# Chapter 4
# Internet of Things in Disaster Logistics Productivity

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## ABSTRACT

*It is possible to carry out logistics operations in a highly efficient and reliable manner with internet of things technologies. These technologies increase the added value of logistics activities and expand their benefits in the supply chain. Logistic activities are a sine qua non of disaster management. The active use of internet of things during disaster preparedness stage, during disaster, and after disaster, in warehouse and material management, fleet and transport management is an important technological milestone which will greatly increase productivity. Right place, right time, right quantity, right quality, and right price rule is known as 5 Right rule in logistics. In disaster logistics, only the price is excluded from these rules because it does not matter if human life is concerned. Strategic approaches, which are provided by IoT technology, are key to efficiently carry out 5 Right rule in disaster logistics.*

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## INTRODUCTION

Human beings who are prepared to establish a colony in space and who have achieved dizzying technological developments are incapable of facing natural disaster. Because natural disasters are events whose time, severity and impact are not certain. Although it is also the human beings most affected by disasters are own, now the majority of disasters stem from the human beings' own actions. Nowadays, the number of human-induced disasters have increased in a way which challenge natural disasters. Climate changes, wars, epidemics, migrations are almost normalized human-induced disasters that we are constantly experiencing. Although the number, type, severity and impact of disasters increase, the productivity and effect of disaster prevention techniques and activities also increases.

Disaster in its most general definition accepted by the United Nations; all kinds of natural, technological or people-oriented events which cause physical, economic and social losses for people, affect society by stopping or interrupting normal life and can not cope with local opportunities (Kadıoğlu, 2008). Logistic activities are a sine qua non of disaster management and they are strategic issues. Successful logistics management is needed to reduce disaster risks, manage effective and efficient operations.

Disaster related studies are increasing in the literature. However, it is not possible to say that studies on disaster logistics are increasing at the same speed. There are many studies about humanitarian logistics and humanitarian aid logistics warehouse location selection within the scope of disaster logistics and some of the most striking of these belong to authors like Barbarosoğlu et al. (2002), Özdamar et al. (2004), Kongsomsaksakul et al. (2005), Ke-jun et al. (2006), Van Wassenhove (2006), Sheu (2007), Mitsotakis and Kassaras (2010), Mete and Zabinsky (2010), Tatham et al. (2010), Afshar and Haghani (2012), Caunhye et al. (2012), Holguín-Veras et al. (2012), Özdamar and Demir (2012), Duran et al. (2013), Jabbarzadeh et al. (2014), Hadiguna et al. (2014), Mulyono and Ishida (2014), Najafi et al. (2014), Rezaei-Malek and Tavakkoli-Moghaddam (2014), Ahmadi et al. (2015), Bayram et al. (2015), Garrido et al. (2015), Özdamar and Ertem (2015), Salman and Yücel (2015), Alem et al. (2016), Bastian et al. (2016), Fereiduni and Hamzehee (2016), Marcelin et al. (2016), Ozkapici et al. (2016), Rezaei-Malek et al. (2016), Tofighi et. al. (2016), Baskaya et al. (2017), Boonmee et al. (2017), Vahdani et al. (2018), Loree and Aros-Vera (2018), Maharjan and Hanaoka (2018), Rodríguez-Espíndola et al. (2018), Tavana et al. (2018), Garrido and Aguirre (2019). As can be seen from literature mentioned above, the articles on disaster logistics have been published after 2002. Most of the articles consist of model proposals that provide solutions to disaster logistics problems. Barbarosoğlu et al. (2002) developed a mathematical model for the planning of helicopter missions during the disaster relief operation.