

## Chapter 26

# Supply Chain Processes as Key Drivers for Upgrading in the Semiconductor Global Supply Chain: The Case of Brazilian Design Houses

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### ABSTRACT

*Brazilian government has developed public policies during the last years in order to promote a national semiconductor industry. Under this program, 22 new Design Houses have started their operations. Considering this context, this study aims to understand how Brazilian Design Houses are upgrading to operate as players in the semiconductor global chain. To really move up in the semiconductor global chain, DHs need to improve key supply chain processes, such as marketing and sales, outsourcing and relationship management. This new scenario will characterize the achievement of functional upgrading, in which the companies will develop capabilities to move to higher value added activities in the global chain.*

### INTRODUCTION

The characteristics and challenges of the global market have been creating new rules for sustaining competitive advantage. This competitive market, along with the constant advances in communication technologies and transportation, motivates the continuing evolution of supply chain management and different techniques for managerial efficiency (Hausman et al., 2010). Recently, Supply Chain Management (SCM) deserves further attention because it has been transformed by the influence of globalization and the conceptual fundamentals of Global Supply Chain Management (GSCM) remain underdeveloped

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(Connelly et al., 2013). Different factors can be considered to represent this new scenario, such as the necessity of mass customization, the presence of global consumers segments, time and quality competition, advances in communication and information technology, and a strong dependence on government policies (Mentzer et al., 2007b).

For being part of these global chains, companies must identify the key factors that would enable their operations as players as well as the important elements behind forming interorganizational relations across borders to upgrade and move up in the supply chain. Therefore, one important issue that must be pursued by companies, especially in developing and emerging countries, is how to gain access to the skills and capabilities required to participate and to upgrade in global chains (Bair, 2005). It is also critical because for companies in developing and emerging countries, their inclusion in global chains not only provides new markets for their products, but also plays a growing and crucial role in access to knowledge and enhanced learning and innovation (Pietrobelli & Rabellotti, 2011).

Participating in global markets which allows for sustained income growth requires the capacity to learn and upgrade (Kaplinsky & Morris, 2001). Upgrading is often seen in the extant literature as one of the main ways through which developing country firms or industries can respond to the challenges of globalization and increased competition. Companies may upgrade in various ways, as for example, by entering higher unit value market niches, by entering into new sectors, or by undertaking new productive or service functions (Pietrobelli & Rabellotti, 2004). It is necessary to understand the upgrading challenge in a wider perspective, capturing the central idea that it may involve changes in the nature and mix of activities, both within each agent in the chain, and in the distribution of intra-chain activities. This relates both to the achievement of new product and process development, and in the functional reconfiguration of who does what in the chain as a whole (Kaplinsky & Morris, 2001).

The semiconductor industry has been one of the most important industries for the past three decades. Because of its critical position in modern industry, the research on the semiconductor industry is plentiful (Li et al., 2010). The semiconductor industry has a supply chain network that is distributed worldwide, and its manufacturing process has the particular characteristics that should be considered in the supply chain framework (Lee et al., 2006). GSCM strategies have helped the semiconductor companies to gain competitive advantage, with high investments in international operations with successive stages of outsourcing and offshore activities (Jiang et al., 2010).

Semiconductor production is one of the priorities of the Brazilian economic planning and technological development. The federal government aims to move from being a high consumer of microelectronics items to a competitive player in the semiconductor chain. The incentives promoted by the Brazilian industrial policy have already developed operations in the three main stages of the semiconductor chain: Design, Manufacturing, and Packaging. Since 2005, the Microelectronics National Program has been inducing project services activities as priority with the creation and implementation of the microelectronics design in the country (Bortolaso et al., 2013). According to Borges and Vieira (2014), currently there are 22 Design Houses (DH) and 2 training centers distributed throughout the national territory. It is recognized that the levels of technological and productive maturity of the national DHs are still far below if compared with leading countries, and the capability of prospecting international market represents the main barrier to increase their productivity.

The identification and improvement of key processes, aligned with the pressures and opportunities established by the global market, can allow the DHs to upgrade in the semiconductor chain with consequent increase of their competitiveness. Considering this context, this chapter aims to describe how

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