Chapter 17

Car Safety: A Statistical Analysis for Marketing Management

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ABSTRACT

Car safety is an essential feature of marketing strategies for automobile companies. In this work, a statistical analysis on crash tests is conducted based on data available from European New Car Assessment Programme (Euro NCAP). The research work developed in this chapter presents a statistical analysis of the information produced by Euro NCAP, using the SPSS and MATLAB software, and seeks to answer the following research questions: - are there statistically significant differences on adult occupant safety in the six years under study? - are there statistically significant differences among the best-selling car classes regarding safety in frontal collisions? - are electric and hybrid automobiles less secure than their traditional counterparts with respect to frontal collisions?

INTRODUCTION

Car marketers know that car buyers need far more than the basic transportation needs. Marketing cars is a kind of art: from the necessity to by a new car because the previous one broke down, or new needs arise for everyday activity, one realizes that hedonic considerations like excitement (power sliding a sports car through a rain-slick city) or emotional attachment (freedom sensation driving thought beautiful landscapes) among advertising themes used by car marketers are well more familiar to car buyers than utilitarian considerations like gas mileage, airbags, safety rating, and number of seats.
Although hedonic aspects are very important to position vehicles characteristics as speed, price, shape, handling, and prestige in the consumer minds, most people shopping a brand new car resorts to utilitarian aspects, such as gas mileage, and airbags.

When advertising cars, marketers take the consumer needs into account placing high emphasis on complementing utilitarian with hedonic considerations in order to create new needs among consumers. Moreover, car marketers know they can develop attitudes and associations toward specific brands based on aggressive marketing campaigns that include excitement and emotional attachment when developing their brands. However, one thing is clear: most people have difficulties analyzing how different cars and brands perform on safety performance.

Institutional marketing seeks to work the identity, the formation and the image consolidation of an organization. As such, public recognition and exerting a strong influence on decision-making of the public are essential for institutions that seek to promote a solid reputation of their activities. Institutional marketing seeks to develop methodologies that can be developed to facilitate communication with the general population, with the aim of clarifying and involving the public in its decision making.

The chapter is structured in four sections. The first section presents the introduction of the chapter. The second section presents the importance of safety tests, a description of the Euro NCAP safety tests and the way they are performed. While the third section presents the methodology, the results of the study and its discussion, the fourth section presents the conclusions and suggestions for future work.

THE IMPORTANCE OF CAR SAFETY

Safety has an increasingly important role in vehicle research because of its economic and social importance. Car safety needs have been disclosed quite long time ago (Seidel, Loch, & Chahil, 2005). For example, Marin and Lenguerrand (2008) show that the risk of a driver being killed in two-car crashes is larger than in single-car crashes. Moreover, the study also shows that when a recent car collides with an older car the driver of the former is more protected than the driver of the latter, which clearly indicates that there has been an improvement of safety and production systems among carmakers. Gronostajski, Bandola, and Karbowski (2006) analyzed the effect of crashworthiness parameters on the behavior of car-body elements, which might have important consequences for passive safety and a threat to life of passengers and persons involved in car accidents. Modelling techniques have also been used to predict the effect on passengers (Orsi, Marchetti, Montomolli, & Morandi, 2013; Pawlus, Karimi, & Robbersmyr, 2013), which is a clear indication of how important car safety has become.

Although research on car accidents has been increasing, papers on how major car brands differ in terms of performance are still scarce (Huang, Li, & Zeng, 2016; Huang, Hu, & Abdel-Aty, 2014). While Huang et al. (2014) analyzed crash worthiness and crash aggressivity involving 34,356 cars of 23 major brands, concluding that European cars have relatively good self-protection when compared with Japanese cars, South-Korean cars being associated with the lowest crash worthiness, Huang et al. (2016) investigated vehicle’s crash protectiveness on occupant injury and vehicle damage using Bayesian bivariate hierarchical ordered logistic model for 23 major brands in total of 7,335 two-vehicle-crash. Huang et al. (2016) found that occupant protectiveness index is relatively coherent with the crash worthiness index found by Huang et al. (2014).
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