

# Chapter 7

## Using System Dynamics to Analyse the Cooperation and Reputation in the Electricity Industry

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### ABSTRACT

*When different stakeholders work together, they can implement a strategy to improve the performance of the electricity industry. This chapter shows how the cooperation and reputation influence on the electricity industry. A simulation model was developed to illustrate how related variables such as altruism, reputation, and strategic alliances contribute to promote the renewable energy industry. To do this, the chapter illustrates a case study for the electricity market in Colombia. The results show a novel perspective that contributes to marketers and engineers in the analysis of the relationship between cooperation and reputation in electricity firms.*

### INTRODUCTION

Recently, the renewable energy market has shown significant growth that contributes to the competitiveness of the Latin American countries (Arias-Gaviria et al., 2019; Cárdenas et al., 2017; Gómez et al., 2017; Herrera et al., 2020; Zapata et al., 2019). The rapid growth of the renewable energy market has provoked severe challenges due to the significant financial resources that are required, highlighting the need for marketing of the utility industry in the electricity sector (Castaneda et al., 2017). As it is an industry that needs to work cooperatively, having a reputation increases the added value, and coopera-

DOI: 10.4018/978-1-7998-5788-4.ch007

tion is maintained in the long term. As well-defined Rand & Nowak (2013), it is worth paying the cost of collaboration today to earn the benefits of a good reputation tomorrow.

Customer satisfaction and corporate reputation management can be considered to be promising approaches for energy supply companies (Herrera et al., 2019a). The reputation is one of the most crucial marketing variables because it can change customer perception while impacts the consumption of electricity. Presently, the electricity market liberalisation gives customers the possibility to choose products that best match their preferences (Kishimoto et al., 2017). The client can choose among different options making the industry more competitive, and it requires a structured marketing plan involving cooperative work, reputation and customer value.

One of the fastest-growing products for the electricity industry is rooftop solar panel of greater use in the residential sector (Castaneda et al., 2020; Chen et al., 2014). In the case of Colombia, the potential of solar energy is very high, solar radiation to reach a daily average of 4.5 kWh/m<sup>2</sup>, which exceed the average world daily of 3.9 kWh/m<sup>2</sup> (UPME & BID, 2015). Currently, the Colombian government has taken an important step to support the deployment of renewable energy through law 1715; however, this law has not adequately implemented (Castaneda et al., 2019). Although solar power has great potential in the household sector as well as positive impacts on emission reduction, Colombia has not developed the residential market sufficiently, which not allow rapid response to the challenges of the household market. In response to this concern, there is interested in understanding the effects of different variables related to marketing on the reputation of the utility industry.

Bearing in mind that Colombia has a high potential for solar energy and relevant opportunities because solar radiation throughout the country is mostly uniform during the year (average 4.5 KWh/m<sup>2</sup>/day) (IDEAM, 2017). It becomes a key product of our industry that requires to be studied and examined. The country needs to diversify its electricity mix by incorporating non-conventional renewable energy sources, but it requires a strategy (Eras et al., 2019; Quiceno et al., 2019). The electricity matrix expansion is clear evidence of the benefits for guarantee the security of supply, which has been experienced in other countries, such as Brazil and Chile (Gómez et al., 2017; Rego & de Oliveira Ribeiro, 2018; Silva et al., 2016).

The development of renewable sources in the electricity industry needs to be reinforced with an accurate organisation and a cooperative working model. Several evolutionary theories can explain why reputation facilitates cooperation (Wu et al., 2016). When the organisation has worked on its reputation, it is easier to get cooperation from the others, and it is a way to get more benefits from different stakeholders like government and other firms (Herrera et al., 2019b). In this sense, it is necessary to go beyond the observation that patterns of social relations matter for cooperation, to study the mechanisms through which social ties may enhance collective outcomes (Baldassarri, 2015).

This chapter, based on a SD model approach, aims at assessing alternative strategies to improve the cooperation and reputation in the industry electricity, to promote the value creation efficiently. This simulation model seeks to understand the dynamic in the electricity sector from consumer behaviour in Colombia to propose an alternative business model based on non-conventional renewable electricity based on cooperation. For this case study, electricity firms must work together to potentiate the electricity utility industry. The chapter updates and improves the findings of a research project recently developed by the authors (Herrera et al., 2019a). Thus, the objective of this chapter is to show a model of cooperation and reputation to assess its effects on the diffusion of the electricity industry in Colombia, particularly renewable energy.

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