

The resource-based-view strategy for the transformation of electricity companies

1. Introduction:

Technological transformation in the electricity sector includes fuel switching (i.e. coal to wind power), adoption of renewable energy sources, installing storage systems and the transition to efficient energy-conversion technologies [1]. In Colombia, this technological transformation has not been as pronounced as in other countries around the world, as regulation has impeded that this takes place, though it is only a matter of time to envision future changes associated with the need not only of reliable energy supply, but also more efficient and inexpensive.

Worldwide, electricity companies respond to market competition, climate change and the importance of increasing the share of renewables in the energy mix, hence there is a growing recognition of the pivotal role of technology transformation in determining market success. As a result of this facts, most companies have increased their adoption of clean technologies in the market place [2].

In this changing context, electricity companies need to prepare properly and develop new resources and capabilities to operate new activities/business, in that sense three main questions are posed: 1. Which resources and capabilities will disappear or evolve? 2. Which are the new resources and capabilities for the new business? 3. At what pace the transformation should take place?

Recent studies on utilities' business models found that the increasing share of renewable energies constitutes a threat to the current utility business models [3] [4] [5] [6]. There are new actors and investor from outside the energy industry causing a loss on the market share of Utilities. Thus, the challenge for utilities is clear: they need to find ways to better commercialize renewable energy technologies. Otherwise, the energy transition will lead to a massive loss of market share, revenues, and profits [7]. Hence, utilities need to improve or transform their resources and capabilities to be able to proactively respond to these new business opportunities. They need to develop the ability to adapt and reconfigure their assets and knowledge more quickly according to changes in their external environment [7]. Utilities are in an enactment mode with respect to new technologies in so far as they explore several novel technologies that could threaten their organizations or be sources of opportunity [2].

2. Methodology:

The strategic resources and capabilities of a firm build a system of interdependencies and feedback loops, so that resources and capabilities ultimately influence among themselves. In this sense, systems of resources and capabilities are not stable over time, meaning that resources and capabilities develop and decay dynamically and their relationships change [8]. Such dynamics have always been fundamental to research in system dynamic [9].

Based on the dynamic hypothesis (where an electricity company participates in the generation and commercialization businesses) a simulation model was built to analyse the role of resources and capabilities in the transformation of an electricity company. The system dynamics model was parameterized with data from the Colombian electricity sector and one of the mayor electricity companies to perform simulations for the period between 2017 and 2030. The next scenarios were considered:

- BAU (Business as usual): There is not adoption of renewable energy and technologies.
- Renewable: in this scenario there is an adoption of renewable energies and technologies).

In order to describe the capabilities maturity, we based on Capability Maturity Model (CMM). This concept is increasingly being used to describe the degree to which an organization applies formalized processes to the management of its various business functions. CMM provide guidance for organizations to define their business processes and improve those processes over time [10].

3. Results:

The results showed that current resources and capabilities will remain the same or even in some periods they will decrease. The new ones begin to increase exponentially from the year of 2021, when the adoption of new technologies is higher.

The capabilities behaviour in the current business model is similar for generation and commercialization business as there is a slowdown in the market and also because the utility firm needs to improve the efficiency in order to reduce costs. The new business focus on renewable energy requires the development of new and different capabilities to be competitive.

4. Conclusions:

A firm's survival depends on its successful adoption of new technologies and management of the evolution of core capabilities [11]. In some cases, it is also important to develop new resources and capabilities ensuring remain on the market. In this study we showed the evolution of current and future (needed) resources and capabilities of an electricity company and also their maturity level.

Strategic decision makers in electricity companies need different approaches, such as resource-based view strategy [12] [13] [14] to gain insights into which resources and capabilities are needed in order to take advantage of the opportunities that bring this technological transformation; system dynamics is used to illustrate the challenges of the dynamics of the transformation [15] [16]. While the case has some limitations, we believe the most important contributions are a clear description of the systematic process of scenario analysis, a detailed demonstration of its application through a case study on the technological transformation in energy, and the valuable results and insights gained from the application that could perhaps be extrapolated to other contexts.

5. References

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