

Chapter XII

Market Response to ISO 9000 Certification of Software Engineering Processes

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ABSTRACT

A very large proportion of software projects are deemed to be failures. In most business sectors, this situation would be dealt with by improving quality assurance processes, frequently including certification of the business processes to standards such as ISO 9000. However, in the field of software engineering, there is controversy over whether or not certification of software engineering processes is a cost-effective response to quality issues. The value of certification in software engineering is examined in the present research by applying event-study methodology to examine the market response to announcements of certification of software engineering processes. The findings support the hypothesis that certification of software engineering processes leads to increased profits for companies that are primarily focused on developing products. Subsequent exploratory analysis suggests that the knowledge of the certification may leak out to the marketplace before the official announcement.

INTRODUCTION

Today, software development can be a risky business. Far too often the software development process fails. One way to reduce the costs associated with software development may be to modify the software engineering processes of a company so that they can be certified as meeting

standards such as those specified in the ISO 9000 (International Organization for Standardization) series. A number of studies has argued that such certification should reduce the costs associated with software development (Kuiboer & Ashrafi, 2000; Stelzer, Mellis, & Herzwurm, 1997; Terziowski, Samson, & Dow, 1997), and a great deal has been written on how to apply these standards

to software engineering (Schmauch, 1994; Stelzer et al.; Yang, 2001). A consulting specialization has even developed to help companies attain certification to these standards. There remains an open question, however, as to whether or not the time and money spent on certification yields benefits that exceed the costs of certification.

Certification should be effective in improving software engineering processes because it not only requires companies to adopt quality assurance processes, but it also puts in place a set of procedures to ensure that the improved processes are consistently followed in order to maintain the certification. Hence, it is reasonable to expect that adoption of quality assurance processes in software development should reduce the rate of project failures. Having more reliable software engineering processes that reduce the rate of project failure will, in turn, reduce software development costs. For projects that would not actually fail without the certification, costs should still be reduced because fewer resources will be expended on correcting errors introduced during the software design, development, and implementation processes. Certification may also act as a means to assure potential customers that a company's software development processes will produce better quality products (Anderson, Daly, & Johnson, 1999), thereby leading to increased sales.

The above arguments support the supposition that certification should increase profits by either reducing costs or by increasing sales. If certification is expected to contribute to profits, obtaining it will increase the value of the certifying firm. In this chapter, the event-study methodology is used to test whether the expected net benefits from the certification of U.S. companies are reflected as changes in the market valuation.

LITERATURE REVIEW OF EVENT STUDIES

The event-study methodology is well established, having been in use for over 30 years. In 1969, an early study sampled stock prices at monthly intervals in order to examine abnormal returns associated with stock splits (Fama, Fisher, Jensen, & Roll, 1969). By 1980, event studies had become well established, and simulation techniques (still based on a monthly sampling interval) were used to validate the methodology and to evaluate different techniques for carrying out the studies (Brown & Warner, 1980). Two important findings were that the use of a market model based on a least squares regression is a valid means of predicting normal stock prices, and that the methodology is relatively insensitive to sample size. This work was extended in 1985 to use daily instead of monthly returns. Although the use of daily returns violated normality assumptions, the methodology was shown to be robust with respect to these violations (Brown & Warner, 1985). The same study showed the methodology to be valid with sample sizes as small as five companies, although it was important that the stocks were regularly traded, with stocks from the New York Stock Exchange (NYSE) producing much better results than those from the American Stock Exchange (AMEX) because of the frequency of trading.

The event-study methodology has been extensively used in the fields of finance and marketing. Use of the methodology to look at certification announcements is not unique. In a study in which the methodology has been applied to the more general case of ISO 9000 registration in the United States across all business sectors, it was found that while small firms reaped significant abnormal market returns from certification (especially after the

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