Modeling the relationship between corporate strategy and wealth creation using neural networks

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Abstract

In this paper, we hypothesize that there is a non-linear relationship between corporate strategy, short-run financial variables, and wealth creation measured as market value added (MVA), and use neural networking to model this relationship. The neural network model accurately categorized over 90% in the training set and nearly 93% of firms in the holdout test sample. Additional analysis revealed that strategy variables were particularly effective predictors of an upward trend in wealth creation whereas short-run financial variables were more effective in predicting a downward trend, or wealth destruction. Neural networks outperformed discriminant analysis in predictive ability in all analyses, suggesting the presence of non-linear effects. This research represents a first attempt to use neural networking to model the relationship between corporate strategy and wealth creation.

Scope and purpose

Strategy researchers are often interested in explaining the relationship between strategy choices and firm performance. Strategy choices are generally of two types: corporate and business. Business-level strategies address issues of competitive positioning and sources of differentiation (Porter ME. Competitive strategy. New York: The Free Press, 1980). Corporate-level strategies, on the other hand, are concerned with which businesses to be in and how to allocate resources among them (Porter ME. Harvard Business Review 1987: 43–59). In this study, we investigated the relationship among (1) patterns of decisions about organization scope and resource allocations (corporate strategy), (2) short-run financial health, which influences resource availability and stock market values, and (3) market value-added (MVA), a measure of wealth creation and destruction (Stewart GB. Journal of Applied Corporate Finance 1994; 7: 71–6). © 2000 Elsevier Science Ltd. All rights reserved.

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1. Introduction

For researchers in strategic management, some of the most compelling research questions are those that ask: do strategy choices matter to firm performance? Does the pattern of decisions about organization scope and resource allocations over time (corporate strategy) make a difference in firm performance? For several decades, researchers have investigated these questions from many perspectives, with largely ambiguous results. For example, studies of diversification strategies and firm performance have often provided contradictory results [4–7] as have studies of retrenchment strategies and performance [8,9].

In investigating strategy–performance relationships, researchers frequently hypothesize relationships between very specific strategic decisions, such as diversification or retrenchment, and measures of organizational performance, such as return on assets or shareholder wealth creation. Researchers might look for a relationship between a decision to retrench and shareholder wealth creation measured by cumulative abnormal returns following the announcement, or between related diversification and corporate return on investment. Research designs sometimes fail to recognize that a firm may pursue one strategy that is not valued by the stock market and that depletes earnings, while simultaneously pursuing other strategies that are positively received by the market and are profitable. In other words, owners and investors evaluate the collective pattern of strategies that a firm pursues at any given point in time. From their perspective, it is this overall pattern of strategies that generates wealth for investors. To the degree that we isolate particular strategy choices from their corporate context, we risk over- or under-stating their importance in explaining performance.

In modeling these relationships, we need to consider not only the variables but also possible interactions or synergy effects between the variables. It is very difficult to pre-specify a model that would capture such interaction effects, especially if such effects are complex. We, therefore, address this problem in an innovative manner by using neural networks, which have hitherto been relatively unused in strategic management research.

We employ neural network analysis to model the pattern of strategy decisions employed by several large corporations over a period of 5 yr. Neural network analysis is an artificial intelligence technique that simulates the human brain's ability to recognize patterns in a series of actions. Neural networks have been used extensively by researchers in biology, physics, and computer science, and are gaining acceptance in the business disciplines. Recently, researchers have employed neural networks in studies of market segmentation [10] and in attempts to use financial statement data to estimate firm financial health [11]. By training the neural network on the strategies and health of a sub-sample of firms, and then applying the network to a new sample of firms, the trained neural network may be used to predict high and low performing firms.

The primary research objectives are to: (1) demonstrate the application of neural network analysis to the study of the relationship between corporate strategy decisions, financial health, and organization performance measured as wealth creation, and (2) contrast the capabilities of neural networks and discriminant analysis to predict wealth creation–wealth destruction outcomes.

2. Corporate strategies and performance

An organization's strategy is defined by the pattern of decisions and actions that it takes over time [12–14]. In general, corporate strategies are concerned with the decisions about organization