

# Chapter 51

## Cleantech and Water Treatment as a Case of Disruptive Innovation

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### ABSTRACT

*Shifts in the disruptive innovations and the growing impact of consumer cleantech are best understood by looking at megatrends in water management. Trends are global long-term forces of development that impact society, economy, environment, culture, and personal lives. Trends are continuously changing the dynamic landscape in which companies operate. This chapter examined commercial opportunities for the internet of things in the market of cleantech with respect to water treatment. The chapter theoretically looked at the four clusters of water management as relates to the application of internet of things: metering, piping, reclamation, and agricultural clusters. An analysis of market strategies and competitive strategies is conducted leading to a brief development of innovation frontiers in water management.*

### INTRODUCTION

Disruptive innovations such cleantech are swiftly capturing the interest of scholars and industry practitioners due to its immense economic and social contributions. The emergences of disruptive waves have significantly revolutionized the cleantech sector especially in water treatment (Grady, 2016). According to Markets and Markets (2017), extensive market research and analysis of this fast paced technology as well as its trends, forecasts and the profiling of major actors show how vital, the growth of disruptive innovations in cleantech has become. Huston (2015) had argued that the effectiveness and efficiency of internet of things has led to great discoveries in the niche of communication and business management. Internet of things through the lens of cleantech market has contributed to a great environmental impact in the areas of water treatment and this has decreased the amount of harmful pollutants that cause erosion of the environmental systems thus creating imbalances on the normal functioning of the ecosystem

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(Lakmaaker & Goehring, 2017; Markets & Markets, 2017). Lakmaaker and Goehring (2017) further asserts that internet of things technologies play an increasingly vital role in different markets and industries of the world economy.

For instance, Huansheng, Hong, Jianhua, Laurence, Yueliang, Xiaozhen and Runhe (2016) argue that internet of things has been adopted in almost all sectors of the business and social functioning. Swan (2012) had established that internet has been enabled on devices with an estimate more than human beings population. According to Swan (2012), this number is expected to grow to 50 billion by 2020.

It now emerges that internet of things ecosystem is slowing coming into being to offer support processes that connect tangible features such as roads, human bodies, buildings and human appliances, to the internet. This application is enabled through microprocessor chips and sensors which record and produce useful data such as temperature variations, objects movements as well as sound waves (Culumbus, 2015; Markets & Markets, 2017). According to Finley (2015), the current surge in the explosion of internet-linked sensors and microchips implies that new breeds of technical application and capability are being developed. For instance, Swan (2012) identifies that new data analytical and simulation behaviors such as anomaly detection, high frequency data processing and correlation assessment are now emerging as human population begins to adjust to the various natures of data flows necessitated by the internet of things. This is the new boom for internet of things especially its four functional areas of data development, data generation, decision making and action implementation (Swan, 2012, Huansheng et al., 2015). However, for the purpose of this research, we endeavor to limit ourselves to the role of the internet of things in cleantech markets with a specific focus on the water treatment innovations. The review of literature has shown that very few researches have been worked on to categorize and compare different technologies that are disruptive and its adoption in water treatment. Thus the main objective of this chapter is to study and categorize the role of the internet of things in cleantech markets with a specific focus on the water treatment with a survey of examples from economic press. As defined by Cohen & Lefebvre (2005), categorization is the process in which ideas and objects are recognized, differentiated, and understood categorization implies that objects are grouped into categories, usually for some specific purpose. A research effort of categorization is fundamental in language, prediction, inference, decision making and in all kinds of environmental interaction (Frey & Saake 2011).

## **BACKGROUND**

According to Lakmaaker and Goehring (2016), cleantech refers to a company, or a section of an industry that is specifically engaged in the identification, development, and commercialization and selling of smart technologies, innovations and/or processes that lower or eliminate the adverse effects of the environment in the air, land or water in a more disruptive front. Disruptive innovations in cleantech market ranges from smart grids, solar panels, bioplastics, biofuels, lithium batteries, energy management systems, smart water treatment and carbon capture technologies. For instance, Lakmaaker and Goehring (2016) note that in Canada, massive investments in disruptive innovations are being initiated to adopt cleantech solutions and products into Canadian extractive industries and companies to increase efficiency in operations and also in Eco business models in water treatment. On the global scenes, Lakmaaker and Goehring (2016) stills find that new cleantech investments are driven by the need for sustainable and disruptive innovations such as, smart technologies such as smart water treatment, smart cities' and the Internet of Things.

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