



D934.123 – RECOMMENDATIONS FOR THE COORDINATION AND COLLABORATION AMONG PUBLIC/PRIVATE LOGISTICS ENTITIES AND END-USERS

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The DRIVER+ project

Current and future challenges due to increasingly severe consequences of natural disasters and terrorist threats require the development and uptake of innovative solutions that are addressing the operational needs of practitioners dealing with Crisis Management. DRIVER+ (Driving Innovation in Crisis Management for European Resilience) is a FP7 Crisis Management demonstration project aiming at improving the way capability development and innovation management is tackled. DRIVER+ has three main objectives:

1. Develop a pan-European Test-bed for Crisis Management capability development:
 - Develop a common guidance methodology and tool (supporting Trials and the gathering of lessons learnt).
 - Develop an infrastructure to create relevant environments, for enabling the trialling of new solutions and to explore and share Crisis Management capabilities.
 - Run Trials in order to assess the value of solutions addressing specific needs using guidance and infrastructure.
 - Ensure the sustainability of the pan-European Test-bed.
2. Develop a well-balanced comprehensive Portfolio of Crisis Management Solutions:
 - Facilitate the usage of the Portfolio of Solutions.
 - Ensure the sustainability of the Portfolio of Solutions.
3. Facilitate a shared understanding of Crisis Management across Europe:
 - Establish a common background.
 - Cooperate with external partners in joint Trials.
 - Disseminate project results.

In order to achieve these objectives, five sub-projects (SPs) have been established. **SP91 Project Management** is devoted to consortium level project management, and it is also in charge of the alignment of DRIVER+ with external initiatives on crisis management for the benefit of DRIVER+ and its stakeholders. In DRIVER+, all activities related to Societal Impact Assessment (from the former SP8 and SP9) are part of SP91 as well. **SP92 Test-bed** will deliver a guidance methodology and guidance tool supporting the design, conduct and analysis of Trials and will develop a reference implementation of the Test-bed. It will also create the scenario simulation capability to support execution of the Trials. **SP93 Solutions** will deliver the Portfolio of Solutions which is a database driven web site that documents all the available DRIVER+ solutions, as well as solutions from external organisations. Adapting solutions to fit the needs addressed in Trials will be done in SP93. **SP94 Trials** will organize four series of Trials as well as the final demo. **SP95 Impact, Engagement and Sustainability**, is in charge of communication and dissemination, and also addresses issues related to improving sustainability, market aspects of solutions, and standardization.

The DRIVER+ Trials and the Final Demonstration will benefit from the DRIVER+ Test-bed, providing the technological infrastructure, the necessary supporting methodology and adequate support tools to prepare, conduct and evaluate the Trials. All results from the Trials will be stored and made available in the Portfolio of Solutions, being a central platform to present innovative solutions from consortium partners and third parties and to share experiences and best practices with respect to their application. In order to enhance the current European cooperation framework within the Crisis Management domain and to facilitate a shared understanding of Crisis Management across Europe, DRIVER+ will carry out a wide range of activities, whose most important will be to build and structure a dedicated Community of Practice in Crisis Management, thereby connecting and fostering the exchange on lessons learnt and best practices between Crisis Management practitioners as well as technological solution providers.

Executive summary

There are a number of benefits and risks for donors and relief agencies when it comes to engaging with the private sector. Developing a clear and accepted policy for strategically engaging with the private sector relationships can mitigate many of these risks. This is achieved whilst maximizing the benefits in either collaboration from private companies that may serve as an economic factor (commercial agreements), as non-profit collaborations, or as a corporate social responsibility (non-commercial agreements). It is necessary to have a solid framework to develop these policies at a European level. This should consider barriers and difficulties that can appear due to differences in legal regulations from different EU countries and internal policies from private companies. Next aim then is to optimize during the crisis: the response, the application of solutions, the transportation of resources, etc.

It is important to elaborate a recommended list of actions for logistics stakeholders and public entities that manage resources during preparedness and operate within the supply chain during the response phase in crisis situations. These guidelines should include needs, objectives and expectations of each party. Roles should be clearly identified as a first step to build a solid framework in this issue.

In the frame of the DRIVER+ project, there will be a series of Trials regarding different scenarios of disasters; flooding, earthquake, etc. some of them adding cascading effects to its consequences. To develop these Trials, it is important to have methodologies regarding all aspects that should be considered. Therefore, the Trial participants can benefit from an operational guideline about how resources during preparedness should be managed and operated within the supply chain.

For this purpose, firstly, it was necessary to carry out a research of the State of the Art regarding public and private collaboration that should include how private and public actors of the logistics sector can contribute to increase resilience of the societies within which they operate. Also, it was necessary to review the possible relationships that can be contracted between a public entity and a private entity, and the requirements that both parties must meet. This includes both their benefits and their difficulties.

After gaining a deep knowledge of the level of development reached, and what has been done related to public and private collaboration in the field of logistics in emergency and crisis management, it was important to ask the different stakeholders about their current knowledge of this kind of agreements. For this reason, a series of interviews and questionnaires were carried out with stakeholders from both public and private sectors.

To complete this information, a face-to-face workshop was held with participants from the logistics sector involved in this matter. These participants cover different operational areas in logistics companies from warehouse and transportation managers to resource planners. All the information was analysed, and a recommended list of action is presented for logistics stakeholders and public entities that manage resources during preparedness and those who operate in the response phase in a disaster situation. This workshop took place in Madrid with stakeholders from retail companies, consumer goods corporations, public and private transport companies and humanitarian entities and logistics associations. The next steps to consolidate such an ambitious work would be to add the vision and the knowledge of more European agents after testing this initial work in real conditions.

Table of Content

1.	Introduction	12
2.	Procedure of the work	13
2.1	Methodology of the state of the art	13
2.2	Methodology of the survey.....	14
2.3	Methodology of the workshop	15
2.4	Guidelines of private-public collaboration and end users and EU validation.....	19
3.	Synthesis and main results of the state of the art analysis: collaboration among public/private entities in case of human disaster.....	20
3.1	Introduction (2) (1) (3) (4)	20
3.2	Commercial participation: collaboration models (2)	21
3.2.1	Model 1: Subcontracting specific tasks in the supply chain.....	21
3.2.2	Model 2: Contracting the end to end logistic process.....	21
3.3	Non-commercial participation. Collaboration models (2) (7) (8) (3)	22
3.3.1	Model 1: Logistics agreements (3) (9)	23
3.3.2	Model 2: Agreements for exploit professional logistic knowledge for the execution and implementation of processes, tasks and protocols.	25
3.3.3	Model 3: Agreements for innovation	26
3.3.4	Model 4: Agreements for coordination (16)	27
3.4	Conclusions	28
4.	Analysis of the survey results	30
4.1	Block 1: Research the spread of public private partnerships.....	30
4.2	Block 2: Get information about the kind of entities that are maintaining collaborative agreements.....	31
4.3	Block 3: Get information about how the agreements are established and their rules	32
4.4	Block 4: Get information about specific staff that logistics and transport companies can provide	32
4.5	Block 5: Enumerate goods, services or operational material that logistics companies can supply	33
4.6	Block 6: See the level of communication between the parties involved.....	34
5.	Recommended list of actions or guidelines for logistics stakeholders and public entities	35
5.1	Introduction	35
5.2	Storage	36
5.3	Transport.....	37
5.4	Supply: Sources and procedures	40
5.4.1	Supply sources.....	40
5.4.2	Supply procedures	41

5.5	Distribution	43
5.6	Conclusions	45
5.7	Next steps.....	45
	References.....	47
	Annexes	49
	Annex 1 – DRIVER+ Terminology	49
	Annex 2 – State of the art: collaboration environment between public and private entities in case of disasters.....	51
	Annex 3 – Surveys answers	66
	Annex 4 – Survey questionnaires for private companies	79
	Annex 5 – Survey questionnaires for public entities	83
	Annex 6 – Bullets points collected during the workshop	87

List of Figures

Figure 2.1: Process diagram	13
Figure 2.2: Workshop image 1.....	15
Figure 2.3: Workshop image 2.....	18
Figure 2.4: Workshop image 3.....	19
Figure 3.1: Land Rover Models of Collaboration.....	24
Figure 3.2: DHL models of collaboration	28
Figure 4.1: Diagram private sector (left), Diagram public sector (right)	30
Figure 4.2: Diagram collaboration	31
Figure 4.3: Public entities diagram	31
Figure 4.4: Entities diagram.....	32
Figure 4.5: Private protocol diagram (left); Public protocol diagram (right).....	32
Figure 4.6: Staff diagram	33
Figure 4.7: Staff demand diagram	33
Figure 4.8: Materials diagram	34
Figure A1: DRIVER+ Terminology	49
Figure A2: Royal Caribbean Models of Collaboration	62
Figure A3: DHL Models of Collaboration	63
Figure A4: Land Rover Models of Collaboration.....	63
Figure A5: Private entities survey question 1.....	66
Figure A6: Private entities survey question 2.....	66
Figure A7: Private entities survey question 3.....	67
Figure A8: Private entities survey question 4.....	67
Figure A9: Private entities survey question 5.....	67
Figure A10: Private entities survey question 6.....	68
Figure A11: Private entities survey question 7.....	68
Figure A12: Private entities survey question 8.....	68

Figure A13: Private entities survey question 9.....	69
Figure A14: Private entities survey question 10.....	69
Figure A15: Private entities survey question 11.....	70
Figure A16: Private entities survey question 12.....	70
Figure A17: Private entities survey question 13.....	70
Figure A18: Private entities survey question 14.....	71
Figure A19: Private entities survey question 15.....	71
Figure A20: Private entities survey question 16.....	71
Figure A21: Private entities survey question 17.....	72
Figure A22: Public entities survey question 1	72
Figure A23: Public entities survey question 2	73
Figure A24: Public entities survey question 3	73
Figure A25: Public entities survey question 4	73
Figure A26: Public entities survey question 5	74
Figure A27: Figure 40. Public entities survey question 6	74
Figure A28: Public entities survey question 7	74
Figure A29: Public entities survey question 8	75
Figure A30: Public entities survey question 9	75
Figure A31: Public entities survey question 10	75
Figure A32: Public entities survey question 11	76
Figure A33: Public entities survey question 12	76
Figure A34: Public entities survey question 13	77
Figure A35: Public entities survey question 14	77
Figure A36: Public entities survey question 15	77
Figure A37: Public entities survey question 16	78
Figure A38: Public entities survey question 17	78

List of Tables

Table 2.1: Participants to working group meeting in Madrid 16

List of Acronyms

Acronym	Definition
EU	European Union
NGO	Non-Governmental Organization
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
UN	United Nations
CEL	Centro Español de Logística
UNO	Organización Empresarial de Transporte y Logística
CITET	Centro de Innovación de Logística y Transporte de mercancías
USAID	United States Agency for International Development
ICRC	International Committee of the Red Cross
UNICEF	United Nation Children's Fund
GARD	Disaster Ready Airports Program
WFP	World Food Programme
RFID	Radio-frequency identification
LET	Logistics Emergency Teams

1. Introduction

From a crisis management point of view, it is essential to build standardized logistics mechanisms and solid procedures to face humanitarian disasters. Collaboration between entities with experience in crisis management and entities with deep experience in logistics procedures is crucial. The private logistics sector can also provide valuable and innovative support when humanitarian assistance is needed.

Public authorities already rely on private sector expertise to respond to emergencies. Specialised equipment used by first responders, for example, is produced by the private sector. Public authorities can also work with the private sector to develop key technologies and improve research on disasters as well as disaster risk management strategies and actions. There is an increasing need for innovative technologies and instruments to support disaster management. This is especially the case when the action is needed. It is necessary to establish prior agreements clearly defining the scope of each party. This needs to be renewed from time to time, which must contemplate probable and possible scenarios and resources related to supply chain (e.g. storage, transport, communication, etc.).

The European Commission (1) emphasizes that there is a need to have a more structured dialogue between policy makers and the industries with interest in disaster risk management. Specific "roundtables" exist for other industrial sectors. It would be a positive action for something similar to be set up for the disaster risk management sector. Such a dialogue could usefully look at the disaster risk management activities that many companies are already carrying out (e.g. the big logistics companies) and see if they could be linked into the response plans that are being planned at European level.

The workshop was held with participants from the logistics sector interested in risk management activities. This is considered as a first step regarding theses demanded "roundtables". The main conclusions of this workshop are presented in this deliverable. This includes the preparation of the workshop and the correct presentation of the results for the guidelines. The work is also supported by the interviews and questionnaires with stakeholders from both, public and private sectors, and with the review of the state of the art of this type of collaboration.

The final, and main, outcome of this deliverable is the recommended list of action for logistics stakeholders and public entities that manage resources during preparedness and those who operate in the response phase in a crisis situation. This is presented with the aim to define the first steps for the development of a wider and solid framework for such kind of collaboration and coordination agreements.

2. Procedure of the work

For the elaboration of this deliverable, articles and studies were evaluated where actions of the public and private companies have been analysed in the face of disasters. We include consideration of the different agreements that have been carried out, and the possibilities and benefits that can be provided to society by the collaboration of entities. The process is shown in Figure 2.1.



Figure 2.1: Process diagram

The working process to develop this deliverable started with a review of the state of the art regarding collaboration and coordination among public and private logistics entities and crisis management entities. The next step was to elaborate two types of surveys for private and public entities and sent them to a database of 2500 participant. This was carried out with the advice of the two-main sectorial associations in Spain in the field of logistics. With the conclusions from this previous work a workshop was organised to discuss and analyse them. Finally, with the information gathered, the guidelines were developed and written.

2.1 Methodology of the state of the art

This section describes the development of the review of the current state of the art of the collaboration environment between public and private entities. A descriptive analysis is carried out that encompasses both the main actors and the current collaboration models.

The main task carried out is the collection of information. Different sources have been consulted, which are referenced. For example, search queries from the Journal of Strategic Security or articles from the International Transactions in Operational Research. The methodology is described below.

Firstly, the websites of organizations where their work focuses and coordinates effective and principled humanitarian action and crisis management were consulted. This includes organizations like the European Civil Protection and Humanitarian Aid Operations, ERRC, ICRC or UNISDR. The aim is to obtain previous collaboration examples between crisis management entities and logistics companies.

Next, the Directory Open Access Journals “DOAJ” database was consulted. References which note public and private collaboration in case of disaster were found in this database and collected. The following search queries were used: “crisis management logistics”, “public private collaboration”, “disaster logistics coordination”, “public private logistics agreements”, “public private partnerships logistics” and “role public private stakeholders disaster management operations”. The documents and articles used from this source are properly referenced.

Following this, the information was filtered choosing the most noted a related literature to the DRIVER+ project. This included especially peer-reviewed documents that have been already presented in conferences or journals. Once the information was analysed and reviewed, different collaboration models and agreements, as well as examples between collaboration and coordination among public and private entities and end-users were added to this document, with detail given in Annex 2.

2.2 Methodology of the survey

The main objectives of the survey are to define and have a broad vision of the current state of collaboration between private companies and public ones in crisis management and an approach to contrast and complete previously developed information in the state of the art.

In order to complete the information described in the state of the art, two types of surveys were prepared (one for private entities and another for public entities) and were sent to the database of CITET, CEL (the biggest Spanish association on the field of logistics companies and retailers) and UNO (the Spanish business organization for logistics and transport) with approximately 2500 contacts including operation directors, general directors and logistics responsible and some end-users like the Austrian Red Cross or the Spanish Red Cross.

The results are from a sample of 105 answers and the survey was sent three times to the same list. The survey included a summary of the DRIVER+ project and the objective of the present task and work package. A number of 105 answers from 2500 entities were surveyed and not every question of the survey was obligatory to answer. The main reason for this low rate is the lack of a high number of collaboration activities between the logistics entities surveyed and entities from the crisis management sector. This was detected after the analysis of the survey. Many entities understood that if they don't have previous experiences, their answers would be less meaningful.

For the development of the questionnaires, this work considered the opinion and advice of the two-main sectorial associations in Spain in the field of logistics. They have been supervised by the Technical Director of the Spanish Logistics Centre and member of the ELA, the European Logistics Association, and the managing director of the business organization of logistics and transport. Thanks to this supervision, a series of specialized questions were determined. The reason for taking into account the opinion of these two persons is firstly, to have the vision of CEL, who is associated with large companies where their core activity is not the logistic one but is a very important part of it. This especially includes retail companies like Carrefour, Corte Ingles or Proctor and Gamble. On the other hand, UNO represents entities with a core focus on logistics or transportation, such as DHL, MRW or FM Logistic. With these two visions, a broader approach can be reached, not just to the survey, but also to prepare the final workshop.

Once the questionnaires were received, a statistical analysis of the results was carried out. It finishes with a series of conclusions that interpret and clarify the scenario described by the ideas obtained for each question.

The types of questions vary from some basic inquiries about the grade of awareness of public - private partnerships. This is considered as important to have knowledge in both sectors about previous examples or models of collaboration, in order to prepare the final workshop. In case the person answering these questions knew about some kind of collaboration, the following inquiries were about whether this collaboration concerns their current company or organization and with what kind of public entity (in case of private companies) they have reached such agreement. It has been considered whether there are correctly established (proper rules, protocols, guidelines) and the resources that the organization assigns to this agreement. The main reason of these questions was to evaluate, just in case of existing relations, the grade of standardization and management of them.

The next questions were subjective questions about the importance of creating new collaborations and the kind of public or private entities that should be involved. With these inquiries the level of engagement that could be expected at a personal level from professional of the logistics sector was sought. The questions were related to the next categories:

- General knowledge about the entity collaboration activities.
- Evaluation of this collaboration.
- Types of entities that should be involved.
- Convenience of established collaborations.
- Communication between the entities involved.
- Strategic leaderships of the activities.

The next category was completely operational, and it looks forward to gaining information about practical issues. The questions were related to the availability to be supplied in collaboration agreements of:

- Goods.
- Services.
- Staff.
- Materials.
- Infrastructure.

Finally, the participant was offered to participate in the final workshop and their personal data and contact is collected. All were closed questions with multiple choices. Likert scale and some linear scale were used to rate the importance of the degree of some parameter inquiries.

2.3 Methodology of the workshop

The main objective of the workshop was to set a roundtable with guests from the logistics sector interested in risk management and public authorities and entities. Advice of the European Commission (1) was followed to obtain a more structured dialogue between policy makers and the industries with interest in disaster risks management (e.g. the big logistics companies). Discussion with the attendees was aiming to understand the best ways to link their companies into response plans and how they can contribute to the crisis management sector, either with materials, infrastructures, procedures or knowledge.



Figure 2.2: Workshop image 1

The working group was set up to analyse the previous work, state of the art and survey conclusions, and discuss the final recommendation for the list of actions for logistics stakeholders, from their point of view based on their professional experience.

This working group took place in Madrid in the shared offices of CITET and UNO, the business organization for logistics and transport, with a morning session from 10:00 to 14:00, lunch break, and 16:00 to 18:00. The group was formed by representatives of 16 companies and institutions listed in Table 2.1.

Table 2.1: Participants to working group meeting in Madrid

COMPANY/INSTITUTION	POSITION	FUNCTIONS
FEDEX EXPRESS EUROPE	LNP Coordinator	Selection of local partners for delivery and local distribution. Selection of DG's partners for delivery and local distribution. Compliance and surveillance for the activities performance by LNP. Implementation of KPI's, SQI's. Participation in quality action teams to improve a service area.
ATOS	Head of Transport	Responsible for all technology research and development activities for transport & mobility projects.
MONDELEZ INTERNATIONAL	Warehouse and transportation manager	Cost to serve solution integration for customer service and logistics reporting needs. Bundling analysis to search savings opportunities. Warehouse management and control of stock. Lead logistic and innovation projects. Coordinate inbound and outbound transportation with Logistic Operators. Logistic operator KPI'S control and tracking. Support new supply chain distribution network designs.
MADRID TOWN HALL	Subdirector for energy and climate change for the City of Madrid	Manage projects related to alternative ways of transport. Manage projects to reduce the carbon footprint of the municipal fleet. Manage low carbon mobility initiatives, increase the contribution of pedestrian and cyclist mobility, and public transport in the modal split. Development of infrastructure for the supply of alternative fuels and electric recharge for transportation.
EMT (Public Transport Company of Madrid City)	Project Manager.	Manager of the European project CIVITAS ECCENTRIC. A project funded by the European Union, focused on sustainable urban mobility, and involving the cities of Madrid (project leader), Munich, Stockholm, Turku and Ruse.
RED CROSS	Team leader at the emergency unit	Identification of water, sanitation and hygiene needs in the Nyaragusu refugee camp. Logistics of the arrival of the intervention team in emergencies of basic health care (ERU - UCBS) sent by the Spanish Red Cross, to give support to the Red Cross Tanzania in the construction of two health posts WASH. Coordinator and construction manager of two health posts in the Nyaragusu refugee camp. Focal point of the team during the transfer between teams
LAST MILE TEAM	CEO and founder	Responsible for designing, developing and implementing flexible and personalised IT systems to provide internet merchants, service providers, three or four PLs, transport operators or public administrations with the required tools to support last mile performance improvement.

COMPANY/INSTITUTION	POSITION	FUNCTIONS
EVERIS	Industry Manager and Supply Chain Consultant	Correos Group: IT maintenance services (logistics applications, BI, Architecture). CEL Logistics: Characterization study of the transport and logistics sector in Spain. Carrefour: Definition of methodologies for demand management and IT projects. Ence: Forest management systems plan, contemplating the IT needs of the entire process. Azkar: Optimization of the trawl route.
ONTIME	V.P. Business Development	Focus on developing innovation projects related to Logistics and Transport and getting funds and forming consortiums.
AMAZON	Fulfilment Manager	Logistics management. Analysis of material quality. Control loading and unloading.
CRAMBO	CEO	Responsible for managing the company over the last 10 years providing global technology solutions for the transport and logistics sector aimed at all market verticals: IoT, DS & LED Solutions and AV Pro.
HUMAN SURGE	Co-Founder and CEO	Launching a Global Emergency Roster of reference for Humanitarian Responders, both Professionals and Organizations.
CITET	Innovation Manager	Managing activities, means and resources of CITET. Supporting the development and implementation of R&D projects related to logistics and transport. Dissemination and transfer of R&D results to the business environment.
CEL The Spanish Logistics Centre	Technical Director	Led projects and national and international committees (Europe, Latin America and USA) oriented to the improvement and development of supply chain management through the application of new management tools and technologies.
UNO The Spanish Business Association of Logistics and Transport	General Manager	Coordination of the human team and suppliers. Relationship with associated companies and collaborating companies. Technical management and projects. Secretariat of the commission of operations and commissions of air cargo. Representative in the CNTC (National Transportation Committee) and CMTC Madrid Transport Committee. Management and budget monitoring.
Nottingham Trent University	Pre-doctoral student	Supply chain collaboration for sustainability such as avoiding food waste and distribution of food role of food traceability in sustainability.

The meeting started with a presentation of the DRIVER+ project by CITET. In this way, the participants had a clear vision of the topics to be treated and the objectives, both the workshop and the project. Special emphasis was placed on the Trials that will be carried out in DRIVER+ since they will also be the examples that will be worked in the workshop.



Figure 2.3: Workshop image 2

Then three posters were presented with three main temporal horizons in case of a crisis disaster: before the disaster or prevention phase, during the crisis management, and after the disaster or mitigation phase. These are used in order to ask the participant about suggestions for the content and approach that a Guideline of Public and Private Collaboration in the field of logistics should include.

The objective of this part of the workshop was to define the guidelines that the collaboration recommended list of actions should have. For this purpose each participant had a time to think and propose their ideas on the subject. Each participant read their suggestions and discusses opinions, suggestions for improvement with the rest of participants. Finally, the ideas that were considered the best were held on the posters forming a scheme. This phase took about three hours.

After the first phase, there was a second phase with posters regarding the resources that each entity could contribute in the different crisis scenarios that are planned to take part in the Trials, such as flooding or earthquake. The posters were divided into sections that are relevant within the logistics sector: transport, supply, distribution, storage and communication and training. This section took about three hours.

Due to many replications in the answers for the suggestions for the type of resources to be shared in the different types of disaster, everything was summarized in just one common list.

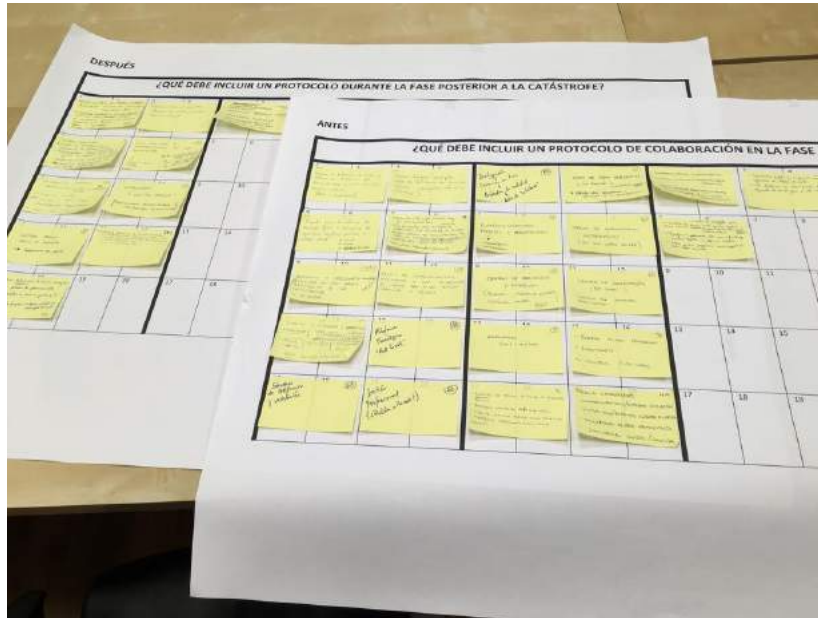


Figure 2.4: Workshop image 3

As a conclusion, a general summary of what has been seen at the meeting was made, and possible lines of future and improvement actions for the project were discussed among all.

This methodology is a modified version of the World Cafe methodology, without dividing the big group in smaller ones, but including the welcome and introduction setting the context with some rounds of conversation with specific questions specially crafted for the context of crisis management. The individuals were invited to share insights or other results from their conversations with the rest of the large group in several rounds.

2.4 Guidelines of private-public collaboration and end users and EU validation

The final result is a list of recommended actions for logistics stakeholders and public entities that manage resources during preparedness and operates within the supply chain. This list or guideline is based in the previous phases and developed by CITET considering the structure of the information gathered in the workshop, the state of the art and the surveys.

3. Synthesis and main results of the state of the art analysis: collaboration among public/private entities in case of human disaster

The complete state of the art document is attached in Annex 2, this chapter of the deliverable includes a synthesis and the main results of the different State of the Art sections as well as the main conclusions.

3.1 Introduction (2) (1) (3) (4)

The logistics private sector can carry out numerous tasks associated to crisis management. This can be for example, delivering warnings, assisting evacuation, or organizing food service. (5) There is also widespread recognition among practitioners that public-private partnerships are an integral part of strengthening resilience because they can help to increase efficiency and effectiveness in disaster management. The next general observation from public-private partnership cooperation applies directly for logistics procedures in the field of crisis management, which is the main objective of the section.

Public-private partnerships can change the tactical focus of crisis management entities. An example can be, when government observes the private sector as a full partner in its efforts to prepare for, respond to, and improve from disasters. This means that the private sector is expected to assume a level of liability and responsibilities before, during, and after emergencies.

(1) Over the past decade, EU cooperation in crisis management has evolved by shifting from response towards a more balanced system that also covers preparedness and prevention actions, where closer collaboration with the private sector is essential. Between the five areas where this public-private cooperation could be usefully developed, there is one of them more strictly related to this deliverable: a more structured dialogue between policy makers and the industries that have an interest in crisis management. Specific roundtables exist for other industrial sectors and there is no reason why something similar should not be set up for the crisis management sector. Such a dialogue could usefully look at the disaster-related corporate social responsibility activities that many companies are already carrying out (e.g. the big logistics companies) and see if they could be linked into the response plans at European level. The other four areas are the need to increase the levels of investment in disaster risk management, the implementation of a specific initiative aimed at the insurance sector; incentives could be introduced by linking certification to reduced insurance premiums and improving the knowledge of disasters and developing innovative disaster management technologies.

(4) Private-public cooperation can be pursued informally or more structured, and it can be pursued in a short or long-time perspective. At present, private-public cooperation in crisis management is often pursued in an informal and temporary manner. Cooperation is often cantered on a specific problem or activity and limited in time to the duration of a certain project. However, cooperation must be long-term and formalized.

(2) As public-private partnerships continue to affect disaster management nationwide, businesses have a number of chances to increase and develop their cooperation with each another. This collaboration improves flexibility by assisting to coordinate the actions of public and private sectors in disaster management. Working in a more organized fashion also decreases repetition of effort, improving efficiency and helping to return communities affected by disasters to a state of normality faster than either government or businesses acting independently.

The frame of this synthesis of the State of the Art is mainly divided between the two collaboration structures existing for private and public partnerships in this sector: commercial participation and non-commercial participation, where the advantages and disadvantages of each are developed. Between commercial participation, the models of subcontracting and contracting are defined with their benefits and challenges. Between the non-commercial participation, the models of logistical agreements, agreements for the execution and implementation of processes, tasks and protocols, agreements for innovation and defence agreements are defined, again with their benefits and challenges. Finally, some examples of real

collaboration projects from logistics entities in the crisis management sector are provided as well as the main conclusions.

3.2 Commercial participation: collaboration models (2)

A commercial participation is defined as the one in which the company is contracted or subcontracted directly by a manager to support or implement crisis management services. These commitments have a direct financial participation of commercial enterprises and the incomes for the company can come from two different forms. First, receiving resources by donors, companies can provide humanitarian and disaster risk management services. Second, companies can be subcontracted and paid directly by crisis management entities to provide a concrete service supporting them in supply chain specific tasks.

3.2.1 Model 1: Subcontracting specific tasks in the supply chain

Subcontracting is carried out if crisis management entities want to get support about any concrete capacity, resource or infrastructure to be provided by logistic entities. Services that are frequently subcontracted are logistics services such as supply and equipment transportation and installation of IT infrastructure.

Benefits: First, crisis management entities can be supported by private companies in certain services where they may lack the experience needed because they do not belong to their core activities. Subcontracting may, on the other hand, be useful if crisis management entities have limited capacities and resources to provide certain services or, failing that, whether a company can offer services more efficiently. For example, warehouse management or transport of goods. In addition, the subcontracting of local businesses has a positive effect on the local economy as it creates wealth and development in the community. In the case of limited or restricted access, they may be provided by approved or permitted companies or subcontractors in that area.

Challenges: Although these arguments are in favour of subcontracting companies, there are also policy concerns and risks. Ensuring quality control and accountability can be difficult because the processes of a company in a crisis situation cannot be as controllable as those of within a business scenario. Consequently, the cost of controlling this process is high, and it is advisable to remember that in case of disputes about the scope or quality control, private entities have an experience and knowledge that should not be underestimated.

Finally, subcontracting a private company can break with humanitarian principles and norms; it is not difficult to imagine a private company that strictly complies with a task or a commission without submitting to principles or humanitarian norms.

3.2.2 Model 2: Contracting the end to end logistic process

In this model, donors allocate funds directly to private companies to carry out the whole process in the supply chain, including warehousing and equipment transportation, first aid goods storage and transportation and even to participate in the transport of people. With this model crisis management entities lose control and do not contribute to any of the levels of organization and execution in the supply chain. The services that are connected to the private entity depend on the priorities of the donor who allocate or provide the funds. (6) There are examples, such as the USAID (United States Agency for International Development), which intervenes and participates in all sectors of humanitarian response and development, while working with private companies to achieve objectives designed for those tasks.

It should be pointed out, that the number of companies that can use and compete for donor funds in the humanitarian field is very small, this is explained because there are financial limits that companies have.

Benefits:

Private companies can play a role in supporting the crisis management of supply chain applying process from the business sector. On the other hand, it can also be said that private entities are not adequate because they specialize in their goals and are based on their corporate culture. Despite this, the specialty of private enterprise must be perceived as an advantage because sometimes it performs tasks more economically and efficiently.

Challenges:

An important factor to be seen is transparency in the games and in the accounts of private companies when they perform activities. In addition, it must be transparent in allocating the funds that are destined to companies and monitor in which items it is used and how much profit is obtained. As a priority, it would be relatively easy to impose on a private company, transparency and control over the humanitarian activities it should carry out, even more so considering that it is a government that assigns the funds and objectives.

In addition, there are claims that hiring companies represents improper use of taxpayer money or donor money given the obvious profitability of a private entity.

3.3 Non-commercial participation. Collaboration models (2) (7) (8) (3)

(7) Non-Commercial Participation is a business model based on the partnership comprising voluntary and collaborative relationships between some stakeholders, both public and private, in which they all agree to work together to achieve a common goal or achieve a particular task so that they share the risks and responsibilities, resources and benefits. It is based on the commitments between private-public companies, donors or principal crisis managers who carry out the response and disaster risk management, and that strategically combine the strengths of all of them.

Private companies can provide their operational expertise to help achieve process efficiencies, foster different viewpoints and exchange knowledge that will benefit companies themselves and the rest of actors, as well as the community itself. (8) A good example of this model is the DHL Gard "Get Airports Ready for Disaster" Program.

Benefits:

(2) A great advantage of having a partnership with the logistics private sector is that the private entity can provide, for example, access to financial and human resources in different areas, provide experience in management, or development of products and specific knowledge about the environments in which it operates.

The benefits in the implementation of tasks contribute to the execution of relief tasks related with logistics such as food management, storage and transportation or the use of information technology like route optimization software, taking advantage of the experience of the private enterprise.

Challenges:

One of the notable risks of non-profit humanitarian organizations working with the private sector is that the non-trade commitments acquired by private sector partners are motivated by the opportunity to obtain financial results indirectly, for example, from the brand image improvement. (3) It is clear that a private entity prefers to operate in environments and markets where they already have presence, are strategic, or that there is media coverage, to take advantage of advertising and thus strengthen their public relations with society and with the rest of countries. This can make it complex to cooperate with the private sector as this can violate the principles of humanity, independence, impartiality and neutrality.

On other occasions, actions and needs arising from a crisis situation may not be aligned with those of the private entity. Consequently, it is more difficult to urge a private enterprise to participate in unattractive markets.

It should be borne in mind that the cost of supporting maintenance, organization and relations with the private sector can be so high that it is not feasible to participate.

Factors such as legal negotiations, delimitation of functions and evaluation of activities to be carried out are strong points in private companies, and the power of private enterprise in these disciplines should never be underestimated.

3.3.1 Model 1: Logistics agreements (3) (9)

This model is related to agreements concerning the logistic sector such as resource mobilization, either because it is mobilized directly or to mobilize external resources, for example, operational bases of customers or partners. This type of model can take different variations, for example, from movements of goods in kind like medicines, water or food, to innovative models developed by logistics companies.

(3) The function of crisis management encompasses a range of activities, including preparedness, planning, procurement, transport, warehousing, tracking and tracing. With speed as the main driver, lead time reduction becomes an important area of consideration. Looking at the industries that compete on the basis of speed, research shows that (10) the total lead time (the elapsed time to complete a business process) only contains 3–5% value adding time, that leaves much room for improvement. Any improvement in the supply chain lead time can have a significant positive impact on the beneficiaries, especially in the crisis management sector.

This validates the focus on supply chain management as a key factor in the overall effectiveness of any crisis management response. Cost is a driver adopted in the later stages of a disaster, once the operation has been set up, roles have been defined, and there is better visibility about the process to assist beneficiaries. As soon as the needs of the beneficiaries are defined (demand) and the donations have been received (supply), the relief supply chain starts to resemble with some similarities to a normal business supply chain.

A concrete example would be the choice of transportation mode. In the ramp-up stage agencies may choose to fly in all aid at high cost. To supply the same goods over the following weeks they will seek cheaper options for procurement, transportation, and distribution such as buying regionally, using road or sea delivery, and working through local actors to distribute the aid in the communities.

The balance between cost and speed is not limited to disaster response only. It is also pertinent to disaster preparedness, where the supply chain approach may be closer to its commercial counterpart. For example, prepositioning goods regionally to reduce the procurement cost of standardized high-demand goods, while reducing the lead time when disaster strikes.

Private logistics companies participate in partnerships with humanitarian organizations, approaching the latter not only from a charitable concern but also as an opportunity for learning and business development. Some of these collaborations have taken the form of long-term partnerships, like TNT and WFP with their “Moving the World” initiative (9). Other collaborations are more project based like FedEx, DHL or Agility. Increasingly, companies are opting to design their social engagement through long-term programs or partnerships with crisis management entities.

Benefits:

Depending on the depth of commitment to the corporate partner, the advantages of this model include spreading the important role of logistics collaboration with crisis management entities to wider audiences, such as company personnel, client bases and even society as a whole.

Challenges:

However, there are numerous challenges attached to these commitments that can make it problematic. On the one hand, tangible advantages like in the business sector are often uncommon, for example direct revenues, and sometimes resource mobilization is not sustainable.

Insurance issues, like for example, the insurance of vehicles from private logistics entities dedicated to help in crisis response, will not cover any use that is not the common utilization of the asset. It will not cover, for example, a problem in a vehicle while transporting emergency equipment on a damage road.

3.3.1.1 Example for Logistic Agreements: Land Rover Case (11)

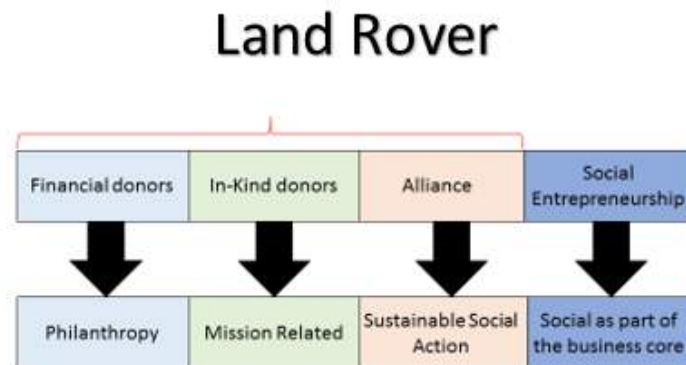


Figure 3.1: Land Rover Models of Collaboration

The Land Rover case is an alliance, in-kind donor and financial donor with the Red Cross. The alliance between the two companies is more than 60 years old, and began in the year 1948, when Land Rover delivered vehicles so that the English Red Cross could move in Dubai at that time the English Crown had a large commercial link in the area.

Since then, Land Rover has contributed as a financial donor with monetary contributions, as an in-kind donor donating vehicles of its brand and as an ally of the Red Cross and Red Crescent, where it is involved in the operations carried out by 15 companies of the Red Cross in the world.

The advantages of the Red Cross with this alliance are on the one hand, may leeway, which makes it possible to make its humanitarian work more sustainable. In addition, Red Cross can count on cars designed by Land Rover to access geographically complicated areas. This implies less resources for transport and vehicles when there is an urgent situation of action in remote and difficult-to-reach locations. It allows the Red Cross to invest the planning and strategy time in other tasks that are related to its core business, thus increasing its capacity, its efficiency and it is easier to achieve the objectives marked.

3.3.1.2 Example for Logistic Agreements: Maersk Case (12)

Maersk is supporting the delivery of humanitarian cargo through supporting the Logistics Cluster. Maersk has allocated up to USD 1 million to the support, which includes ocean freight, local intelligence on logistics and infrastructure, and use of other services which Maersk can effectively support such as operational equipment (containers, forklifts) or services (transport and shipping).

By keeping the trade channels open and by offering the pro-bono delivery of relief items via sea, Maersk is enabling the humanitarian community to reach the most vulnerable people affected by an outbreak. The Logistics Cluster through World Food Program shipping department coordinates with Maersk to identify the best options for sending relief items via sea.

When a major emergency strikes, humanitarian organizations must quickly reach those affected with food, medicine, and shelter at a time when roads, ports, and telecommunication infrastructure might be badly damaged.

3.3.1.3 Example for Logistic Agreements: Agility Case (HELP Program) (13)

Agility has resources that can support the humanitarian community during the time of need. Agility makes its capabilities – experienced people, warehousing facilities, and transportation assets – available to humanitarian partners in crisis situations.

Agility's Humanitarian and Emergency Logistics Program (HELP) takes a systematic approach to disaster response. The program is built on the Agility's partnership with the International Medical Corps and a multilateral partnership with other private sector partners and the humanitarian community. Agility's volunteers receive training in the curriculum required by crisis management organizations. Training includes the Humanitarian Code of Conduct; cultural awareness; and humanitarian logistics systems and practices.

To improve effectiveness and increase cooperation, the Logistics Emergency Teams (LETs) member companies jointly train their response volunteers on a yearly basis. The first LET training exercise took place in Indonesia, and volunteers were fully embedded into an existing crisis management operation. Since that time, Agility has participated in the joint training sessions by providing a lead facilitator to present training content to the LET volunteers.

The first few weeks of a disaster response operation tend to be critical. That is when the distribution of emergency relief can help save lives, and typically, it is the period when there is a "resource gap" between donor pledges and receipt of funds at the disaster site. Agility gets involved for a finite period during this emergency phase, typically donating services for periods of three to six weeks before transitioning out. In some cases, Agility will deploy to ongoing emergencies.

As part of Agility commitment, they ensure that when deploying employee volunteers to the field, they are experienced logisticians and trained disaster responders. They collaborate with crisis management entities in volunteers training processes. Agility has trained more than 75 volunteers to date.

3.3.2 Model 2: Agreements for exploit professional logistic knowledge for the execution and implementation of processes, tasks and protocols.

This type of association has as its main objective to take advantage of the experience of the companies in the provision of services.

Benefits:

The main benefit of this model is the opportunity to leverage the knowledge and experience of the private sector in the joint provision of humanitarian services. Companies can achieve a better reputation and also allow to incorporate more skills or improve existing ones in the private sector in the face of new contexts and situations. Consequently, they improve their services and knowledge in previously unknown or inaccessible areas.

Challenges:

The risks and organizational requirements for execution partnerships are more complex than in the logistics collaboration model. While better results can be produced, there are also higher risks. The culture of public associations and private companies is different, so a careful agreement is required in the alignment of interests, expectations and a clear division of the scope of supply of all actors. It is also necessary that this management is continually fed to ensure that all actors implement their tasks in order to succeed in the humanitarian objectives.

3.3.2.1 Example for Agreements for exploit professional logistic knowledge for the execution and implementation of processes, tasks and protocols: TNT-WFP ‘Moving the World’ partnership (14)

TNT supports WFP in several ways, including airlift services in emergencies, specialist support program, volunteers and cash donations. TNT-WFP ‘Moving the World’ partnership forged in 2002 for an initial five-year period which originally encompassed five different initiatives and the IFRC-Fritz Institute collaboration on humanitarian logistics software. (15) These types of partnerships emerge when there is an organizational fit between the contributing firm and the assisted humanitarian organization. The business partner is expected to provide its core competencies in terms of expertise and assets (including in IT) to the assisted organization both in-between and during disasters. In-between disasters, they are meant to contribute to the innovation and growth goals of a humanitarian organization. During disasters, by extending their expertise, time and assets, the corporate partner can directly impact the cost, timeliness, flexibility and accuracy of relief operations.

To achieve a new level of staff enthusiasm, TNT had to come up with an initiative that had the potential to engage all of its 161,000 employees in the 62 countries of operation. To attract the attention and approval of its customers and financial markets, the initiative had to produce social impact. In terms of area of focus, social and humanitarian related issues were identified as more compatible with the company business line, brand image and objectives.

3.3.3 Model 3: Agreements for innovation

Innovation-related agreements are globally stimulated by the growing of crisis management needs that, in order to meet their objectives, requiring a more effective and innovative response for the management of the crisis and the risk associated with a disaster. The innovative approach of enterprises, combined with the experience of crisis management entities is a strong tool that can be used for innovation in private public partnerships. Based on the knowledge and experience of the partners involved, these partnerships can develop and implement technologies and tools that can help anyone to cope with a specific problem or improve processes.

Benefits:

Improvement in work processes is usually achieved through knowledge transfer and capacity building. A common approach between entities with experience in the field of crisis management and “outsiders” from the sector like logistics companies, can give an added value at the time of implementation or develop an innovation, since usually innovations comes from merging different point of views, professionals and experience in the same frame. Therefore, the incentive for innovation partnerships between companies and crisis management is high because it gives them the opportunity to explore the development of a new technology, process or method.

Challenges:

By nature, partnerships for innovation take risks deliberately, something inherent in the entrepreneurial spirit of private entities. Although it is true that risk-taking is part of the innovation itself, the other actors may not understand or accept that risk, as the burden associated with a bad result must be assumed by all actors. Therefore, these associations bear the brunt of failures in process innovation and in the possible resulting benefits, even if these are never guaranteed. On the other hand, partnerships for innovation share risks related to the clash of cultures between actors and the particular requirements of partners to organize and manage the processes and actions needed to cope with a crisis. This is an important issue that projects like DRIVER+ should accomplish.

Regarding the three main objectives of DRIVER+ project, concretely, the logistics private sector can support the innovation spirit of the project:

- In the portfolio of solutions, clearly, there are solutions in the logistic private sector that can apply to this portfolio, for example, tracking technologies, data management, innovative modes of transport or warehousing inventory solutions.
- In the pan-European Test-Bed for Crisis Management capability, key stakeholders are related to supply chain processes and the can exploit for example, innovative communication solutions from the transport and logistic sector, such as RFID or IoT.
- To foster a shared understanding in Crisis Management across Europe, the innovation of the logistic sector is an important factor for the enhancement of any cooperation framework, since this sector is traditionally a sector that is used to interoperate with many and heterogeneous stakeholders. Usually this interoperability is based on innovation solutions.

3.3.3.1 Example of Agreements for Innovation: DHL Case (8)

Innovation also took place in developing a different way of packaging aid products. In the Southeast Asian earthquake in 2005, DHL employees saw that conventional means of transportation, such as boxes, were often not sufficiently sturdy and instead, they used sturdy and waterproof DHL courier bags to offer relief products to remote and inaccessible areas. These speedballs, as they call the sturdy bags, can hold up to 25 kilograms, withstand better releases from the air and stay afloat longer than other containers. The speedballs have been tested in numerous relief activities. In 2008, in an alliance with the United Nations Refugee Commission (UNHCR), they managed to package and place more than 13,500 salvage bags in flooded areas of India and Myanmar (Burma).

3.3.4 Model 4: Agreements for coordination (16)

Coordination in emergencies is crucial to avoid duplication of work, the delivery of necessary aid and to ensure an effective and responsible response.

Coordination initiatives bring together various stakeholders, such as companies, governments, donors, and crisis management entities, to improve coordination in particular issues that are not organized by a leading actor who drives everyone. These partnerships exist globally, regionally or nationally and will probably become increasingly important, as the tendency is to increase the number of actors with each disaster. In most cases, an international organization or donor assumes the role of convener and fixes the agenda in an initiative of the coordination of the system, while other actors, including companies, participate and engage in these initiatives.

There are some partnerships which mediate between governments and mobilized actors to reduce the risks associated with crisis management (16). Some examples of organizations coordinating multiple members are the National Platforms for disaster risk reduction and disaster risk management. Concretely in Europe some examples are the German Committee for Disaster Reduction (DKKV), which is a registered association under private law and not a government authority, or the Polish National Platform for disaster risk reduction, which is focused on information exchange and improving existing solutions.

Benefits:

The benefits of the model include the improvement in the execution of the actions, consequence of an improvement in the coordination of the response of the group of actors. These agreements are also aimed at leveraging economies of scale and overcoming their limitations. Indirect benefits in the implementation of response activities and disaster preparedness and mitigation efforts are derived from this. This type of initiative achieves coordination between crisis management entities and an access point for private sector participation. Consequently, they promote an exchange of information and a greater knowledge of a sector towards the other actors, which helps to overcome the common challenges of public-private partnerships.

Challenges:

It should be recalled that the coordination initiatives of the system should include all relevant information to the other actors and should not overlap with the mandates of other initiatives. The participation requirements and the costs derived from improving coordination among the many actors are high and, in addition, the timeframes required for the improvement of processes or inclusion of other actors is considerably long. The roles, functions and activities should be clarified, from information sharing to coordination and decision making.

3.3.4.1 Example of Agreements for Coordination: DHL Case Airport Program (8)



Figure 3.2: DHL models of collaboration

This collaboration began in the year 2005, with the aim of acting in a coordinated emergency situation. In December 2010, the alliance was renewed after five years of joint activity. This collaboration brings to the service of OCHA the logistics and expertise of DHL to reach the neediest populations in disaster scenarios and humanitarian crises.

Airport Program:

The disaster-Ready Airports Program (GARD) prepares airports to manage increased supplies and relief activity. The program aims to coordinate emergency supplies arriving at airports after natural disasters. With the GARD program, DHL performs on-site assessments, trains local governments and airport personnel, and participates in the development of emergency action plans. The program is based on the training approach of trainers. In Indonesia, the GARD team trained local volunteers from DHL employees at two airports. After a week, both airports had trained staff and a detailed report on how to support relief operations had been created. With this information, the DHL-GARD team will develop the concept and implementation of a plan for implementation at selected airports in high-risk areas in Asia and America.

3.4 Conclusions

Business logistics and commercial supply chains are sophisticated operations based on forecast demand, inventory control and a number of models that optimise a dynamic and fast-moving system. Disaster management supply chains are essentially the same but with the following significant differences:

- Unpredictable demand in terms of timing, geographic location, type of commodity, quantity of commodity.
- Short lead time and suddenness of demand for large amounts of a wide variety of products and services.
- High humanitarian stakes regarding timelines in the face of a sophisticated global media and the high anticipatory attention of the donors.
- Lack of initial resources in terms of supply, human resource, technology, capacity and funding.

In establishing a logistics collaboration partnership it is firstly important to recognize the different capabilities and potential contribution of each stakeholder. Then there is a need to work on persuasion and

influence aspects as most firms may not be prepared to realize and admit the need for cooperation on logistics issues. More precisely, it is necessary to find two very different sets of members: those firms with and without finance capability. The challenge is to secure the active participation and contribution of larger firms that do not necessarily see the need and merits of sharing resources. To overcome resistance, the partnership should make sure they support firm visibility and brand identity.

Business partners can create value by facilitating the transfer of knowledge as well as advancing the state of knowledge and practice for crisis management entities, by applying their expertise, know-how, capabilities, resources and network.

Logistic companies can provide technological support and logistics staff and managers. They also provide specific services that may no longer be available on the ground immediately after a disaster, such as electricity supply, engineering solutions and postal services. Initially, companies are moved to participate in crisis efforts because they have observed that enormous losses are inflicted when disasters interrupt the flow of their business; so, they invest in re-establishing their business continuity. (17) Working to alleviate the economic impact of such disruptions “makes good business sense”.

Nevertheless, the impact in the efficiency in the supply chain aspects in a crisis management, can be significantly improve being supported by the knowledge, the resources and the technology from the logistic sector. This must always consider the most suitable collaboration model depending of the stakeholder’s profile and their experience and willingness to collaborate. For this reason, is important to valuate previous experiences and examples.

4. Analysis of the survey results

The main objective of the survey is to define and have a broad vision of the current state of collaboration between public and private logistics entities in crisis management. This chapter contains the analysis of the survey results. The complete document with the results, statistics and graphics is in Annex 3.

The specific objectives of the survey are the assessing related to the next blocks:

- Block 1: Research the spread of public private partnerships.
- Block 2: Get information about the kind of entities that are maintaining collaborative agreements.
- Block 3: Get information about how the agreements are established and their rules.
- Block 4: Get information about specific staff that logistics and transport companies can provide.
- Block 5: Enumerate goods, services or operational material that logistics companies can supply.
- Block 6: Review the level of communication between the parties involved.

Two types of surveys were disseminated (one for private companies and another for public entities). The number of respondents was 105.

4.1 Block 1: Research the spread of public private partnerships

About the spread of public private partnerships, using dichotomous questions (yes or no) and asking about the awareness of collaboration examples, the main conclusion of the survey results is the low level of awareness of any kind of public – private logistics partnership from the private sector (see Figure 4.1). Only 4% of the respondents stated that they had knowledge or information about this. From the public sector, the results are sensibly better than in the private case, 25% of the respondents stated that they had knowledge or information about this. This is probably because the public sector is usually a lead actor in most of public- private partnerships in other sector or initiatives.

Are you aware of any kind of collaborations of this type?

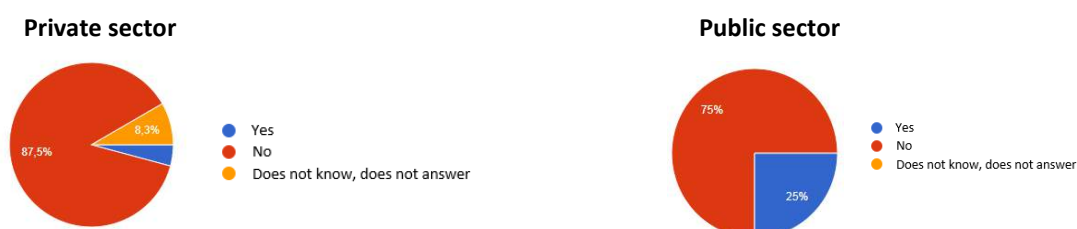


Figure 4.1: Diagram private sector (left), Diagram public sector (right)

The survey in this block, using ranking scale questions, tries also to assess the degree of importance that private and public entities give to collaborate with each other. The results were similar in both cases with more than 75% of them arguing that these agreements are important or very important. The interpretation of these results is that it should not be particularly difficult to get entities involved in collaboration and coordination, because it should be taking into account that the majority of the samples of inquired persons have decision making power in their entities. 13% of them general managers at European level, 27% general managers at country level, 37% directors of different areas, 15% technical managers and the rest a mixed between ICT, human resources and other staff (see Figure 4.2).

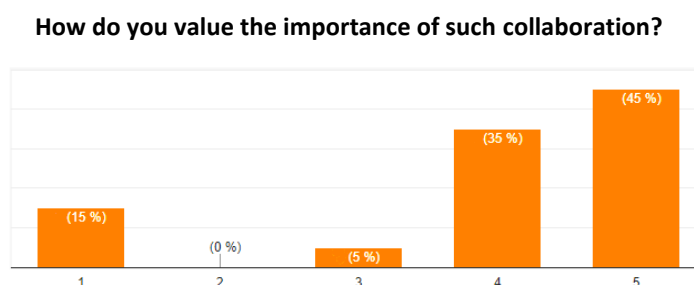


Figure 4.2: Diagram collaboration

4.2 Block 2: Get information about the kind of entities that are maintaining collaborative agreements

In this case, the questions seek the kind of private organization that should be involved in the agreements from the public point of view and the kind of public organization that should be involved in the agreements from the private point of view.

From the private vision, the analysis and interpretation of the results shows, using multiple choice questions, with 90.9 % of the answers, that emergency services entities should lead and be participant of any collaboration of this nature. They are the most experienced and specialist entities. The results show that the importance of the participation of military emergency units with 72.7% of the survey participants, stating that it is a key factor to have them in consortium agreements. This is basic since most of the army bodies in the world possess strategic resources and infrastructures. Non-governmental entities like Red Cross or Civil Protection Bodies were also highly requested to participate in these kinds of agreements by the responders of the survey. 72.7% of the respondents positively assessed their inclusion in the agreements. Also police bodies assessed it with 77.3% of positive request from their survey participants. This drives the interpretation that there is demand to regulate this kind of collaboration. See Figure 4.3.

What kind of public entities do you think should be involved in these agreements?

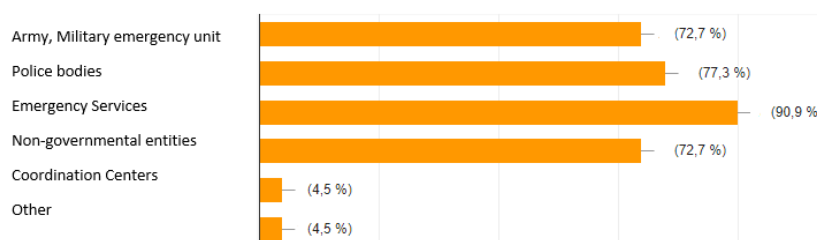


Figure 4.3: Public entities diagram

From the point of view of public entities, 100% of the public entities participating in the survey claimed that logistics and transport private companies should be involved in crisis management agreements. Consequently, there is a big understanding that logistics and transport companies must participate and collaborate with the administration and crisis management entities, because they can provide facilities, infrastructures and knowledge. Also supply and retailers, pharmaceutical companies and FMCG should participate, with 100%, 75% and 25% of the respondents measuring positively their participation, this represents the strategical advantage that could mean to involve professional specialists in the managing and use of food or first aid products. See Figure 4.4.

What kind of entities do you think should be involved in these agreements?

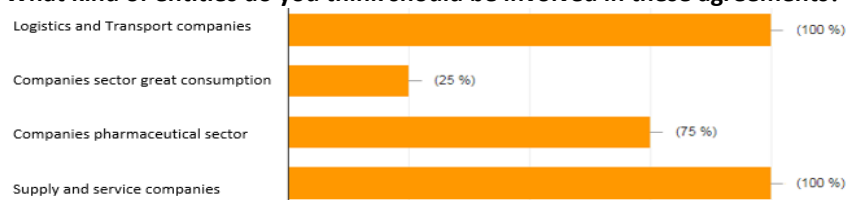


Figure 4.4: Entities diagram

4.3 Block 3: Get information about how the agreements are established and their rules

The objective of this part of the survey is to obtain information about any guideline used between private and public entities, asking about the frame and main lines established in the guidelines. Using multiple choice questions, 15.4% in private companies and 50% in public ones stated that guidelines that they are using are clear and duly established (see Figure 4.5). The results are more benevolent about the quality and the clarity of such protocols in the public sector, with half of them finding the protocols or guidelines properly established. The main conclusion in this section is that there is a need in the sector, not just to go deeper in the development of agreements, but also doing it in a proper way where suggestions from both aspects must be considered.

If such protocols exist, are they properly established and are there clear rules?

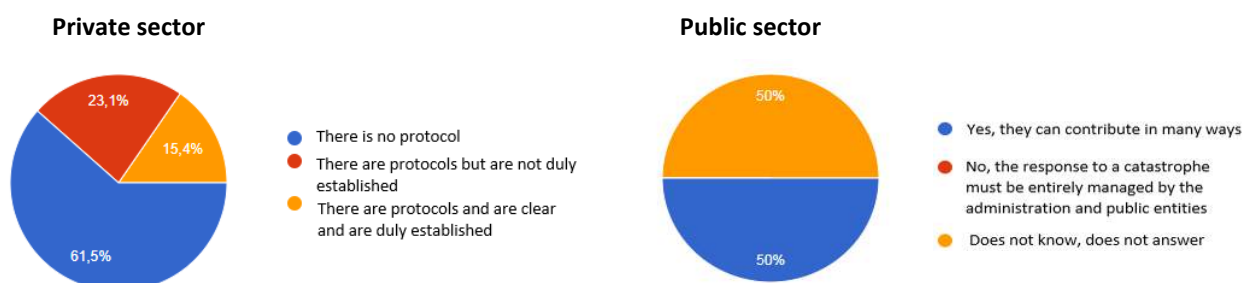


Figure 4.5: Private protocol diagram (left); Public protocol diagram (right)

4.4 Block 4: Get information about specific staff that logistics and transport companies can provide

The aim of this block of questions is to obtain information about operational services that private and public entities can supply to support crisis management entities.

Using multiple choice questions, the results of these questions from the perspective of the private logistics companies, have shown that 90% of the companies could provide qualified personnel. Among these qualified personnel, drivers, according to 60% of responders, are the most valued staff to be provided. Experts in ICT are another important staff, according to 55% of the responders that can support crisis management entities. The logistics sector is a highly digitalized sector with many professionals and experts in ICT. The reason is that the logistics sector is a horizontal partner in the value chain and has to be integrated with every system of every partner working in this chain. Thus, ICT experts from the logistics sector can flexibly adapt to crisis management systems to support crisis management entities. Finally, 50% of responders have considered that experts in traffic can be highly added valued professionals from the logistics sector. They can support and help to plan, for example, evacuation activities with crisis management entities (see Figure 14).

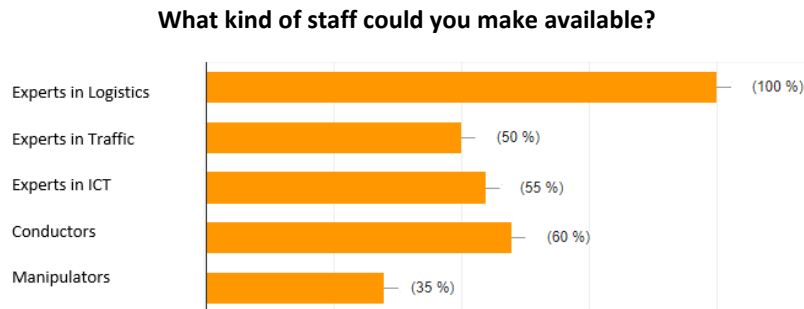


Figure 4.6: Staff diagram

From the point of view of public entities, 100% of responders assessed positively the inclusion of experts in logistics in the crisis management sector. As well as the results of the private sector, experts in traffic and experts in ICT are also highly evaluated by the public sector to support crisis management activities (see Figure 15).

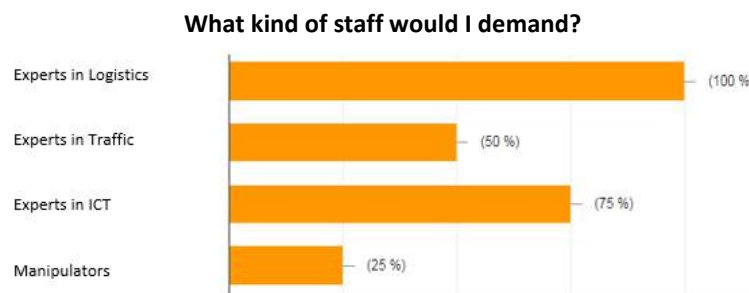


Figure 4.7: Staff demand diagram

4.5 Block 5: Enumerate goods, services or operational material that logistics companies can supply

From the perspective of the private sector, using multiple choice questions, the results were almost unanimous that are two kinds of infrastructures from the logistics sector that should be included as part of their input to crisis management collaboration. These infrastructures were, with 92,3% vehicles, and 69,2% warehouses. Vehicles and warehouses can play an interesting role supporting or creating an infrastructure portfolio that crisis management entities can utilise.

Related to operational materials that can be provided by logistics companies to crisis management entities, it was highlighted, using multiple choice questions, with 37.5%, that fuel supply can be a key factor supporting the transport activities or the electric generation in different crisis management situations. It was also equally weighted by 25% of responders, that surgical material and electric generators are two elements that should be included in the list of possible donations from the logistics sector. These answers drive to include a section in the guidelines about how to proceed and organise the operations that involves both operational supplies (see Figure 16).

What kind of operational materials could you provide?

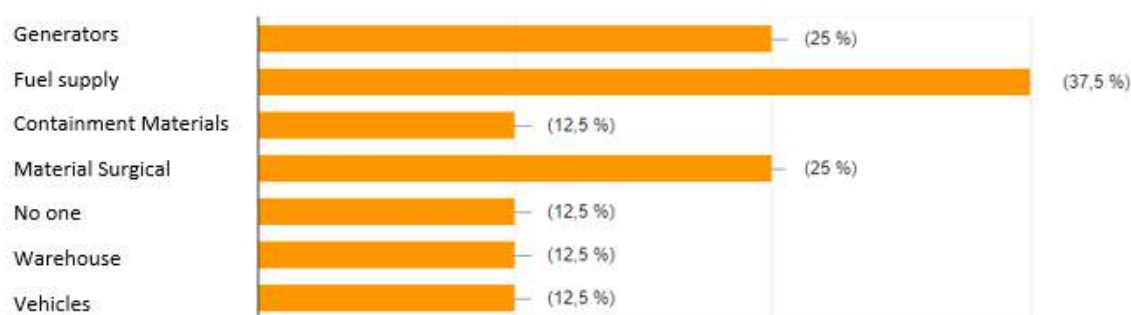


Figure 4.8: Materials diagram

From the perspective of the public sector, the demand and supply of resources were basically focused on the assignment of infrastructures. 100% of the responders considered warehouses and transport infrastructure important to support crisis management activities. There is also an identification of food, water and medications that can be provided by the logistic sector and by the nature of these products, it should also be well defined in the guidelines how to operate, transport and stock them. 100% of responders supported the idea of including electric generators, surgical materials, water, food, medications and first aid materials.

4.6 Block 6: See the level of communication between the parties involved

This section aims to measure the degree of communication between private and public organisms when collaborating with crisis management entities, which kind of channels are often used and the main improvements that should be considered to include in the guidelines.

The analysis of the results in the private sector, using rating scale question, reflect from the perspective of the private companies that there is a low level of knowledge about communication channels. These results lead to think again about the lack at internal level of information of any kind, in both sector private and public. This must be a critical issue to be defined and included in the final guidelines.

The perspective of the kind of entities that should carry up the leadership and the initiative in the communication leadership and the measures already implemented from these leaders is considered. From the point of view of the private sector, it should be the public sector who takes the leadership. Private logistics companies understand that their role should be to go along with the public sector and not to lead them. Contrasting this point of view of the private sector, 50% of the responders from the public sector stated that there is not a strategic leadership from their sector. Lack of leadership can cause serious problems from the operational and organizational perspective. This is a clear aspect that should be clarified in the guidelines.

Finally, the participants in the survey were asked about their interest of participating in the workshop about coordination and collaboration among public and private entities, representatives of policy bodies and non-governmental entities, such as Madrid City Council and Red Cross agreed to participate in the workshop. It was a key result of the survey to identify them as key players to develop the guideline. Some logistics and transport companies like FedEx Express Europe and Mondelez International also agreed to participate in the same table with the public representatives.

5. Recommended list of actions or guidelines for logistics stakeholders and public entities

5.1 Introduction

These guidelines serve as a list of recommended actions about the role and the actions of logistics companies and public entities collaborating in the crisis management sector, as they seek to align the classical principles of humanitarian aid with the role that companies can play. It is a basic proposal for the private and public sector, in a constant dialogue with other crisis management actors, to identify the best way to intervene and the principles to be respected.

In emergency operations, logistics is required to support the organization and implementation of response actions not only fast, but also agile and effective. The mobilization of personnel, equipment and the necessary material for the work of the organizations provided by crisis management entities can take advantage of professional logistics systems. This is needed to carry out the crisis management efficiently. Therefore, the resources and their characteristics provided by logistics companies must be identified. That means, for example, how long the logistics resources will be available for the crisis situation. This would entail the evaluation of possible risks, such as possible diseases affecting the logistics personal involved in the collaboration tasks.

It is crucial that the contingency plans of the logistic company adapt to or complement the contingency plan of the crisis management entities and that the state of the art of other agreements and procedures established, according to the type of disaster, is well known by both parts. Another important issue is to establish alternative communication systems in case that the current communication network collapses. Analogic systems might be useful; however, the public sector or the administration can take the lead and provide the end-users and private participants with their communication capacities.

To make the most of the information recollected during the final workshop, carried out with guests from the transport sector, retailers, IT companies, public authorities and public transport entities, every bullet point gathered has been recollected in four different information categories that are developed and analysed in the following guidelines:

1. Storage.
2. Transport.
3. Supply.
4. Distribution.

Therefore, setting out from this structure,

- the information,
- knowledge and suggestions from the workshop,
- the examples and previous experiences from the state of the art and the level of awareness,
- information and analysis results from the survey,

the following recommended list of actions are proposed for logistics stakeholders and public entities that manage resources during preparedness and operate the supply chain. The main objective is to increase the efficiency of the transportation and to improve the sharing of information between public and private entities.

5.2 Storage

The purpose of this recommendation is to help to coordinate the private or public entity collaboration with crisis management entities to ensure the optimal conditions and maintenance of storage spaces, such as warehouses or storage areas donated or loaned by the private sector. This is recommended in order to have the availability and management of all supplies that have to be stored for the attention of emergencies.

First some basic conditions should be considered:

- An appropriate location should be selected, depending on the characteristics and specifications of each supply and the kind of disaster. Logistics operators collaborating with end-users can provide a wide variety of storage solutions depending on the needs of the supply. For example, in case of an earthquake, strategic warehousing on urban areas can play a key role to supply the population of this area because probably the city access can collapse.
- The professional knowledge from the logistics sector and the inventory software widely used in logistics companies, can be a useful tool for the crisis management sector. This knowledge should be transferred (e.g. via trainings) to the crisis management professionals from the private sector and especially to the public sector, where sometimes these kinds of tools are not widely used. For example, in case of a prolonged crisis situation, these tools are a good support to determine the replenishment deadlines of necessity goods.

From an infrastructure perspective, a special effort should be made to find a suitable place for storing the supplies that can be provided by private donors or public ones. These supplies, however, do not often follow any forecast or do not arrive in an orderly way like in the business sector. It is important to add that in an emergency there are not many options when the time to select a temporary storage place arrives.

Considering this, some basic indications should be followed by any private or public entity that can provide such **infrastructure**:

- There should be enough accessibility for large transport vehicles and not only the capacity should be considered, but also their location in relation to the operational area. For instance, in a flooding situation it should be considered to choose a warehouse located in an elevated area. It is important to consider the wide number of options that can be provided by public entities, such as hospitals, military facilities, airports, ports or train station.
- Whenever finding a suitable warehouse is not possible, it would be necessary to explore different alternatives to have a temporary storage site. Other options may include a donation by the private and the public sector, such as prefabricated structures or even truck containers. In case of an earthquake many facilities can be damaged and the use of these kinds of alternatives can mitigate storage need.
- The solution for storing of supplies in containers is, however, not recommended for products such as food and medicines due to the high temperatures that are generated in these containers. In any case, the decision about which type of structure should be used is also related to the expected duration of the operation and should be coordinated by the crisis management entities, relying on the opinion and knowledge of professionals from the logistics sector.
- It is important to coordinate the public sector and the crisis management entities to establish a prioritization of storage resources to solve the problem of managing massive donation inputs. From the point of view of the public sector it could be useful to have a repository of available storage resources from the private sector reserved, exclusively for this purpose.

Regarding the type of provision to be stored, it is necessary to establish a data base for stock and resources, organized by zones and kind of stock (perishable, hazardous, first aid, etc.):

- The different type of stock can vary from medicines or first aid products to food that may need a cooled, dry and ventilated place. In case of needing a control of environmental storage conditions, food retailers or cold storage providers should have an important role. From the public-sector,

hospital facilities can play an important role to provide medicines. For instance, a flooding can trigger a power outage. Alternative cooling facilities, for example from other areas less affected, should be considered.

- Other items, such as clothing, safety material or response equipment do not need special storage requirements. A-priori planning, coordinating end-users, logistics and public entities, can specifically allocate this material depending on the kind of disaster that is supposed to manage. For example, water pumps should be allocated close to strategic firewalls, or electric generators in public first aid facilities such as hospital or clinics.
- In the same way, it is important to maintain the updated data of the availability levels of each supply by controlling inventories, always ensuring that the physical inventory corresponds to the consolidated record of the corresponding database managed by the crisis management leader. It is important to coordinate this with the database of the supplies provided by the public and private collaborators.
- To define security stock in crisis management, it could be interesting to consider the different procedures followed by the private companies of the logistics sector. For this purpose, it is necessary to adapt the response and replenishment times from the business sector to the crisis management sector and to other public entities collaborating.

Regarding the coordination of actors and the staff working in this phase of the supply chain:

- It is important to establish a hierarchy for the correct management of the warehouses to avoid confusion in management and staff with the same level of responsibility, especially between professional volunteers and end-users are working together. For instance, this applies directly in the first phases of a crisis response where hierarchy and leadership from crisis management entities is a key factor to coordinate volunteers not used to this kind of stress situations.
- A team will be needed for maintenance tasks and for the handling of supplies in the working area (loading, unloading, sorting, movements, collection, etc.). This team can be formed by volunteers from logistics organizations due to the fact that the use of this type of labour force helps to reduce operational costs. The public sector could coordinate specific training with crisis management entities, for these volunteers, with some basics on how to act in different possible crisis situations.
- In case it is not possible to have professional volunteers from the logistic sector, even though there are not highly complex tasks, volunteers should receive basic training for the performance of their work. This training should be coordinated and organized by logistic collaborators.

5.3 Transport

The purpose of this recommendation is to guarantee that the supplies for the operation of each user respond to the population affected by the emergency; arriving at destination in excellent conditions, on time and using adequate different modes of transport, where the private sector can support them by providing their **knowledge and resources**. For example:

- Local providers can help with alternative routes trying to get the most optimized routes as possible.
- Planning to optimize the transport in delivery places such as warehouses or facilities provided by the public sector.
- The necessary means and equipment to transport the aid to the delivery places previously established in the planning stage of the end-user (freight vehicles, personnel transport vehicles, boats, ships, cranes, airplanes, among others depending on the case). Fuels and oils for these means of transport, response times, alternative means, points of distribution and supply.
- With technology, with real-time platforms to manage alerts and make transport updates connecting the logistics private sector and the crisis management sector.

Although sometimes some preferential treatment can be negotiated for humanitarian supplies, commercial transportation is a business like any other. Regarding contracting with transport companies:

- Not only the price should be considered, but also the reliability and quality of the company are factors that need be taken into consideration for the correct development of the relationship.
- In case of using a contract with the transport company, the contracting modalities are diverse, some aspects to consider in order to collaborate with transportation companies are: amount of the load to be transported, destination of the cargo, distance, form of access to the delivery place, conditions of access roads, urgency of delivery, etc.

The management of a fleet of vehicles is a logistic operation, due to the amount of activities that it will generate. As recommendations, some of the general procedures that could be applied among the crisis management sector and transport companies to coordinate the collaboration are:

- Designation of a person who is specifically responsible for everything related to the fleet of vehicles. This person would be the supervisor of the drivers, and among other things his duty would be to ensure the application and fulfilment of the established protocol of action with the crisis management leader.
- Whichever the situation of vehicle loan (free or under payment), the use of standardized forms agreed between logistics participants and responder authorities for the registration of controls of each vehicle should be established. These forms should include all the relevant data about the vehicle, such as its conditions and activities, control of mechanical services, mileage, fuel consumption, etc. The public sector could lead the role of establishing these controls.
- Policy of "a vehicle, a driver", to assign responsibilities of maintenance and control of each vehicle to a single person, either a volunteer driver or a professional one from the same transport company which is donor or lender of the vehicle. This information should be provided by the donor or provider.
- Both vehicles and their drivers should have their documents up to date and on board. This includes vehicle insurance, driver license for the driver and vehicle registration papers.
- Volunteers and vehicles should be given priority based on proximity, costs and response capacity. This prioritization could be made by the crisis management leader.
- To avoid unnecessary transport donations, a discriminatory system should be established, especially when crisis explodes. In this case the public sector could help by establishing a transport needing procedure depending on the type of disaster to be managed.
- It is important to bear in mind previous experiences related to contract models and insurances for the approach of new possible loans. A good example could be the Land Rover case of in-kind donor with the Red Cross. It allows crisis management entities to invest in the planning and strategy time in other tasks that are related to its core business, thus increasing its capacity and its efficiency.

Non-commercial or free transportation could be provided by logistics companies, thus relieving the operating costs. However, the owners of the means of transportation do not assume responsibility for the safety of the goods. It is important to take advantage of these services, and even more when these are the only available ones. In these cases, extreme security measures will have to be implemented to protect the cargo. Just when the public sector does not have these necessary tools, a contract with the private sector could be made to comply with the schedule of deliveries.

For safety aspects, the cargo should be protected against damage during displacement, inclement weather conditions, etc. The regular and standardized application of some basic measures from the private sector can be applied and be considered to facilitate the safe arrival of supplies to the destination, some examples are:

- When a transport company donates or loans a vehicle, it should not be loaded with weights greater than its capacity load. Moreover, it is preferable to move within safe cargo where vehicles will not carry their maximum load capacity to allow them better handling in difficult terrain conditions.
- In an open truck or vehicle, the load should be covered with tarpaulin or plastic, to protect it from rain and dust.

- The safety instructions established previously should be known and respected by everyone involved in the operation to protect staff and supplies. For example: standards of behaviour, maximum travel speeds, care of supplies, hours of route and rest times, relationship with the authorities on the route, etc.
- The load should be immobilized with lashing devices to prevent it from moving, which can damage the packages or destabilize the vehicle.
- When transporting on land, any load exceeding the lateral dimensions of the vehicle should be identified using red handkerchiefs or some striking tone, so that they can be seen and sized by other drivers, who will take the prudent distance.
- Management of insurance agreements is a key factor to get volunteers involved in any kind of collaboration and big barrier.
- The use of adequate cooling equipment for transporting supplies that require a cold chain.

Emergency operations are characterized by taking place in contexts in which conditions considered "normal" have been interrupted or transformed. The routes may be destroyed or in very bad conditions and the social situation can be an element of risk. These situations make it necessary to double the security and protection, especially with volunteers that are not used to dealing with this kind of situation.

Therefore, for security aspects, given the complexity of an operation of this type, it is necessary to follow some basic recommendation that should apply to both convoys and vehicles traveling individually:

- From the point of view of security, it is better to travel in daylight.
- Caravans should travel under the responsibility of a person capable of maintaining discipline and making decisions in case of problems. This person should be identified by everyone before the departure of the convoy, particularly when the caravan is formed by several organizations traveling together. All factors related to the authority and hierarchy in the companies collaborating should be previously coordinated by the crisis management leader.
- Drivers should have means of communication that allow them contact between each other and with the points of departure and arrival.
- Drivers must have a copy of the manifest of cargo and an official authorization of the organization to transport these goods so that they can show them to the authorities if required during the route.
- When the route involves passing through restricted transit areas, the transport should be coordinated previously with the authorities in charge of the area in question.
- In an open truck or vehicle, the load should be covered with tarpaulin or plastic to maintain some discretion regarding the material that is being transported, therefore avoiding robbery problems that can complicate the collaboration relation.
- Ideally, vehicles will travel with sealed doors and should not be opened in the transport period; especially when the vehicles must stay overnight with the load on board.

For the function of planning routes of transport, the selection depends on the means of transportation that is available. In case a volunteer driver is provided by a transport company and depending on the urgency of the delivery and the schedule, this person should follow some basic principles:

- As a general principle, the safest route should be chosen even if it is not the shortest.
- Assistance points for refuelling, food, mechanical service, medical attention, etc. should be previously identified along the route.
- Any change or deviation of the route provided, as well as the situation special that is presented on the way, it should be communicated and coordinated immediately with the crisis management authorities, either the point of departure or arrival.

Fuel is always a very coveted commodity and especially in times of shortage such as emergencies. To supply the vehicles at the service of operations with fuel and lubricants, a meticulous control of the consumption according to the routes that they are following could be established from the beginning. It is important that

the public sector takes the initiative and implements a regulation for the transport prices after a disaster to guarantee the service.

In the transport sector, it is very common to use credit or coupons for the **dispatch of fuel**. This solution can be implemented in crisis situations since it avoids complication of storing and shipping fuel. However, it also requires strict control to prevent theft. For example:

- The supply of fuel can be bought with coupons or purchase orders donated by private companies that already have agreements with fuel providers. However advantageous this situation can be, it will be only valid with the signature of the authorized person and the stamp of the organization.
- Consumption should be recorded if the vehicle is driven by a volunteer driver from a transport company, especially when it is a loaned vehicle, therefore indicating the date and mileage of each refuelling.
- Periodic control should be carried out by the person responsible, who should verify any abnormality in consumption. This may be a sign of mechanical problems or inadequate handling of the vehicle, which may cause further insurance problems with the donors.

5.4 Supply: Sources and procedures

These recommendations refer to the sources and the set of activities that allow identifying and acquiring the requirements regarding supplies in order to organize response actions and distribution during operations. Some elements to be taken into consideration in case of emergency are assistance, accessibility and transportation, telecommunications, damage assessment and needs analysis, health and basic sanitation, search and rescue, public information and general management of the response, among others.

In a crisis, all of these factors are required and, depending on the circumstances, it is not always possible to choose among them. However, whenever possible, the decision should be made based on technical criteria.

These supplies that will be used to deal with the emergency can come from different sources. The organizations may acquire them directly or they may be provided with by collaborators.

5.4.1 Supply sources

Private companies can participate in collaboration by directly organizing the **procurement** of supplies which will always be coordinated by the crisis management leader. A good communication channel should be implemented, and some considerations should be considered such as:

- **Local procurement:** depends on different criteria, such as the local availability of required products, the quality and quantity of what can be found locally or the urgency that such products are needed versus time to get them from abroad. However, in any case, the cost-quality relationship is crucial, and it could be a good support to have technical advice from the private sector.
Advantages: prompt delivery, lower cost of transportation. Buying locally favours recovery of the affected region.
Disadvantages: the quantity and quality required can cause shortages. The big volume of purchase of a specific product could eventually have a negative effect on the local market or on the access of the population to this product.
- **External procurement** (foreign or other regions of the European Union that are not the affected ones): frequently, the local availability of specific items represents a difficulty. In these cases, external purchases are an option.
Advantages: wider options.
Disadvantages: costs and response time.

Regarding the purchase orders, these should be coordinated with the organisation receiving the products and should be fast and accurate. Misunderstandings can come from any part when ordering products, especially in technical aspects.

- It is important to define agreements with the suppliers regarding supplies or materials. For this purpose, the use of standardized documents, which should be numbered, dated and with copies, is necessary to facilitate their monitoring and to control the performance of orders.
- It is important to control and update stock and possible supply deficiencies. The level of priority depending on the detected needs and the volume of distribution and the stock available should be mentioned very clearly.
- Order frequency depends on the needs detected, the volume of distribution and stock control of each item and should be determined by the crisis management leader.

In a developed and well-organized crisis management sector like the one that already exists in the European Union, donations are more related to external operations, such as the European civil protection and humanitarian aid operations outside Europe. Only in an extreme and prolonged in time crisis situation in Europe, donations could be significantly important in the crisis management sector. When it comes to items that have not been requested or prioritized or are inadequate for the crisis, this situation usually results in a logistic complication.

Some issues should be considered by the private and the public sector when making this kind of collaboration in the form of donation:

- Ideally, the supplies that are to be sent have already been sorted and not mixed together, such as clothing with medication or food.
- As much as possible, they should be packed separately by items and by characteristics, for example: clothes by sizes and gender.
- To facilitate the identification of contents, packages should be marked applying protocol systems that have been previously arranged with the crisis management entities. Each package should be clearly labelled using packing lists to prevent possible manipulation of the products.

Advantages: low costs, good as a first step to start collaboration from a private company with the crisis management sector.

Disadvantages: usually is not the required material. If they are not usable, the results are a logistic cost, because of the difficulty in making reverse logistics or storage in case it is not useful.

Individuals, organizations or private companies can contribute through the modality of free provision of services or the loan of equipment and materials during the supply phase of an emergency crisis. Although many will be offered spontaneously at the time of the emergency, it is also important to have them identified and to establish prior agreements during the planning phase.

Advantages: this usually involves complex materials or equipment that is difficult to find or buy; it is good for the operation costs.

Disadvantages: limited time of use, insurance issues.

5.4.2 Supply procedures

The supplies and donations come from different origins and by different means. In this way, the entry and reception sites are equally diverse, and some basic consideration should be considered:

- Assistance entry points in general, donations or purchases, either from abroad or from other regions of the same country, will arrive at maritime or river ports, at airports or land borders. Public authorities should oversee its management but being supported by private logistics. For example, participating in the stowage could reduce lead and response times.

- It is important to establish a control of goods arrival from the beginning. When this control is organized by logistics operators, they should be updated and coordinated with the crisis management leader.
- Regarding to reception facilities, they can be public or private infrastructures. It would be significantly useful to utilise private logistics facilities when they are located in the affected region.
- When the arrival of shipments is massive, the capacity operation of these entry points usually reaches its limit and its management can become complex. To overcome this difficulty, public authorities can rely on collaboration with logistic companies, not just for using alternative storage places, but also for utilizing logistics business procedures on managing the supplies.
- For unloading the supplies, and when there is no proper equipment available from the public sector in the field, the use of private logistic equipment for handling the goods should be considered. For example, forklifts and lift trucks, to plan the reception properly.
- When collaborating with teams from the private logistic sector, responsibility from the crisis management leader should be designated for supervising and verifying the load.

Regarding the registration, control and monitoring of supplies, this is often a crucial task since it is basically the first contact with incoming donations or purchases and performance at this stage will have a notable impact on the rest of the system. Supplies should be registered as quickly as possible at the entry and reception sites using standardized systems and tools for control and monitoring. Regarding these tasks, some basic consideration should be considered:

- This task requires the provision of a human team as well as a coordinator, preferentially from the crisis management leader, to guide the work and resolve inquiries about selection, priority, classification and in general the treatment of donations according to their categories and other criteria that have been established.
- Based on the documentation that comes with the cargo, a registration is made of each of the shipments in the entry. Usually at the entry points there are no adequate conditions (space, availability) to do the detailed verification of the load. Particular details of the cargo to be verified are: origin, packaging, means of transport, quantity of packages, weight (if possible, specifying the weight of the different types of supplies individually, bills, etc.).
- Separation by priority and labelling: the crisis management leader should set priorities for different types of supplies depending on the most urgent needs detected and coordinate it with logistics operators and public authorities when they collaborate. For example, in the event of an earthquake, medical supplies and equipment for treatment of wounds and fractures could be a priority, while in a flooding situation; the priority could be water and food.
- It is also important to label supplies that require cooling or refrigeration. This task could be made by logistic specialists following the priorities set by the crisis management leader.
- To reduce losses and implement a more efficient use of resources, the tracking of freights through each storage and distribution point should be controlled. These controls should also indicate what type of supplies have been mobilized, the quantity and identify the operators who have intervened in the process of their mobilization. These controls could be made by each logistic operator collaborating in the supply chain, updating and coordinating with public authorities and the crisis management leader.

A significant proportion of the donations contain products that are not priority or simply useless. Both become an additional burden for the supply management system. However, establishing a prioritization system for provisions can help to differentiate between both types improving the efficiency of the process:

- Separation by priority and labelling: the crisis management leader should set priorities for different types of supplies depending on the most urgent needs detected and coordinate this with logistics operators and public authorities when they collaborate. For example, in the event of an earthquake, medical supplies and equipment for treatment of wounds could be a priority, while in a flooding situation; the priority could be water and food.

- The goods that are damaged, expired or are considered "not usable", should be eliminated, with the aim of setting free space for other priorities. This is not an easy procedure since usually it is about tons of material, for which a whole logistics process is required including transportation, temporary storage and areas for disposal. There are specialised logistic operators for this task who can collaborate in such activities in coordination with the crisis management leader.
- For this elimination, there is also a "political" and image complexity, since public opinion, including donors, could not approve the elimination of products. In this case the role of public authorities is a key to communicate properly the objective of this elimination.
- These materials can be destroyed, incinerated, buried, etc., but it is important to implement a defined procedure from the crisis management leader. Regarding the type of material, for example medicines or hazard goods, the elimination of them will require specialized professionals due to the special care required by European and international regulations.

5.5 Distribution

Distribution is the final step in the logistics chain. In this regard, the monitoring of previously defined systems from the private sector for the distribution and documentation of the delivery should be considered. The main objective of crisis management distribution is to supply assistance to people affected by disasters with some general aspects that should be considered, for example:

- In the response phase, products and articles should be strictly distributed to cover basic needs for survival and to improve the living conditions of the affected population.
- It aims to support people in a situation of sudden interruption of supply capacity.

For this reason, covering the critical moments of need should be immediate. Distribution is a highly complex activity that demands great capacity and experience and where the knowledge of the professional logistics sector can be significantly important. A poorly managed operation can have a negative impact on the same population that it is intended to benefit. That is why before undertaking the task of assistance distribution, it is important to be very clear about the responsibilities that this implies and the criteria that should be considered when external players (such as private logistics companies, not familiar with the humanitarian principles) play an active role in a disaster scenario. An action of distribution coordinated with public and private logistic entities should not be undertaken until it is certain that these entities are capable of facing the organizational requirements that an operation of this type demands.

Regarding to a direct distribution (where the crisis management entities and the public sector directly coordinate the distribution without looking for support from local distribution companies) some aspects should be considered:

- Direct distribution allows a better control over the supplies but can be extremely complex if these entities do not have the capabilities or experienced staff for this concrete task. There are public entities, such as military or civil protection, that may take a key role regarding this type of distribution.
- To undertake distribution, it is necessary to have good knowledge of the physical and social environment of the population as well as good logistical knowledge. It could be positive to have regional or local responder units from public entities leading this task, always coordinating it with the main decision-making actors of the crisis management leader.
- To establish a registration system in order to identify suppliers and beneficiaries by using a system of ballots, coupons, ration books, receipts, vouchers, etc. in a prolonged crisis situation. For example, in a city collapsed after a great earthquake where the supply of first aid can be cut down, these procedures help to maintain order and to calm the population, showing that everyone is receiving the same aid in a proportional and fair way.
- A visible mark should be added to the distribution document to certify that the delivery was made and avoid repetitions. In same way as the previous point, this helps to manage scarce resources properly.

- The treatment of beneficiaries should be fair. Exceptions and preferential treatment should be avoided since this is a source of conflicts. Regarding possible conflicts, public security entities such as police and military units can be a great advantage supporting the distribution tasks.
- Frequent changes in delivery procedures should be avoided since this confuses the beneficiaries and causes disruption in the progress of the distribution. As possible, a fixed distribution scheduled by zones or areas should be implemented.
- The distribution areas must be isolated to avoid agglomerations around and the direct contact of the beneficiaries with the provisions. Again, public security entities such as police and military units can be a great advantage helping to maintain these order conditions.
- Depending on the situation and the resources available, it could be advantageous to give responsibilities to the same beneficiaries in the tasks related to distribution (carrying provisions, organizing rows, etc.). This should always be led and coordinated by the responsible local unit of the crisis management leader in the area or by local public authorities.

When working in regions without local response units, it is very difficult for a crisis management entity to make a convenient and fair distribution in a short time. Furthermore, sometimes it is not the operational vocation of the responder entity in the affected area to do the direct distribution. In these circumstances it is a great advantage to find a reliable local logistic company that knows the population and the zone to take care of gaining the assistance. This method is easier and faster, but the final destination of the donations must be very well monitored to ensure adequate delivery to affected populations. For this indirect distribution (made by local logistics and carriers companies), it should be considered:

- To establish the agreements of action and the procedures for control and monitoring of the distribution from the beginning and jointly with the crisis management leader and the local government. It is also important to define how they should report their activities to the crisis management leader.
- It is important to establish a close contact and a fluid communication channel between the crisis management leader and the local companies with a continuous follow-up and feedback between the counterparts. If possible, frequent presence in the field from local authorities would support their work and ensure that the distribution responds to humanitarian principles and standards.

One of the fundamental tasks when working with indirect distribution is to ensure that assistance reaches the victims of disasters and to prevent supplies from ending in the wrong hands. For that reason, the control and monitoring components should be present in each of the stages of supply management, and especially in distribution, distinguishing control and documentary monitoring:

- Professional tracking systems and monitoring tools from the private sector can play an important role when managing the distribution aspects. For example, technologies such as RFID, could significantly support the correct management of the distribution, tracking freights and allocating them properly for the crisis management entities.
- The communication of the incoming supplies should be maintained in the local storage centres and the outputs. This communication comes from the local logistics companies to the crisis management leaders. It could be interesting to interoperate inventory and logistics software from private companies with management software operated by crisis management entities.
- Logistics managers should report to the crisis management leaders at the end of each distribution day, specially updating inventories.

And with regards to control and physical monitoring:

- Document reviewing is not enough and should be completed with a frequent physical verification in the field (at the distribution sites). If possible, this should be carried out by crisis management representatives or personnel from public authorities. It is important to observe and determine the suitability of the procedures used, identify needs, correct problems, etc.

5.6 Conclusions

(5) When public and private entities collaborate, it can change the strategic trajectory of crisis management as a whole. Governments no longer need to view crisis management as a purely public-sector responsibility. Instead, businesses and government work together in partnerships, and this cooperation changes the strategic orientation of crisis management itself, from a solely public-sector activity to a shared cross-sector activity. Public-private partnerships also change the day-to-day operations of crisis management agencies and businesses. Government is able to do more with less in completing these tasks, because it can rely on businesses for information and resources.

The private sector can make good business decisions related to crisis management when it is better informed by government representatives. Both sectors benefit operationally from working with one another. Government and businesses repeatedly show that public-private partnerships are also beneficial for tactical decisions in crisis management.

Cross-sector cooperation, for example in the last European immigration crisis where the furniture giant IKEA began its efforts to help the refugee community by donating furniture to camps and temporary houses, but it graduated to building a factory in Jordan that will employ refugees to manufacture textiles and other products for IKEA stores everywhere. This demonstrates that businesses can accelerate and improve response and recovery from disasters. This underscores that when businesses and government work together in disaster management, it can deliver immediate and sometimes dramatic benefits for disaster survivors.

As disaster relief operations become more complex, there is also an increasing need for societies to become resilient in the face of disasters. And while in recent years there has been excellent progress toward this objective, fully achieving societal resilience is still a far stretch away.

But public-private partnerships, if properly defined, implemented, and regulated, adapt disaster management practices to the increasing complexity of today's large-scale emergencies. In this way, public-private partnerships bolster societal resilience.

5.7 Next steps

To increase the resilience of a society and its ability to recover from a disaster event, a next step could be to define a structured protocol, confronting the processes and actions defined in the theoretical guidelines to the real action where new lessons can be reflected with a wider European vision. This should consider the experience of developing this guideline towards a broader and ambitious protocol at a European level for the collaboration and coordination between the private and public sector. When developing this protocol, some general aspects could be considered (5):

- Government and businesses should clearly define what they want from public-private partnerships. Both government and businesses should resist the temptation to leave their relationships in an ambiguous state so as to minimize their contributions to the partnership while maximizing potential net gains from the partnership. Instead, they should clearly spell out what they each expect from one another in a public-private partnership.
- Government and businesses should further develop relationships that were forged in crisis. Government and businesses would be remiss to not cultivate new relationships with one another that are formed during shared response to emergencies. Shared experience during crisis can help both sectors to collaborate better in the future. And while there may not be an obvious near-term payoff for this collaboration, these relationships will likely become valuable in the future. In this sense, there is value in building public-private sector relationships that were born of immediate necessity because they may offer unforeseen payoffs at a later date.
- Government and businesses should directly address concerns about accountability. When businesses and government work closely together under non-emergency circumstances, the lines of organizational authority and accountability can become blurry. There are not simple solutions to

the problem of accountability in public-private partnerships for disaster management, yet directly confronting the issue of accountability itself is a positive first step in tackling this challenge. The fact remains that firms are profit-driven and have a vested interest in developing business with government. The public sector, for its part, strives to keep costs balanced and deliver high-value services for the public.

- Government agencies should hire partnership-oriented managers. To avoid the “hollowing out” effect, government agencies could recruit managers who are able to coordinate the actions of a wide range of public, private, and non-profit sector resources. Managers that can synchronize the actions of disparate actors introduce new skills, values, and practices into their organizations. Their influence can permeate the agency in which they work, which can change the agency itself from within.

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Annexes

Annex 1 – DRIVER+ Terminology

In order to have a common understanding within the DRIVER+ project and beyond and to ensure the use of a common language in all project deliverables and communications, a terminology is developed by making reference to main sources, such as ISO standards and UNISDR. This terminology is presented online as part of the Portfolio of Solutions and it will be continuously reviewed and updated¹. The terminology is applied throughout the documents produced by DRIVER+. Each deliverable includes an annex as provided hereunder, which holds an extract from the comprehensive terminology containing the relevant DRIVER+ terms for this respective document.

Figure A1: DRIVER+ Terminology

Terminology	Definition	Comment
Crisis	Situation with high level of uncertainty that disrupts the core activities and/or credibility of an organization and requires urgent action.	
Crisis management	Holistic management process that identifies potential impacts that threaten an organization and provides a framework for building resilience, with the capability for an effective response that safeguards the interests of the organization's key interested parties, reputation, brand and value creating activities, as well as effectively restoring operational capabilities.	
Disaster	Situation where widespread human, material, economic or environmental losses have occurred which exceeded the ability of the affected organisation, community or society to respond and recover using its own resources.	
Emergency	Sudden, urgent, usually unexpected occurrence or event requiring immediate action.	
End-users	Individual person who ultimately benefits from the outcomes of the system.	
Lesson Learned	Lessons learning: process of distributing the problem information to the whole project and organization as well as other related projects and organizations, warning if similar failure modes or mechanism issues exist and taking preventive actions.	
Need	Prerequisite identified as necessary to achieve an intended outcome, implied or stated.	

¹ Until the Portfolio of Solutions is operational, the terminology is presented in the DRIVER+ Project Handbook and access can be requested by third parties by contacting coordination@projectdriver.eu.

Terminology	Definition	Comment
Public	General public: people having all possible variations of user characteristics, usually within a particular geographical area.	
Risk	Effect of uncertainty on objectives.	
Volunteer	Individual, who is not affiliated with an existing incident response organization or voluntary organization but who, without extensive preplanning, offers support to the response to, and recovery from, an incident.	

Annex 2 – State of the art: collaboration environment between public and private entities in case of disasters

Descriptive Analysis

In the present descriptive analysis, some relevant agents and basic concepts are used to describe the basic features of the data in the study of the state of the art.

EU Civil Protection Mechanism (18)

To further improve the management of disasters, on 23 November 2017, the European Commission proposed a new system to strengthen the EU's civil protection response mechanism. It is structured on two complementary pillars:

Increasing disaster response capacities: RescEU

The Commission wants to increase the collective response capacities available to effectively respond to disasters, especially when they hit Member States simultaneously. This will be sought by:

- The creation of an EU civil protection response reserve of assets, managed by the EU to assist Member States in responding to disasters when the respective national capacities are overwhelmed. rescEU will initially be comprised of assets such as firefighting aircrafts, high pressure water pumps, urban search and rescue and field hospitals to respond to the most devastating disasters in recent years in Europe.
- Assisting Member States to boost their national capacities and available shared capacities by offering higher financial incentives for doing so. Concretely, the Commission proposes to cover the bulk of the costs that derive from the adaptation, repair, transport and operation of national contributions to the existing common pool. Inside the upgraded European Civil Protection Pool, these assets would be available for an EU crisis response at any given point of time.

Better preventing and preparing for disasters

To decrease the risks and impacts of potential disasters the Commission wants to work more closely with Member States, in reviewing national prevention strategies and guiding them in their implementation. In addition, the Commission wants to strengthen cooperation and coherence with existing EU policies dealing with prevention and preparedness, while also developing a European Civil Protection Knowledge Network, a European web of specialised training and exercise centres, in which best practice would be disseminated and joint EU exercises would be undertaken.

The Emergency Response Coordination Centre (ERCC)

The ERCC is the operational heart of the EU Civil Protection Mechanism. It operates around the clock to monitor and coordinate response to disasters. The ERCC collects real-time and early warning information on disasters, monitors hazards, prepares plans for the deployment of resources (experts, teams and equipment) from the common pool, works with participating states to map available assets and coordinates EU's disaster response efforts. Potentially harmful events in Europe, such as fires, storms, floods or industrial accidents are constantly analysed. The centre is directly linked with the civil protection and humanitarian aid authorities in the participating states, to ensure a coherent and common European response to disasters.

EU civil protection operations in action

Since its establishment in 2001, the EU Civil Protection Mechanism has monitored over 400 disasters and has received over 250 requests for assistance. During the intense 2017 forest fire season, the Mechanism was activated 17 times to assist southern European countries. Albania, Portugal, France, Italy, Montenegro and Portugal received assistance through the mechanism in the form of firefighting airplanes, firefighters and vehicles.

The mechanism can also be activated in marine pollution emergencies. For example, Greece requested assistance following the sinking of an oil tanker which polluted the area of Piraeus in 2017. Beyond European borders, the mechanism was activated in 2017 in response to devastating events such as the floods in Peru, the earthquake in Mexico and the tropical cyclones Irma and Maria in the Caribbean. In 2015, Croatia, Greece, Hungary, Serbia and Slovenia requested assistance through the mechanism to respond to the influx of migrants and refugees. Other operations within Europe in recent years include the conflict in Ukraine in 2015 and the floods in the Balkans in 2014.

Civil protection operations can be supported by satellite maps produced by the Copernicus Emergency Management Service. This service provides timely and very precise geospatial information that is used to plan disaster relief operations. Maps were notably produced following the earthquakes in Italy in 2016 and hurricane Harvey in Texas in 2017.

OCHA. Actors of the crisis. Strategic sectors. (19)

OCHA is the part of the United Nations secretariat responsible for bringing together humanitarian actors to ensure a coherent response to emergency situations. OCHA also ensures that there is a framework within which each can contribute to the global response effort.

The mission of OCHA is:

- Mobilizing and coordinating effective humanitarian action and principles in partnership with national and international agents to alleviate human suffering in disasters and emergencies.
- Advocating for the rights of the people in need.
- Promote preparation and prevention.
- Facilitate sustainable solutions.

In an emergency situation, a government can call for international aid. When it does, a call for help is created, in which the UN and the other agencies create a line of action, called a consolidated appeal. This way, it is possible to fix the plants of action. The consolidated calls OCHA fixes are the following:

- Analysis of the context.
- Valuing needs.
- Build scenarios.
- Select Priorities.
- Response plan.
- Issue appeal.
- Monitoring and review.
- Report.

Likewise, for each of these consolidated called the resources required are key, and therefore, there are key sectors for obtaining these resources. Private entities can participate with public entities in two different ways: commercial participation and non – commercial participation. In turn, depending on the type of participation, you can follow different models that are explained below.

Private Sector: Sensitivity to conflict and basic principles of collaboration (20) (21)

The participation of private entities must be identified with clear limits so that their intervention is adequate and has a relevant role for the company itself in addition to intervention itself. The so – called UN Global Compact is formed by a large number of private entities. This global compact indicates an agreement on the principles of the international community that companies need to comply.

Once these principles are fulfilled, private entities can build bonds, agreements and alliances with United Nations agencies. It is advisable for a company, that it complies and adheres to principles of the Global compact. These principles must be understood in a profound way in a company and incorporated into culture of the company itself.

Studies on the role that the private sector can have are directed mainly at the following points of view:

- The private sector as a financial or in – kind donor to humanitarian activities. This includes calculations on the total contributions of private companies, foundations and individual donors to the system.
- Companies as strategic partners for humanitarian organizations to help carry out humanitarian organizations to help carry out humanitarian activities for example, logistics, or to enable humanitarian organizations to better comply with their mandates, for example new design products. These studies focus on the different models of public/private partnerships between humanitarian organizations and companies. They also provide good practice and successful case studies.

These studies have been quite successful in highlighting the benefits and risk inherent to humanitarian organizations in the dialogue with companies. Benefits can include, for example the largest and most diversified budgets, access to core business competencies in key sectors, or adaption of new technologies. However, humanitarian organizations must be smart about participation with companies, as there are a number of risks, such as damage to their reputation, that the company's contributions and the crisis manager are not aligned, or that there is a clash in the culture of the crisis manager and the private enterprise.

Private entities can participate with public entities in two different ways: commercial participation and non-commercial participation. In turn, depending on the type of participation, you can follow different models that are explained below.

Changes in disaster management (Public – Private)

Public-private partnerships can change the tactical focus of disaster management agencies. An example can be, when government observe the private sector as a full partner in its efforts to prepare for, respond to, and improve from disasters, meaning that the private sector is expected to assume a level of liability and responsibilities before, during, and after emergencies.

The private sector can do numerous tasks associated to emergency management. These tasks may be for example delivering warnings, assisting evacuation or organizing food service. The government may discover that it doesn't need to accomplish certain services it would normally deliver to the public, because private sectors fulfil those functions. Based on strategic planning, government leaders have no need to fear on certain functions

Assigning contracts for goods before emergencies arise can restructure the strategic planning efforts for businesses and governments. For instance, when a business drafts its own intentional plan, this supports to know that it can assume financial returns from export goods to government in the course of disasters. For the business, this means that even if request for products and services dries up instantly after a disaster, the government will be a customer who can count be involved immediately after a disaster. Moreover, when government understands that it can depend on firms to provide government with goods or services during disasters, which allows government to focus on further strategic planning priorities, as it decreases the amount of resource procurement decisions that the government must make in the centre of a crisis

Opportunities for partnerships in disaster

As public-private partnerships continue to effect disaster management nationwide, businesses have a number of chances to increase and develop their cooperation with each another. This collaboration improves flexibility by assisting to coordinate the actions of public and private sectors in disaster management. Working in a more organized fashion also decreases repetition of effort, improving efficiency and helping to return communities affected by disasters to a state of normality faster than either government or Businesses acting independently.

Commercial Participation. Collaboration Models (2) (22) (23) (24)

(2) A commercial participation is defined as the one in which the company is contracted or subcontracted directly by a manager to increase or implement crisis management services. These commitments have a direct financial participation of commercial enterprises can take two different forms. First, as non – profit

actors, companies can provide humanitarian and disaster risk management services themselves, if these companies are contracted by donors to implement their services. Second, companies can be outsourced directly by crisis management entities to provide services of goods that help these organizations to implement their goals.

There are not big differences between the terms of hiring and subcontracting. Recruitment is based on the collaboration between the donor and the companies. Instead, outsourcing involves companies and relief agencies. In addition, there is a difference between the two concepts in term of the risk and benefits they bring to the humanitarian system.

Model 1: Subcontracting specific tasks in the supply chain

Subcontracting is carried out if relief agencies lack the knowledge, capacities, resources or infrastructure to provide the required services. Subcontracting thus describes the direct and autonomous provision of humanitarian service companies and, as such, often occurs at the end of the humanitarian supply chain. For example, a donor can provide funds to an international aid agency that then subcontracts the implementation of the planned program for an NGO that has the knowledge and access to the region in which the application is supposed to happen. In turn, this NGO may subcontract a local company to provide all or part of the services required.

Services that are frequently outsourced are logistics services such as supply and equipment transportation and installation of IT infrastructure.

The subcontracting of security services in particular the deployment of security personnel to protect the compounds, personnel and operations of humanitarian organizations, becomes an increasingly important factor, since each time they record more attacks on humanitarian monitoring and evaluation services during a disaster. On other occasions, when access to the places of intervention is restricted or controlled by the security risks that they pose or for political reasons it is easy to find this type of subcontracting.

Benefits: First, relief agencies may lack the experience needed to provide the types of goods or services because they do not belong to their core activities, such as security services. Subcontracting may, on the other hand, be useful if relief agencies have limited capacities and resources to provide certain services or, failing that, whether a company can offer services more efficiently than the agency Aid or an NGO. In addition, the subcontracting of local businesses has a positive effect on the local economy, as it creates wealth and development in the community. In the case of limited or restricted access, they may be provided by approved or permitted companies or subcontractors in that area.

Challenges: Although these arguments are in favour of subcontracting companies, there are also policy concerns and risks.

First, humanitarian organizations can outsource security systems and external coordination with private – sector companies that adhere to humanitarian principles. However, when other private sector companies for military purposes or that might be badly perceived, they often use the same companies as NGOs, which can damage their reputation or the way they are perceived.

Second, ensuring quality control and accountability is made more difficult because the processes of a company with humanitarian work cannot be as controllable as those of within a private training. Consequently, the cost of controlling this process is high, and it is advisable to remember that in case of disputes about the scope or quality control, private entities have an experience and knowledge that should not be underestimated.

Finally, hiring a private company can lose the identity of the NGO agency and even break with humanitarian principles and norms; it is not difficult to imagine a private company that strictly complies with a task or a commission without submitting to principles or humanitarian norms. However, these risks can be monitored such as lists of private companies not adhering to humanitarian principles by private companies can never be eliminated; but on the other hand, there are positions that indicate that humanitarian organizations use in a few occasions the subcontracting of companies to avoid complying with safety standards.

Model 2: Contracting the end to end logistic process

In this model, individual donors allocate funds directly to private companies to carry out humanitarian tasks, in the case of logistics companies would be to implement supply and equipment transportation, first aid goods storage and transportation and even to participate in the transport of people. With this model Non – Profit and humanitarian companies disappear and do not contribute to any of the levels of organization and execution in the supply chain. The services that are connected to the private entity depend on the priorities of the donor who allocate or provide the funds. (6) There are examples, such as the USAID (United States Agency for International Development), which intervenes and participates in all sectors of humanitarian response and development, while working with private companies to achieve objectives designed for those tasks.

It should be pointed out, that the number of companies that can use and compete for donor funds in the humanitarian field is very small if compared with the number of non-profit humanitarian companies. This is explained because there are financial limits that companies have. While non-profit companies can increase their fund from public actors and private entities, private companies can only receive funds from public actors because the private donors prefer to allocate such funds to charitable entities.

All of this considerably limits the availability of funds to companies that want to compete with non-profit actors to provide crisis management services.

Benefits: There are as many arguments for and against a private entity offering humanitarian services, when it is something that is expected of a non – profit company. On the one hand, private companies can play a role in professionalizing the humanitarian industry because they perform effective practices.

On the other hand, it can also be said that private entities are not adequate because they specialize in their goals and are based on their corporate culture, which is not aligned with the foundations and ends of relief agencies or with the holistic understanding of needs of each context. Despite this, the specialty of private enterprise must be perceived as an advantage because it performs tasks more economically and efficiently than a humanitarian agency.

Challenges: An important factor to be seen is transparency in the games and in the accounts of private companies when they perform the humanitarian activities. For example, a company may depend on contracts that the government can allocate to it, positively or negatively influences donors in contracted enterprises. In addition, it must be transparent in allocating the funds that are destined to companies and monitor in which items it is used and how much profit is obtained. A priority, it would be relatively easy to impose on a private company transparency and control over the humanitarian activities it should carry out, even more so considering that it is a government that assigns funds and objectives.

In addition, there are claims that hiring companies represents improper use of taxpayer money or donor money, and that using budgets to allocate to private companies with other humanitarian organizations non-profit may not be in the interest of taxpayers, given the obvious profitability of a private entity. Therefore, there would be no greater cost inherent in hiring for profit companies, which may represent an inefficient use of donor's money.

Non-Commercial Participation. Collaboration Models (3) (25) (26) (9) (27) (16) (28) (2) (7) (8) (3)

A business model based on the partnership is a business model comprising voluntary and collaborative relationships between various stakeholders, both public and private, in which they all agree to work together to achieve a common goal or achieve a particular task so that they share the risks and responsibilities, resources and benefits (24). It is based on the commitments between companies and relief agencies, donors or principal managers who carry out the response and disaster risk management and that strategically combine the strengths of all of them. In particular, humanitarian organizations can provide their unique knowledge in local contexts and in understanding humanitarian needs and standards.

Private companies can provide their operational expertise to help achieve process efficiencies, foster different viewpoints, and foster an exchange of ideas that will benefit companies themselves, the main gesture, and the rest of actors, as well as the community itself.

The main difference with the trade associations is that the remuneration of the services offered by the company is not included.

Models of non-commercial participation:

There are different models based on the partnership, and all of them offer advantages and inconvenience. The types of models are as follows:

- Partnerships in execution and implementation of processes, tasks and protocols.
- Innovation Partnerships.
- Partnerships for coordination between actors.
- Partnerships in defence matters.

These models illustrate different associations with companies, although these models or agreements are not committed to each other, that is, they can combine with each other, or adopt own models based on these.

Benefits and common challenges:

A great advantage of having a partnership with the private sector is that private entities provide benefits that provide the manager and other tool players to fill their mandates. That is, the private entity can provide, for example, access to financial and human resources in different areas of the world, provide experience in management, or development of products and specific knowledge about the environments in which it operates. Moreover, the innovative potential inherent in companies, especially in new technologies, research, early warning systems and disaster risk models, is another major advantage of these models.

The benefits in the implementation of tasks contribute to the execution of relief tasks, logistics, the use of information technology, food management or tasks such as construction, taking advantage of the experience of the private enterprise. This experience contributes to more effective response, creating better opportunities, and helping to give innovative approaches to the system as a whole.

This model is also beneficial because it urges private companies to comply with humanitarian commitments, and to identify themselves as an active and responsible actor in the face of a crisis. As a result, societies and communities that are created are more resilient to act and be prepared in the event of a disaster.

There are also benefits for the private company. This type of collaboration can help strengthen a brand image and give visibility to the company. Of course, it also helps you improve or positively increase your reputation. As a result, they can also attract valuable employees and manage to retain their own. On the other hand, this collaboration allows the private sector to test against new markets, access them, and obtain information for their own procedures when participating with the other actors.

One of the notable risks of non-private humanitarian organizations working with the private sector is that the non-trade commitments acquired by private sector partners are motivated by the opportunity to obtain financial results. This can make it impossible to cooperate with the private sector, as this can violate the principles of humanity, independence, impartiality and neutrality.

On other occasions, actions and needs arising from a crisis situation may not be aligned with those of the private entity. It is also clear that a private entity prefers to operate in environments and markets where they already have presence are strategic, or that there is media coverage, to take advantage of advertising and thus strengthen their public relations with society and with the rest of countries. Consequently, it is more difficult to urge a private enterprise to participate in unattractive markets, countries with complicated environments, or with declining economies, without even assessing the urgency or need for action in the face of a crisis

Another risk for non-profits is to collaborate with private entities that can be perceived negatively by society or considered with a bad reputation, that cooperation between actors is not expected and also that expectations that they have towards the private actor are not those stipulated in the agreements and limits that are established previously. It should be borne in mind that the cost of supporting maintenance, organization and relations with the private sector can be so high that it is not feasible to participate.

Factors such as legal negotiations, delimitation of functions and evaluation of activities to be carried out are strong points in private companies, and the power of private enterprise in these disciplines should never be underestimated.

Model 1: Logistical Agreements (3) (9)

This model is related to agreements in resource mobilization, either because it is mobilized directly or to mobilize external resources for example, operational bases of customers or partners. This type of model can take different variations, for example, from the cash movement in the form of donations, movements of goods in kind as for example medicines, water and food, to innovative models developed by companies of mobile technology and even financial institutions that induce indirect cost reductions through the quota waiver application.

Humanitarian logistics is defined as “the process of planning, implementing and controlling the efficient, cost effective flow and storage of goods and materials as well as related information from the point of origin to the point of consumption for the purpose of alleviating the suffering of vulnerable people. The function encompasses a range of activities, including preparedness, planning, procurement, transport, warehousing, tracking and tracing, customs and clearance” (3).

Absent in this definition is the notion of profit, a salient characteristic of the commercial sector. In lieu of profit, humanitarian organizations seek a balance between speed and cost in their supply chain.

Consider that disasters vary in types and levels of intensity, each demanding a different response. However, regardless of their nature they typically show distinct stages: ramp-up, sustain, and ramp-down. The ramp-up stage covers the first few days after the onset of the disaster, during which getting access to the field and setting up operations as fast as possible is the highest priority. During the sustain stage agencies focus on implementing their programs, while cost and efficiencies gain importance. In the ramp-down stage agencies are focusing on their exit strategy including transfer of operations to local actors.

In terms of operational performance, the interesting part about the transition between the stages is the shift in focus from speed to cost reduction. Driven by the urgency of the needs and high levels of uncertainty, during the ramp-up stage all processes focus on speed and cost takes a back seat. Humanitarian agencies prioritize the need to get to the area, witness and document the extent of the damage, assess how many resources are needed, and implement immediate solutions.

With speed as the main driver, lead time reduction becomes an important area of consideration. Looking at the industries that compete on the basis of speed, research shows that the total lead time (the elapsed time to complete a business process) only contains 3–5% value adding time, that leaves much room for improvement, especially in the humanitarian sector, where any improvement in the supply chain lead time can have a significant positive impact on the beneficiaries and therefore higher return on donations.

This validates our focus on supply chain management as a key factor in the overall effectiveness of any humanitarian response. Cost is a driver adopted in the later stages of a disaster, once the operation has been set up, roles have been defined, and there is better visibility about the process to assist beneficiaries. As soon as the needs of the beneficiaries are defined (demand) and the donations have been received (supply), the relief supply chain starts to resemble a normal business supply chain. Consequently, donors will increasingly look for efficiency in how their money is being spent.

A concrete example would be the choice of transportation mode. In the ramp-up stage agencies may choose to fly in all aid at high cost. To supply the same goods over the following weeks they will seek cheaper options for procurement, transportation, and distribution such as buying regionally, using road or sea delivery, and working through local actors to distribute the aid in the communities.

The balance between cost and speed is not limited to disaster response only. It is also pertinent to disaster preparedness, where the supply chain approach may be closer to its commercial counterpart. Taking in mind cost and speed, humanitarian agencies work to develop processes and products to be better prepared to target both objectives. For example, they preposition goods regionally to reduce the procurement cost of standardized high-demand goods, while reducing the lead time when disaster strikes. In some cases, prepositioning allows agencies to do postponement by delaying to the last possible moment the combination of goods that will be sent to the field in order to adapt them to the local requirements.

For example, after the earthquake of 2010 in Haiti, Master Card waived the donation rates to organizations that include the United Nations Children's Fund (UNICEF), World Vision, and Save the Children (25). As discussed above, it is necessary to differentiate between the associations which aim at the mobility of resources with traditional philanthropy, the last of which is not considered a "non-commercial commitment".

As such, in the logistical model, the humanitarian organization and the company share certain risks, benefits and responsibilities in the context of the partnership. This type of model contemplates different types of association, such as media and marketing. For example, in 2013, between the Red Cross, the iTunes Store of Apple and Facebook agreed to establish methods using their know-how, to raise money and be sent to face the response to the devastation provoked by Typhoon Haiyan in the Philippines (26). In the case of Facebook, the company used its network to voluntarily invite its users to donate by means of a link a quantity of money to the user's convenience. This allows humanitarian organizations to attract additional resources to those initially envisaged for their operations.

Benefits:

Depending on the depth of commitment to the corporate partner, the advantages of this model include spreading the humanitarian cause to wider audiences, such as company personnel, client bases and even society as a whole. Companies, on the other hand, can increase their commercial reputation, a greater motivation of their own workers, a challenge to develop that will provide value within their structure and also tangible benefits, as their services can be directed to a market where they are present or if they are later conceived as a reliable company according to their performance in the humanitarian task.

Being a good corporate citizen is at the heart of most companies' humanitarian activities, whether this revolves around providing cash, goods, human resources, knowledge and expertise, or a combination of these, each with its pros and cons

Increasingly, companies are opting to design their social engagement through long-term programs or partnerships with humanitarian partners.

Private logistics companies participate in partnerships with humanitarian organizations, approaching the latter not only from a charitable concern but also as an opportunity for learning and business development. Some of these collaborations have taken the form of long-term partnerships, like TNT and WFP with their "Moving the World" initiative (9). Other collaborations are more project based like FedEx, DHL or Agility.

Challenges:

However, there are numerous challenges attached to these commitments that can make it problematic. On the one hand, tangible advantages are often uncommon, and sometimes resource mobilization is not sustainable. Second, while corporate contributions to humanitarian organizations can be significant after a natural disaster, it is usually not consistent as often this donation slows down or stops as coverage media disappears. This factor is particularly problematic for humanitarian organizations because they need resources in a constant way to cope with crises and that the impact of the actions they carry out have echoes in the media.

Furthermore, while in-kind donations in products or services may be received when necessary, they are usually based on an initial alarm and the novelty and interest that the conflict arouses but are not linked to the real needs in Supply, so it is often difficult to link real needs in the time the crisis lasts. Aid efforts may be difficult if, for example, donated items are outdated, unreliable, or incompatible with local customs and

preferences. The collection, storage and distribution of these items can be costly, and requires a lot of intensive working time, unwanted merchandise can produce logistic bottlenecks in ports and airports and prevent priority in supplying passing through and in-kind donations, particularly food, can have a negative impact on local markets.

Moreover, while in-kind donations in products or services may be received when necessary, they are usually based on an initial alarm and the novelty and interest that the conflict arouses but are not linked to the real needs in terms of supply, so it is often difficult to link real needs in the time the crisis lasts. Aid efforts may be difficult if, for example, donated items are outdated, unreliable, or incompatible with local customs and preferences. The collection, storage and distribution of these items can be costly, and requires a lot of intensive working time, unwanted merchandise can produce logistic bottlenecks in ports and airports and prevent priority in supply passing through and in-kind donations, particularly food, can have a negative impact on local markets.

As a result, there is a growing consensus in the humanitarian community that cash and voucher donation is more efficient than in-kind donations. Logistical associations are generally less demanding with the implementation, design and evaluation of the tasks they need to perform and require fewer organizational resources. The costs that are often produced are limited to indirect costs such as salaries and expenses related to administration and communication.

Model 2: Agreements for exploit professional logistic knowledge for the execution and implementation of processes, tasks and protocols.

This type of association has as its main objective to take advantage of the experience of the companies in the provision of services. Private-sector partners use their core competencies to support humanitarian aid organizations in effective and efficient implementation of humanitarian programs and disaster risk management activities.

Benefits:

In this model, both partners with a humanitarian vocation and private sector partners play an active role: the private sector partner provides experience, while execution is carried out by the private sector partner or by both partners, depending on the service. Small and medium-sized enterprises, however, can also be part of the model as beneficiaries – for example, to receive technical knowledge and then to help their communities indirectly by creating new positions of work. This type of model can be part of the crisis response and can occur in all disaster management areas. Employee Volunteering Programs – understanding volunteering as an agreement that exists before a crisis triggers, are another model of partnership.

The European Commission emphasizes the importance and potential value of employee volunteering for the response to humanitarian crises (27). The main benefit of this model is the ability to leverage the knowledge and experience of the private sector in the joint provision of humanitarian services. Companies can achieve a better reputation and also allow incorporating more skills or improving existing ones in the private sector in the face of new contexts and situations. Consequently, they improve their services and knowledge in previously unknown or inaccessible areas.

During periods of crisis and disaster recovery, this model uses private sector expertise to empower local industries and use their infrastructure to make all critical services work.

Challenges:

The risks and organizational requirements for execution partnerships are more complex than in the logistic collaboration model. While better results can be produced, there are also higher risks. The culture of public associations and private companies is different, so a careful agreement is required in the alignment of interests, expectations and a clear division of the scope of supply of all actors. It is also necessary that this management be continually fed to ensure that all actors implement their tasks in order to succeed in the humanitarian objectives.

Model 3: Agreements for Innovation

Innovation-related agreements are globally stimulated by the growing humanitarian needs that, in order to meet their objectives, require a more effective and innovative humanitarian response for the management of the crisis and the risk associated with a natural disaster. The innovative approach of enterprises, combined with the experience of humanitarian organizations regarding to key issues affecting humanitarian assistance, is the only tool that can be used for innovation in private public partnerships. Based on the knowledge and experience of the partners involved, these partnerships can develop and implement technologies and tools that can help anyone to cope with a specific problem or improve work processes.

Benefits:

Among the obvious benefits of such partnerships, it is found that technologies and instruments developed by innovation partnerships may vary from the development of new construction materials, or in logistics distribution methods. The most common are partnerships for innovation that achieve benefits in the areas of transport, logistics and banking. In the latter example, collaboration with banks and telecommunications companies is included to develop new models of financial transfer, such as mobile money. In the area of disaster risk management, innovations can be developed in the systems of alert and disaster risk with models of simulation and preparation against possible disasters. Innovations can be given in processes that help to improve the timeliness of aid delivery, monitoring, results management and the most effective delivery of humanitarian assistance.

Improvement in work processes is usually achieved through knowledge transfer and capacity building. A common approach is by competencies or a voluntary employee, in the face of traditional forms of volunteering in the field after a disaster. Therefore, the incentive for innovation partnerships between companies and humanitarian organizations is high because it gives them the opportunity to explore the development of a new product, process or method.

Challenges:

By nature, partnerships for innovation take risks deliberately, something inherent in the entrepreneurial spirit of private entities. Although it is true that risk-taking is part of the innovation itself, the other actors may not understand or accept that risk, as the burden associated with a bad result must be assumed by all actors. Therefore, these associations bear the brunt of failures in process innovation and in the possible resulting benefits, even if these are never guaranteed. On the other hand, partnerships for innovation share risks related to the clash of cultures between actors and the particular requirements of partners to organize and manage the processes and actions needed to cope with a crisis.

Model 4: Agreements for Coordination (16)

Coordination in emergencies is crucial to avoid duplication of work, the delivery of necessary aid and to ensure an effective and responsible response. Despite the creation of a sectoral coordination system, in which the private sector does not play a relevant role, coordination in the humanitarian system remains a challenge.

The system's coordination initiatives bring together various stakeholders--companies, governments, donors, and relief agencies--to improve coordination in particular issues that are not led by a leading actor who leads everyone. These partnerships exist globally, regionally or nationally and will probably become increasingly important, as the tendency is for the number of actors to increase in each conflict or disaster. In most cases, an international organization or donor assumes the role of convener and fixes the agenda in an initiative of the coordination of the system, while other actors, including companies, participate and engage in these initiatives.

There are some partnerships for the reduction of private-sector disaster risk, which mediates between the United Nations Office for Disaster Risk Reduction (UNISDR) and mobilizing actions to reduce the risks associated with natural disasters (16).

Benefits:

The benefits of the model include the improvement in the execution of the actions, consequence of an improvement in the coordination of the response of the group of actors. One example is lessons learned from other humanitarian projects or disasters and facilitate structured and clear dialogues for all parties. These agreements are also aimed at leveraging economies of scale and overcoming their limitations. Coordination initiatives focus on changing policies and behaviour of actors within the humanitarian system. Indirect benefits in the implementation of response activities and disaster preparedness and mitigation efforts are derived from this. This type of initiative achieves coordination between humanitarian agents and an access point for private sector participation. Consequently, they promote an exchange of information and a greater knowledge of a sector towards the other actors, which helps to overcome the common challenges of public-private partnerships and to identify the advantages of the private sector and Humanitarian associations. Finally, such initiatives can be used by traditional humanitarian actors to promote humanitarian values and to highlight the needs of private-sector participants.

Challenges:

Due to the nature of the actors, the large number of them and their different geographical locations, the impact of this type of association can be difficult to measure. On the one hand, these associations should be considered legitimate by humanitarian organizations and must have the desired effects on the humanitarian system. It should be recalled that the coordination initiatives of the system should include all relevant information to the other actors and should not overlap with the mandates of other initiatives. The participation requirements and the costs derived from improving coordination among the many actors are high and, in addition, the timeframes required for the improvement of processes or inclusion of other actors is considerably long.

Model 5: Defence Agreements

This type of partnership aims to raise awareness of the humanitarian challenges between the general public and the private sector. While companies can provide resources and knowledge in market analysis and advertising strategies, defence associations are complex associations, as the media are essential, but as is evident, there is no control over them. Therefore, messages transmitted through these channels may be inadequate, too simple, or even counter-productive to meet humanitarian objectives.

Benefits:

For defence associations that address the general public, the behaviour that can be induced goes from a low level to more substantial changes. For example, when low-level changes are induced, they focus on issues of how to spread humanitarian problems and their importance through demands such as world humanitarian day and are done through social media and events. More impact changes can be achieved through the use of campaigns to convince people in the areas at risk of using some type of insurance and/or by advising people in risk areas how to behave in the event of natural disasters. Partnerships with other entities such as the Red Cross can also help to change the perception and behaviour of societies. For example, the International Committee of the Red Cross (ICRC) convenes discussions on humanitarian concerns with private enterprises as a form of preventive action, given the fact that companies can have a huge positive or negative impact on situations of armed conflict, situations of violence or natural disaster (28).

Defence associations can take many forms, ranging from bilateral talks with a company to a specific humanitarian issue, to the production of a generic guide or participation in multi-stakeholder initiatives jointly managed by various social groups (e.g., Governments, civil society organizations, and private companies) in order to respond to specific disaster-related challenges. In this way, the ICRC seeks to foster conditions that reduce the likelihood that the actions taken by members will have negative impacts, such as non-observance of human rights or the deterioration of the conditions of local communities such as Consequence of their actions.

Challenges:

The greatest risk that can be suffered with this model is that the actions of the trading partners can question the reputation of the associations of which they are part, and consequently attract negative headlines that question the actions and jeopardize the achievements achieved. The appropriate selection of partners and the follow-up of actions carried out during the crisis-related stages can mitigate these risks and are therefore an integral part of the organizational requirements of a promotional campaign. An additional challenge is to determine the overall impact of advocacy campaigns. In the past, the success of promotional activities was difficult to measure. However, with social networks, it is increasingly easy to get a sense of global reach of these campaigns. Finally, due to its short deadlines and generally the fact that companies, with their advertising and marketing experience, often take the lead in developing such campaigns, the needs of the organization's resources by the humanitarian organizations are relatively small compared to the requirements of other models.

Current role of companies in logistical humanitarian aid (29)

Companies can participate in various forms of humanitarian aid: as financial or in-kind donors, which continues to be the most widely used scheme; in models of public-private partnerships, that is to say, developing the activities or services that best they know: how to lend in contexts of humanitarian crises, they are more refined models and that, in the long term they include various forms of help. The third model refers to social entrepreneurship: These are companies that have designed products or services specially conceived to meet needs in crises.

The following are examples of the participation of private companies providing logistic assistance in the event of natural disasters.

Royal Caribbean Case (30)



Figure A2: Royal Caribbean Models of Collaboration

As a result of the crisis generated by the earthquake in Haiti, Royal Caribbean contributes through economic and in-kind aid, on the one hand donating money and on the other, lending its infrastructure to transport aid. This collaboration arose from the dilemma of being criticized for continuing to operate in the area without altering its activity while Haiti was in a deep crisis.

This case is an example of a private partner that leveraging their experience and leadership, get on the one hand, continue to maintain their business line transporting tourists and passengers, their workers and vendors who depended on the company and on the other, take advantage Their transportation lines and infrastructure in ports and hotels to load food so that they can reach the places where they are required.

This type of agreement can start being punctual and for a short time, while it can be opportunistic and look for a facelift or a friendly image to avoid bad publicity. However, this type of agreement may be the first episode of a possible alliance between Royal Caribbean and the non-profit actors and the Haitian Government itself.

DHL Case (31)



Figure A3: DHL Models of Collaboration

This collaboration began in the year 2005, with the aim of acting in a coordinated emergency situation. In December 2010, the alliance was renewed after five years of joint activity. This collaboration brings to the service of OCHA the logistics and expertise of DHL to reach the neediest populations in disaster scenarios and humanitarian crises.

Airport Program:

The disaster-Ready Airports Program (GARD) prepares airports to manage increased supplies and relief activity. The program aims to coordinate emergency supplies arriving at airports after natural disasters. With the GARD program, DHL performs on-site assessments, trains local governments and airport personnel, and participates in the development of emergency action plans. The program is based on the training approach of trainers. In Indonesia, the GARD team trained local volunteers from DHL employees at two airports. After a week, both airports had trained staff and a detailed report on how to support relief operations had been created. With this information, the DHL-GARD team will develop the concept and implementation of a plan for implementation at selected airports in high-risk areas in Asia and America.

Innovative packages:

Innovation also took place in developing a different way of packaging aid products. In the Southeast Asian earthquake in 2005, DHL employees saw that conventional means of transportation, such as boxes, were often not sufficiently sturdy and instead, they used sturdy and waterproof DHL courier bags to offer relief products to remote and inaccessible areas. These speedballs, as they call the sturdy bags, can hold up to 25 kilograms, withstand better releases from the air and stay afloat longer than other containers. The speedballs have been tested in numerous relief activities. In 2008, in an alliance with the United Nations Refugee Commission (UNHCR), they managed to package and place more than 13,500 salvage bags in flooded areas of India and Myanmar (Burma).

Land Rover Case (32)

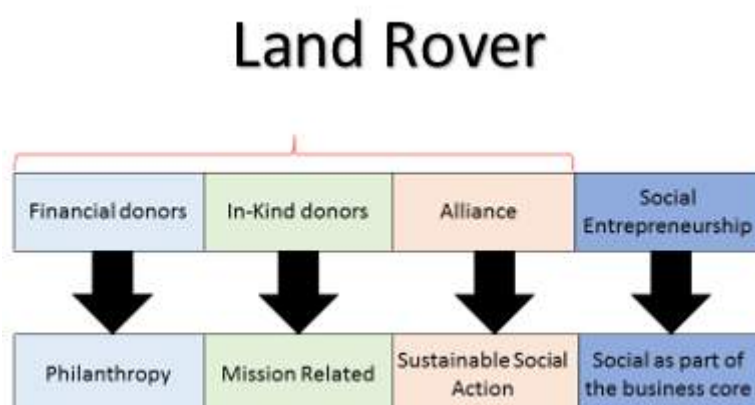


Figure A4: Land Rover Models of Collaboration

The Land Rover case is an alliance, in-kind donor and financial donor with the Red Cross. The alliance between the two companies is more than 60 years old, and began in the year 1948, when Land Rover delivered vehicles so that the English Red Cross could move in Dubai that at that time the English Crown had a large commercial link in the area.

Since then, Land Rover has contributed as a financial donor with monetary contributions, as an in-kind donor donating vehicles of its brand and as an ally of the Red Cross and Red Crescent, where it is involved in the operations carried out by 15 companies of the Cross Red in the world.

The advantages of the Red Cross with this alliance are on the one hand, may leeway, which makes it possible to make its humanitarian work more sustainable. In addition, you can count on cars designed by Land Rover to access geographically complicated areas. This implies less resources for transport and vehicles when there is an urgent situation of action in remote and difficult-to-reach locations. It allows the Red Cross to invest the planning and strategy time in other tasks that are related to its core business, thus increasing its capacity, its efficiency and it is easier to achieve the objectives marked.

The advantages that Land Rover obtains with this collaboration is that it positions its brand with quality cars that can adapt to geographically difficult environments and seeks to create a social impact where this activity is related to its mission and culture Business, while consolidating a stable and sustainable relationship over time.

TNT-WFP ‘Moving the World’ partnership (14)

TNT-WFP ‘Moving the World’ partnership forged in 2002 for an initial five-year period which originally encompassed five different initiatives and the IFRC-Fritz Institute collaboration on a humanitarian logistics software. (15) These types of partnerships emerge when there is an organizational fit between the contributing firm and the assisted humanitarian organization. The business partner is expected to provide its core competencies in terms of expertise and assets (including in IT) to the assisted organization both in-between and during disasters. In-between disasters, they are meant to contribute to the innovation and growth goals of a humanitarian organization. During disasters, by extending their expertise, time and assets, the corporate partner can directly impact the cost, timeliness, flexibility and accuracy of relief operations.

Maersk Case (12)

Maersk – is supporting the delivery of humanitarian cargo through support to the (33) Logistics Cluster. Maersk has allocated up to USD 1 million to the support, which includes ocean freight, local intelligence on logistics and infrastructure, and use of other services which Maersk can effectively support such as operational equipment (containers, forklifts) or services (transport and shipping).

By keeping the trade channels open and by offering the pro-bono delivery of relief items via sea, Maersk is enabling the humanitarian community to reach the most vulnerable people affected by an outbreak. The Logistics Cluster through World Food Program shipping department coordinates with Maersk to identify the best options for sending relief items via sea.

When a major emergency strikes, humanitarian organizations must quickly reach those affected with food, medicine, and shelter at a time when roads, ports, and telecommunication infrastructure might be badly damaged.

Agility Case (HELP Program) (13)

Agility has resources that can support the humanitarian community during this time of need. Agility make its capabilities – experienced people, warehousing facilities, and transportation assets – available to humanitarian partners in crisis situations.

Agility’s Humanitarian and Emergency Logistics Program (HELP) takes a robust and systematic approach to disaster response. The program is built on the Agility’s partnership with the International Medical Corps and a multilateral partnership with other private sector partners and the humanitarian community.

Rules of Engagement

Whether to deploy in a disaster scenario is a decision that must be thought through on a case-by-case basis. Factors such as the type and scale of the emergency, the security situation, the needs of our humanitarian partners on the ground must all be taken into consideration. The operational parameters are:

- Type of emergency: deploying response teams to natural disasters, trying to avoid complex emergencies with poor security situations to minimize risks to the safety of Agility's employee volunteers.
- Partnership: responding only when invited to participate by humanitarian partners or local government emergency relief bodies. Agility works at the request of their partners and taking their operational cues from the crisis management organizations that specialize in this work and lead their efforts.
- Local capacity and availability: they respond where they have local capacity. On-the-ground knowledge, people, and transportation and warehousing assets are an important part of the value that Agility offers. Before Agility commit resources, they consider the health and welfare of their local office staff, as well as available capacity to support a disaster response operation.

Conclusions

Business logistics and commercial supply chains are sophisticated operations based on forecast demand, inventory control and a number of models that optimise a dynamic and fast-moving system. Disaster management supply chains are essentially the same but with the following significant differences:

- Unpredictable demand in terms of timing, geographic location, type of commodity, quantity of commodity.
- Short lead time and suddenness of demand for large amounts of a wide variety of products and services.
- High humanitarian stakes regarding timelines in the face of a sophisticated global media and the high anticipatory attention of the donors.
- Lack of initial resources in terms of supply, human resource, technology, capacity and funding.

In establishing a logistics collaboration partnership it is important to recognize the different capabilities and potential contribution of each member firm beforehand. Then there is a need to work on the organizational buy-in of the facility as most firms may not be prepared to realize and admit to the need for cooperation on logistics issues. More precisely, the concept may need the buy-in of two very different sets of members: firms with and those without finance capability. The challenge is to secure the active participation and contribution of those larger firms that do not necessarily see the need and merits of sharing resources. To overcome resistance, the partnership should make sure it does not overshadow firm visibility and brand identity.

Business partners can create value by facilitating the transfer of knowledge as well as advancing the state of knowledge and practice in the social sector, by applying their expertise, know-how, capabilities, resources and network.

Companies are capable of providing technological support and logistics staff and managers. They also provide specific services that may no longer be available on the ground immediately after a disaster has occurred, such as electricity supply, engineering solutions, banking support, and postal services. Initially, companies are moved to participate in humanitarian efforts because they have observed that enormous losses are inflicted when disasters interrupt the flow of their business; so, they invest in re-establishing their business continuity. (17) Working to alleviate the economic impact of such disruptions "makes good business sense".

Annex 3 – Surveys answers

To give a technical approach to the deliverable that contrasts and complements previously developed information, two types of surveys are disseminated (one for private companies and another for public entities). The results are from a sample of 105 answers (105 answers from 2500 entities surveyed, not every question of the survey was obligatory to answer), the survey was sent 3 times to the same list. The survey includes a summary of the DRIVER+ project and the object of the present task and work package.

Private Entities Survey

Private – Public partnerships for Crisis Management

1. Are you aware of any kind of collaborations of this type?

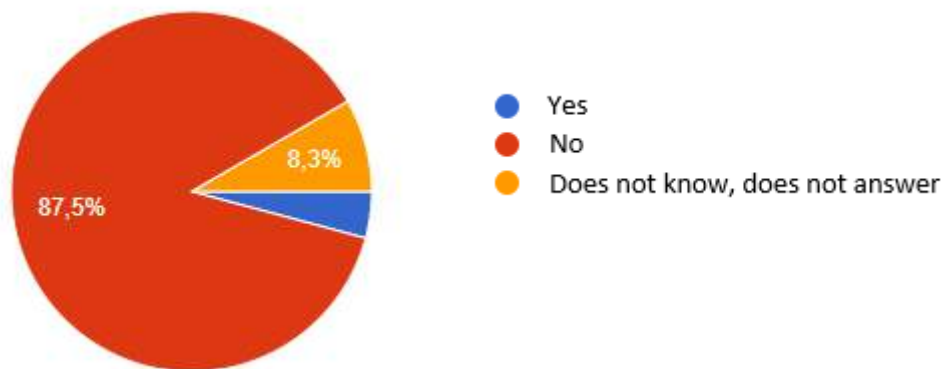


Figure A5: Private entities survey question 1

The widespread ignorance about this type of collaboration is remarkably high, in such a way that a guide is necessary to provide information on collaboration to the different stakeholders. This study is therefore crucial.

Private – Public collaboration protocols

2. Does the entity have established collaboration protocols with public entities to respond to the crisis generated by a disaster?

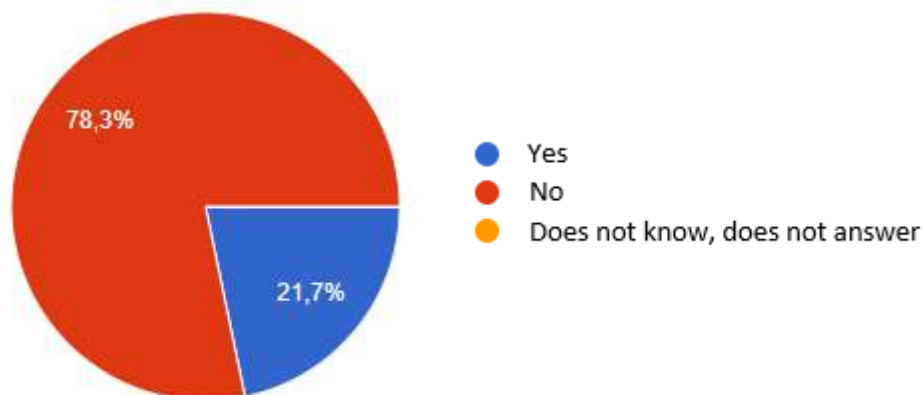


Figure A6: Private entities survey question 2

Looking at the results, it shows that there is a great number of participants who answered No. This indicates that, the public do not have a strong connection with the protocols to react to the crisis generated by a disaster. To resolve this matter, perhaps a form of support or guide would be useful to execute such an issue.

3. Affirmative case what kind of public entities have collaborative agreements in these cases?

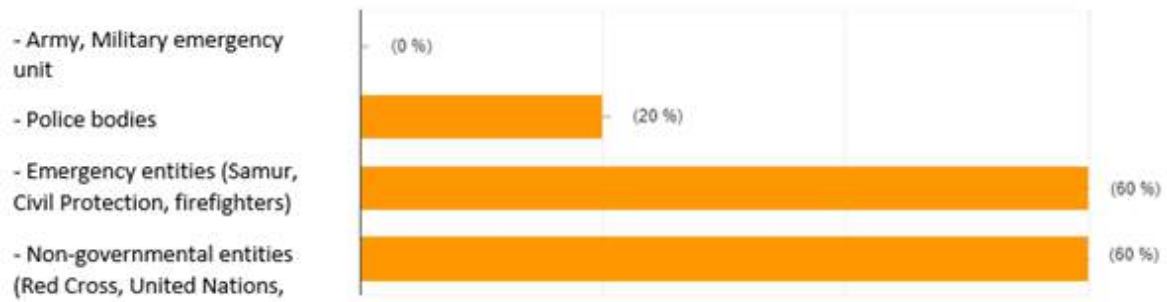


Figure A7: Private entities survey question 3

According to this, both emergency and non-governmental entities have a high percentage of collaboration. It makes sense that these entities have a huge, as for the 0% on army military, it is rare that private entities will collaborate with them as they are more independent.

4. If such protocols exist, are they properly established and are there clear rules?

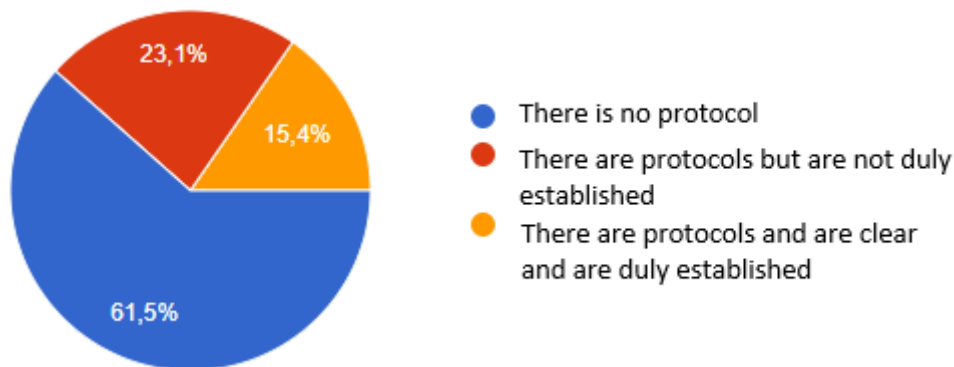


Figure A8: Private entities survey question 4

Since a high result shows that there is no protocol, this is a concern because it shows that it does not exist. Perhaps it would be convenient and necessary that protocols are not only established but also properly displayed in order to support and help the collaboration.

5. What type of collaboration do you have established?

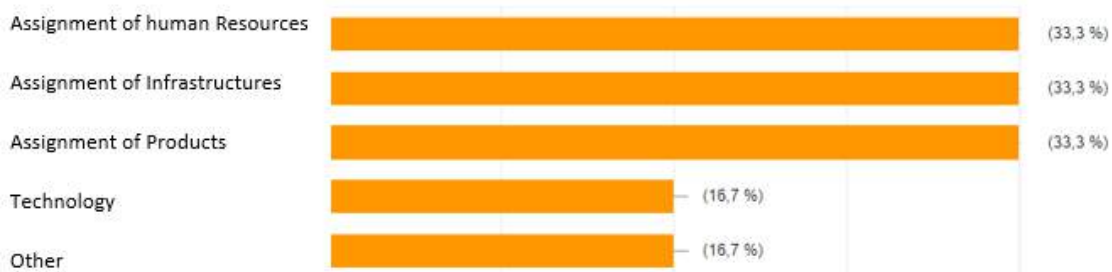


Figure A9: Private entities survey question 5

Seeing the graph it can be concluded that there are different types of transfer of resources that are common as a way of collaboration, the main ones are assignment of human resources, infrastructure and products. Less common are technology transfers and other types of collaborations.

6. How do you value the importance of such collaboration?

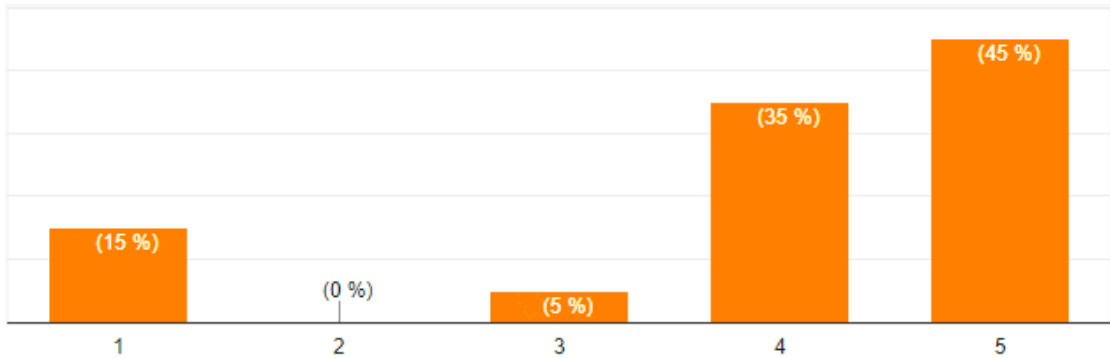


Figure A10: Private entities survey question 6

It seems that the value of collaboration is fairly high as 45% of the result was five. This shows that collaboration seems to be very important. However, 15% chose one which shows that not everyone believes in the importance of collaboration.

Collaboration agreements with public entities

7. What kind of public entities do you think should be involved in these agreements?

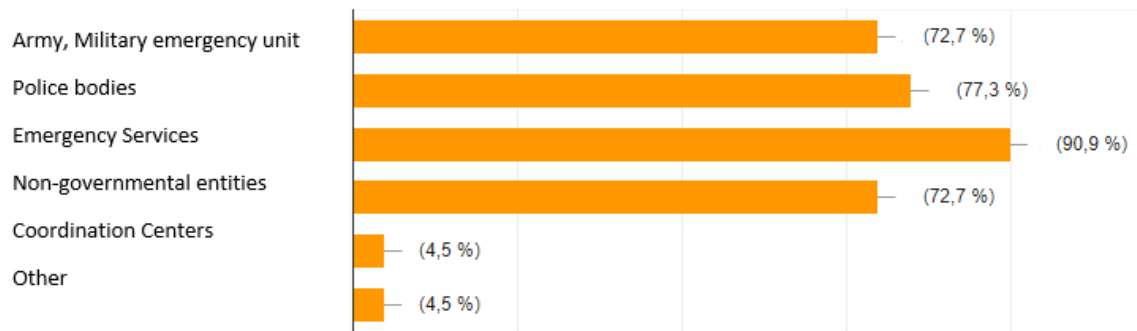


Figure A11: Private entities survey question 7

Majority of the group answered emergency services, which is quite understandable as they provide the most resources of health support relatable to public entities. Perhaps it would be ideal for army emergency unit to also have a contribution similar to emergency unit as they play a crucial part when it comes to crisis management.

8. Do you think that it is necessary for private entities to be involved in the collaboration to respond in crisis cases?

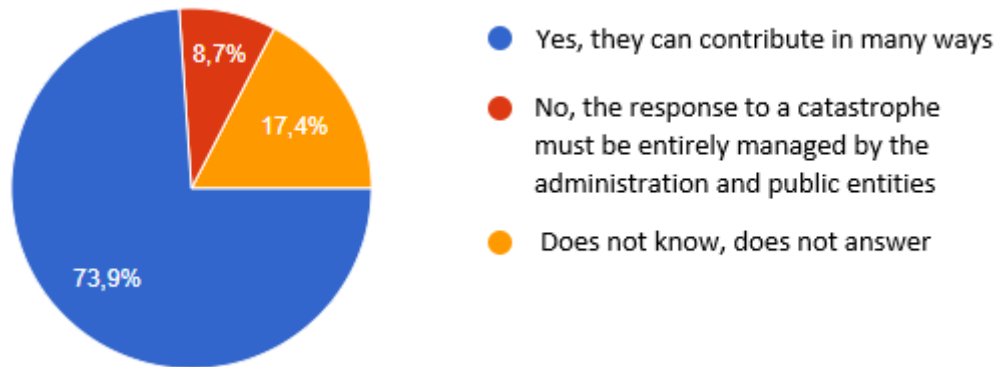


Figure A12: Private entities survey question 8

Majority of the result chose 'yes' this means that it is perfectly important that private entities are involved in communication and reacting to respond in crisis cases. In addition it shows not only public entities but private entities play a huge part when responding to a crisis.

Communication between entities

9. If there is a collaboration of your entity with public entities in this area, is there a fluid communication between the parties?

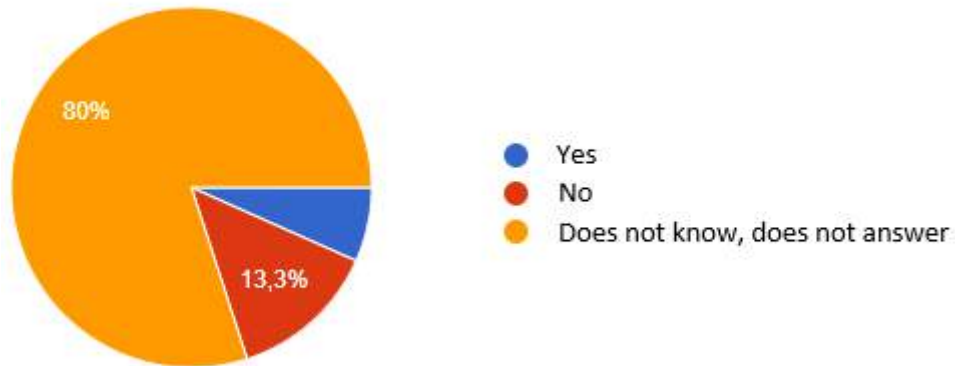


Figure A13: Private entities survey question 9

10. Have necessary organizational measures been implemented by public entities?

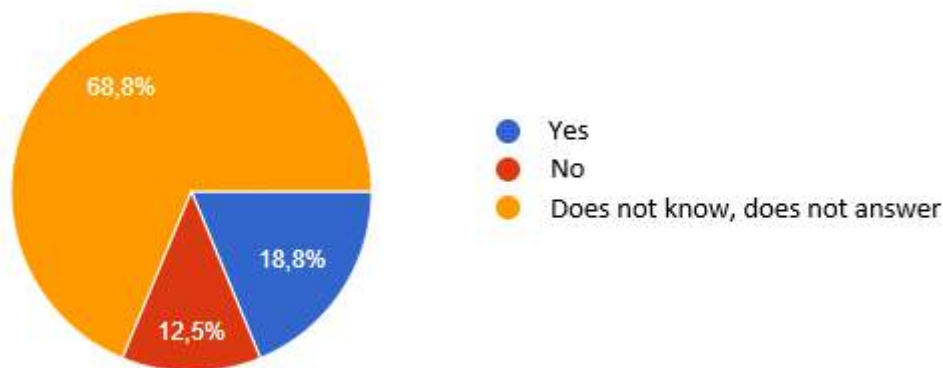


Figure A14: Private entities survey question 10

This shows there is minimal information about this topic that the people are not aware of. In order to change this, perhaps guidance would be suitable to allow the people to understand the procedure.

11. Is there a strategic leadership on the part of the administration?

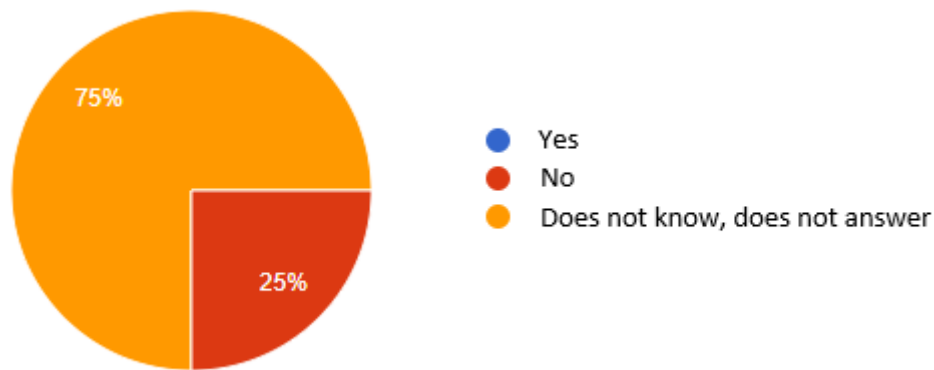


Figure A15: Private entities survey question 11

This result shows that there is no form of leadership at all on the administration. Having no leadership can cause serious problems for example no results and no organization. Without leadership the organization can't run successfully. However, providing training and support to people who want to be a leader can be useful and can resolve the matter.

Goods or services that could make available to public entities

12. Goods or services that would make available to public entities

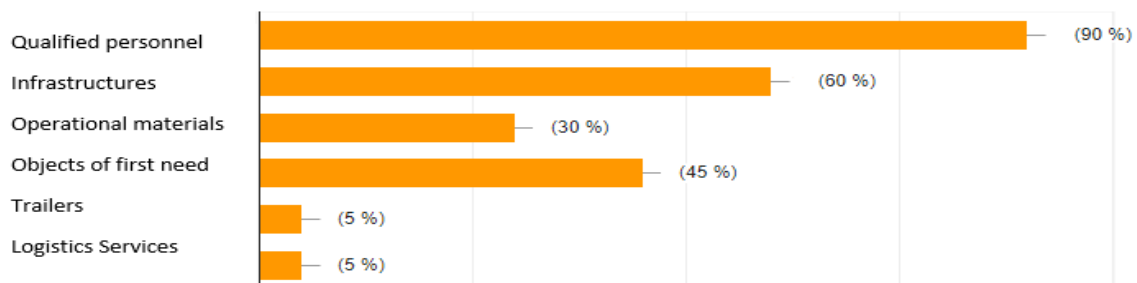


Figure A16: Private entities survey question 12

There is a huge result for “Qualified personnel” as it has reached 90%. This shows that a body of persons in and organization are more useful and effective to be available to public entities.

13. What kind of staff could you make available?

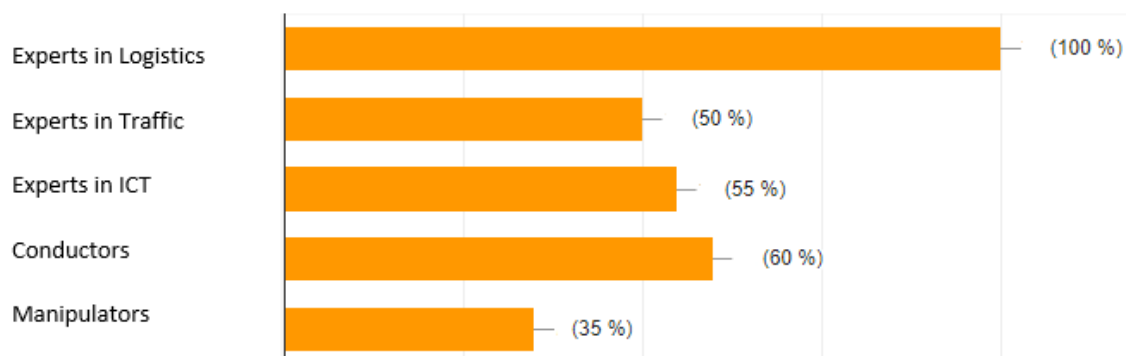


Figure A17: Private entities survey question 13

It is ideal to make experts in logistics more available and useful in a crisis situation as they are the ones who have the resources and materials to help provide and support. It makes perfect sense that logistics has a higher result because they specialize in the transports, traffic etc.

14. What kind of infrastructure could you make available?



Figure A18: Private entities survey question 14

Transport will be a better infrastructure to make available when it comes to a crisis or incident. This involves numerous ways on delivering resources and material to countries which have experiences a natural disaster. Warehouses plays a part too because they may hold the resources needed for the private entities.

15. What kind of operational materials could you provide?

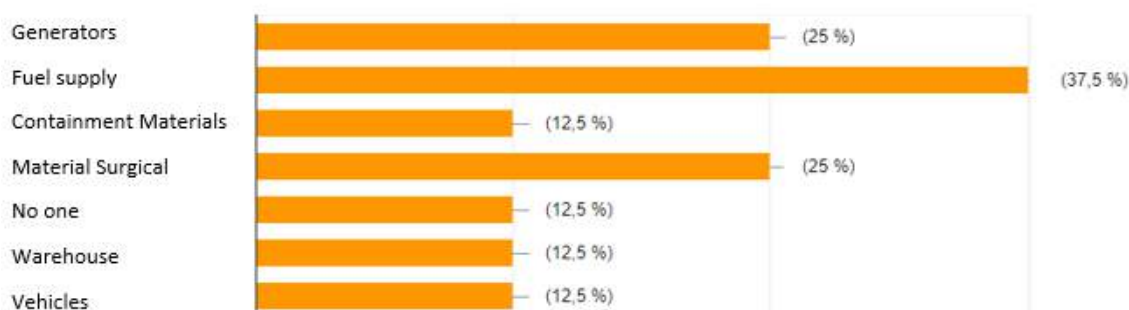


Figure A19: Private entities survey question 15

Fuel supply seems like a reasonable choice to pick as a high result in this question. As fuel supply is likelier to be reliable in providing and delivering goods to areas in crisis. Material surgical, is also convenient in a crisis as they deliver medical goods and first aid equipment's.

16. What kind of first-need goods could you bring?

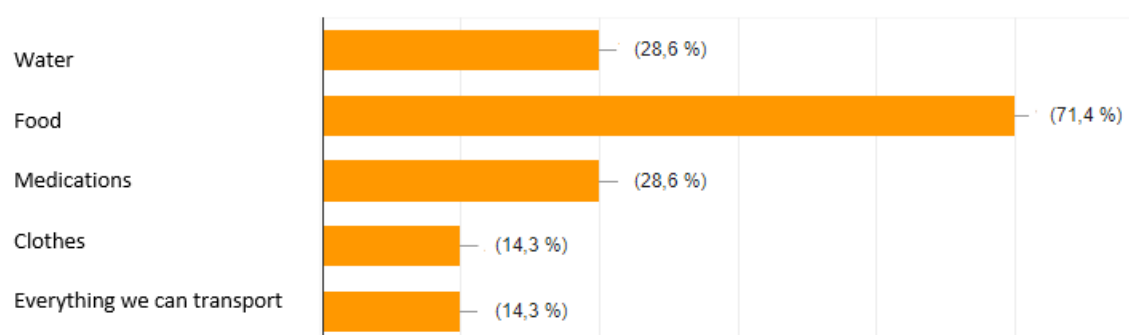


Figure A20: Private entities survey question 16

Food and water are probably the most important things you will need when a crisis occurs. It is essential that these types of goods are a priority as many people who have experienced the crisis would need most

of it. Medications such as first aid are also essential in a crisis as they could be potential harms and damages.

Participation in working groups on the subject

17. Interested in participating in a working group on collaboration between public and private entities to support a crisis caused by a natural disaster?

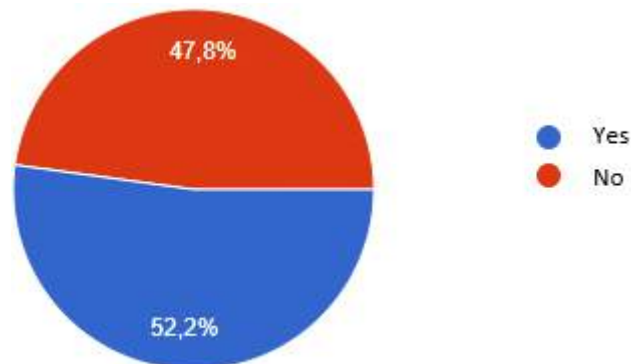


Figure A21: Private entities survey question 17

The result given are roughly equal, this shows that half of the participants would prefer to be involved in participating to support crisis caused by disaster.

Public Entities Survey

Private – Public partnerships for Crisis Management

The results are from a sample of just 8 answers (8 answers from 2500 entities surveyed where just a small number of entities are public ones, not every question of the survey was obligatory to answer), the survey was sent 3 times to the same list. The survey includes a summary of the DRIVER+ project and the object of the present task and work package.

1. Are you aware of such collaborations?

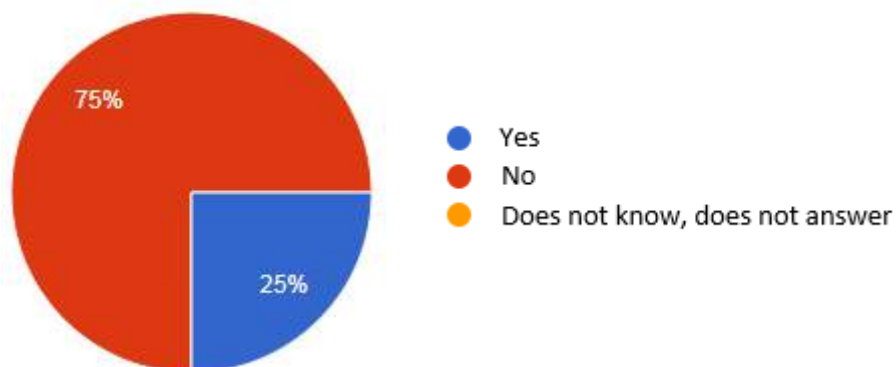


Figure A22: Public entities survey question 1

Majority of the respondents answered “No” which means that they are not attentive and do not know any information about the collaborations. Perhaps a form of guideline or instructions can be of use to allow them to receive knowledge and understanding about the collaborations.

Private public collaboration Protocols

2. Does the entity have established collaboration protocols with private entities to respond to the crisis generated by a disaster?

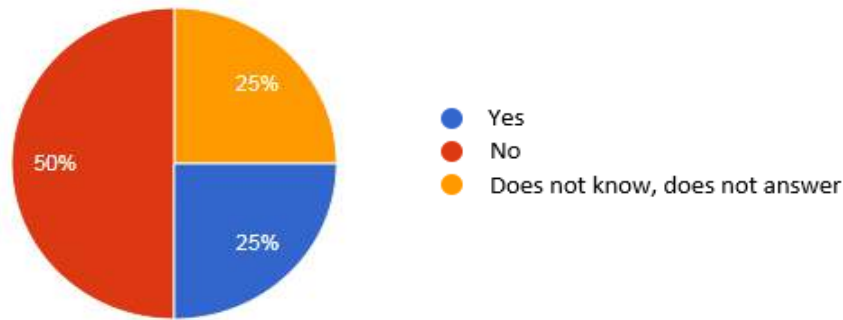


Figure A23: Public entities survey question 2

Half of the respondents answered No which means that they barely have any knowledge about the private entities responding to the crisis. However, to amend this, it can be necessary recognize or research more protocols for the private entities.

3. Affirmative case what kind of private entities have collaborative agreements in these cases?



Figure A24: Public entities survey question 3

According to the graph, supply and service seems to have the highest result. This is realistic as this case us shown to provide service and resources in areas that have been affected by natural disaster or a crisis. However, “companies sector pharmaceutical” has zero result which shouldn’t be the case as they can provide medical service and attention such as first aid.

4. If such protocols exist, are they properly established and are there clear rules?

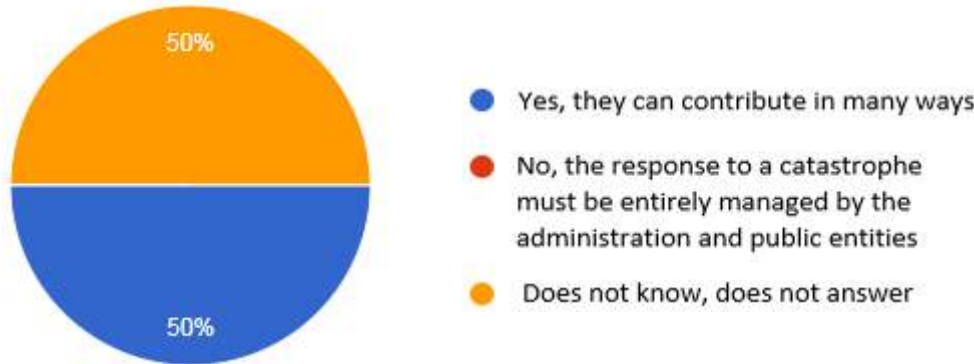


Figure A25: Public entities survey question 4

5. What type of collaboration do you have established?

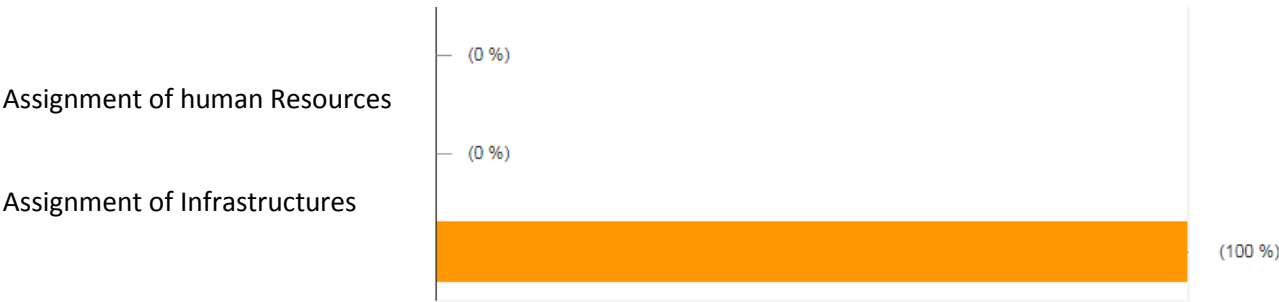


Figure A26: Public entities survey question 5

According to this result, every respondent chose the assignment of products. This is fairly an important assignment as products such as food and water are essential in a crisis and it is positive that the respondents have knowledge about this. However, it may also be crucial to establish infrastructures such as transport. Perhaps a recommendation can be used in order for respondents to establish this assignment.

6. How do you value the importance of such a collaboration?

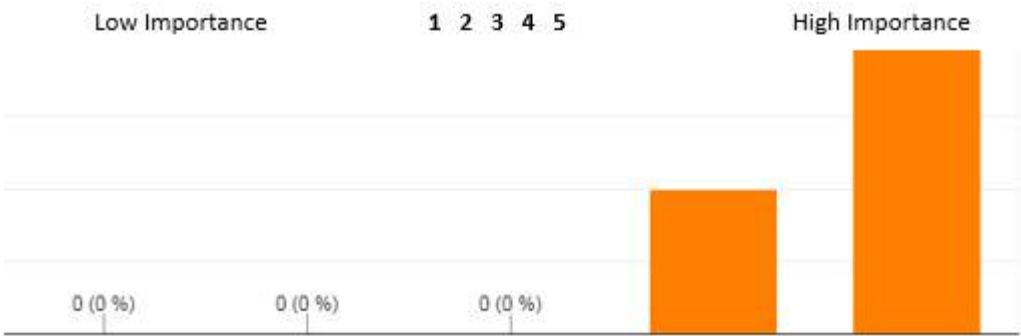


Figure A27: Figure 40. Public entities survey question 6

It seems like the importance of such collaboration was pretty much high. This shows that it is crucial and important for this form of collaboration to take place when there is a crisis or a natural disaster.

Collaboration agreements with public entities

7. Do you think that it is necessary for private entities to be involved in the collaboration to respond in crisis cases?



Figure A28: Public entities survey question 7

This result receives full 100% on deciding if it is necessary for private entities to be involved in crisis. This is fairly correct as private entities play an important part when it comes to crisis within different countries.

8. What kind of entities do you think should be involved in these agreements?

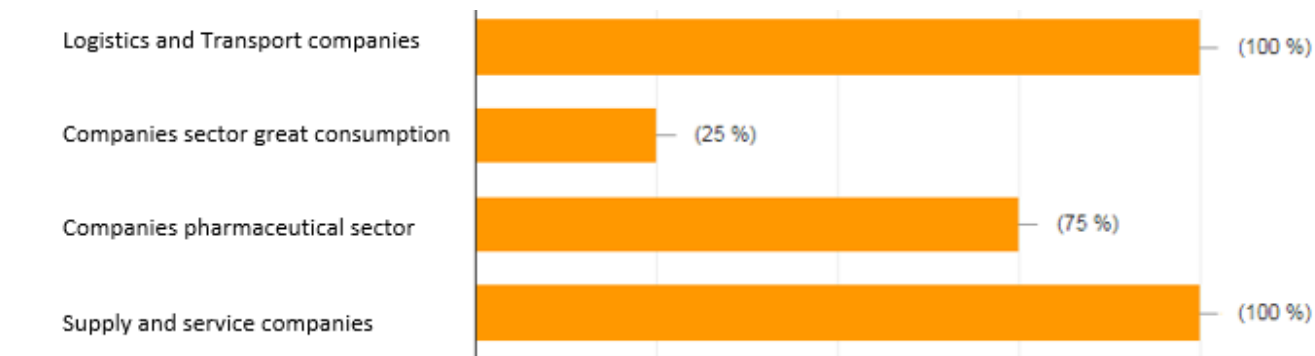


Figure A29: Public entities survey question 8

Looking at this result there seem to be a majority of respondents from each choice. Supply and service/ Logistics and support seems to be the one with the most equal votes. As they provide the most reliable sources when it comes to supporting an area involved with a crisis. In additions logistics plays a part with transportation i.e. delivering goods.

Communication between entities

9. If there is a collaboration of your entity with private entities in this area, is there a fluid communication between the parties?

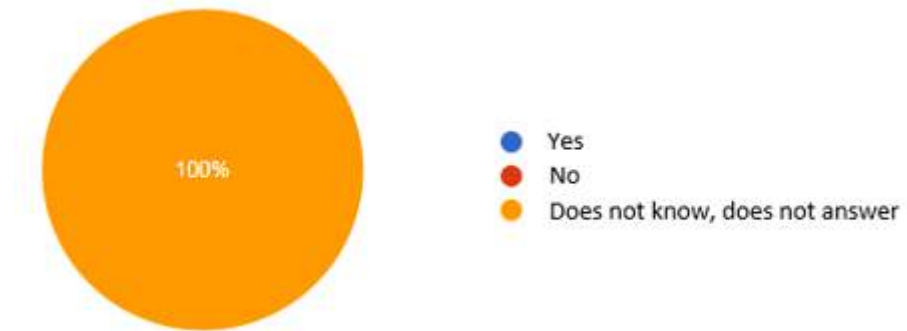


Figure A30: Public entities survey question 9

Unfortunately, looking at this results the respondents are not aware of the communication between the parties. Perhaps support and information about this would help to allow them to have an understanding.

10. Have necessary organizational measures been implemented by public entities?

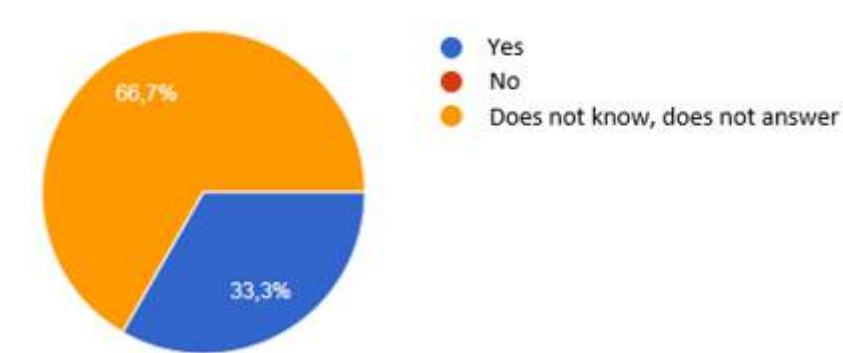


Figure A31: Public entities survey question 10

Looking at this, most respondents do not know about this question. While a small amount does, for the respondents that don't know, it will be ideal to create a guide to represent and have an understanding about the situation.

11. Is there a strategic leadership on the part of the administration?

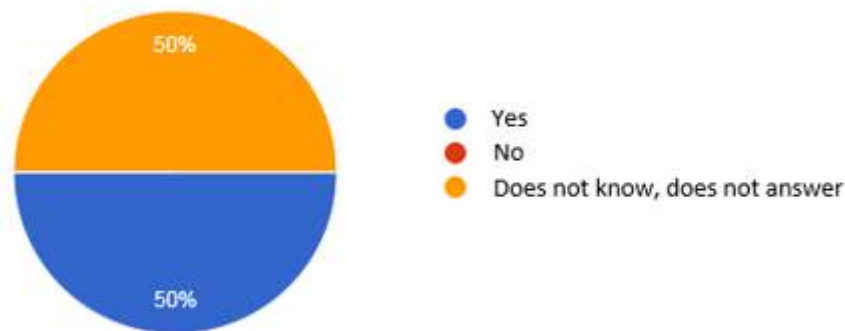


Figure A32: Public entities survey question 11

Half of the respondents, answered saying they are not aware of the protocols while the other half answered yes. For the respondents you answered “does not know” this can be resolved by creating a guideline which can allow them to gain knowledge of the protocols. In addition perhaps, allocating a leader who is able to take control on the part of the administration, and also hosting meetings in order to keep up to date with situations. Linked to question 13, on respondent recommended that employees should have regular and frequent meetings. This can help increase productivity within the employees as they are given some form of guidance

Necessary goods or services

12. Goods or services that would make available to public entities

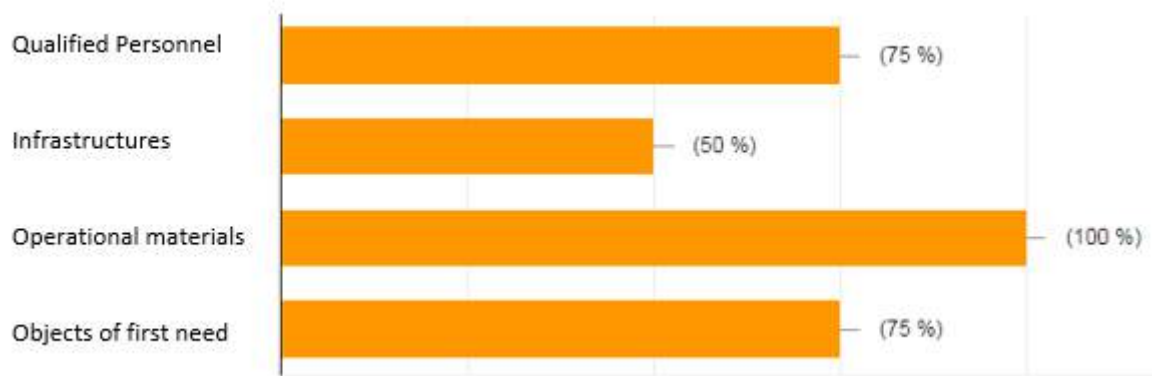


Figure A33: Public entities survey question 12

Operational materials got the most vote as this is fairly linked to public entities. It is reasonable that objects of first need has a good amount too as it can be provided by the government since it is available to public entities.

13. What kind of staff would I demand?

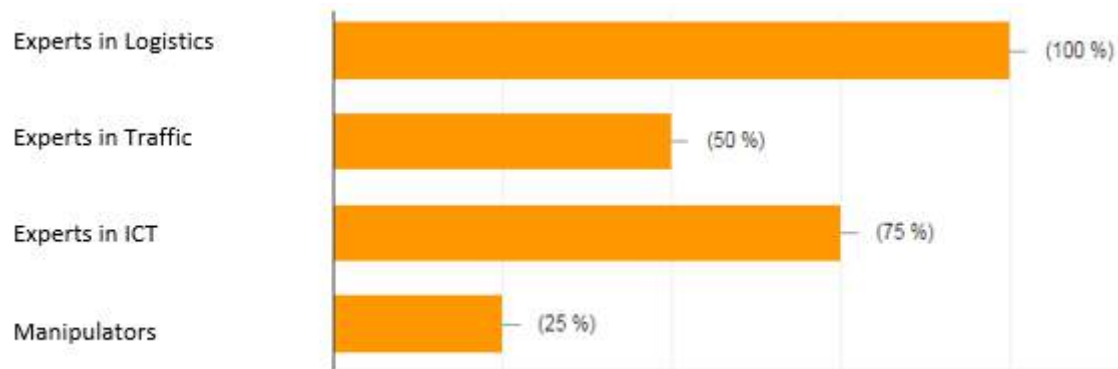


Figure A34: Public entities survey question 13

Experts in logistics make perfect sense when addressing a crisis situation, as they are mainly involved with transportation and delivering goods. Logistics/transportation can be able to transport the materials and objects of need to areas involved in a disaster

14. What type of infrastructure would you demand?

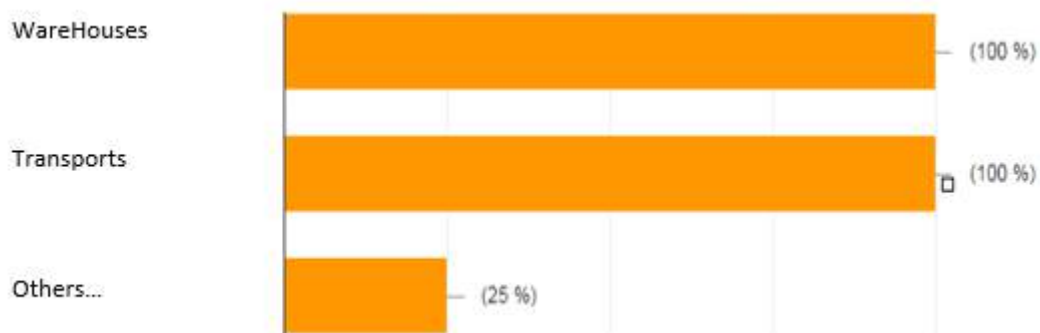


Figure A35: Public entities survey question 14

Both warehouses and Transports are fairly important when it comes to dealing with natural disaster as they both provide a form of support and help in their own way. Warehouses may contain goods such as food and water and the transports are used to send out and deliver the resources.

15. What kind of operational materials would you require?

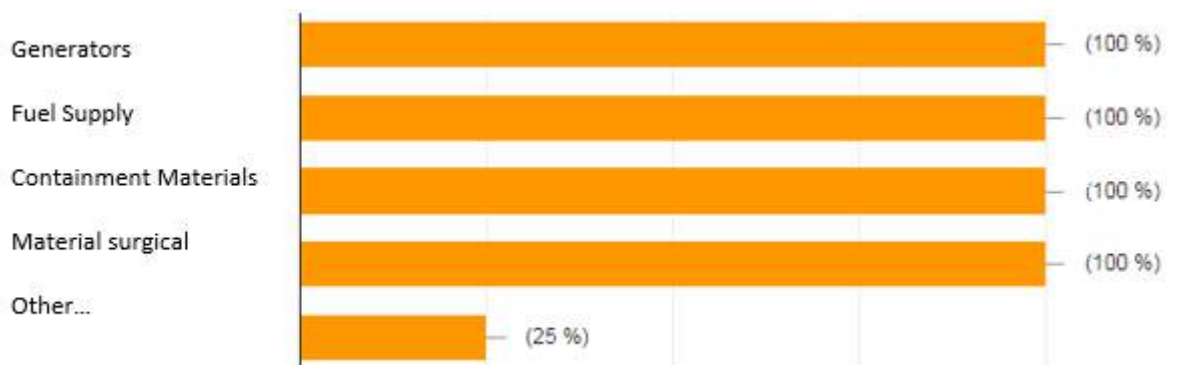


Figure A36: Public entities survey question 15

Looking at the results, it seems that every choice plays an important part in the operational materials that is required.

16. What kind of first-need goods would you demand?



Figure A37: Public entities survey question 16

All choices are essential and important in order to help areas in natural disaster, these are at high demand as they will be able to help and support people who are in need. Knowing this can allow the respondents to know what is vital and what needs to be used.

Participation in working groups on the subject

17. Interested in participating in a working group on collaboration between public and private entities to support a crisis caused by a natural disaster?

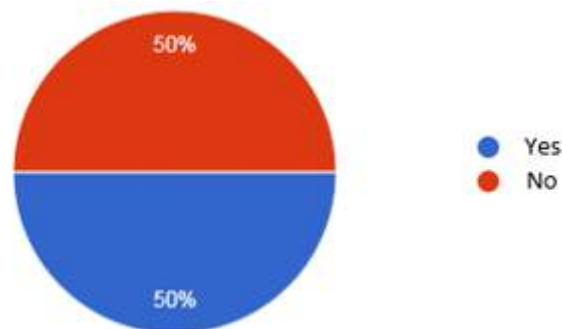


Figure A38: Public entities survey question 17

According to this the answer was fairly split 50/50, at least it shows that half of the respondents would like to participate to support. As for the other half, this could be based because of the lack of knowledge and understanding when it came to the established protocols or the lack of leadership in the administration.

Annex 4 – Survey questionnaires for private companies

Public-private collaboration questionnaire for disaster crisis management

Summary of the DRIVER project the European Union, like any territory on the planet, is exposed to a range of possible crises and disasters. These crises can be due to multiple factors, from climate change and infrastructure failures to terrorist and cyber-attacks. Within this scope, the European Commission supports the DRIVER Innovation Project ("Driving Innovation in Crisis Management for European Resilience") focused on reinforcing Europe's responsiveness to Crisis situations. One of the DRIVER's goals is to improve the responsiveness of the community in a crisis situation, supporting the resource management process and the resilience of the supply chain. To this end, one of the most important factors is cooperation between organizations and public-private collaboration.

Where it was formerly an almost exclusive role for governments and international humanitarian aid organizations to respond to crisis situations, companies are increasingly contributing through donations, extensions of their business activity, partnerships Public-private or innovation with social impact. This collaboration is necessary to cope with the growing demand for humanitarian aid, but there is a lack of collaborative protocol agreements where DRIVER can help solve some of these problems. For more information on the project: <http://driver-project.eu/> To start the survey click on the next tab in the lower left corner, thank you very much for your collaboration.

The CITET team.

Private public partnerships for Crisis management

1. Are you aware of such collaborations?

- Yes
- No
- Does not know, does not answer

2. Let us indicate which

Private public collaboration Protocols

3. Does the entity have established collaboration protocols with public entities to respond to the crisis generated by a disaster?

- Yes
- No
- Does not know, does not answer

4. Affirmative case what kind of public entities have collaborative agreements in these cases?

- Army, Military emergency unit
- Police bodies
- Emergency entities (Samur, Civil Protection, firefighters)
- Non-governmental entities (Red Cross, United Nations, food bank)
- Other.....

5. If such protocols exist, are they properly established and are there clear rules?

- There is no protocol
- There are protocols but are not duly established
- There are protocols and are clear and are duly established

6. What type of collaboration do you have established?

- Assignment of human Resources
- Assignment of Infrastructures
- Assignment of Products
- Other.....

7. How do you value the importance of such a collaboration?

- Low Importance 1 2 3 4 5 High Importance

Collaboration agreements with public entities

8. What kind of public entities do you think should be involved in these agreements?

- Army, Military emergency unit
- Police bodies
- Emergency Services (Samur, Civil Protection, firefighters)
- Non-governmental entities (Red Cross, United Nations, food bank)
- Other

9. Do you think that it is necessary for private entities to be involved in the collaboration to respond in crisis cases?

- Yes, they can contribute in many ways
- No, the response to a disaster must be entirely managed by the administration and public entities
- Do not know, does not answer

Communication between entities

10. If there is a collaboration of your entity with public entities in this area, is there a fluid communication between the parties?

- Yes
- No
- Does not know, does not answer

11. Have necessary organizational measures been implemented by public entities?

- Yes
- No
- Does not know, does not answer

12. Is there a strategic leadership on the part of the administration?

- Yes
- No
- Does not know, does not answer

13. How should communication between participating actors be established? (Open response)

Goods or services that could make available to public entities

14. Goods or services that would make available to public entities

- Qualified personnel
- Infrastructures
- Operational materials (generators, petrol, sandbags ...)
- Objects of first need (water, food, medicines ...)
- Other.....

15. What kind of staff could you make available?

- Experts in Logistics
- Experts in Traffic
- Experts in ICT
- Conductors
- Manipulators
- Other.....

16. What kind of infrastructure could you make available?

- Warehouses
- Transports
- Other.....

17. What kind of operational materials could you provide?

- Generators
- Fuel supply
- Containment Materials (sandbags)
- Material Surgical
- Other.....

18. What kind of first-need goods could you bring?

- Water
- Food
- Medications
- Other.....

Participation in working groups on the subject

19. Interested in participating in a working group on collaboration between public and private entities to support a crisis caused by a natural disaster?

- Yes
- No

Identification

Remember that this survey is for internal use and your data is confidential. Although not is obligatory, we would appreciate it to be identified below. Thank you for your collaboration.

20. Name and Surname

21. Company

22. Email

23. Telephone

Annex 5 – Survey questionnaires for public entities

Public-private collaboration questionnaire for disaster crisis management

Summary of the DRIVER project the European Union, like any territory on the planet, is exposed to a range of possible crises and disasters. These crises can be due to multiple factors, from climate change and infrastructure failures to terrorist and cyber-attacks. Within this scope, the European Commission supports the DRIVER Innovation Project ("Driving Innovation in Crisis Management for European Resilience") focused on reinforcing Europe's responsiveness to Crisis situations. One of the DRIVER's goals is to improve the responsiveness of the community in a crisis situation, supporting the resource management process and the resilience of the supply chain. To this end, one of the most important factors is cooperation between organizations and public-private collaboration.

Where it was formerly an almost exclusive role for governments and international humanitarian aid organizations to respond to crisis situations, companies are increasingly contributing through donations, extensions of their business activity, partnerships Public-private or innovation with social impact. This collaboration is necessary to cope with the growing demand for humanitarian aid, but there is a lack of collaborative protocol agreements where DRIVER can help solve some of these problems. For more information on the project: <http://driver-project.eu/> To start the survey click on the next tab in the lower left corner, thank you very much for your collaboration. The CITET team.

Private Public Partnerships for Crisis management

1. Are you aware of such collaborations?

- Yes
- No
- Does not know, does not answer

2. Let us indicate which

Private public collaboration Protocols

3. Does the entity have established collaboration protocols with private entities to respond to the crisis generated by a disaster?

- Yes
- No
- Does not know, does not answer

4. Affirmative case what kind of private entities have collaborative agreements in these cases?

- Logistics and transport companies
- Companies in the Sector great consumption
- Companies Sector pharmaceutical
- Supply and service companies
- Other.....

5. If such protocols exist, are they properly established and are there clear rules?

- There is no protocol
- There are protocols but are not duly established
- There are protocols and are clear and are duly established

6. What type of collaboration do you have established?

- Assignment of human Resources
- Assignment of Infrastructures
- Assignment of Products
- Other.....

7. How do you value the importance of such a collaboration?

- Low Importance 1 2 3 4 5 High Importance

Collaboration agreements with public entities

8. Do you think that it is necessary for private entities to be involved in the collaboration to respond in crisis cases?

- Yes, can contribute in many ways
- No, the response to a disaster must be entirely managed by the administration and public entities
- Does not know, does not answer

9. What kind of entities do you think should be involved in these agreements?

- Logistics and transport companies
- Companies sector Great consumption
- Companies pharmaceutical Sector
- Supply and service companies
- Other:

Communication between entities

10. If there is a collaboration of your entity with private entities in this area, is there a fluid communication between the parties?

- Yes
- No
- Does not know, does not answer

11. Have necessary organizational measures been implemented by public entities?

- Yes
- No
- Does not know, does not answer

12. Is there a strategic leadership on the part of the administration?

- Yes
- No
- Does not know, does not answer

13. How should communication between participating actors be established? (Open response)

Necessary goods or services

14. Goods or services that would make available to public entities

- Qualified personnel

- Infrastructures
- Operational materials (generators, petrol, sandbags ...)
- Objects of first need (water, food, medicines ...)
- Other.....

15. What kind of staff would I demand?

- Experts in Logistics
- Experts in Traffic
- Experts in ICT
- Conductors
- Manipulators
- Other.....

16. What type of infrastructure would you demand?

- Warehouses
- Transports
- Other.....

17. What kind of operational materials would you require?

- Generators
- Fuel supply
- Containment Materials (sandbags)
- Material Surgical
- Other.....

18. What kind of first-need goods would you demand?

- Water
- Food
- Medications
- Other.....

Participation in working groups on the subject

19. Interested in participating in a working group on collaboration between public and private entities to support a crisis caused by a natural disaster?

- Yes
- No

Identification

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Annex 6 – Bullets points collected during the workshop

Summarized information collected in the Workshop:

To the question:

What should a collaboration protocol include in the prevention phase of a disaster and suggestions to elaborate it?

- Know the tasks distribution and the coordination systems that already exist at a regional, national and urban level. Roles and organisms with key functions.
- Know and mapping the main distribution routes for basic elements and include them in the guidelines, taking into account airports, train nets, warehouses, etc.)
- Contingency plan: logistics operator should adapt their own contingency plans to the contingency plans of the end-user and put them to take information confronting both plans for the guidelines.
- Know the state of the art of other agreements and procedures pre-established, according to the type of natural disaster.
- Define supply materials agreements with the suppliers, use standardized formats (prices, delivery time, contents, basics resources, etc.)
- Identify key callers or contact persons.
- Define roles and tasks. Prioritize the actions roles based on response times, proximity, costs and response capacity.
- To stablish alternative communication systems in case the traditional net is down. From the digital to analogic. Mainly between public coordinators and end-users.
- Stablish a data base of logistics professionals and volunteers, this data base has to be cross border and organized by roles, profiles, capacity, zones and knowledge.
- In order to take profit of the precious data base, would be interesting to develop and have an open use of a technology platform acting as a social net connecting volunteers, end-users and logistics professionals of private companies where it is included professional's profiles, knowledge, skills, availability, action zones, etc.
- Stablish a data base of stock and resources, organized by zones and kind of stock (perishable, hazard, first necessity, etc.)
- Stablish a data base and a mapping graph of available shelters including location and access routes.
- Take advantage and include SFA delivery models.
- To stablish qualification and evaluation standards.
- Would be interesting to stablish company's protocols to define security stock just for humanitarian disasters.
- Define an alternative route map indicating other routes in case the main routes are collapse or blocked.
- To stablish a need prioritization and where can be found the resources to solved them due to the problem of manage massive inputs donations.
- Include training for end-users and volunteers from professionals from the logistics sector and in the opposite way training from the end-user to this professional's.
- For the previous task a connection platform for this issue should be convenient.
- To define formats for recollection sheets.
- To stablish a protocol for monitoring and quality control of stock, resources, infrastructures, etc.
- To define a financial product from insurance companies to ensure that every resource used form the company is recovered.
- To define a quality stamp for companies that collaborate.
- Specify a governance model between end-users and logistics providers, defining objectives.
- Take advantage of the knowledge of the private sector.

- Inventory of resources available, like warehouses, vehicles, emergency materials, basic food, medicines and electric generators.
- To establish coordination centres with the aim of serve as checkpoints distributed in the affected area.
- Take into consideration the problem of collaborations in previous lessons learned and how they evolved with time.

What should a collaboration protocol include in the response phase of a disaster and suggestions to elaborate it?

- Establish a data base of available transport provided by private and public entities and organized it by zones and response time.
- To attend the crisis disaster evolutions and evaluate the logistics resources and solutions according to this new need.
- To adjust responses with a continue reporting system.
- To study the sustainability of the action, understanding sustainability as the capacity of maintain the logistics resources in a long period and anticipating futures problems.
- Control and update of the resources, stock and procedures and supply deficiencies.
- To manage the controlling and updating with an umbrella system which has to be crisis proof with no needs of communication systems that are fragile to a disaster.
- To define capacity horizons, how long my logistics resources will be available for the crisis situation?
- To study long terms risk: possible diseases affecting to the logistics personal involved in the helping tasks.
- To elaborate an efficiency process to withdraw waste materials, elements or useless resources from the affected zone.
- It must be established a communication feedback system to evaluate the performance and actions of the companies or entities involved.
- It would be interesting to confront the processes and actions define in the theoretical protocol to the real actions to learn new lesson of how acting in the future. It should be a kind of documentation system.
- It has to be a discriminatory system establish to avoid unnecessary transport or logistics donations when the crisis explodes.
- A system should be implemented to respect the rights of the affected groups, it has to be coordinated and the resources have to be widespread the more balanced as possible.
- The donors must move in a safety framework related to regularization and conditions.

What should a collaboration protocol include after a disaster and suggestions to elaborate it?

- To establish prioritization on resources maintenance and infrastructure.
- To establish a system of distribution of the profits to the participants and clearly define the way to get it. For example, publicity, actions in social networks, etc.
- To establish recover process of the environment and the habitual logistics activity, for example, restitution of provided resources, evaluation of the non-contemplated costs.
- To create a quantification system of the provided resources, fixed one and consumable goods.
- To make a study of the lesson learned of the supply chain activities in the disaster.
- To revise the previous contract signed, for example, replacement of the supplied transport resources provided.
- Elaborate ethics agreements between logistics providers and administration to protect the affected population. This is important because monopoly actions could be carried out in case one company stay as the only supplier in one determined action or process.

- Include an evaluation system to recognize and quantify the collaboration degree of the participants, with two main objectives: attribute credit and merit to the deserved ones and to realize which are the best partner to take into consideration for the future.
- Implement KPIs (Key Performance Indicators) to correct/redefine future process.
- To implement a regulation of the transport prices after a disaster to guarantee the service.

During a crisis situation what resources could your company or entity provide related to: DISTRIBUTION, TRANSPORT, SUPPLY, WAREHOUSING, COMMUNICATION AND TRAINING.

- From the perspective of a public entity, like a town hall, to provide public building to provide temporary warehouses and distribution centres.
- From the perspective of a public entity, to provide mobility agents to manage preferred ways of circulation.
- From the perspective of a public entity, provide public gas station and open it to the main actors of the crisis response.
- From the perspective of a public entity, to give a seamless communication to the populations through the public media and use it to coordinate possible logistics actions.
- From a technology firm perspective, it would be interesting to have a real-time platform to manage alerts and make transport updates.
- From a technology firm perspective, to facilitate algorithms of routes optimization.
- To include the use of a digital platform with training resources related to logistics process.
- Provide the monitoring of logistics actors and process through IoT tools.
- To train end-users on managing logistics resources skills, supply chain basic information, waste management and operation safety.
- Innovation on the current process and services that end-users on logistics activities already have: use of determined software's, hardware, logistics resources, etc.
- To provide specialized vehicles for reverse logistics, drivers, waste management.
- Workers transport and volunteers to the affected zone.
- Mobilization and transport of injured people to hospital and rescue zones.
- Donor localization systems like GPS or transport software managers.
- Provide available spaces in private warehouses to safety stock for end-users.
- From NGOs and end-users to share knowledge of needed resources related to training and communication.