

UNLEASHING THE POWER OF AI: TRANSFORMING MARKETING DECISION-MAKING IN HEAVY MACHINERY WITH MACHINE LEARNING, RADAR CHART SIMULATION, AND MARKOV CHAIN ANALYSIS

Tian Tian, Stuart Business School of Illinois Institute of Technology, U.S.A.

Jiahao Deng, College of Computing and Digital Media, DePaul University, U.S.A.

Shengnan Zhang, CEO of XCMG American Research Corp, U.S.A.

Kai Shu, Department of Computer Science College of Computing Illinois Institute of Technology, U.S.A.

[dx.doi.org/10.18374/IJBR-23-2.1](https://doi.org/10.18374/IJBR-23-2.1)

ABSTRACT

This pioneering research introduces a novel approach for marketing decision-makers in the heavy machinery industry, combining machine learning (specifically Ridge Regression), Markov chain analysis, and radar charts. By integrating these methodologies, the study provides valuable insights into the North American Crawler Cranes market and offers innovative applications for other industries. The utilization of Ridge Regression enables the identification of growth patterns and performance assessment, allowing decision-makers to compare companies and address industry challenges. Markov chain analysis extracts and evaluates risk factors, aiding in informed decision-making and effective risk management strategies. Moreover, the research extends the use of radar charts to simulate benchmark product designs, offering a powerful tool for optimizing product design across industries. This unique combination of machine learning, Markov chain analysis, and radar chart visualization provides decision-makers with transformative insights and enhanced competitiveness. By bringing together these cutting-edge techniques, the research revolutionizes marketing strategies in the heavy machinery industry and beyond. The interdisciplinary approach has the potential to drive success and strategic decision-making in diverse markets, transforming the way marketing decisions are made and enabling businesses to thrive in an ever-evolving marketplace.

Keywords: Machine learning, Markov chain analysis, Ridge Regression, radar chart, Marketing decision-making, Heavy machinery industry, Competitive dynamics, Company performance, Risk management.

1. INTRODUCTION

This pioneering research makes significant contributions to marketing decision-making in the heavy machinery industry by combining machine learning, Markov chain analysis, and radar charts. The findings and methodologies of this study have broader applications and can be beneficial for decision-makers. The integration of machine learning, Markov chain analysis, and radar charts offers valuable insights, risk assessment capabilities, and visualization tools that can be harnessed by decision-makers in various industries to optimize performance, manage risks, and drive strategic decision-making.

1.1. Introduction of data-driven decision-making and risk factors

In today's dynamic and competitive business landscape, data-driven decision-making has become essential for marketing professionals to gain a competitive edge. The heavy machinery industry, in particular, requires meticulous analysis of market dynamics, competition, and risk factors to make informed strategic choices. A data-driven decision-making study aims to identify the competitive landscape, understand the market dynamics, and assess the strategies of key players in the industry (Prescott and Grant (1988); Bloodgood and Bauerschmidt (2002)). Data-driven decision-making study in the heavy machinery industry involves evaluating the strengths and weaknesses of key business players, including comparing manufacturers' revenue, revenue size, revenue growth rate, and competition relationship, which are essential factors to consider (Barney (1995); Chinowsky and Meredith (2000); Nyambane and Bett (2018)). By conducting a competitive business strategy analysis, companies in the heavy machinery industry can identify their strengths and weaknesses, benchmark themselves against