Chapter 6
Clustering for Innovative Business Model Design for Products and Services

Jesús-Fabian López Pérez
Universidad Autonoma de Nuevo Leon, Mexico

Ana Elena De la Mora
Universidad de Monterrey, Mexico

Rosalba Trevino Reyes
Universidad Autonoma de Nuevo Leon, Mexico

ABSTRACT

Acceleration of technology evolution, customers' requests of agility in operations and rapid product development requires the supply chains to become more active and connected to attend clients and new markets. The chapter content is structured on three business use cases. The first section is related to the aerospace industry. The purpose is to identify the influence of quality and quantity of the supplier base in the innovation activities of aerospace companies participating in a cluster. Authors applied a framework based on factor analysis and multivariate linear regression to measure the impact of the quality and quantity of a set of suppliers. The second section is related to operation of Micro Finance institutions (MFIs). Authors design and propose a full-featured optimization framework based on a mixed integer programming model. They discuss the impact of the risk balancing and merits of the proposed model.

INTRODUCTION

The interest in the cluster approach as a philosophy for achieving regional competitiveness has growth. Organizations in common industries with similar operations are creating synergies to get access for more sophisticated services and customers, reducing manufacturing and logistics costs and creating integrated strategies for a specific geographical region to compete in a changing environment. The acceleration of

technology evolution, customers' requests of agility in operations, and the rapid product development requires the supply chains become more active and connected to attend clients and new markets. M. Porter's 1990 suggest the cluster concept. Geographic concentrations of interconnected companies, in a particular field that compete but also cooperates integrated by specialized suppliers, service providers, and firms in related industries, associated institutions and financial services.

Other application of clustering is in terms of customer segmentation, clustering design is at the core of any efficient a focused supply chain. This is not only to address complexity issues but to effectively deal with dynamics of participants using different set of information and resources involved to deliver a product or service to end-customers. Nowadays, current supply chain systems are globalized and interconnected in terms of resources & manufacturing capacities, therefore supply chains require new paradigms, tools and techniques as well in order to stay competitive and address future challenges.

On other hand, faced with an ever-changing world, organizations mainly consider the attitudes and behaviors of their workers as the most important resource in achieving success. There are multiple conditions in which work is carried out. However, for better work performance, increased productivity, and improved conditions for employees, it is important to consider and identify the organizational behavior factors that may influence the workforce in a positive or negative way.

Different techniques, tools and methodologies are proposed on this chapter to manage resources efficiently and deliver economic value to end customers. This chapter will be developed using 3 different & relevant business cases applying distinct clustering concepts.

The first section of the chapter focused on the concept of industrial clusters, which are defined as a geographical concentration of interconnected firms that cooperate and compete in one given industry. One of the key factors influencing the competitiveness of industrial clusters is the development of integrated supply chains. In the aerospace industry the clustering phenomenon is especially relevant because most part of the innovation activities on take place within the value chain to ensure protection for proprietary industrial designs. After deregulation in the industry, new global value chains were born and each aerospace cluster started specializing in different parts of these global value chains, making the supplier base a key element in the cluster ecosystem. Several studies have related the capabilities of the supplier base with operational efficiency, productivity and even competitiveness: however, there are few empirical researches measuring the impact of the supplier base with innovation activities of aerospace companies participating in a cluster. The purpose of this research is to identify the influence of the quality and quantity of the supplier base in the innovation activities of aerospace companies participating in a cluster. This research focused in the Mexican aerospace industry and gathered information from top executives participating in aerospace clusters. As part of the design and methodology we applied a framework based on factor analysis and multivariate linear regression to measure the impact of the quality and quantity of a set of suppliers participating in this aerospace cluster. Our hypothesis is related to how these factors (i.e. independent variables) generate a positive impact on the innovation as the response variable for the group of aerospace companies involved on the cluster. Our results showed that the quality and specialization of suppliers have a positive and statistically significant impact on the innovation activities carried out by the aerospace companies that are part of a cluster.

The second business case determine the impact between structural empowerment, psychological empowerment, and job satisfaction among teachers in Mexico. The research was carried out with a non-experimental and transversal design of correlational and causal scope. We used a comparative statistical analysis using multivariable linear regression and structural equations. The two hypotheses of research proposed were supported and coincide with the literature review. One limitation involved conducting

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