Emerging technology trends in humanitarian logistics: Benefits in the future and challenges along the way

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In what ways will humanitarian organisations be able to improve supply chain operations as a result of technological development, and what challenges will have to be tackled in order to get there? In this thesis, these questions are investigated through the case of one organisation in particular: Doctors Without Borders.

Humanitarian aid and disaster relief aid are terms that are often used interchangeably. They refer to the process of responding to a disaster, providing aid to people that has suffered from some sort of catastrophe. In order to provide this type of aid, logistics play an important role. To operate a supply chain during a disaster requires robust and well-proven equipment, and in general humanitarian logistics is not known as an area which is in the frontline when it comes to utilization of new technologies. However, the importance of an updated use of technology in order to improve humanitarian operations is pointed out repeatedly in literature on the subject of humanitarian logistics. For this thesis, the expected benefits of currently emerging technologies have been investigated together with the main challenges that might stand in the way of technology adoption. This have been investigated by looking at the case of one organization in particular: Médecins Sans Frontières (MSF).

Two technologies stand out as particularly reasonable to focus on for MSF: three-dimensional printing and drones. Together they can be used to increase the access to supply, increase supply chain flexibility and create more efficiency in the distribution process. Both of these technologies are currently tested by MSF (as well as many other organisations). Drones have been used for example in Papua New Guinea, to transport blood samples for testing and monitoring of tuberculosis in outreach areas that are very hard to reach by road. Drones with camera equipment have also successfully been used to create up-to-date maps after a flooding, used e.g. to assess supply routes. Three-dimensional printing is currently used in Jordan for the printing of prothesis, in a location where it would not be possible to supply this type of care otherwise. The specific operational conditions of medical disaster relief make these technologies very useful. While they might not yet be cost efficient or competitive enough to meet the requirements of the commercial markets, the requirements and competition in a humanitarian aid context are different.

Further into the future we can also expect benefits such as increased visibility of resources as well as better tools for assessment and monitoring. These benefits are the conclusion of trials and discussions about Virtual Reality, Augmented Reality and Internet of Things. However, for these types of technologies there are some issues blocking the way. The main challenges that would have to be tackled are improvement of IT and data management, as well as communication and coordination issues. These are challenges for humanitarian organisations in general, frequently mentioned in literature on the subject.

In conclusion, we see that there are some cases where the operational conditions during or after a disaster creates added incentives for the implementation of a certain technology. For example, in the case of three-dimensional printing and cargo drones it would be reasonable for disaster relief providers to lead the technological development. In other cases, the

operational conditions add a lot of complications that might limit the benefit of a technology greatly, or even remove it completely. For example, information technologies requiring reliable internet connexion. In these cases, it would be recommended for disaster relief providers to wait with investments in the technology until it is mature and well-proven.