data from different categories such as disaster descriptions or processes, tools and resources of organizations involved in the management of disasters. The outcome of these combinations can be made available in the format of tables or graphics; data can be exported and further processed using Microsoft Excel. Figure 2 gives an example of a table realized in order to combine different data collected in the scope of the analysis.

**Figure 1.** *The Framework of the Inventory*



The principles of data management of the framework encompass multiple aspects such as data security (centralized data repository, distributed data usage), user-defined data tables (customization of input data, transparent calculation models) as well as documented results.

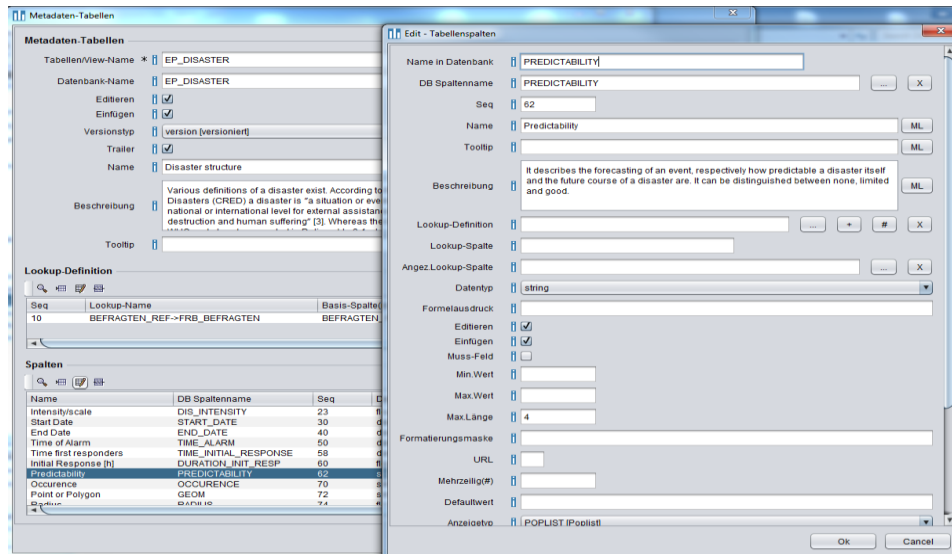
**Figure 2.** *Interface for Experts Allowing Logic Combination of Data from the Inventory*

The screenshot shows the 'emikat Szenario Manager' application. On the left is a tree view under 'emikat.at' containing various categories like 'Base scenario for EPISECC', 'Questionnaire#1', 'Befragter', 'Organisation', 'Disaster', 'Disaster Casualties', 'Standards', 'Standards used', 'Processes', 'Data resource', 'Data resource by org', 'Data resource by process', 'Measure', 'Resource types', 'Means used in measures', 'Organisations in measure', 'Tools', 'Tools used', 'Interoperability', 'Allgemeine Statistiken', 'Verwaltungseinheiten#1', 'Hilfstabellen, Parameter', 'Berechnungsmodell', 'Formulare', 'Modelle berechnen', 'Ergebnisse', 'Auswertungen', 'Definitionen', and 'Allgemeine Auswertungen'. The main window displays a table titled 'Beschreibung E10 Time of startup' with columns: Old, DISASTER, DisasterTypeID, DisasterType, Country, Process name, Measure name, Startup time (h), and Overall. The table lists numerous disaster scenarios with their respective IDs, types, countries, and associated measures and startup times.

Old	DISASTER	DisasterTypeID	DisasterType	Country	Process name	Measure name	Startup time (h)	Overall
124	Snowstor...	1212	Extra-tropical cyc...	HU	Planning response op...	ASFNAG - Snow...	3.0	
287	Great Flo...	1311	Generic (river) fl...	DE	Liaison and Coordinat...	Collecting informa...	1.0	0.0
497	G 7 summit	0	no specific disa...	DE	Routing for emergency...	Traffic Overview a...	6.0	
498	Multiple C...	2101	Transport accide...	FI	Casualty rescue and pr...	Medical Aid to cas...	1.0	0.0
494	Migration	3000	Complex Disaster		COM	define talk groups	0.0	0.0
494	Migration	3000	Complex Disaster		Transport	Organise transport...	10.0	0.0
362	Floods in ...	1311	Generic (river) fl...	HR	Construction of critica...	Construction of el...	24.0	576.0
362	Floods in ...	1311	Generic (river) fl...	HR	Construction of critica...	Construction of ral...	24.0	576.0
362	Floods in ...	1311	Generic (river) fl...	HR	Construction of critica...	Construction of no...	24.0	576.0
362	Floods in ...	1311	Generic (river) fl...	HR	Decontaminating infra...	Removing contam...	24.0	576.0
362	Floods in ...	1311	Generic (river) fl...	HR	Decontaminating infra...	Setting disinfecto...	24.0	576.0
362	Floods in ...	1311	Generic (river) fl...	HR	Decontaminating infra...	Pumping	24.0	576.0
362	Floods in ...	1311	Generic (river) fl...	HR	Decontaminating infra...	Dereliction, disin...	24.0	576.0
362	Floods in ...	1311	Generic (river) fl...	HR	Evacuation	Evacuation and ta...	2.0	248.0
362	Floods in ...	1311	Generic (river) fl...	HR	Evacuation	Evacuation and ta...	2.0	84.0
362	Floods in ...	1311	Generic (river) fl...	HR	Information and comm...	Putting into funcio...	30.0	576.0
362	Floods in ...	1311	Generic (river) fl...	HR	Information and comm...	Installation of a lo...	12.0	
362	Floods in ...	1311	Generic (river) fl...	HR	Information and comm...	Running Operatio...	24.0	576.0
362	Floods in ...	1311	Generic (river) fl...	HR	Search & Rescue of p...	Rescuing animals	0.0	100.1
362	Floods in ...	1311	Generic (river) fl...	HR	Search & Rescue of p...	Search	0.0	124.1
362	Floods in ...	1311	Generic (river) fl...	HR	Search & Rescue of p...	Rescuing people	0.0	100.1
362	Floods in ...	1311	Generic (river) fl...	HR	Traffic control and traff...	Traffic regulation	1.0	684.0
362	Floods in ...	1311	Generic (river) fl...	HR	Traffic control and traff...	Traffic control and...	2.0	678.0
366	UND ADR...	3000	Complex Disaster	HR	Coordination of SAR o...	Assessment of th...	3.0	96.0
366	UND ADR...	3000	Complex Disaster	HR	Coordination of SAR o...	Informing particip...	0.0	296.4
366	UND ADR...	3000	Complex Disaster	HR	Coordination of SAR o...	Towing vessel	2.0	52.0
366	UND ADR...	3000	Complex Disaster	HR	Coordination of SAR o...	Firefighting	2.0	146.6
366	UND ADR...	3000	Complex Disaster	HR	Coordination of SAR o...	The evacuation of	1.0	16 479 770
405	Fire in Du...	3000	Complex Disaster	HR	Firefighting intervention	Deployment of fire...	0.0	26.5
405	Fire in Du...	3000	Complex Disaster	HR	Firefighting intervention	Firefighting	0.0	26.5
405	Fire in Du...	3000	Complex Disaster	HR	Firefighting intervention	Providing electric	0.0	26.0
405	Fire in Du...	3000	Complex Disaster	HR	Firefighting intervention	Providing water	0.0	26.0
405	Fire in Du...	3000	Complex Disaster	HR	Organizing and provid...	Psychological ass...	0.25	17.25
405	Fire in Du...	3000	Complex Disaster	HR	Organizing and provid...	Treatment of the i...	0.25	25.0
405	Fire in Du...	3000	Complex Disaster	HR	Security and investigat...	Investigation of fir...	1.0	2.0
405	Fire in Du...	3000	Complex Disaster	HR	Security and investigat...	Securing the fire s...	0.5	25.25
405	Fire in Du...	3000	Complex Disaster	HR	Traffic regulation and r...	Road maintenance	1.0	12.0
405	Fire in Du...	3000	Complex Disaster	HR	Traffic regulation and r...	Traffic regulation	0.25	25.25
382	Fire in Lo...	3000	Complex Disaster	HR	Firefighting intervention	Firefighting	0.5	84.33
382	Fire in Lo...	3000	Complex Disaster	HR	Firefighting intervention	The allocation of r...	0.5	84.33

The implemented datasets are free in structure and can be defined by the expert using the framework. The datasets are described in the metadata subsystem according to their datatypes, dialog behavior, multilingual names and the descriptions and some of their behavior rules.

**Figure 3.** *Metadata Editor for Defining New Datasets*



As mentioned above, the framework is able to integrate data from different sources; in this case an electronic questionnaire was used, only. The questionnaire was realized to implement the methodology to analyse interoperability aspects developed in the strategic research program 2014 and is described in more detail in the next subsection.

### *Interface to Collect Information – the Electronic Questionnaire*

The purpose of the Inventory is to provide information on the management of past critical disasters and events that occurred in the past in Europe. Data obtained in response to the questionnaire are extrapolated and analysed in order to provide information and knowledge supporting the development of a common information space.

The questionnaire consists of the three main parts described below:

1. Information on the respondent: This data is basic information about the "respondent" of the interview and is needed for quality assurance purposes only, it is not provided to any external institution. Only limited information on the respondents professional ID is requested, including his name, his office address, his business Email address and finally the phone number.
2. Information on the respondent's organization: This section of the electronic questionnaire includes general information about the organization (of the respondent), and also gives the possibility to describe the standards and data sets as well as tools used by the organization. Information is requested for an example on the organisation's main function in disaster management, their main nature of specialisation, the spatial area in which they operate, their organisational scope and whether the organisation focuses on specific disaster types.

3. Information on disasters: The main focus of the questionnaire is the disaster during which the examined information exchange took place. In order to specify a disaster, the respondent needs to select the category or the type of disaster, if applicable the intensity of the event (e.g., magnitude of an earthquake) and multiple parameters such as the start date and the end date, the geographic area of the event as well as the population density and critical infrastructure in the affected area. Additional parts of the questionnaire are dedicated to collect information on casualties, other organizations co-operating with the organization of the interviewee and the processes applied in order to enable co-operation between the before mentioned organizations (not shown here). A wide range of the questionnaire is dedicated to disaster management processes consisting of multiple sub-processes. In order to analyse the quality of information exchange of co-operating organizations, an indicator for interoperability has been developed and implemented in the questionnaire. This indicator is described in the next subsection.

#### *A Key Indicator to Analyse Interoperability*

Interestingly, it has turned out during the development of the data model of the questionnaire that at that time no suitable indicator for interoperability was available in scientific literature, motivating the project team to develop such an indicator (Davidson 2006, Engelbach et al. 2014). Basically, the indicator allows quantifying the quality of information exchange based on the time required to set up a channel or path to exchange information, the time needed to exchange information, the comparison of the amount of information that has been exchanged and the information expected to be exchanged, and finally, the amount of information which could be understood (Neubauer, et al. 2015). Below the indicator is described in detail.

$$KI_{Int} = [0,5 \cdot (1 - T_{suc}) + 0,5 \cdot (1 - T_c)] \cdot \left[ \frac{D_{Tr-is}}{D_{Tr-id}} \cdot \frac{D_{Us-is}}{D_{Us-id}} \right]$$

where:

$KI_{Int}$	Key Indicator for Interoperability (Value between 0 and 1, 0 = Worst Case, 1 = Best Case)
$T_{suc}$	Normalized Time for Setting Up an information exchange Channel, e.g. a frequency channel for communication (Value 0 ideal case = no time for setting up Channel, value 1 worst case = worst case time to set up Channel, depending on expectation of stakeholder)



$T_c$	Normalized Time for the exchanging or provision of information (Value 0 ideal case = no time needed for the process of information exchange (ideal, not possible, the shorter, the better), value 1 worst case = worst case time for exchanging information, depending on expectation of stakeholder)
$D_{Tr-is}$	Data transmitted real status (is); (Value 100 best case = all required data transmitted, value 0 worst case = worst case, no required data transmitted)
$D_{Tr-id}$	Data transmitted ideal (id); always 100 (100%), all expected data transmitted
$D_{Us-is}$	Data understood real status (is); (Value 100 best case = all data transmitted understood, value 0 worst case = worst case, no required data understood)
$D_{Us-id}$	Data understood ideal (id); always 100 (100%), all expected data understood

The results achieved by using this indicator are presented and discussed in the next subsection together with the selected results from the whole questionnaire.

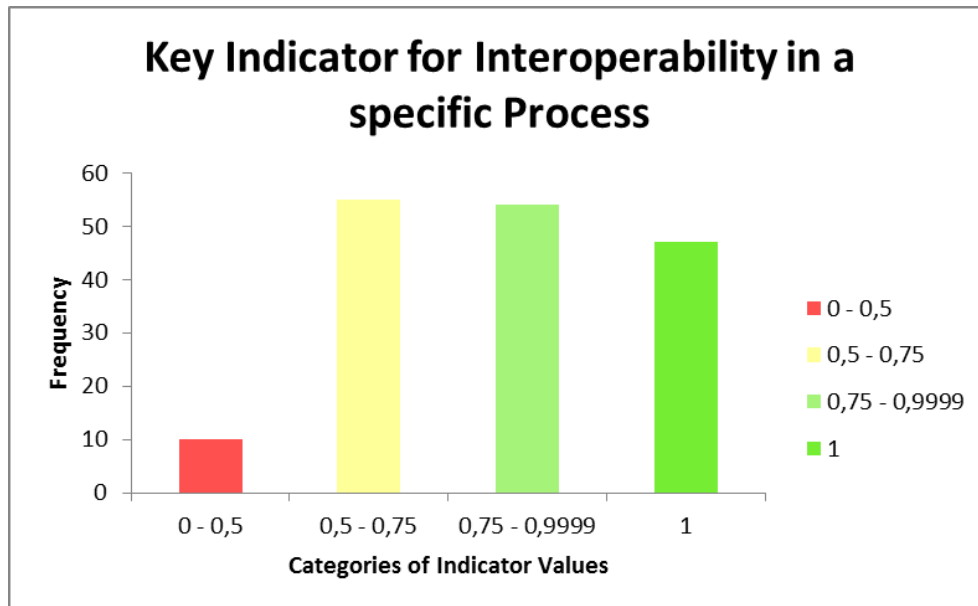
## Results

Together with international partners from the FP7 project EPISECC, 46 interviews were so far performed using the questionnaire described above. Due to the fact that more than 100 questions are included in the questionnaire, it is only possible to give some exemplary results here.

### *Applying the Interoperability Indicator for all Type of Crisis*

166 processes of information exchange that took place during the management of various European crisis and disasters have been analysed using the interoperability indicator described in the previous subsection, the corresponding results are provided in Figure 4.

**Figure 4.** *Outcome of the Analysis of 166 Processes of Information Exchange*



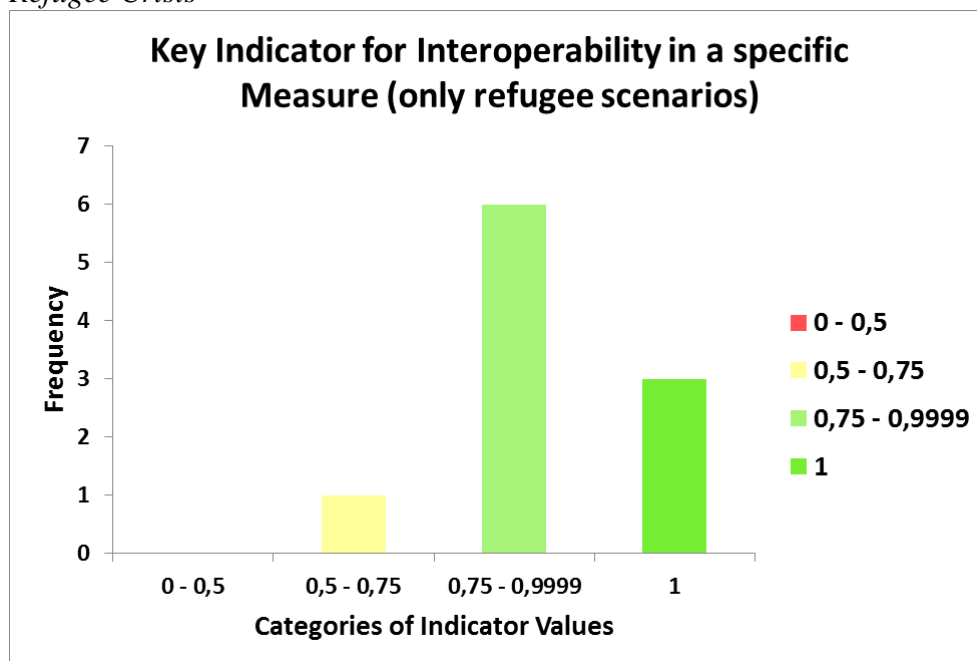
Taking into account that the interoperability indicator ranges between 0 (worst case) and 1 (best case), only a small amount of processes (6 %) has been considered to be poor (0 – 0.5), 33 % to be acceptable (0.5 – 0.75) and also 33 % to be good to very good (0.75 – 0.99). Surprisingly, 28 % of the processes were judged to be excellent. The results seem to be in contrast to the general declaration of shortcomings of interoperability within Europe. It needs to be taken into account, that firstly only very specific processes have been analysed, but not the totality of all information exchange processes taking place during a specific disaster. The high number of excellent processes needs a careful interpretation: some interview partners selected "face to face information exchange" of two persons (often speaking the same language) as the process to be analysed, therefore potentially unintentionally hiding information exchange problems of other processes during the same disaster. It can also not be excluded that the meaning of the indicator was transmitted correctly to all interview partners.

#### *Applying the Interoperability Indicator for the Refugee Crisis*

In this section the interoperability indicator describing the quality of information exchange with regard to the European refugee crisis are analysed, with information from 6 of the 46 interviews discussed in the previous section, which were carried out in context to the European refugee crisis.

Despite the considerable challenges stakeholders faced, the information exchange of the available information between the stakeholders seems to have worked and achieved its aims. On average an interoperability indicator value of 0.84 was reached, which is slightly better than the mean interoperability indicator value for all disaster categories (migration and refugee crises excluded), which is 0.79.

**Figure 5.** *Outcome of the Analysis of Processes with Regard to the European Refugee Crisis*



As it can be seen in **Error! Reference source not found.** more than half of the relevant processes has been considered to be good to very good (0.75 – 0.99) and not a single process has been assessed as poor (0.0 – 0.5).

#### *Challenges and Requirements Faced while Managing the Refugee Flow*

The vast majority of the organizations interviewed have been governmental ones. Again, the majority of these organizations predominantly operate on all levels, i.e. strategic, tactical and operational. Only 16 % of all interviewed organizations operate on one level, only. Looking at the type of standards (including Standard Operating Procedures) and tools specified by interview partners to be relevant for their organizations in terms of daily or frequent use, results indicate a large degree of fragmentation within Europe. The majority of standards as well as tools were only indicated by a single organization, whereas exceptions include common protocols such as CAP or tools such as Virtual OSOCC by the United Nations. Although the interviews performed so far do not represent the totality of the crisis management organizations in Europe, they are indicative for an overall lack of harmonization within the European crisis management.

The predominant category of requirements identified in the inventory is related to interoperability in one or the other way (34% of all identified requirements). Out of these requirements:

- 30% are dealing with improved information exchange on rather tactical/operational level,

- 26% with improved information exchange on a political/strategic level,
- 26% with technical interoperability requests,
- 7% with alarming,
- 7% are related to language problems and/or taxonomy,
- 4% finally with information on/for the population.

It can be seen that the number of requirements is predominated by requests on interoperability. The stakeholders involved called very specifically for information on the number of refugees within and beyond Austria/the countries. While the stakeholders of other disaster categories like geological- and hydrological disasters are also struggling with an operational picture, the lack of essential information is the main problem for the stakeholders of the migration and refugee crisis. Thus, a potential solution would be software or platforms, to get detailed information about the amount of refugees approaching specific border areas, or to manage quarters for them. Apart from information exchange problems, also logistic problems such as waste management very pointed out. Finally, the above described heterogeneity of procedures and standards was also identified as shortcoming

## **Discussion and Conclusions**

Looking at the results obtained by using the interoperability indicator it appears that the results contradict the often mentioned requirements to improve cooperation, which lie particularly in the area of interoperability. One reason may be that interviewees were free to select the processes they wanted to describe. It is not unlikely that the majority of interview partners did not select "bad" information exchange processes, but rather good ones. For instance, no process of information exchange on a cross border level was analysed, although some interviewees specifically pointed to the almost complete lack of information from the neighbour country, where the refugees were coming from. Furthermore, it has to be taken into account that the limited number of interviews performed so far allows no final conclusion related to the quality of information exchange while managing the refugee flow in Europe. In contrast to the interviews performed on all type disasters, interviews related to the refugee crisis were all performed in Austria and only describe the situation from late summer to winter 2015. Apart from interoperability other requirements, many of them related to logistics such as communication tools, shelter for refugees were also pointed out.

The authors are currently preparing a second series of interviews both in Germany and Austria with a focus on cross border cooperation. In addition, the questionnaire is partially adapted in order to better analyse the efforts required to coach refugees. The authors are cooperating with stakeholders to ensure the suitability of their approach. Of course it has to be taken into account that the situation changed considerably since late August 2015 (e.g. Kermani 2016, Grenz et al. 2015). Due to political measures leading to different type of

obstacles, including administrative processes as well as physical measures, refugees were changing their main routes to and through Europe several times. New build border protection facilities forced the refugee flow towards western routes and reduced the number of refugees moving to target countries such as Germany, Sweden and Austria considerably. In addition, the attitude of the society towards refugees and migrants in receiving countries changed in the last months from a very positive attitude ("Willkommenskultur") towards a more reluctant one. Currently, the European Union as well as several neighbour countries is looking for a common approach on how to deal with the challenge tackled by the movement of refugees across Europe. The question arises if a common balanced immigration policy will be found; encompassing aspects such as suitable migration-rates and expatriate congregations (see e.g. Collier 2013, Carr 2015). In consideration of the hardly or not at all predictable political developments it seems to be very likely that the management of refugee flows as well as migration movement will continue to challenge European stakeholders on strategic, tactical as well as an operational level. In face of past shortcomings it can be recommended to continue to improve common processes and information exchange between stakeholders both on the national as well as on the international level. In this context we are attempting to analyse the processes applied in the management of refugee flows in order to identify strength and shortcomings in a systematic way. The outcome of this analysis shall support stakeholders in their future activities.

## References

- ABC (2015, December 30) *Australian Broadcasting Corporation*. Retrieved from <http://ab.co/1RbjpKX>.
- BBC (2015, September 19) Migrant crisis: Explaining the exodus from the Balkans. Retrieved from <http://bbc.in/1KYCoo9>.
- Carr M (2015) *Fortress Europe – Inside the War against Immigration*. Glasgow: United Kingdom by Bell & Bain Ltd.
- Collier P (2013) *Exodus: How Migration is Changing Our World*. Random House GmbH. ISBN 978-3-570-55287-2.
- CFR, Council on Foreign Relations (2016) *Europe's Migration Crisis*. Retrieved from <http://on.cfr.org/2jbXC85>.
- Davidson A (2006) *Key Performance Indicators in Humanitarian Logistics*. Engineering Systems Division.
- Economist (2015, June 18) *The dispossessed*. Retrieved from: <http://econ.st/1G8epMZ>.
- Engelbach W, Frings S, Molarius R, Aubrecht C, Meriste M, Perrels A (2014) *Indicators to compare simulated crisis management strategies*. Davos: International Disaster and Risk Conference.
- EUROSTAT (2016) *Asylum in the EU Member States Record number of over 1.2 million first time asylum seekers registered in 2015 Syrians, Afghans and Iraqis: top citizenships*. Eurostat News Release. Retrieved from <http://bit.ly/1oUIAGC>.
- Grenz W, Lehmann J, Keßler S (2015) *Schiffbruch – Das Versagen der europäischen Flüchtlingspolitik [Shipwreck - The Failure of European Refugee Policy]*. Knauer Verlag.

- Huebner K., Dalaff C, Vorraber W, Lichtenegger G, Delprato U, Neubauer G, Jager B, Preinerstorfer A (2015) *Towards a Pan-European Information Space*, ISCRAM.
- Kermani N (2016) *Einbruch der Wirklichkeit [Burglary of reality]*. München: Verlag C.H. Beck oHG.
- Neubauer G, Preinerstorfer A, Jager B, Humer H, Lichtenegger G, Vorraber W, Linke H, Tusa G, Gruener R, Dalaff C, Huebner K, Knezic S, Blaha M. 2015. A Methodology to Analyze Interoperability in Crisis and Disaster Management. In *IDIMT-2015 Information Technology and Society Interaction Interdependence*. Schriftenreihe Informatik 44. Pödebrady: Trauner Verlag.
- The Guardian (2015) Refugee crisis: apart from Syrians, who is travelling to Europe?. Retrieved from <http://bit.ly/1KabeJ4>.
- The New York Times (NYT) (2015, August 26) The Global Refugee Crisis, Region by Region. Retrieved from <http://nyti.ms/1GnMnAL>.
- UNHCR Convention (1951) *Convention and Protocol relating to the Status of Refugees*, Retrieved from <http://bit.ly/1eSdp1Y>. [Accessed May 2016].
- UNHCR (2015) World at war, UNHCR Global Trends –Forced Displacement in 2014. UNHCR. Retrieved from <http://bit.ly/1fiBJ4a>.