Chapter 1
Demand Forecasting:
A Challenge for Furniture SMEs

Natalie Nicole Mar Hernández
UPAEP University, Mexico

Patricia Cano-Olivos
UPAEP University, Mexico

Diana Sánchez-Partida
UPAEP University, Mexico

José-Luis Martínez-Flores
UPAEP University, Mexico

Santiago Omar Caballero-Morales
https://orcid.org/0000-0002-9986-7768
UPAEP University, Mexico

ABSTRACT

This chapter provides a proposal for demand management in furniture SMEs located in the city of Puebla, México. The historical production data reviewed, and the classification of the most critical articles was made using the ABC classification methodology. Subsequently, the literature of SMEs was analyzed as well as the current situation and statistical information was sought. Additionally, it presented an overview of the models to forecast demand and applied to the most relevant articles. Due to the results and previous study, it was decided to implement a forecasting technique which is modelled by artificial neural networks. The ANN model developed with the TANSIGMOID transfer function by using MATLAB software. The appropriate forecasting techniques selected according to the variability of the demand of the articles takes a short-term planning horizon. This research will help the company reduce uncertainty, forecasting sales, and achieve better production planning through ANNs.

INTRODUCTION

Currently, small and medium-sized enterprises (SMEs) have faced new challenges; then, the companies require strategies for making-decisions, which allow obtaining a competitive advantage. Demand planning is one strategic area since the majority of activities depend on it. Therefore, forecast techniques are vital for making-decisions from historical information, enabling minimizing errors and eliminating the uncertainty in the planning. However, the problem is that most of the SMEs do not make use of it, either because of its lack of knowledge or not knowing how to choose the right forecast technique. In Mexico, SMEs represent 1.15% gross domestic product (GDP), employ to 92,107 Mexicans (National Institute of Statistics and Geography [INEGI], 2018), according to data, are having up to 250 employees (Organization for Economic Co-operation and Development [OECD], 2013).

SMEs must begin to know techniques that allow them to have a competitive advantage. Methods of forecasts have been a powerful tool which reduces the uncertainty of suffering erroneous planning and in this way, achieving an improvement in the performance of the supply chain. Forecasts predict the future based on historical data and support decision making in the organization. That is why it is part of the administration of the supply chain. Through the application of traditional forecasts, it can observe the limitations that affect the accuracy of them. However, artificial neural network algorithms showed a better response predicting the demand due to the ability to accommodate nonlinear data (Chang & Wang, 2006). "Artificial intelligence forecasting techniques have been receiving much attention lately to solve problems that are hardly solved using traditional methods. ANNs can learn like humans, by accumulating knowledge through repetitive learning activities. Animal brain's cognitive learning process simulated in ANNs" (Kumar, Herbert & Rao, 2014).

This research was applied to a Mexican enterprise of furniture, which is a company of family tradition and artisanal, the owners manage the internal operations, and they are not specialists in the area. This company sells its products in different regions of the country, offering their customers products for home, garden and offices. Therefore, the main objective is to apply the right forecasting technique that will estimate the demand with minimal error.

BACKGROUND

SMEs in the current economy are of great importance due to the generation of employment at the national and regional level that they generate. In recent years these companies are linking with larger industries and provide a regional balance through the distribution of more equitable investments (Taiwo, Ayodeji M, & Yusuf A, 2012). It should consider that the conditions under which SMEs operate are not precisely favourable. Its low level of technological acceptance, insufficiently qualified workers and/or owners, inefficient administration, low productivity, among others (Zeballos, 2003), to minimize competitive advantages. In Mexico, SMEs represent about 4% of the total of economic units, employ 32% of the population, and produce 36% of the GDP (Ministry of Economic, 2012). The classification of the companies is according to the people occupied and the amount of income per year. The criteria recommended by the European Union and OECD are for small companies of 10 to 49 people and annual sales less than 10 million of euros, for medium-sized companies from 50 to 249 people and yearly transactions of less than 50 million euros (National Institute of Statistics and Geography [INEGI], 2014). SMEs means a vital component of the productive network in the region: employ around 67% of the total number of

Related Content

Demand Forecasting: A Challenge for Furniture SMEs

Natalie Nicole Mar Hernández, Patricia Cano-Olivos, Diana Sánchez-Partida, José-Luis Martínez-Floresand Santiago Omar Caballero-Morales (2020). *Handbook of Research on Developments and Trends in Industrial and Materials Engineering (pp. 1-21).*

www.irma-international.org/chapter/demand-forecasting/247008

Design of a Controller with Time Response Specifications on STM32 Microcontroller

Maher Ben Hariz, Faouzi Bouaniand Mekki Ksouri (2015). *Handbook of Research on Advanced Intelligent Control Engineering and Automation (pp. 624-650).*

www.irma-international.org/chapter/design-of-a-controller-with-time-response-specifications-on-stm32-microcontroller/123335

Navigation Control of a Mobile Robot under Time Constraint using Genetic Algorithms, CSP Techniques, and Fuzzy Logic

Tlijani Hayet, Tlijani Hatemand Knani Jilani (2015). *Handbook of Research on Advanced Intelligent Control Engineering and Automation (pp. 457-478).*

www.irma-international.org/chapter/navigation-control-of-a-mobile-robot-under-time-constraint-using-genetic-algorithms-csp-techniques-and-fuzzy-logic/123327

The Role of Strategic Outsourcing in Global Business

Kijpokin Kasemsap (2016). *Handbook of Research on Managerial Strategies for Achieving Optimal Performance in Industrial Processes (pp. 325-357).*

www.irma-international.org/chapter/the-role-of-strategic-outsourcing-in-global-business/151790

Ergonomic Assessment of Material Handling in CV Joint Assembly

Juan Luis Hernández-Arellano, J. Nieves Serratos-Perezand Porfirio Peinado Coronado (2016). *Handbook of Research on Managerial Strategies for Achieving Optimal Performance in Industrial Processes (pp. 101-115).*

www.irma-international.org/chapter/ergonomic-assessment-of-material-handling-in-cv-joint-assembly/151779